



Fisheries and Oceans  
Canada

Pêches et Océans  
Canada

Coast Guard

Garde côtière

**18-080-000-SG-003**  
(FORMERLY DFO/5884)

# *Paints and Coatings Standard*



*Canadian Coast Guard*  
*Standards*

**Published under the Authority of :**  
Integrated Technical Support Directorate  
Fisheries and Oceans Canada  
Canadian Coast Guard  
Ottawa, Ontario  
K1A 0E6

**18-080-000-SG-003** (formerly DFO/5884 - TP 12445E)

Second Edition – March 1999  
Revised June 2002

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Available on CCG Intranet site at:  
<http://ccg-gcc.ncr.dfo-mpo.gc.ca>

Disponible en français : **Norme sur les peintures et  
revêtements**



Printed on recycled paper

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## FOREWORD

*This Standard is issued by the Director General Integrated Technical Support, CCG's National Authority under delegation from Deputy Minister Fisheries and Oceans and the Commissioner of the Canadian Coast Guard.*



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## **1.0 GENERAL**

### **1.1 Paints and Coatings Standard**

This Standard has been prepared by Canadian Coast Guard, Fisheries and Oceans Canada, Ottawa.

The intended purpose is to provide basic paints and coatings specifications for use on ships and boats.

Refer to ***Canadian General Standards Board CAN/CGSB - 1.211-95 Coating Systems for Marine Floating Navigational Aids (buoys)*** for Paints and Coatings Standard for use on floating aids (buoys).

Paints and coatings from various manufacturers may slightly alter specifications. The manufacturers specifications and product data sheets should always be consulted and adhered to. Once a specification has been written using a specific coating, manufacturers' products, always obtain technical approval from the manufacturer for the specification

All inquiries regarding this Standard, including suggestions for revision and requests for interpretation shall be addressed to Director, Technical Services, Canadian Coast Guard, Fisheries and Oceans Canada, 200 Kent Street, 7th Floor, Ottawa, Ontario, CANADA, K1A 0E6.

All requests should:

- define the problem;
- reference the specific section, sub-section, paragraph, data sheet, and;
- provide a detailed explanation surrounding the actual work conditions.



## 2.0 TERMS AND COMMENTS

The following terms apply to this Standard:

- 2.1 *New building specifications*** are based on the assumption that latest generation (low) zinc shop primer is utilized.
- 2.2 *Surface preparation*** for underwater systems generally calls for gritblasting to SA 2½ for optimum results. Some coating manufacturers may allow their products to be applied to a lesser standard (say SA2). Also there may be special circumstances that dictates a lesser standard be used than that specified.
- 2.3 *Abrasive blasting*** standards Sa2 and Sa 2½ refers to Swedish standard SIS 055900.
- 2.4 *Power tool cleaning*** standard PT2 and PT3 refers to Shipbuilding Research Association of Japan (JSRA). See also section on Surface Preparation.
- 2.5 *Wash off of oil and grease*** is effectively done using an emulsifying cleaner. This type of cleaner can readily be rinsed off the surface with freshwater.
- 2.6 *Application:*** The number of coats and dry film thickness (DFT) listed in the specifications are generally based on the coating being applied by airless spray. When coatings are applied by brush and/or roller, as often is the case during on board maintenance (OBM), two or more coats may be necessary to obtain the specified DFT. Always consult Manufacturer's Product Data Sheets for wet film thickness needed to achieve required DFT, and use wet film thickness gauge for every coat.
- 2.7 *Products:*** Primers containing lead and chromates have been used extensively in the past. Due to their toxicity alternate products have been developed. Many good lead and chromate free primers are available and should be used instead of the old lead/chromate types. As far as is practical and available, lead free top coats should also be promoted.
- 2.8 *Epoxy Coatings:*** are used extensively in the specifications in this Standard. They are tough, long-wearing coatings that by far out perform single component conventional paints. In general, pure epoxy coatings are specified on exterior areas of the vessel and modified epoxy coatings (hydro carbon resin modified) on most internal areas. It should be noted that modified epoxies can be used externally and pure epoxies internally. The choice is based on the fact that modified epoxies tend to be less abrasion resistant and less resistant to solvents and chemicals than the pure epoxies. However, they can also be lower in cost than pure epoxies. One drawback with epoxy coatings is their tendency to chalking and loss of gloss (and colour) after some time of exterior exposure. On areas of a vessel, such as the superstructure, where a good cosmetic finish is desirable, polyurethane cosmetic coats have been widely specified. However in the last few years acrylic modified epoxy coatings have become available. They may not have quite the "gloss retention" of a polyurethane finish but will retain reasonable gloss for several years. In this standard acrylic modified epoxy coatings, (AME) can be specified or substituted for polyurethane finish (PUF) at the same DFT. (See also Section 2.9)
- 2.9 *Polyurethane Coatings*** A large number of specifications in this standard specify polyurethane finish (PUF) as a cosmetic coat over high build epoxy coatings. These coating systems are considered excellent systems with long service life. However, polyurethane coatings contain isocyanate which may present a health hazard. The applicator must consult product data sheets and material safety data sheets for these products concerning health and safety information. If a paint contractor or shipyard would prefer not to apply polyurethane coatings, acrylic modified epoxy (AME) can be specified or substituted. (See also section 2.8)

- 2.10    *Antifouling:*** Specified in this Standard is of the type called Controlled Depletion Polymer Antifouling (CDP). Most of these antifoulings are TBT (tributyltin) free. Other types of antifouling such as self-polishing copolymer (SPC) types are very efficient products and are fully acceptable from a technical point of view. However, these antifoulings often contain TBT. Although the leaching rate of TBT in antifoulings in Canada is strictly controlled by Agriculture Canada, Pesticides Division, the use of these products is controversial. If, from an operational point of view, such antifoulings are desirable, they can, in most cases, be substituted or interchanged with CDP types. The 24 months service period in these specifications may be substantially prolonged by the application of more coats and higher DFT.

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<b>EXTERNAL AREAS: UNDERWATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			<b>Type of Specification:</b>		
<ul style="list-style-type: none"> <li>VESSELS THAT, DURING NORMAL OPERATION, SEE SERVICE IN ICE.</li> </ul>			<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>		
<b>UNDERWATER HULL AND RUDDER</b>			<b>SYSTEM:</b> HIGH ABRASION RESISTANT LOW FRICTION EPOXY COATING		
<b>SURFACE PREPARATION:</b>		HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. (NOT APPLICABLE TO NEW BUILDINGS.) GRITBLAST <sup>2</sup> ALL STEEL TO Sa2½. ON NEW BUILDINGS, ALL SHOP PRIMER MUST BE REMOVED. SURFACE PROFILE TO BE A <u>MINIMUM</u> OF 80µ (MICRONS). PAY PARTICULAR ATTENTION TO SURFACE PROFILE ON NEW STEEL.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	HARPE <sup>3</sup> - LFC <sup>4</sup>		1 FULL	750	
<b>NOTE(s):</b>					
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(s):</b>		HARPE-LFC = HIGH ABRASION RESISTANCE PURE EPOXY - LOW FRICTION COATING			

EXTERNAL AREAS: UNDERWATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ VESSELS THAT, DURING NORMAL OPERATION, SEE SERVICE IN ICE.			▪ ON BOARD MAINTENANCE ▪ M & R DOCKING		
UNDERWATER HULL AND RUDDER			SYSTEM: HIGH ABRASION RESISTANT LOW FRICTION EPOXY COATING		
SURFACE PREPARATION:		HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. DAMAGED AND BARE AREAS TO BE GRITBLASTED <sup>2</sup> TO SA2½. SURFACE PROFILE TO BE A <u>MINIMUM</u> OF 80µ (MICRONS). PAY PARTICULAR ATTENTION TO SURFACE PROFILE ON NEW STEEL. EXISTING COATING EDGES TO BE FEATHERED BY CAREFUL BLASTING 6-8" (15-20 CM) INTO SOUND COATING SURFACE.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	HARPE <sup>3</sup> - LFC <sup>4</sup>		1 T/U	750	
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VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
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Underwater Hull and Rudder			<b>SYSTEM:</b> HIGH ABRASION RESISTANT PURE EPOXY COATING (ANTIFOULING OPTIONAL)		
SURFACE PREPARATION:		HIGH PRESSURE FRESHWATER WASH <sup>1</sup> WASH OFF OIL AND GREASE. (NOT APPLICABLE TO NEW BUILDINGS.) GRITBLAST <sup>2</sup> ALL STEEL TO SA2½. ON NEW BUILDINGS, ALL SHOP PRIMER MUST BE REMOVED. STEEL SHOULD HAVE A SURFACE PROFILE OF 80µ MINIMUM.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
A	HARPE <sup>3</sup> HARPE <sup>3</sup>		1 FULL <sup>7</sup> 1 FULL <sup>7</sup>	125 125	
IF ANTIFOULING IS REQUIRED:					
B	VME <sup>6</sup> (TIECOAT) CDPAF		1 FULL 2 FULL	75-100 75 EA. *	* BEST OPTION FOR GOOD COATING DISTRIBUTION
OR:					
	CDPAF		1 FULL	150	
NOTE(S):		▪ TIECOAT MAY BE OMITTED IF ANTIFOULING CAN BE APPLIED TO EPOXY COAT WHILE STILL "THUMB PRINT SOFT". ▪ ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS SERVICE.			
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ABBREVIATION(S):		HARPE = HIGH ABRASION RESISTANCE PURE EPOXY VME = VINYL MODIFIED EPOXY CDPAF = CONTROLLED DEPLETION POLYMER ANTIFOULING (TBT FREE)			

<b>EXTERNAL AREAS: UNDERWATER SYSTEMS</b>					
<b>Vessel Type / Characteristics:</b>			<b>Type of Specification:</b>		
<ul style="list-style-type: none"> <li>▪ VESSELS THAT, DURING NORMAL OPERATION, DO <u>NOT</u> SEE SERVICE IN ICE, BUT REQUIRE A HIGH ABRASION RESISTANT COATING.</li> </ul>			<ul style="list-style-type: none"> <li>▪ ON BOARD MAINTENANCE</li> <li>▪ M &amp; R DOCKING</li> </ul>		
<b>UNDERWATER HULL AND RUDDER</b>			<b>SYSTEM:</b> HIGH ABRASION RESISTANT PURE EPOXY COATING (ANTIFOULING OPTIONAL)		
<b>SURFACE PREPARATION:</b>		HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. DAMAGED AND BARE AREAS TO BE GRITBLASTED <sup>2</sup> TO SA2½. STEEL SHOULD HAVE A SURFACE PROFILE OF 80µ MINIMUM. EXISTING COATING EDGES TO BE FEATHERED BY CAREFUL BLASTING 6-8" (15-20 CM) INTO SOUND COATING SURFACE.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
A	HARPE <sup>3</sup> HARPE <sup>3</sup>		1 T/U <sup>7</sup> 1 T/U <sup>7</sup>	125 125	
<b>IF ANTIFOULING IS REQUIRED:</b>					
B	VME <sup>6</sup> (TIECOAT) CDPAF		1 T/U 2 FULL	75-100 75 EA. *	* BEST OPTION FOR GOOD COATING DISTRIBUTION
<b>OR:</b>					
	CDPAF		1 FULL	150	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ TIECOAT MAY BE OMITTED IF ANTIFOULING CAN BE APPLIED TO EPOXY COAT WHILE STILL "THUMB PRINT SOFT".</li> <li>▪ ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS SERVICE.</li> <li>▪ NEW ANTIFOULING MUST BE COMPATIBLE WITH OLD ANTIFOULING</li> </ul>			
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UNDERWATER HULL AND RUDDER			<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY COATING (ANTIFOULING OPTIONAL)		
SURFACE Preparation:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: SECONDARY SURFACE PREPARATION OF SHOP PRIMER SHOULD BE BLASTING TO SA2½ OR POWER TOOL <sup>9</sup> CLEANING TO PT3. ALL ZINC SALTS (WHITE RUST), IF ANY, MUST BE REMOVED BY LIGHT BLASTING OR SCRUBBING AND WASHING.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
A	ARPE <sup>8</sup>		1 FULL	125	
	ARPE <sup>8</sup>		1 FULL	125	
IF ANTIFOULING IS REQUIRED:					
B	ARPE <sup>8</sup>		1 FULL	125	* BEST OPTION FOR GOOD COATING DISTRIBUTION
	VME <sup>6</sup>		1 FULL	125	
	CDPAF		2 FULL	75 EA *	
OR:					
	CDPAF		1 FULL	150	
NOTE(s):		<ul style="list-style-type: none"><li>▪ IF FIRST COAT OF ANTIFOULING CAN BE APPLIED TO THE EPOXY COAT WHILE IT IS STILL "THUMB PRINT SOFT", SYSTEM "A "CAN BE USED.</li><li>▪ ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS SERVICE.</li></ul>			
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	CDPAF		1 FULL	150	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>IF FIRST COAT OF ANTIFOULING CAN BE APPLIED TO THE EPOXY COAT WHILE IT IS STILL "THUMB PRINT SOFT", SYSTEM A CAN BE USED.</li> <li>ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS' SERVICE.</li> <li>NEW ANTIFOULING MUST BE COMPATIBLE WITH OLD ANTIFOULING.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		ARPE = ABRASION RESISTANT PURE EPOXY VME = VINYL MODIFIED EPOXY CDPAF = CONTROLLED DEPLETION POLYMER ANTIFOULING (TBT FREE)			

EXTERNAL AREAS: UNDERWATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
<ul style="list-style-type: none"> <li>VESSELS THAT, DURING NORMAL OPERATION, DO <u>NOT</u> SEE SERVICE IN ICE AND WHERE A VINYL ANTICORROSIVE COATING IS DESIRED.</li> </ul>			<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>		
UNDERWATER HULL AND RUDDER			<u>SYSTEM:</u>		
			TAR FREE VINYL ANTICORROSIVE SYSTEM WITH ANTIFOULING		
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT, BY LIGHT GRIT BLASTING OR SCRUBBING AND WASHING. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE BLASTED TO SA2½ OR POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
	VATF <sup>7</sup>		1 FULL	100	
	VATF <sup>7</sup>		1 FULL	125	
	CDPAF		2 FULL	75 EA.	3 COATS OF 75μ EACH GIVES BETTER COATING DISTRIBUTION BEST OPTION FOR GOOD COATING DISTRIBUTION
<b>OR:</b>					
	CDPAF		1 FULL	150	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>VINYL ANTICORROSIVE COATINGS WHEN APPLIED TO PROPER FILM THICKNESS, ARE CONSIDERED VERY EFFECTIVE. LOW TEMPERATURE APPLICATION PROPERTIES HAVE MADE THEM POPULAR IN COLD CLIMATES. HOWEVER, DUE TO LEGISLATION REGARDING VOC REGULATIONS, THESE PRODUCTS, WILL IN THE FUTURE, BE REPLACED BY VOC COMPLIANT PRODUCTS.</li> <li>ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS SERVICE.</li> </ul>			
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<b>ABBREVIATION(s):</b>		VATF = VINYL ALUMINUM ANTICORROSIVE TAR FREE CDPAF = CONTROLLED DEPLETION POLYMER ANTIFOULING (TBT FREE)			

<b>EXTERNAL AREAS: UNDERWATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
<ul style="list-style-type: none"> <li>▪ VESSELS THAT, DURING NORMAL OPERATION, DO <u>NOT</u> SEE SERVICE IN ICE AND WHERE A VINYL ANTICORROSIVE COATING IS DESIRED.</li> </ul>				<ul style="list-style-type: none"> <li>▪ ON BOARD MAINTENANCE</li> <li>▪ DOCKING</li> </ul>	
<b>UNDERWATER HULL AND RUDDER</b>				<b>SYSTEM:</b> TAR FREE VINYL ANTICORROSIVE SYSTEM WITH ANTIFOULING	
<b>SURFACE PREPARATION:</b>		HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> ALL DAMAGED AREAS TO SA2½.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	VATF <sup>7</sup> VATF <sup>7</sup> CDPAF		1 T/U 1 T/U 2 FULL	100 125 75 EA.	BEST OPTION FOR GOOD COATING DISTRIBUTION
<b>OR:</b>					
	CDPAF		1 FULL	150	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ VINYL ANTICORROSIVE COATINGS WHEN APPLIED TO PROPER FILM THICKNESS, ARE CONSIDERED VERY EFFECTIVE. LOW TEMPERATURE APPLICATION PROPERTIES HAVE MADE THEM POPULAR IN COLD CLIMATES. HOWEVER, DUE TO LEGISLATION REGARDING VOC REGULATIONS, THESE PRODUCTS, WILL IN THE FUTURE, BE REPLACED BY VOC COMPLIANT PRODUCTS.</li> <li>▪ ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS' SERVICE.</li> <li>▪ NEW ANTIFOULING MUST BE COMPATIBLE WITH OLD ANTIFOULING</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
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EXTERNAL AREAS: UNDERWATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS.</li> </ul>			<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>		
SEA CHESTS			<b>SYSTEM:</b> PURE EPOXY COATING WITH ANTIFOULING. FOR USE ON EPOXY OR VINYL COATED VESSELS.		
SURFACE PREPARATION:		HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. (NOT APPLICABLE TO NEW BUILDINGS.) GRITBLAST <sup>2</sup> TO SA2½. ON NEW BUILDINGS, PREPARE DAMAGED SHOP PRIMER AREAS WITH POWER TOOLS <sup>9</sup> TO PT3 OR BLAST TO SA2½.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	PE VME <sup>6</sup> CDPAF		1 FULL 1 FULL 2 FULL	125 125 75 EA.	BEST OPTION FOR GOOD COATING DISTRIBUTION
<b>OR:</b>					
	CDPAF		1 FULL	150	
NOTE(S):		<ul style="list-style-type: none"> <li>A SYSTEM UTILIZING 2 COATS OF PURE EPOXY COATINGS FOLLOWED BY 2 COATS OF ANTIFOULING, CAN BE USED IF ANTIFOULING CAN BE APPLIED WHILE EPOXY COATING IS STILL "THUMB PRINT SOFT".</li> <li>MODIFIED EPOXY COATING MAY BE USED INSTEAD OF PURE EPOXY COATINGS.</li> <li>ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS SERVICE.</li> <li>FOR VESSELS COATED WITH HIGH ABRASION OR ABRASION RESISTANT EPOXY COATINGS, IT MAY BE DESIRABLE AND PRACTICAL TO USE THESE COATINGS IN THE SEA CHESTS. IF SO, USE SAME SYSTEM AS FOR UNDERWATER HULL.</li> </ul>			
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<b>EXTERNAL AREAS: UNDERWATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			<b>Type of Specification:</b>		
<ul style="list-style-type: none"> <li>▪ ALL APPLICABLE VESSELS.</li> </ul>			<ul style="list-style-type: none"> <li>▪ ON BOARD MAINTENANCE</li> <li>▪ DOCKING</li> </ul>		
<b>SEA CHESTS</b>			<b>SYSTEM:</b>		
			PURE EPOXY COATING WITH ANTIFOULING. FOR USE ON EPOXY OR VINYL COATED VESSELS.		
<b>SURFACE PREPARATION:</b>		HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. IF PRESENT COATING IS IN POOR CONDITION, GRITBLAST <sup>2</sup> TO SA2½ AND APPLY SYSTEM AS LISTED UNDER MAJOR REFIT/REBLAST. IF PRESENT SYSTEM IS IN PERFECT CONDITION JUST APPLY NEW ANTIFOULING AS PER SYSTEM LISTED UNDER MAJOR REFIT/REBLAST. IF REPAIRS TO EXISTING SYSTEM IS NEEDED BLAST DAMAGED AREAS TO SA2½ OR POWER TOOL <sup>9</sup> CLEAN TO PT3.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	PE VME <sup>6</sup> CDPAF		1 T/U 1 T/U 2 FULL	125 125 75 EA.	BEST OPTION FOR GOOD COATING DISTRIBUTION
<b>OR:</b>					
	CDPAF		1 FULL	150	
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VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
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SEA CHESTS			<u>SYSTEM:</u>		
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SURFACE PREPARATION:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: REMOVE ALL ZINC SALTS (WHITE RUST) IF PRESENT, BY LIGHT GRITBLASTING OR SCRUBBING AND WASHING. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE BLASTED TO SA2½ OR POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	VATF <sup>7</sup> VATF <sup>7</sup> CDPAF		1 FULL 1 FULL 2 FULL	100 125 75 EA.	BEST OPTION FOR GOOD COATING DISTRIBUTION
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	CDPAF		1 FULL	150	
NOTE(s):		<ul style="list-style-type: none"> <li>VINYL ANTICORROSIVE COATINGS WHEN APPLIED TO PROPER FILM THICKNESS, ARE CONSIDERED VERY EFFECTIVE. LOW TEMPERATURE APPLICATION PROPERTIES HAVE MADE THEM POPULAR IN COLD CLIMATES. HOWEVER, DUE TO LEGISLATION REGARDING VOC REGULATIONS, THESE PRODUCTS, WILL IN THE FUTURE, BE REPLACED BY VOC COMPLIANT PRODUCTS.</li> <li>ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS SERVICE.</li> </ul>			
Definition(s):		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
ABBREVIATION(s):		VATF = VINYL ALUMINUM ANTICORROSIVE TAR FREE CDPAF = CONTROLLED DEPLETION POLYMER ANTIFOULING (TBT FREE)			

<b>EXTERNAL AREAS: UNDERWATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS.</li> </ul>				<ul style="list-style-type: none"> <li>ON BOARD MAINTENANCE</li> <li>DOCKING</li> </ul>	
<b>SEA CHESTS</b>				<b>SYSTEM:</b>	
				TAR FREE VINYL ANTICORROSIVE SYSTEM WITH ANTIFOULING.	
<b>SURFACE PREPARATION:</b>		HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. PREPARE DAMAGED AND CORRODED AREAS BY GRITBLASTING <sup>2</sup> TO SA2½ OR POWER TOOL <sup>9</sup> CLEAN TO PT3. IF NO DAMAGE OR CORROSION IS PRESENT, HIGH PRESSURE FRESHWATER WASH <sup>1</sup> AND APPLY 2 COATS OF ANTIFOULING.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	VATF <sup>7</sup> VATF <sup>7</sup> CDPAF		1 T/U 1 T/U 2 FULL	100 125 75 EA.	BEST OPTION FOR GOOD COATING DISTRIBUTION
<b>OR:</b>					
	CDPAF		1 FULL	150	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>VINYL ANTICORROSIVE COATINGS WHEN APPLIED TO PROPER FILM THICKNESS, ARE CONSIDERED VERY EFFECTIVE. LOW TEMPERATURE APPLICATION PROPERTIES HAVE MADE THEM POPULAR IN COLD CLIMATES. HOWEVER, DUE TO LEGISLATION REGARDING VOC REGULATIONS, THESE PRODUCTS, WILL IN THE FUTURE, BE REPLACED BY VOC COMPLIANT PRODUCTS.</li> <li>ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS SERVICE.</li> <li>NEW ANTIFOULING MUST BE COMPATIBLE WITH OLD ANTIFOULING</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(s):</b>		VATF = VINYL ALUMINUM ANTICORROSIVE TAR FREE CDPAF = CONTROLLED DEPLETION POLYMER ANTIFOULING (TBT FREE)			

<b>EXTERNAL AREAS: UNDERWATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
▪ ALL APPLICABLE VESSELS				REFERENCE	
<b>IN WAY OF CATHODIC PROTECTION</b>				<b><u>SYSTEM:</u></b>	
<b>SURFACE PREPARATION:</b>					
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
<b>NOTE(S):</b>		<ul style="list-style-type: none"> <li>▪ PLEASE REFER TO SPECIFICATIONS PROVIDED BY THE SUPPLIER / MANUFACTURER OF THE CATHODIC PROTECTION SYSTEM.</li> <li>▪ FOR MORE INFORMATION ON CATHODIC PROTECTION, SEE SECTION 6.0, CATHODIC PROTECTION (PAGE 144).</li> </ul>			
<b>Definition(s):</b>					
<b>ABBREVIATION(S):</b>					

## 4.1.2 EXTERNAL AREAS: ABOVE WATER SYSTEMS

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL VESSELS (STEEL)			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
TOPSIDE AND EXTERIOR BULWARK			SYSTEM: ABRASION RESISTANT PURE EPOXY AND POLYURETHANE		
SURFACE PREPARATION:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> ALL STEEL TO SA2½ (PREFERRED) OR SA2 NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY LIGHT GRITBLASTING OR SCRUBBING AND WASHING. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE BLASTED TO SA2½ OR SA2 OR POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	ARPE <sup>8</sup> ARPE <sup>8</sup> PUF <sup>10</sup> OR AME		1 FULL 1 FULL 1 FULL	100 100 50	SEE ITEMS 2.8 AND 2.9, PAGE 2
NOTE(s):					
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(s):		ARPE = ABRASION RESISTANT PURE EPOXY PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL VESSELS (STEEL)			▪ ON BOARD MAINTENANCE		
TOPSIDE AND EXTERIOR BULWARK			SYSTEM: ABRASION RESISTANT PURE EPOXY AND POLYURETHANE		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW 2 COATS OF EPOXY ALUMINUM AND 1 TOP COAT TO BE APPLIED IN ONE DAY, (DEPENDENT ON TEMPERATURE.) ABRASION RESISTANT PURE EPOXY COATING (AS IN PRESENT SYSTEM) MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
	APSTE		1 T/U	100	SEE ITEMS 2.8 AND 2.9, PAGE 2
	APSTE		1 T/U	100	
	PUF <sup>10</sup>		1 T/U	50	
	OR AME				
NOTE(s):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<ol style="list-style-type: none"><li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(s):		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
▪ ALL VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>TOPSIDE AND EXTERIOR BULWARK</b>				<b>SYSTEM:</b> PURE EPOXY AND MODIFIED ACRYLIC TOP COAT	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		<p>WASH OFF OIL AND GREASE. FRESHWATER WASH<sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL<sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD.</p> <p>IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW 2 COATS OF EPOXY ALUMINUM AND 1 TOP COAT TO BE APPLIED IN ONE DAY, (DEPENDENT ON TEMPERATURE.) EPOXY COATINGS (AS IN PRESENT SYSTEM) MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.</p>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	APSTE		1 T/U	100	
	APSTE		1 T/U	100	
	MAF		1 OR 2T/U	40 EA.	
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(s):</b>		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY MAF = MODIFIED ACRYLIC FINISH			



EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
▪ ALL VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
TOPSIDE AND EXTERIOR BULWARK				<b>SYSTEM:</b> MODIFIED ALKYD PRIMER AND MODIFIED ACRYLIC FINISH	
<b>SURFACE PREPARATION:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. FOR MAINTENANCE, CHOOSE A MULTIPURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	MAF		1 OR 2T/U	40 EA.	
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER MAF = MODIFIED ACRYLIC FINISH			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
▪ ALL VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>TOPSIDE AND EXTERIOR BULWARK</b>				<b>SYSTEM:</b> ALKYD	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		<p>WASH OFF OIL AND GREASE. FRESHWATER WASH<sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL<sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD.</p> <p>MANY TYPES OF ALKYD OR MODIFIED ALKYD PRIMERS ARE AVAILABLE AND SUITABLE FOR MAINTENANCE OF ALKYD SYSTEMS. CHOOSE A SURFACE TOLERANT, MULTI-PURPOSE FAST DRYING PRIMER WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.</p>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	AF		1 OR 2T/U	40 EA.	
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF = ALKYD FINISH			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL VESSELS (STEEL)			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
BULWARK INTERIOR			SYSTEM: ABRASION RESISTANT PURE EPOXY AND POLYURETHANE		
SURFACE PREPARATION:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> ALL STEEL TO SA2½ (PREFERRED) OR SA2 NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY LIGHT GRITBLASTING OR SCRUBBING AND WASHING. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE BLASTED TO SA2½ OR SA2 OR POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	ARPE		1 FULL	100	SEE ITEM 2.8 AND 2.9, PAGE 2
	ARPE		1 FULL	100	
	PUF <sup>10</sup> OR AME		1 FULL	50	
NOTE(S):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(S):		ARPE = ABRASION RESISTANT PURE EPOXY PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
▪ ALL VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>BULWARK INTERIOR</b>				<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY AND POLYURETHANE	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		<p>WASH OFF OIL AND GREASE. FRESHWATER WASH<sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL<sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD.</p> <p>IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW 2 COATS OF EPOXY ALUMINUM AND 1 TOP COAT TO BE APPLIED IN ONE DAY, (DEPENDENT ON TEMPERATURE.) EPOXY COATINGS (AS IN PRESENT SYSTEM) MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.</p>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	APSTE APSTE PUF <sup>10</sup> OR AME		1 T/U 1 T/U 1 T/U	100 100 50	SEE ITEMS 2.8 AND 2.9, PAGE 2
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
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<b>ABBREVIATION(s):</b>		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
▪ ALL VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
BULWARK INTERIOR				<b>SYSTEM:</b> PURE EPOXY AND MODIFIED ACRYLIC TOP COAT	
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW 2 COATS OF EPOXY ALUMINUM AND 1 TOP COAT TO BE APPLIED IN ONE DAY, (DEPENDENT ON TEMPERATURE.) EPOXY COATINGS (AS IN PRESENT SYSTEM) MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
	APSTE		1 T/U	100	
	APSTE		1 T/U	100	
	MAF		1 OR 2T/U	40 EA.	
NOTE(s):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
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EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL VESSELS (STEEL)			▪ ON BOARD MAINTENANCE		
BULWARK INTERIOR			<b>SYSTEM:</b> MODIFIED ALKYD PRIMER AND MODIFIED ACRYLIC FINISH		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. FOR MAINTENANCE, CHOOSE A MULTIPURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP		1 T/U	75	
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	MAF		1 OR 2T/U	40 EA.	
NOTE(s):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
ABBREVIATION(S):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER MAF = MODIFIED ACRYLIC FINISH			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
▪ ALL VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
BULWARK INTERIOR				<b>SYSTEM:</b> ALKYD	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. FOR MAINTENANCE, CHOOSE A MULTIPURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	AF		1 OR 2T/U	40 EA.	
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF = ALKYD FINISH			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
<ul style="list-style-type: none"> <li>▪ ALL APPLICABLE VESSELS</li> </ul>				<ul style="list-style-type: none"> <li>▪ MAJOR REFIT / REBLAST</li> <li>▪ NEW BUILDINGS</li> </ul>	
<b>STEEL DECKS - UNDER DECK MACHINERY</b>				<b>SYSTEM:</b> PURE EPOXY	
<b>SURFACE PREPARATION:</b>		REBLAST: IF OLD EQUIPMENT IS REMOVED AND NEW EQUIPMENT INSTALLED - HIGH PRESSURE FRESHWATER WASH. WASH <sup>1</sup> OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) BY LIGHT GRITBLASTING OR SCRUBBING AND WASHING. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE BLASTED TO SA2½ OR POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	PE		1 FULL	250	
<b>NOTE(s):</b>					
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(s):</b>		PE = PURE EPOXY COATING			



EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS</li> </ul>				<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>	
STEEL DECKS - UNDER WOOD PLANKING				<u>SYSTEM:</u>	
				PURE EPOXY	
SURFACE PREPARATION:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½ (PREFERRED) OR SA2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) BY LIGHT GRITBLASTING OR SCRUBBING AND WASHING. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE BLASTED TO SA2½ OR SA2 OR POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	PE		1 FULL	125	
	PE		1 FULL	125	
NOTE(s):					
Definition(s):		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
ABBREVIATION(s):		PE = PURE EPOXY COATING			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL VESSELS WITH STEEL DECKS			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
EXTERIOR DECKS			SYSTEM: ABRASION RESISTANT PURE EPOXY (OPTIONAL POLYURETHANE TOP COAT)		
SURFACE PREPARATION:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½ (PREFERRED) OR SA2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) BY LIGHT GRITBLASTING OR SCRUBBING AND WASHING. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE BLASTED TO SA2½ OR SA2 OR POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	ARPE <sup>8</sup>		2 FULL	100 EA.	BEST OPTION FOR GOOD COATING DISTRIBUTION
OR:					
	ARPE <sup>8</sup>		1 FULL	200	
If A COSMETIC COAT IS DESIRABLE, APPLY:					
	PUF <sup>10</sup> OR AME		1 FULL	50	SEE ITEMS 2.8 AND 2.9, PAGE 2
NOTE(S):		▪ WHERE A NON-SKID SURFACE IS DESIRABLE, ADD 3 KG (7 LBS.) OF GLASS GRANULES TO 5 GAL. (20 L) O F EPOXY COATING AND APPLY THIS AS SECOND COAT. GRANULE COARSENESS OF 18-25 U.S. SCREEN SIZE GIVES A GOOD NON-SKID FINISH. ALUMINUM OXIDE GRIT CAN ALSO BE USED.			
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(S):		ARPE = ABRASION RESISTANT PURE EPOXY COATING PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL VESSELS WITH STEEL DECKS			▪ ON BOARD MAINTENANCE		
EXTERIOR DECKS			SYSTEM: ABRASION RESISTANT PURE EPOXY (OPTIONAL POLYURETHANE TOP COAT)		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW FOR 2 OR MORE COATS TO BE APPLIED IN ONE DAY (DEPENDENT ON TEMPERATURE). TWO COATS OF ABRASION RESISTANT PURE EPOXY COATING AS IN PRESENT SYSTEM, MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
	APSTE <sup>8</sup> ARPE <sup>8</sup>		1 T/U 1 T/U	100 100	
IF A COSMETIC COAT IS DESIRABLE, APPLY:					
	PUF <sup>10</sup> OR AME		1 T/U	50	SEE ITEMS 2.8 AND 2.9, PAGE 2
NOTE(s):		<ul style="list-style-type: none"><li>ONE COAT OF ARPE (ABRASION RESISTANT PURE EPOXY COATING) TO 200μ IS ALSO ACCEPTABLE.</li><li>WHERE A NON-SKID SURFACE IS DESIRABLE, ADD 3 KG (7 LBS.) OF GLASS GRANULES TO 5 GAL. (20 L) OF EPOXY COATING AND APPLY THIS AS SECOND COAT. GRANULE COARSENESS OF 18-25 U.S. SCREEN SIZE GIVES A GOOD NON-SKID FINISH. ALUMINUM OXIDE GRIT CAN ALSO BE USED.</li><li>ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li></ul>			
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(S):		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY ARPE = ABRASION RESISTANT PURE EPOXY COATING PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
▪ ALL VESSELS WITH STEEL DECKS				▪ ON BOARD MAINTENANCE	
<b>EXTERIOR DECKS</b>				<b>SYSTEM:</b> PURE EPOXY AND MODIFIED ACRYLIC FINISH	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		<p>WASH OFF OIL AND GREASE. FRESHWATER WASH<sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD.</p> <p>IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW FOR 2 OR MORE COATS TO BE APPLIED IN ONE DAY (DEPENDENT ON TEMPERATURE). TWO COATS OF EPOXY COATING AS IN PRESENT SYSTEM, MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.</p>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
	APSTE APSTE MAF		1 T/U 1 T/U 1 OR 2 T/U	100 100 40 EA.	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ ONE COAT OF APSTE (ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY) TO 200<math>\mu</math> IS ALSO ACCEPTABLE.</li> <li>▪ WHERE A NON-SKID SURFACE IS DESIRABLE, ADD 3 KG (7 LBS.) OF GLASS GRANULES TO 5 GAL. (20 L) OF EPOXY COATING AND APPLY THIS AS SECOND COAT. GRANULE COARSENESS OF 18-25 U.S. SCREEN SIZE GIVES A GOOD NON-SKID FINISH. ALUMINUM OXIDE GRIT CAN ALSO BE USED.</li> <li>▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		APSTE                   = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY MAF                     = MODIFIED ACRYLIC FINISH			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL VESSELS (STEEL)			▪ ON BOARD MAINTENANCE		
EXTERIOR DECKS			SYSTEM: MODIFIED ALKYD PRIMER AND MODIFIED ACRYLIC FINISH		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. FOR MAINTENANCE, CHOOSE A MULTIPURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	MAF		1 OR 2 T/U	40 EA.	
NOTE(s):		<ul style="list-style-type: none"><li>▪ FOR THIN FILM TOP COATS SUCH AS ACRYLICS, USE GROUND NUTSHELLS, 0.5 KG (1 LB.) PER GAL., OR POLYPROPYLENE BEADS, 0.25 KG (8 OZ.) PER GAL., FOR NON-SKID AGENT.</li><li>▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li></ul>			
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ABBREVIATION(s):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER MAF = MODIFIED ACRYLIC FINISH			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL VESSELS WITH STEEL DECKS			▪ ON BOARD MAINTENANCE		
EXTERIOR DECKS			SYSTEM: ALKYD		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. MANY TYPES OF ALKYD OR MODIFIED ALKYD PRIMERS ARE AVAILABLE. CHOOSE A SURFACE TOLERANT, MULTIPURPOSE, FAST DRYING PRIMER WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
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NOTE(s):		<ul style="list-style-type: none"><li>▪ FOR THIN FILM TOP COATS SUCH AS ALKYD, USE GROUND NUTSHELLS, 0.5 KG (1 LB.) PER GAL., OR POLYPROPYLENE BEADS, 0.25 KG (8 OZ.) PER GAL., FOR NON-SKID AGENT.</li><li>▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li></ul>			
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ABBREVIATION(s):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER MAF = MODIFIED ACRYLIC FINISH			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL VESSELS WITH STEEL DECKS			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
FLIGHT DECKS			SYSTEM: ABRASION RESISTANT PURE EPOXY (OPTIONAL POLYURETHANE TOP COAT)		
SURFACE PREPARATION:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½ (PREFERRED) OR SA2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) BY LIGHT GRITBLASTING OR SCRUBBING AND WASHING. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE BLASTED TO SA2½ OR SA2 OR POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
	ARPE		2 FULL	100 EA.	BEST OPTION FOR GOOD COATING DISTRIBUTION
OR:					
	ARPE		1 FULL	200	
FOR MARKINGS AND AS A COSMETIC COAT IF DESIRABLE					
	PUF <sup>10</sup> OR AME		1 FULL	50	SEE ITEMS 2.8 AND 2.9, PAGE 2
NOTE(S):		▪ WHERE A NON-SKID SURFACE IS DESIRABLE, ADD 3 KG (7 LBS.) OF GLASS GRANULES TO 5 GAL. (20 L) O F EPOXY COATING AND APPLY THIS AS SECOND COAT. GRANULE COARSENESS OF 18-25 U.S. SCREEN SIZE GIVES A GOOD NON-SKID FINISH. ALUMINUM OXIDE GRIT CAN ALSO BE USED.			
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH/ HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(S):		ARPE = ABRASION RESISTANT PURE EPOXY COATING PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			Type of Specification:		
▪ ALL VESSELS WITH STEEL DECKS			▪ ON BOARD MAINTENANCE		
<b>FLIGHT DECKS</b>			<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY (OPTIONAL POLYURETHANE TOP COAT)		
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW FOR 2 OR MORE COATS TO BE APPLIED IN ONE DAY (DEPENDENT ON TEMPERATURE). TWO COATS OF ABRASION RESISTANT PURE EPOXY COATING AS IN PRESENT SYSTEM, MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
	APSTE		1 T/U	100	
	ARPE		1 T/U	100	
<b>FOR MARKINGS AND AS A COSMETIC COAT IF DESIRABLE:</b>					
	PUF <sup>10</sup> OR AME		1 OR 2 T/U	50 EA.	SEE ITEMS 2.8 AND 2.9, PAGE 2
<b>NOTE(S):</b>		<ul style="list-style-type: none"> <li>▪ ONE COAT OF ARPE (ABRASION RESISTANT PURE EPOXY COATING) TO 200<math>\mu</math> IS ALSO ACCEPTABLE.</li> <li>▪ WHERE A NON-SKID SURFACE IS DESIRABLE, ADD 3 KG (7 LBS.) OF GLASS GRANULES TO 5 GAL. (20 L) OF EPOXY COATING AND APPLY THIS AS SECOND COAT. GRANULE COARSENESS OF 18-25 U.S. SCREEN SIZE GIVES A GOOD NON-SKID FINISH. ALUMINUM OXIDE GRIT CAN ALSO BE USED.</li> <li>▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li> </ul>			
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<b>ABBREVIATION(S):</b>		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY ARPE = ABRASION RESISTANT PURE EPOXY COATING PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			



EXTERNAL AREAS: ABOVE WATER SYSTEMS					
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▪ ALL VESSELS WITH STEEL DECKS				▪ ON BOARD MAINTENANCE	
FLIGHT DECKS				<b>SYSTEM:</b> MODIFIED ALKYD PRIMER, MODIFIED ACRYLIC FINISH ALKYD SYSTEM	
SURFACE PREPARATION:					
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
NOTE(s):		<ul style="list-style-type: none"> <li>VESSELS WITH THESE SYSTEMS ON THE FLIGHT DECK CAN MAINTAIN THE SYSTEMS AS OUTLINED IN SPECIFICATIONS FOR "EXTERIOR DECKS".</li> <li>THESE SYSTEMS ARE NOT NORMALLY RECOMMENDED FOR FLIGHT DECKS DUE TO THEIR RELATIVELY LOW RESISTANCE TO HYDRAULIC FLUID, CHEMICALS, ETC.</li> <li>SEVERAL "HIGH TECH" OR "NEW TECHNOLOGY" SYSTEMS ARE AVAILABLE FOR FLIGHT DECKS.</li> <li>SYSTEMS RANGE FROM SIMPLE ZINC/EPOXY SYSTEMS TO SOPHISTICATED SYSTEMS INCORPORATING ELASTOMERIC TECHNOLOGY. POLYURETHANE COATINGS ARE WIDELY USED IN THESE SYSTEMS AND THE NON SKID PROFILE CAN BE FROM FINE GRAIN TO EXTREMELY AGGRESSIVE.</li> <li>THESE SYSTEMS OFFER UNMATCHED PERFORMANCE BOTH ON STEEL AND ALUMINUM DECKS. THEY ARE HARD WEARING AND OFFER LOW MAINTENANCE EVEN IN HIGH TRAFFIC AREAS. THEY OFFER EXCELLENT ABRASION RESISTANCE, EXCELLENT FUEL AND CHEMICAL RESISTANCE AND MINIMIZE CORROSION DUE TO MECHANICAL DAMAGE. THEY ARE USED ON AIRCRAFT CARRIERS AND OTHER NAVY VESSELS AS WELL AS COMMERCIAL VESSELS SUCH AS MAJOR CRUISE SHIPS. INQUIRE WITH THE MAJOR COATING MANUFACTURES REGARDING THIS TYPE OF SYSTEM FOR FLIGHT DECKS.</li> </ul>			
Definition(s):					
ABBREVIATION(S):					

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			Type of Specification:		
<ul style="list-style-type: none"> <li>▪ ALL VESSELS (STEEL).</li> </ul>			<ul style="list-style-type: none"> <li>▪ MAJOR REFIT / REBLAST</li> <li>▪ NEW BUILDINGS</li> </ul>		
<b>SUPERSTRUCTURE</b>			<b>SYSTEM:</b>		
			PURE EPOXY AND POLYURETHANE		
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½ (PREFERRED) OR SA2. NEW BUILDINGS: REMOVE ALL ZINC SALTS (WHITE RUST) IF PRESENT, BY LIGHT GRITBLASTING OR SCRUBBING AND WASHING AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE BLASTED TO SA2½ OR SA2 OR POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	PE		1 FULL	100	
	PE		1 FULL	100	
	PUF <sup>10</sup> OR AME		1 FULL	50	SEE ITEMS 2.8 AND 2.9, PAGE 2
<b>NOTE(S):</b>					
Definition(s):		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		PE = PURE EPOXY COATING PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
▪ ALL VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
SUPERSTRUCTURE				<b>SYSTEM:</b> PURE EPOXY AND POLYURETHANE	
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW FOR 2 OR MORE COATS TO BE APPLIED IN ONE DAY (DEPENDENT ON TEMPERATURE). TWO COATS OF PURE EPOXY COATING, AS IN PRESENT SYSTEM, MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
	APSTE		1 T/U	100	SEE ITEMS 2.8 AND 2.9, PAGE 2
	APSTE		1 T/U	100	
	PUF <sup>10</sup> OR AME		1 OR 2 T/U	50 EA.	
NOTE(s):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
ABBREVIATION(S):		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
▪ ALL VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>SUPERSTRUCTURE</b>				<b>SYSTEM:</b> MODIFIED ALKYD PRIMER AND MODIFIED ACRYLIC FINISH	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		<p>WASH OFF OIL AND GREASE. FRESHWATER WASH<sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD.</p> <p>FOR MAINTENANCE, CHOOSE A MULTI-PURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.</p>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	MAF		1 OR 2 T/U	40 EA.	
<b>NOTE(s):</b>		ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		MPMAP                   = MULTI-PURPOSE MODIFIED ALKYD PRIMER MAF                     = MODIFIED ACRYLIC FINISH			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
▪ ALL VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
SUPERSTRUCTURE				<b>SYSTEM:</b> ALKYD	
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. FOR MAINTENANCE, CHOOSE A MULTI-PURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	AF		1 OR 2 T/U	40 EA.	
NOTE(s):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
ABBREVIATION(S):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF = ALKYD FINISH			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
▪ ALL VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>SUPERSTRUCTURE</b>				<b>SYSTEM:</b> MODIFIED ALKYD PRIMER AND NO STAIN FINISH (MODIFIED VINYL ESTER)	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. FOR MAINTENANCE, CHOOSE A MULTI-PURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	NSF		1 T/U	40	
	NSF		1 T/U	40	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ NSF (NO STAIN FINISH) CAN BE APPLIED TO 80µ IN ONE COAT IF SPRAYED. AS THE NON-STAINING QUALITIES OF THIS TYPE PRODUCT ACTUALLY DIMINISHES WITH TIME, IT MAY BE DESIRABLE TO APPLY A FULL COAT ONCE EVERY 3-4 YEARS.</li> <li>▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(s):</b>		MPMAP                    = MULTI-PURPOSE MODIFIED ALKYD PRIMER NSF                        = NO STAIN FINISH			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL).</li> </ul>				<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>	
MASTS, BOOMS, CRANES, VENTILATORS				<u>SYSTEM:</u>	
				PURE EPOXY AND POLYURETHANE	
SURFACE PREPARATION:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½ (PREFERRED) OR SA2. NEW BUILDINGS: ENSURE ALL SURFACES ARE FREE OF OIL, GREASE AND FOREIGN MATTER. GRITBLAST TO SA2½ OR SA2. IF EQUIPMENT IS COATED BY OEM SPECIFY PRIMER COMPATIBLE WITH EPOXY COATINGS OR SPECIFY FULL EPOXY AND POLYURETHANE SYSTEM.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	PE		1 FULL	100	SEE ITEMS 2.8 AND 2.9, PAGE 2
	PE		1 FULL	100	
	PUF <sup>10</sup> OR AME		1 FULL	50	
NOTE(s):					
Definition(s):		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
ABBREVIATION(S):		PE = PURE EPOXY COATING PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>MASTS, BOOMS, CRANES, VENTILATORS</b>				<b>SYSTEM:</b> PURE EPOXY AND POLYURETHANE	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		<p>WASH OFF OIL AND GREASE. FRESHWATER WASH<sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD.</p> <p>IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW FOR 2 OR MORE COATS TO BE APPLIED IN ONE DAY (DEPENDENT ON TEMPERATURE). TWO COATS OF PURE EPOXY COATING, AS IN PRESENT SYSTEM, MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.</p>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	APSTE APSTE PUF <sup>10</sup> OR AME		1 T/U 1 T/U 1 OR 2 T/U	100 100 50 EA.	SEE ITEMS 2.8 AND 2.9, PAGE 2
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			



EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
▪ ALL APPLICABLE VESSELS (STEEL).				▪ ON BOARD MAINTENANCE	
MASTS, BOOMS, CRANES, VENTILATORS				<b>SYSTEM:</b> MODIFIED ALKYD PRIMER AND MODIFIED ACRYLIC FINISH	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. FOR MAINTENANCE, CHOOSE A MULTI-PURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	MAF		1 OR 2 T/U	40 EA.	
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER MAF = MODIFIED ACRYLIC FINISH			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL APPLICABLE VESSELS (STEEL).			▪ ON BOARD MAINTENANCE		
MASTS, BOOMS, CRANES, VENTILATORS			<b>SYSTEM:</b> ALKYD		
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. FOR MAINTENANCE, CHOOSE A MULTI-PURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	AF		1 OR 2 T/U	40 EA.	
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
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<b>ABBREVIATION(s):</b>		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF = ALKYD FINISH			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			<b>Type of Specification:</b>		
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL).</li> </ul>			<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>		
<b>DECK MACHINERY</b>			<b>SYSTEM:</b>		
			PURE EPOXY AND POLYURETHANE		
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		<p>REBLAST: HIGH PRESSURE FRESHWATER WASH<sup>1</sup>. WASH OFF OIL AND GREASE. IF BLASTING IS POSSIBLE, GRITBLAST<sup>2</sup> TO SA2½ (PREFERRED) OR SA2 AND APPLY SYSTEM SPECIFIED BELOW. IF BLASTING IS NOT POSSIBLE, POWER TOOL<sup>9</sup> TO BEST POSSIBLE STANDARD. PRESUMING PRESENT SYSTEM IS AGED ALKYD PAINT TOUCH UP WITH EPOXY COATING THEN APPLY ONE FULL COAT OF EPOXY AND ONE COAT OF POLYURETHANE AS SPECIFIED BELOW. SOME MANUFACTURERS MAY REQUIRE A BARRIER COATING BETWEEN ALKYD AND EPOXY SYSTEMS. REFER TO PRODUCT DATA SHEETS.</p> <p>NEW BUILDINGS: IF EQUIPMENT IS COATED BY OEM SPECIFY PRIMER COMPATIBLE WITH EPOXY COATINGS OR SPECIFY FULL EPOXY AND POLYURETHANE SYSTEM.</p>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	PE		1 FULL	100	SEE ITEMS 2.8 AND 2.9, PAGE 2
	PE		1 FULL	100	
	PUF <sup>10</sup> OR AME		1 FULL	50	
<b>NOTE(S):</b>					
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<b>ABBREVIATION(S):</b>		PE = PURE EPOXY COATING PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
▪ ALL APPLICABLE VESSELS (STEEL).				▪ ON BOARD MAINTENANCE	
<b>DECK MACHINERY</b>				<b>SYSTEM: (FOR EQUIPMENT COATED WITH)</b> PURE EPOXY AND POLYURETHANE SYSTEM	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW FOR 2 OR MORE COATS TO BE APPLIED IN ONE DAY (DEPENDENT ON TEMPERATURE). TWO COATS OF PURE EPOXY COATING, AS IN PRESENT SYSTEM, MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	APSTE		1 T/U	100	
	APSTE		1 T/U	100	
	PUF <sup>10</sup> OR AME		1 OR 2 T/U	50 EA.	SEE ITEMS 2.8 AND 2.9, PAGE 2
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			Type of Specification:		
▪ ALL APPLICABLE VESSELS (STEEL).			▪ ON BOARD MAINTENANCE		
<b>DECK MACHINERY</b>			<b>SYSTEM: (FOR EQUIPMENT COATED WITH)</b> MODIFIED ALKYD PRIMER AND MODIFIED ACRYLIC FINISH		
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. FOR MAINTENANCE CHOOSE A MULTI-PURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	MAF		1 OR 2 T/U	40 EA.	
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
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<b>ABBREVIATION(S):</b>		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER MAF = MODIFIED ACRYLIC FINISH			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			Type of Specification:		
▪ ALL APPLICABLE VESSELS (STEEL).			▪ ON BOARD MAINTENANCE		
<b>DECK MACHINERY</b>			<b>SYSTEM: (FOR EQUIPMENT COATED WITH)</b> ALKYD		
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. FOR MAINTENANCE CHOOSE A MULTI-PURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	AF		1 OR 2 T/U	40 EA.	
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<b>ABBREVIATION(S):</b>		MPMAP                   = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF                        = ALKYD FINISH			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS</li> </ul>			<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>		
Bollards, Fairleads, Mooring pipes, etc. (Steel)			<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY (OPTIONAL POLYURETHANE TOP COAT)		
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½ (PREFERRED) OR SA2 OR POWER TOOL <sup>9</sup> CLEAN TO PT3. NEW BUILDINGS: DEPENDING ON EQUIPMENT CONDITION FROM SUPPLIER; PREPARE AS ABOVE.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	ARPE <sup>8</sup> ARPE <sup>8</sup>		1 FULL 1 FULL	100 100	
<b>IF COSMETIC COAT IS DESIRABLE:</b>					
	PUF <sup>10</sup> OR AME		1 FULL	50	SEE ITEMS 2.8 AND 2.9, PAGE 2
<b>NOTE(S):</b>					
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
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<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			Type of Specification:		
▪ ALL APPLICABLE VESSELS			▪ ON BOARD MAINTENANCE		
<b>BOLLARDS, FAIRLEADS, MOORING PIPES, ETC. (STEEL)</b>			<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY (OPTIONAL POLYURETHANE TOP COAT)		
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW FOR 2 OR MORE COATS TO BE APPLIED IN ONE DAY (DEPENDENT ON TEMPERATURE). TWO COATS OF ABRASION RESISTANT PURE EPOXY COATING AS IN PRESENT SYSTEM, MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	APSTE ARPE		1 T/U 1 T/U	100 100	
<b>IF COSMETIC COAT IF DESIRABLE:</b>					
	PUF <sup>10</sup> OR AME		1 OR 2 T/U	50 EA.	SEE ITEMS 2.8 AND 2.9, PAGE 2
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	MAF		1 OR 2 T/U	40 EA.	
NOTE(s):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<ol style="list-style-type: none"><li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(s):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER MAF = MODIFIED ACRYLIC FINISH			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			Type of Specification:		
▪ ALL APPLICABLE VESSELS			▪ ON BOARD MAINTENANCE		
Bollards, Fairleads, Mooring pipes, etc. (Steel)			<u><b>SYSTEM:</b></u> ALKYD		
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		<p>WASH OFF OIL AND GREASE. FRESHWATER WASH<sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD.</p> <p>FOR MAINTENANCE, CHOOSE A MULTI-PURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.</p>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	AF		1 OR 2 T/U	40 EA.	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		MPMAP                   = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF                        = ALKYD FINISH			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL)</li> </ul>				<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> <li>ON BOARD MAINTENANCE</li> </ul>	
<b>EXTERIOR HATCH COVERS &amp; HATCH COAMINGS</b>				<b>SYSTEM:</b>	
<b>SURFACE PREPARATION:</b>		.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>TO BE COATED AS EXTERIOR DECKS</li> </ul>			
<b>Definition(s):</b>					
<b>ABBREVIATION(s):</b>					

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
<ul style="list-style-type: none"> <li>▪ ALL APPLICABLE VESSELS (STEEL)</li> </ul>				<ul style="list-style-type: none"> <li>▪ MAJOR REFIT / REBLAST</li> <li>▪ NEW BUILDINGS</li> </ul>	
<b>INTERIOR OF HATCH COVERS</b>				<u><b>SYSTEM:</b></u> PURE EPOXY	
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. IF BLASTING IS POSSIBLE, GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	PE PE		1 FULL 1 FULL	125 125	
<b>NOTE(S):</b>					
Definition(s):		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		PE = PURE EPOXY COATING			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
Interior of hatch covers:				<b>SYSTEM:</b> PURE EPOXY	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW FOR 2 OR MORE COATS TO BE APPLIED IN ONE DAY (DEPENDENT ON TEMPERATURE). TWO COATS OF PURE EPOXY COATING AS IN PRESENT SYSTEM, MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
	APSTE PE		1 T/U 1 T/U	125 125	
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY PE = PURE EPOXY COATING			

<b>EXTERNAL AREAS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			Type of Specification:		
<ul style="list-style-type: none"> <li>▪ ALL APPLICABLE VESSELS (STEEL)</li> </ul>			<ul style="list-style-type: none"> <li>▪ MAJOR REFIT / REBLAST</li> <li>▪ NEW BUILDINGS</li> </ul>		
<b>INTERIOR OF HATCH COVERS</b>			<b>SYSTEM:</b> MODIFIED EPOXY		
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. IF BLASTING IS POSSIBLE, GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	ME		1 FULL	125	
	ME		1 FULL	125	
<b>NOTE(S):</b>					
Definition(s):		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		ME = MODIFIED EPOXY COATING (HYDROCARBON RES. MOD.)			

EXTERNAL AREAS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
INTERIOR OF HATCH COVERS				<b>SYSTEM:</b> ON BOARD MAINTENANCE	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW FOR 2 OR MORE COATS TO BE APPLIED IN ONE DAY (DEPENDENT ON TEMPERATURE). TWO COATS OF PURE EPOXY COATING AS IN PRESENT SYSTEM, MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
	APSTE ME		1 T/U 1 T/U	125 125	
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(s):</b>		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY ME = MODIFIED EPOXY COATING (HYDROCARBON RES. MOD.)			

### 4.1.3 INTERNAL AREAS: ACCOMMODATIONS, STORE ROOMS, LOCKERS, ETC.

INTERNAL AREAS: ACCOMMODATIONS, STORE ROOMS, LOCKERS, ETC.					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL APPLICABLE VESSELS (STEEL)			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
Accommodations: (all interior structure covered by insulation)			SYSTEM: ZINC RICH EPOXY PRIMER		
SURFACE PREPARATION:		REFIT: A SPECIFIC SPECIFICATION IS NOT AVAILABLE. IT CAN ONLY BE MADE WHEN IT IS KNOWN WHAT THE EXACT COATING TYPE IS THAT PRESENTLY IS ON THE STEEL. REBLAST: IF A TOTAL REBLAST IS TO TAKE PLACE, BLAST TO SA2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. AREA WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
	ZREP		1 FULL	50	
NOTE(S):					
Definition(s):		<div>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</div> <div>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</div> <div>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div> <div>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</div> <div>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</div> <div>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</div> <div>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</div> <div>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div> <div>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</div> <div>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</div>			
ABBREVIATION(S):		ZREP = ZINC RICH EPOXY PRIMER			



<b>INTERNAL AREAS: ACCOMMODATIONS, STORE ROOMS, LOCKERS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			<b>Type of Specification:</b>		
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL)</li> </ul>			<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>		
<b>ACCOMMODATIONS (ALL INTERIOR STRUCTURE COVERED BY INSULATION)</b>			<b>SYSTEM:</b> ALKYD		
<b>SURFACE PREPARATION:</b>		REFIT: SEE ON BOARD MAINTENANCE SPECIFICATION FOR APPROPRIATE SYSTEM. REBLAST: IF A REBLAST IS TO TAKE PLACE, BLAST TO Sa2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
	APHB		1 FULL	85	
<b>NOTE(S):</b>					
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		APHB = ALKYD PRIMER H.B.			

<b>INTERNAL AREAS: ACCOMMODATIONS, STORE ROOMS, LOCKERS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			<b>Type of Specification:</b>		
<ul style="list-style-type: none"> <li>▪ ALL APPLICABLE VESSELS (STEEL)</li> </ul>			<ul style="list-style-type: none"> <li>▪ MAJOR REFIT / REBLAST</li> <li>▪ NEW BUILDINGS</li> </ul>		
<b>ACCOMMODATIONS</b> (ALL INTERIOR STRUCTURE <u>NOT</u> COVERED BY INSULATION, EXCEPT DECKS)			<b>SYSTEM:</b> ZINC RICH EPOXY PRIMER WITH WATER BASED ACRYLIC FINISH		
<b>SURFACE PREPARATION:</b>		REFIT: SEE ON BOARD MAINTENANCE SPECIFICATION FOR APPROPRIATE SYSTEM. REBLAST: IF A REBLAST IS TO TAKE PLACE, BLAST TO Sa2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
	ZREP WBAF		1 FULL 1 OR 2 FULL	50 - 75 40 EA.	
<b>NOTE(S):</b>		<ul style="list-style-type: none"> <li>▪ ONE OR TWO TOP COATS DEPEND ON COLOUR APPLICATION METHOD, ETC.</li> <li>▪ IN WET OR HUMID AREAS, USE THE HIGHER DRY FILM THICKNESS.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		ZREP = ZINC RICH EPOXY PRIMER WBAF = WATER BASED ACRYLIC FINISH			

<b>INTERNAL AREAS: ACCOMMODATIONS, STORE ROOMS, LOCKERS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>ACCOMMODATIONS</b> (ALL INTERIOR STRUCTURE <u>NOT</u> COVERED BY INSULATION, EXCEPT DECKS)				<b>SYSTEM:</b> ZINC RICH EPOXY PRIMER WITH WATER BASED ACRYLIC FINISH	
<b>SURFACE PREPARATION:</b>		WASH OFF OIL, GREASE AND DIRT. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2. IF OVER COATING OLD, HARD, GLOSSY SURFACES, REMOVE GLOSS BY SANDING OR WASHING WITH APPROPRIATE CHEMICAL. RINSE WELL TO REMOVE ANY RESIDUUM.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
	WBAP WBAF		1 FULL 1 OR 2 T/U AND / OR FULL	60 40 EA.	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ ONE OR TWO TOP COATS DEPEND ON COLOUR, APPLICATION METHOD, ETC..</li> <li>▪ IN WET OR HUMID AREAS, USE TWO TOP COATS.</li> <li>▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(s):</b>		WBAP = WATER BASED ACRYLIC PRIMER WBAF = WATER BASED ACRYLIC FINISH			

<b>INTERNAL AREAS: ACCOMMODATIONS, STORE ROOMS, LOCKERS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
<ul style="list-style-type: none"> <li>▪ ALL APPLICABLE VESSELS (STEEL)</li> </ul>				<ul style="list-style-type: none"> <li>▪ MAJOR REFIT / REBLAST</li> <li>▪ NEW BUILDINGS</li> </ul>	
<b>ACCOMMODATIONS</b> (ALL INTERIOR STRUCTURE <u>NOT</u> COVERED BY INSULATION, EXCEPT DECKS)				<b>SYSTEM:</b> ZINC RICH EPOXY PRIMER WITH WATER BASED EPOXY TOP COAT	
<b>SURFACE PREPARATION:</b>		REBLAST: IF A REBLAST IS TO TAKE PLACE, BLAST TO Sa2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	ZREP WBPE		1 FULL 1 FULL	50 - 75 50 - 75	
<b>NOTE(S):</b>		<ul style="list-style-type: none"> <li>▪ ON BULKHEADS, THE LOWER DRY FILM THICKNESS FIGURES SHOULD SUFFICE. USE THE HIGHER DRY FILM THICKNESS FIGURE FOR WET AND HUMID AREAS.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTI-FOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
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<b>INTERNAL AREAS: ACCOMMODATIONS, STORE ROOMS, LOCKERS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>ACCOMMODATIONS</b> (ALL INTERIOR STRUCTURE <u>NOT</u> COVERED BY INSULATION, EXCEPT DECKS)				<b>SYSTEM:</b> ZINC RICH EPOXY PRIMER WITH WATER BASED EPOXY TOP COAT	
<b>SURFACE PREPARATION:</b>		WASH OFF OIL, GREASE AND DIRT. RINSE WITH FRESHWATER. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
	WBEP WBPE		1 T/U 1 T/U AND/OR 1 FULL	50 - 75 50 - 75	
<b>NOTE(S):</b>		<ul style="list-style-type: none"> <li>▪ ON BULKHEADS, THE LOWER DRY FILM THICKNESS FIGURE SHOULD SUFFICE. USE THE HIGHER DRY FILM THICKNESS FIGURE FOR WET OR HUMID AREAS.</li> <li>▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		WBEP = WATER BASED EPOXY PRIMER WBPE = WATER BASED PURE EPOXY			

<b>INTERNAL AREAS: ACCOMMODATIONS, STORE ROOMS, LOCKERS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			<b>Type of Specification:</b>		
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL)</li> </ul>			<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>		
<b>ACCOMMODATIONS</b> (ALL INTERIOR STRUCTURE <u>NOT</u> COVERED BY INSULATION, EXCEPT DECKS)			<b>SYSTEM:</b> ALKYD		
<b>SURFACE PREPARATION:</b>		REFIT: SEE ON BOARD MAINTENANCE SPECIFICATION FOR APPROPRIATE SYSTEM. REBLAST: IF REBLAST IS TO TAKE PLACE, BLAST TO SA2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT, BY BEST PRACTICAL METHOD. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> TO PT2.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
	APHB AF		1 FULL 1 OR 2 FULL	85 40 EA	
<b>NOTE(S):</b>		<ul style="list-style-type: none"> <li>TWO FULL COATS OF ALKYD FINISH WOULD BE BENEFICIAL IN WET AND HUMID AREAS</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		APHB = ALKYD PRIMER H.B. AF = ALKYD FINISH			

<b>INTERNAL AREAS: ACCOMMODATIONS, STORE ROOMS, LOCKERS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>ACCOMMODATIONS</b> (ALL INTERIOR STRUCTURE <u>NOT</u> COVERED BY INSULATION, EXCEPT DECKS)				<b>SYSTEM:</b> ALKYD	
<b>SURFACE PREPARATION:</b>		<p>WASH OFF OIL, GREASE AND DIRT. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2. IF OVER COATING OLD, HARD, GLOSSY SURFACES, REMOVE GLOSS BY SANDING OR WASHING WITH APPROPRIATE CHEMICAL. RINSE WELL TO REMOVE ANY RESIDUUM.</p> <p>MANY TYPES OF ALKYD OR MODIFIED ALKYD PRIMERS ARE AVAILABLE AND SUITABLE FOR MAINTENANCE OF ALKYD SYSTEMS. CHOOSE A SURFACE TOLERANT, MULTI-PURPOSE FAST DRYING PRIMER WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.</p>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	MPMAP AF		1 T/U 1 OR 2 T/U AND / OR FULL	75 40 EA.	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ IN WET OR HUMID AREAS, USE TWO TOP COATS.</li> <li>▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(s):</b>		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF = ALKYD FINISH			

<b>INTERNAL AREAS: ACCOMMODATIONS, STORE ROOMS, LOCKERS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
<ul style="list-style-type: none"> <li>▪ ALL APPLICABLE VESSELS (STEEL)</li> </ul>				<ul style="list-style-type: none"> <li>▪ MAJOR REFIT / REBLAST</li> <li>▪ NEW BUILDINGS</li> </ul>	
<b>INTERIOR DECKS WITH DECK COVERING</b>				<b><u>SYSTEM:</u></b>	
<b>SURFACE PREPARATION:</b>					
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ DECKS TO BE COVERED WITH TILE, ETC., NEED NOT BE COATED.</li> <li>▪ ON NEW BUILDINGS, INTACT SHOP PRIMER CAN BE LEFT IN PLACE. IF A COATING IS DEEMED TO BE DESIRABLE, ONE COAT OF ZINC EPOXY PRIMER OR PURE EPOXY COATING TO 50<math>\mu</math> WILL SUFFICE.</li> <li>▪ PRIOR TO APPLICATION, FLOORING CONTRACTOR SHOULD BE CONSULTED IN ORDER TO ASCERTAIN COMPATIBILITY BETWEEN PROPOSED COATING AND FLOOR COVERING ADHESIVE / FLOOR COVERING.</li> </ul>			
<b>Definition(s):</b>					
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<b>INTERIOR UNCOVERED DECKS</b>			<b>SYSTEM:</b>		
			ZINC RICH EPOXY PRIMER WITH WATER BASED EPOXY TOP COAT		
<b>SURFACE PREPARATION:</b>		REFIT: SEE ON BOARD MAINTENANCE SPECIFICATION FOR APPROPRIATE SYSTEM REBLAST: IF A REBLAST IS TO TAKE PLACE, BLAST TO Sa2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT, BY BEST PRACTICAL METHOD. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
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	ZREP WBPE		1 FULL 1 FULL	75 75	
<b>NOTE(S):</b>					
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<b>ABBREVIATION(S):</b>		ZREP = ZINC RICH EPOXY PRIMER WBPE = WATER BASED PURE EPOXY			

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<b>INTERIOR UNCOVER DECKS</b>				<b>SYSTEM:</b> ZINC RICH EPOXY PRIMER WITH WATER BASED EPOXY TOP COAT	
<b>SURFACE PREPARATION:</b>		WASH OFF OIL, GREASE AND DIRT. RINSE WITH FRESHWATER. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	WBEP WBPE		1 T/U 1 T/U AND / OR FULL	75 75	
<b>NOTE(S):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
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<b>INTERIOR UNCOVERED DECKS</b>				<b>SYSTEM:</b>	
				ALKYD	
<b>SURFACE PREPARATION:</b>		REFIT: SEE ON BOARD MAINTENANCE SPECIFICATION FOR APPROPRIATE SYSTEM. REBLAST: IF A REBLAST IS TO TAKE PLACE, BLAST TO Sa2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
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	APHB		1 FULL	85	
	AF		1 FULL	40	
	AF		1 FULL	40	
<b>NOTE(S):</b>					
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		APHB = ALKYD PRIMER H.B. AF = ALKYD FINISH			

<b>INTERNAL AREAS: ACCOMMODATIONS, STORE ROOMS, LOCKERS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>INTERIOR UNCOVERED DECKS</b>				<b>SYSTEM:</b> ALKYD	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		<p>WASH OFF OIL, GREASE AND DIRT. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2. IF OVER COATING OLD, HARD, GLOSSY SURFACES, REMOVE GLOSS BY SANDING OR WASHING WITH APPROPRIATE CHEMICAL. RINSE WELL TO REMOVE ANY RESIDUUM.</p> <p>MANY TYPES OF ALKYD OR MODIFIED ALKYD PRIMERS ARE AVAILABLE AND SUITABLE FOR MAINTENANCE OF ALKYD SYSTEMS. CHOOSE A SURFACE TOLERANT, MULTI-PURPOSE FAST DRYING PRIMER WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.</p>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	MPMAP AF		1 OR 2 T/U 1 OR 2 T/U AND/OR FULL	75 EA. 40 EA.	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(s):</b>		MPMAP                   = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF                        = ALKYD FINISH			

**4.1.4 INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES**

INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL APPLICABLE VESSELS (STEEL)			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
BULKHEADS, DECK HEADS			SYSTEM: ZINC RICH EPOXY PRIMER WITH WATER BASED EPOXY TOP COAT		
SURFACE PREPARATION:		REBLAST: N/A NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
	ZREP		1 FULL	60	
	WBPE		1 FULL	60	
NOTE(S):					
Definition(s):		<div>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</div> <div>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</div> <div>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div> <div>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</div> <div>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</div> <div>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</div> <div>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</div> <div>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div> <div>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</div> <div>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</div>			
ABBREVIATION(S):		ZREP = ZINC RICH EPOXY PRIMER WBPE = WATER BASED PURE EPOXY			

<b>INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>BULKHEADS, DECK HEADS</b>				<b>SYSTEM:</b> ZINC RICH EPOXY PRIMER WITH WATER BASED EPOXY TOP COAT	
<b>SURFACE PREPARATION:</b>		WASH OFF OIL, GREASE AND DIRT. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	WBEP		1 T/U	60	
	WBPE		1 T/U	60	
<b>NOTE(S):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		WBEP                   = WATER BASED EPOXY PRIMER WBPE                   = WATER BASED PURE EPOXY			

INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL)</li> </ul>			<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>		
BULKHEADS, DECK HEADS			<u>SYSTEM:</u>		
			ALKYD		
<b>SURFACE PREPARATION:</b>		REFIT: SEE ON BOARD MAINTENANCE SPECIFICATION FOR APPROPRIATE SYSTEM. REBLAST: N/A NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. ENSURE SURFACE IS FREE OF ALL FOREIGN MATTER. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
	APHB AF		1 FULL 1 FULL	85 40	
<b>NOTE(S):</b>					
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
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BULKHEADS, DECK HEADS			<b>SYSTEM:</b> ALKYD		
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	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP AF		1 T/U 1 OR 2 T/U AND / OR FULL	75 40 EA.	
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ABBREVIATION(S):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF = ALKYD FINISH			



INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES					
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DECKS				<b>SYSTEM:</b> ZINC RICH EPOXY PRIMER WITH WATER BASED EPOXY TOP COAT	
SURFACE PREPARATION:		REBLAST: N/A NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
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	WBPE		1 FULL	60	
NOTE(S):					
Definition(s):		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
ABBREVIATION(S):		ZREP = ZINC RICH EPOXY PRIMER WBPE = WATER BASED PURE EPOXY			

<b>INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
▪ ALL APPLICABLE VESSELS (STEEL).				▪ ON BOARD MAINTENANCE	
<b>DECKS</b>				<b>SYSTEM:</b> ZINC RICH EPOXY PRIMER WITH WATER BASED EPOXY TOP COAT	
<b>SURFACE PREPARATION:</b>		WASH OFF OIL, GREASE AND DIRT. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	WBEP		1 T/U	60	
	WBPE		1 T/U	60	
<b>NOTE(S):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		WBEP                   = WATER BASED EPOXY PRIMER WBPE                   = WATER BASED PURE EPOXY			

INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL)</li> </ul>			<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>		
DECKS			<b>SYSTEM:</b>		
			ALKYD		
SURFACE PREPARATION:		REFIT: SEE ON BOARD MAINTENANCE SPECIFICATION FOR APPROPRIATE SYSTEM. REBLAST: N/A NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. ENSURE SURFACE IS FREE OF ALL FOREIGN MATTER. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
	APHB AF		1 FULL 1 OR 2 FULL	85 40 EACH	
NOTE(S):					
Definition(s):		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
ABBREVIATION(S):		APHB = ALKYD PRIMER H.B. AF = ALKYD FINISH			

INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL APPLICABLE VESSELS (STEEL)			▪ ON BOARD MAINTENANCE		
DECKS			<b>SYSTEM:</b> ALKYD		
SURFACE PREPARATION & COMMENTS:		<p>WASH OFF OIL, GREASE AND DIRT. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2. IF OVER COATING OLD, HARD, GLOSSY SURFACES, REMOVE GLOSS BY SANDING OR WASHING WITH APPROPRIATE CHEMICAL. RINSE WELL TO REMOVE ANY RESIDUUM.</p> <p>MANY TYPES OF ALKYD OR MODIFIED ALKYD PRIMERS ARE AVAILABLE AND SUITABLE FOR MAINTENANCE OF ALKYD SYSTEMS. CHOOSE A SURFACE TOLERANT, MULTI-PURPOSE FAST DRYING PRIMER WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.</p>			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP AF		1 T/U 1 OR 2 T/U AND / OR FULL	75 40 EA.	
NOTE(S):		<ul style="list-style-type: none"> <li>ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE</li> </ul>			
Definition(s):		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
ABBREVIATION(S):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF = ALKYD FINISH			

INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES		
<b>VESSEL TYPE / CHARACTERISTICS:</b>		<b>Type of Specification:</b>
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL)</li> </ul>		<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> <li>ON BOARD MAINTENANCE</li> </ul>
<b>ENGINE ROOM, HOT SURFACES</b>		<b>SYSTEM:</b>
		HEAT RESISTANT SYSTEM
<b>SURFACE PREPARATION:</b>	FOR NEW APPLICATIONS, BEST RESULTS WILL BE OBTAINED BY BLASTING TO SA2½. FOR ON BOARD MAINTENANCE POWER TOOL <sup>9</sup> CLEANED TO PT3.	
<b>FOR SURFACES UP TO:</b>		<b>TYPE OF PRODUCT TO USE:</b>
250° (482°F)		A GOOD QUALITY HYDROCARBON RESIN ALUMINUM PAINT. APPLY 2 COATS OF 25-40μ EACH.
420°C (800°F)		SILICONE/ALKYD ALUMINUM PAINT. APPLY 1 OR 2 COATS OF 25-40μ EACH. WHEN APPLYING 2 COATS, THE FIRST COAT SHOULD BE HEATED TO WORKING TEMPERATURE BEFORE COOLING AND APPLYING SECOND COAT.
BETWEEN 260°C (500°F) - 540°C (1000°F)		SILICONE ALUMINUM PAINT. APPLY 1 OR 2 COATS OF 15-20μ EACH. FIRST COAT SHOULD BE HEATED TO WORKING TEMPERATURE BEFORE COOLING AND APPLYING SECOND COAT. IF HEATING/COOLING OF FIRST COAT CAN NOT BE ACHIEVED, APPLY ONLY ONE COAT.
<b>NOTE(S):</b>		
<b>Definition(s):</b>	<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>	
<b>ABBREVIATION(S):</b>		

<b>INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
<ul style="list-style-type: none"> <li>▪ ALL APPLICABLE VESSELS (STEEL)</li> </ul>				<ul style="list-style-type: none"> <li>▪ MAJOR REFIT / REBLAST</li> <li>▪ NEW BUILDINGS</li> <li>▪ ON BOARD MAINTENANCE</li> </ul>	
<b>PIPES AND VALVES</b>				<b><u>SYSTEM:</u></b>	
<b>SURFACE PREPARATION:</b>					
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ PIPES WITH LAGGING SHOULD BE PAINTED WITH 1 OR 2 COATS OF WATER BASED ACRYLIC LATEX 40-50<math>\mu</math> EACH. OTHERWISE, PIPES AND VALVES ARE PAINTED AS THE REST OF THE AREA IN WHICH THEY ARE INSTALLED.</li> </ul>			
<b>Definition(s):</b>					
<b>ABBREVIATION(s):</b>					

<b>INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES</b>					
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<b>BATTERY ROOM (EXCLUDING DECK)</b>				<b>SYSTEM:</b>	
				PURE EPOXY	
<b>SURFACE PREPARATION:</b>		REBLAST: WASH OF OIL, GREASE AND DIRT. BLAST TO SA2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT, BY BEST PRACTICAL METHOD. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
	PE		1 FULL	100	
	PE		1 FULL	100	
<b>NOTE(S):</b>					
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		PE = PURE EPOXY COATING			

<b>INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>BATTERY ROOM (EXCLUDING DECK)</b>				<b>SYSTEM:</b> PURE EPOXY	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		<p>WASH OFF OIL AND GREASE. FRESHWATER WASH<sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD.</p> <p>IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW 2 OR MORE COATS TO BE APPLIED IN ONE DAY. (DEPENDING ON TEMPERATURE.) TWO COATS OF PURE EPOXY COATING AS IN PRESENT SYSTEM MAY ALSO BE USED, ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.</p>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	APSTE PE		1 T/U 1 T/U	100 100	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(s):</b>		<p>APSTE                    = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY</p> <p>PE                        = PURE EPOXY</p>			



INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
BATTERY ROOM (EXCLUDING DECK)				<b>SYSTEM:</b> CHLORINATED RUBBER	
<b>SURFACE PREPARATION:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT2 OR BEST POSSIBLE STANDARD. FOR MAINTENANCE, CHOOSE A MULTI-PURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP		1 T/U	75	
	CRHB		1 T/U	75	
	CRHB		1 FULL OR 1 T/U	75	
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(s):</b>		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER CRHB = CHLORINATED RUBBER H.B.			

<b>INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			<b>Type of Specification:</b>		
▪ ALL APPLICABLE VESSELS (STEEL)			▪ ON BOARD MAINTENANCE		
<b>BATTERY ROOM (EXCLUDING DECKS)</b>			<b>SYSTEM:</b> ALKYD		
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		<p>WASH OFF OIL AND GREASE. FRESHWATER WASH<sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT2 OR BEST POSSIBLE STANDARD.</p> <p>FOR MAINTENANCE, CHOOSE A MULTI-PURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.</p>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	MPMAP		1 T/U	75	
	MPMAP		1 T/U	75	
	AF		1 OR 2 T/U	40 EA.	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ ALKYD SYSTEM IS NOT RECOMMENDED FOR DECK AND OTHER AREAS WHERE ACID MAY BE SPILLED.</li> <li>▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(s):</b>		<p>AF = ALKYD FINISH</p> <p>MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER</p>			

INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL)</li> </ul>				<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>	
battery room (deck)				<b>SYSTEM:</b> PURE EPOXY	
<b>SURFACE PREPARATION:</b>		REBLAST: WASH OFF OIL, GREASE AND DIRT. BLAST TO Sa2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
	PE		1 FULL	100	
	PE		1 FULL	100	
<b>NOTE(S):</b>					
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		PE = PURE EPOXY COATING			

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<b>VESSEL TYPE / CHARACTERISTICS:</b>			Type of Specification:		
▪ ALL APPLICABLE VESSELS (STEEL)			▪ ON BOARD MAINTENANCE		
Battery room (decks)			<b>SYSTEM:</b> PURE EPOXY		
<b>SURFACE PREPARATION &amp; COMMENTS:</b>	<p>WASH OFF OIL AND GREASE. FRESHWATER WASH<sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL<sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD.</p> <p>IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW 2 COATS OF EPOXY ALUMINUM AND 1 TOP COAT TO BE APPLIED IN ONE DAY, (DEPENDENT ON TEMPERATURE.) TWO COATS OF PURE EPOXY COATING (AS IN PRESENT SYSTEM) MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.</p>				
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	APSTE PE		1 T/U 1 T/U	100 100	
<b>NOTE(s):</b>	▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.				
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<b>ABBREVIATION(s):</b>	APSTE                   = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY PE                        = PURE EPOXY COATING				

<b>INTERNAL AREAS: ENGINE ROOM, MACHINERY SPACES</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>BATTERY ROOM (DECKS)</b>				<b>SYSTEM:</b> CHLORINATED RUBBER	
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT2 OR BEST POSSIBLE STANDARD. FOR MAINTENANCE, CHOOSE A MULTI-PURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.. USE 2 COLOURS OF SAME PRIMER TO DIFFERENTIATE BETWEEN COATS.			
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	CRHB		1 T/U	75	
	CRHB		1 FULL OR 1 T/U	75	
<b>NOTE(s):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(s):</b>		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER CRHB = CHLORINATED RUBBER H.B.			

#### 4.1.5 INTERNAL AREAS: CARGO HOLDS

INTERNAL AREAS: CARGO HOLDS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL APPLICABLE VESSELS (STEEL)			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
Cargo holds (no lining) Interior of hatch coamings			<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY		
SURFACE PREPARATION:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> OFF OIL AND GREASE. IF BLASTING IS POSSIBLE, GRITBLAST <sup>2</sup> TO Sa2½. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. ENSURE SURFACES ARE CLEAN AND FREE OF ALL FOREIGN MATTER. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT3 OR BLASTED TO Sa2½.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	ARPE <sup>8</sup>		1 FULL	125	
	ARPE <sup>8</sup>		1 FULL	125	
NOTE(S):		▪ IF ABRASION RESISTANCE IS NOT OF IMPORTANCE, USE SYSTEM WITH MODIFIED EPOXY AS SPECIFIED FOR CARGO HOLDS BEHIND LININGS.			
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li></ol>			
ABBREVIATION(S):		ARPE = ABRASION RESISTANT PURE EPOXY			

INTERNAL AREAS: CARGO HOLDS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL APPLICABLE VESSELS (STEEL)			▪ ON BOARD MAINTENANCE		
Cargo holds (no lining) Interior of hatch coamings			<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW 2 COATS OF EPOXY ALUMINUM AND 1 TOP COAT TO BE APPLIED IN ONE DAY, (DEPENDENT ON TEMPERATURE). TWO COATS OF PURE EPOXY COATING (AS IN PRESENT SYSTEM) MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
	APSTE ARPE <sup>8</sup>		1 T/U 1 T/U	125 125	
NOTE(s):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li></ol>			
ABBREVIATION(s):		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY ARPE = ABRASION RESISTANT PURE EPOXY			

<b>INTERNAL AREAS: CARGO HOLDS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			Type of Specification:		
<ul style="list-style-type: none"> <li>▪ ALL APPLICABLE VESSELS (STEEL)</li> </ul>			<ul style="list-style-type: none"> <li>▪ MAJOR REFIT / REBLAST</li> <li>▪ NEW BUILDINGS</li> </ul>		
Cargo holds, behind linings and holds where abrasion resistance is not important <b>(including interior of hatch coamings)</b>			<b>SYSTEM:</b> MODIFIED EPOXY		
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½ (PREFERRED) OR SA2. NEW BUILDINGS: REMOVE ZINC SALTS (WHITE RUST) IF PRESENT BY BEST PRACTICAL METHOD. ENSURE SURFACES ARE CLEAN AND FREE OF ALL FOREIGN MATTER. AREAS WHERE SHOP PRIMER IS DAMAGED SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT3 (PREFERRED) OR PT 2, OR BLASTED TO SA2½ (PREFERRED) OR SA2.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	ME		1 FULL	125	
	ME		1 FULL	125	
<b>NOTE(S):</b>					
Definition(s):		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		ME = MODIFIED EPOXY COATING (HYDROCARBON RES. MOD.)			



INTERNAL AREAS: CARGO HOLDS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALL APPLICABLE VESSELS (STEEL)			▪ ON BOARD MAINTENANCE		
CARGO HOLDS, BEHIND LININGS AND HOLDS WHERE ABRASION RESISTANCE IS NOT IMPORTANT (INCLUDING INTERIOR OF HATCH COAMINGS)			SYSTEM: MODIFIED EPOXY		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH <sup>1</sup> AND RINSE TO REMOVE SALT AND DIRT. PREPARE DAMAGED AREAS BY POWER TOOL <sup>9</sup> CLEANING TO PT3 OR BEST POSSIBLE STANDARD. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS, A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW 2 COATS OF EPOXY ALUMINUM AND 1 TOP COAT TO BE APPLIED IN ONE DAY, (DEPENDENT ON TEMPERATURE.) TWO COATS OF EPOXY COATING (AS IN PRESENT SYSTEM) MAY ALSO BE USED ALTHOUGH SURFACE TOLERANCE MAY NOT BE AS GOOD.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	APSTE ME		1 T/U 1 T/U	125 125	
NOTE(S):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<div><div>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</div><div>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</div><div>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div><div>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</div><div>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</div><div>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</div><div>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</div><div>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div><div>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</div><div>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</div></div>			
ABBREVIATION(S):		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY ME = MODIFIED EPOXY COATING (HYDROCARBON RES. MOD.)			

#### 4.1.6 INTERNAL AREAS: TANKS, DOUBLE BOTTOMS, ETC.

<b>INTERNAL AREAS: TANKS, DOUBLE BOTTOMS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				Type of Specification:	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ REPAIR OF TANK COATINGS	
Tanks, Double Bottoms, etc.				<u><b>SYSTEM:</b></u>	
<b>SURFACE PREPARATION:</b>					
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ IF REPAIRS ARE DEEMED NECESSARY IN TANKS, BILGES, DOUBLE BOTTOMS, ETC., SURFACES TO BE REPAIRED SHOULD BE FRESHWATER WASHED AND RINSED TO REMOVE ANY SURFACE CONTAMINANTS. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT3.</li> <li>▪ APPLY THE SAME COATING THAT IS PRESENTLY BEING REPAIRED TO THE SAME FILM THICKNESS SPECIFIED IN REBLAST / NEW BUILDINGS SPECIFICATIONS.</li> </ul>			
Definition(s):					
<b>ABBREVIATION(s):</b>					

<b>INTERNAL AREAS: TANKS, DOUBLE BOTTOMS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL)</li> </ul>				<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>	
<b>CHAIN LOCKERS</b>				<b>SYSTEM:</b>	
				ABRASION RESISTANT PURE EPOXY	
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. IF BLASTING IS POSSIBLE, GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: INTACT SHOP PRIMER MUST BE CLEANED OF ANY CONTAMINANTS, INCLUDING ZINC SALTS (WHITE RUST) IF PRESENT. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	ARPE	COLOURED	1 FULL	100	
	ARPE	OFF WHITE	1 FULL	150	
<b>NOTE(S):</b>					
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		ARPE = ABRASION RESISTANT PURE EPOXY			

<b>INTERNAL AREAS: TANKS, DOUBLE BOTTOMS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
<ul style="list-style-type: none"> <li>▪ ALL APPLICABLE VESSELS (STEEL)</li> </ul>				<ul style="list-style-type: none"> <li>▪ MAJOR REFIT / REBLAST</li> <li>▪ NEW BUILDINGS</li> </ul>	
<b>CHAIN LOCKERS</b>				<b>SYSTEM:</b>	
				MODIFIED EPOXY	
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: INTACT SHOP PRIMER MUST BE CLEANED OF ANY CONTAMINANTS, INCLUDING ZINC SALTS (WHITE RUST) IF PRESENT. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	ME	COLOURED	1 FULL	125	
	ME	OFF WHITE	1 FULL	125	
<b>NOTE(s):</b>					
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(s):</b>		ME = MODIFIED EPOXY COATING (HYDROCARBON RES. MOD.)			

INTERNAL AREAS: TANKS, DOUBLE BOTTOMS, ETC.					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL)</li> </ul>				<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>	
SEA BAYS				<u>SYSTEM:</u>	
				MODIFIED EPOXY, NO ANTIFOULING	
SURFACE PREPARATION:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. IF BLASTING IS POSSIBLE, GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: INTACT SHOP PRIMER MUST BE CLEANED OF ANY CONTAMINANTS, INCLUDING ZINC SALTS (WHITE RUST) IF PRESENT. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	ME	ALTERNATE	1 FULL	125	
	ME	COLOURS	1 PREFERABLY 2 STRIPE COATS		
	ME	OFF WHITE	1 FULL	125	
NOTE(s):					
Definition(s):		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
ABBREVIATION(s):		ME = MODIFIED EPOXY COATING (HYDROCARBON RES. MOD.)			

<b>INTERNAL AREAS: TANKS, DOUBLE BOTTOMS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			<b>Type of Specification:</b>		
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL)</li> </ul>			<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>		
<b>SEA BAYS</b>			<b>SYSTEM:</b>		
			MODIFIED EPOXY WITH ANTIFOULING		
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: MAKE SURE SHOP PRIMER IS FREE OF ANY CONTAMINANTS. DAMAGED AREAS SHOULD BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS μ</b>	<b>COMMENTS</b>
	ME ME	ALTERNATE COLOURS	1 FULL 1 PREFERABLY 2 STRIPE COATS	125	
	VME CDPAF	OFF WHITE	1 FULL 2 FULL	125 75 EA.	BEST OPTION FOR GOOD
<b>OR:</b>	CDPAF		1 FULL	150	COATING DISTRIBUTION
<b>NOTE(S):</b>		<ul style="list-style-type: none"> <li>A SYSTEM UTILIZING 2 COATS OF ME (MODIFIED EPOXY) FOLLOWED BY 2 COATS OF ANTIFOULING CAN BE USED, IF ANTIFOULING CAN BE APPLIED WHILE EPOXY COATING IS STILL "THUMB PRINT SOFT".</li> <li>ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTH SERVICE.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		ME = MODIFIED EPOXY COATING (HYDROCARBON RES. MOD.) VME = VINYL MODIFIED EPOXY CDPAF = CONTROLLED DEPLETION POLYMER ANTIFOULING (TBT FREE)			

INTERNAL AREAS: TANKS, DOUBLE BOTTOMS, ETC.					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
<ul style="list-style-type: none"> <li>ALL APPLICABLE VESSELS (STEEL)</li> </ul>				<ul style="list-style-type: none"> <li>MAJOR REFIT / REBLAST</li> <li>NEW BUILDINGS</li> </ul>	
POTABLE FRESHWATER TANKS				<b>SYSTEM:</b> SOLVENT FREE HIGH BUILD EPOXY	
SURFACE PREPARATION:		REBLAST: DRY AND DEHUMIDIFY TANK. GRITBLAST <sup>2</sup> TO Sa2½. NEW BUILDINGS: BLAST TO Sa2½. (SEE NOTE BELOW.) - OR REMOVE ZINC SALTS (WHITE RUST) IF PRESENT, BY BEST PRACTICAL METHOD. ENSURE SURFACE IS CLEAN AND FREE OF ANY FOREIGN MATTERS. AREAS WHERE SHOP PRIMER IS DAMAGED MUST BE POWER TOOL <sup>9</sup> CLEANED TO PT3 OR BLASTED TO Sa2½. SHOP PRIMER MAY HAVE TO BE REMOVED.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	SFHBE SFHBE	COLOURED WHITE	STRIPE COAT 1 FULL	460	
NOTE(S):		<ul style="list-style-type: none"> <li>PROPER VENTILATION / AIR EXCHANGE IN THE TANK IS VERY IMPORTANT DURING CURE. FOLLOW COATING MANUFACTURER'S RECOMMENDATION FOR VENTILATION AND CHLORINE RINSING OF TANK BEFORE USE.</li> <li>COATINGS CERTIFIED FOR POTABLE WATER ARE NORMALLY CERTIFIED BASED ON APPLICATION DIRECT TO STEEL. CHECK THIS FACT WITH COATING SUPPLIER. STRICTLY FROM A TECHNICAL POINT OF VIEW, THE COATING CAN BE APPLIED OVER A CLEANED SHOP PRIMER.</li> </ul>			
Definition(s):		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
ABBREVIATION(S):		SFHBE = SOLVENT FREE HIGH BUILD EPOXY			

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<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
▪ ALL APPLICABLE VESSELS (STEEL)				▪ ON BOARD MAINTENANCE	
<b>POTABLE FRESHWATER TANKS</b>				<b>SYSTEM:</b> SOLVENT FREE HIGH BUILD EPOXY	
<b>SURFACE PREPARATION:</b>		DRY AND DEHUMIDIFY TANK. POWER TOOL <sup>9</sup> CLEAN DAMAGED AREAS TO PT3. OR SPOT BLAST TO SA 2½			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	SFHBE SPHBE	COLOURED WHITE	STRIPE COAT 1 T/U	125 460	
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>▪ A MINIMUM DRY FILM THICKNESS OF 460µ MUST BE APPLIED IN TOTAL. SEVERAL COATS MAY BE NECESSARY TO ACHIEVE THIS, DEPENDING ON APPLICATION METHOD.</li> <li>▪ PROPER VENTILATION / AIR EXCHANGE IN THE TANK IS VERY IMPORTANT DURING CURE. FOLLOW COATING MANUFACTURER'S RECOMMENDATION FOR VENTILATION AND CHLORINE RINSING OF TANK BEFORE USE.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
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DOMESTIC FRESHWATER TANKS			<b>SYSTEM:</b>		
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	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	SFHBE SFHBE	COLOURED WHITE	STRIPE COAT 1 FULL	460	
<b>NOTE(S):</b>		<ul style="list-style-type: none"> <li>PROPER VENTILATION / AIR EXCHANGE IN THE TANK IS VERY IMPORTANT DURING CURE. FOLLOW COATING MANUFACTURER'S RECOMMENDATION FOR VENTILATION AND CHLORINE RINSING OF TANK BEFORE USE.</li> <li>COATINGS CERTIFIED FOR POTABLE WATER ARE NORMALLY CERTIFIED BASED ON APPLICATION DIRECT TO STEEL. CHECK THIS FACT WITH COATING SUPPLIER. STRICTLY FROM A TECHNICAL POINT OF VIEW, THE COATING CAN BE APPLIED OVER A CLEANED SHOP PRIMER.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		SFHBE = SOLVENT FREE HIGH BUILD EPOXY			

<b>INTERNAL AREAS: TANKS, DOUBLE BOTTOMS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>				<b>Type of Specification:</b>	
<ul style="list-style-type: none"> <li>▪ ALL APPLICABLE VESSELS (STEEL)</li> </ul>				<ul style="list-style-type: none"> <li>▪ MAJOR REFIT / REBLAST</li> <li>▪ NEW BUILDINGS</li> </ul>	
<b>COFFER DAMS (DRY)</b>				<b>SYSTEM:</b>	
				MODIFIED EPOXY	
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2. NEW BUILDINGS: INTACT SHOP PRIMER MUST BE CLEANED OF ANY CONTAMINANTS, INCLUDING ZINC SALTS (WHITE RUST) IF PRESENT. DAMAGED AREAS TO BE POWER TOOL <sup>9</sup> CLEANED TO PT2.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
	ME	OFF WHITE	1 FULL	125	
<b>NOTE(S):</b>					
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
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<b>BALLAST TANKS</b>				<b>SYSTEM:</b>	
				MODIFIED EPOXY	
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: INTACT SHOP PRIMER MUST BE CLEANED OF ANY CONTAMINANTS, INCLUDING ZINC SALTS (WHITE RUST) IF PRESENT. DAMAGED AREAS TO BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS μ</b>	<b>COMMENTS</b>
	ME	ALTERNATE	1 FULL	125	
	ME	COLOURS	1 PREFERABLY 2 STRIPE COATS		
	ME	OFF WHITE	1 FULL	125	
<b>NOTE(S):</b>					
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<b>FLUME AND DUMP TANKS</b>			<b>SYSTEM:</b>		
			MODIFIED EPOXY		
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: INTACT SHOP PRIMER MUST BE CLEANED OF ANY CONTAMINANTS, INCLUDING ZINC SALTS (WHITE RUST) IF PRESENT. DAMAGED AREAS TO BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
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<b>BILGES</b>				<b>SYSTEM:</b>	
				MODIFIED EPOXY	
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO Sa2½. NEW BUILDINGS: INTACT SHOP PRIMER MUST BE CLEANED OF ANY CONTAMINANTS, INCLUDING ZINC SALTS (WHITE RUST) IF PRESENT. DAMAGED AREAS TO BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
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<b>DOUBLE BOTTOMS</b>			<b>SYSTEM:</b>		
			MODIFIED EPOXY		
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: INTACT SHOP PRIMER MUST BE CLEANED OF ANY CONTAMINANTS, INCLUDING ZINC SALTS (WHITE RUST) IF PRESENT. DAMAGED AREAS TO BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
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<b>HOLDING TANKS (SEWAGE)</b>				<b>SYSTEM:</b>	
				PURE EPOXY	
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: INTACT SHOP PRIMER MUST BE CLEANED OF ANY CONTAMINANTS, INCLUDING ZINC SALTS (WHITE RUST) IF PRESENT. DAMAGED AREAS TO BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
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	PE	COLOURS	1 PREFERABLY 2 STRIPE COATS		
	PE	OFF WHITE	1 FULL	125	
<b>NOTE(S):</b>		<ul style="list-style-type: none"> <li>MODIFIED EPOXY COATINGS SHOULD NOT BE USED IN SEWAGE TANKS</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		PE = PURE EPOXY COATING			

<b>INTERNAL AREAS: TANKS, DOUBLE BOTTOMS, ETC.</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			<b>Type of Specification:</b>		
<ul style="list-style-type: none"> <li>▪ ALL APPLICABLE VESSELS (STEEL)</li> </ul>			<ul style="list-style-type: none"> <li>▪ MAJOR REFIT / REBLAST</li> <li>▪ NEW BUILDINGS</li> </ul>		
<b>GRAY WATER TANKS</b>			<b>SYSTEM:</b>		
			PURE EPOXY		
<b>SURFACE PREPARATION:</b>		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. GRITBLAST <sup>2</sup> TO SA2½. NEW BUILDINGS: INTACT SHOP PRIMER MUST BE CLEANED OF ANY CONTAMINANTS, INCLUDING ZINC SALTS (WHITE RUST) IF PRESENT. DAMAGED AREAS TO BE POWER TOOL <sup>9</sup> CLEANED TO PT3.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS μ</b>	<b>COMMENTS</b>
	PE	ALTERNATE	1 FULL	125	
	PE	COLOURS	1 PREFERABLY 2 STRIPE COATS		
	PE	OFF WHITE	1 FULL	125	
<b>NOTE(S):</b>		<ul style="list-style-type: none"> <li>▪ MODIFIED EPOXY COATINGS SHOULD NOT BE USED IN GRAY WATER TANKS.</li> </ul>			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME.</li> </ol>			
<b>ABBREVIATION(S):</b>		PE = PURE EPOXY COATING			



## 4.2 Aluminum Vessels

### 4.2.1 PAINTING OF ALUMINUM

In order to successfully paint aluminum, a two-step surface preparation has to take place. Namely, *degreasing* and *etching*.

*Degreasing* can be done by solvent cleaning, but in many instances, this method merely "moves the grease around". It is far better to use an emulsifying cleaner of which many types are available. After degreasing, use the "water test" to see if the aluminum surface is clean. Simply spray or flow water on the surface. If the surface is uniformly wet, it is clean. If the water "curtains" or "withdraws" from areas, the surface is still greasy and must be washed again.

*Etching* takes place after the surface has been properly degreased. It can be done by surface treatment such as application of etch primers or by abrading the surface by light abrasive blasting. A light abrasive blast is the best way to ensure good adhesion of paint to aluminum surfaces. An abrasive such as 80 mesh garnet or 50 grit aluminum oxide should give a 25-40  $\mu$  (1-1.5 mil) surface profile, an ideal aluminum surface to receive various coatings. Surface profile should be 25  $\mu$  minimum, (check with abrasive supplier). For small areas *Scotchbrite* (by 3M Canada) abrasive pads or careful disc grinding can be used. Coating should take place immediately after blasting and removal of dust is done.

**Note:** When long over coating times are needed between epoxy coats and cosmetic top coats, a vinyl modified epoxy tiecoat may be necessary.

**Important Note:** Aluminum and its alloys readily form galvanic couples with paint containing lead and copper compounds. Do not use primers containing red lead. Also, it is generally not recommended to use antifoulings containing cuprous oxide or metallic copper.

## 4.2.2 ALUMINUM VESSELS: UNDERWATER SYSTEMS

ALUMINUM VESSELS: UNDERWATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
UNDERWATER HULL AND RUDDER			<u>SYSTEM:</u> ABRASION RESISTANT PURE EPOXY (WITH/WITHOUT ANTIFOULING)		
SURFACE PREPARATION:		REBLAST: HIGH PRESSURE FRESHWATER WASH · WASH OFF OIL AND GREASE. BLAST OFF OLD COATINGS AND LIGHTLY ABRASE SURFACE TO ACHIEVE 40µ (MICRONS) SURFACE PROFILE. NEW BUILDINGS: DEGREASE AND BLAST AS OUTLINED UNDER "PAINTING OF ALUMINUM" IMPORTANT NOTE: IF, FOR ANY REASON, THE SURFACE TO BE PAINTED CAN NOT BE ABRADED BY BLASTING APPLY, 1 COAT ETCH PRIMER TO 12µ DFT. FOLLOW PRODUCT DATA SHEET CLOSELY WITH REGARDS TO APPLICATION AND OVER COATING TIMES.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
A	ARPE <sup>8</sup>		1 FULL	100	DEPENDING ON SERVICE REQUIREMENTS, TOTAL FILM THICKNESS COULD BE REDUCED TO 100µ DFT
	ARPE <sup>8</sup>		1 FULL	100	
IF ANTIFOULING IS REQUIRED:					
B	ARPE <sup>8</sup>		1 FULL	100	SEE ABOVE
	VME <sup>6</sup>		1 FULL	100	
	CFAF		1 FULL	75	
	CFAF		1 FULL	75	
NOTE(S):		▪ ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS SERVICE. ▪ APPLY TWO DIFFERENT COLOURS OF ANTIFOULING. THIS WILL ENSURE MORE UNIFORM COVERAGE AND ALLOW A VISIBLE CHECK FOR SYSTEM DEPLETION AND NEED FOR RECOATING.			
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(S):		ARPE = ABRASION RESISTANCE PURE EPOXY VME = VINYL MODIFIED EPOXY CFAF = COPPER FREE ANTIFOULING FOR ALUMINUM			

ALUMINUM VESSELS: UNDERWATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ ON BOARD MAINTENANCE / DOCKING		
UNDERWATER HULL AND RUDDER			SYSTEM:		
			ABRASION RESISTANT PURE EPOXY (WITH/WITHOUT ANTIFOULING)		
SURFACE PREPARATION:		HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
A	ARPE <sup>8</sup>		1 T/U	100	DEPENDING ON SERVICE REQUIREMENTS, TOTAL FILM THICKNESS COULD BE REDUCED TO 100μ DFT.
	ARPE <sup>8</sup>		1 T/U	100	
IF ANTIFOULING IS REQUIRED:					
B	ARPE <sup>8</sup>		1 T/U	100	SEE ABOVE
	VME <sup>6</sup>		1 T/U	100	
	CFAF		1 FULL OR 1 T/U	75	
	CFAF		1 FULL OR 1 T/U	75	
NOTE(s):		<ul style="list-style-type: none"><li>▪ ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS SERVICE.</li><li>▪ APPLY TWO DIFFERENT COLOURS OF ANTIFOULING. THIS WILL ENSURE MORE UNIFORM COVERAGE AND ALLOW A VISIBLE CHECK FOR SYSTEM DEPLETION AND NEED FOR RECOATING.</li><li>▪ NEW ANTIFOULING MUST BE COMPATIBLE WITH OLD ANTIFOULING.</li></ul>			
Definition(s):		<ol style="list-style-type: none"><li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(s):		ARPE = ABRASION RESISTANCE PURE EPOXY VME = VINYL MODIFIED EPOXY CFAF = COPPER FREE ANTIFOULING FOR ALUMINUM			

ALUMINUM VESSELS: UNDERWATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
▪ ALUMINUM VESSELS				▪ ON BOARD MAINTENANCE / DOCKING	
UNDERWATER HULL AND RUDDER				<b>SYSTEM:</b> TAR FREE VINYL ANTICORROSIVE (WITH/WITHOUT ANTIFOULING)	
SURFACE PREPARATION:		HIGH PRESSURE FRESHWATER WASH <sup>1</sup> · WASH OFF OIL AND GREASE. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
A	VATF <sup>7</sup>		1 T/U	100	
	VATF <sup>7</sup>		1 T/U	100	
<b>IF ANTIFOULING IS REQUIRED:</b>					
B	VATF <sup>7</sup>		1 T/U	100	
	VATF <sup>7</sup>		1 T/U	100	
	CFAF		1 FULL OR 1 T/U	75	
	CFAF		1 FULL OR 1 T/U	75	
NOTE(s):		<ul style="list-style-type: none"> <li>▪ ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS SERVICE.</li> <li>▪ APPLY TWO DIFFERENT COLOURS OF ANTIFOULING. THIS WILL ENSURE MORE UNIFORM COVERAGE AND ALLOW A VISIBLE CHECK FOR SYSTEM DEPLETION AND NEED FOR RECOATING.</li> <li>▪ NEW ANTIFOULING MUST BE COMPATIBLE WITH OLD ANTIFOULING.</li> </ul>			
Definition(s):		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
ABBREVIATION(s):		VATF = VINYL ALUMINUM ANTICORROSIVE TAR FREE FAF = COPPER FREE ANTIFOULING FOR ALUMINUM			

ALUMINUM VESSELS: UNDERWATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ ON BOARD MAINTENANCE / DOCKING		
UNDERWATER HULL AND RUDDER			<u>SYSTEM:</u> CHLORINATED RUBBER PRIMER (WITH/WITHOUT ANTIFOULING)		
SURFACE PREPARATION:		HIGH PRESSURE FRESHWATER WASH <sup>1</sup> · WASH OFF OIL AND GREASE. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
A	CRHB		1 T/U	75	
	CRHB		1 T/U	75	
<u>IF ANTIFOULING IS REQUIRED:</u>					
B	CRHB		1 T/U	75	
	CRHB		1 T/U	75	
	CFAF		1 FULL OR 1 T/U	75	
	CFAF		1 FULL OR 1 T/U	75	
NOTE(s):		<ul style="list-style-type: none"><li>▪ ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS SERVICE.</li><li>▪ APPLY TWO DIFFERENT COLOURS OF ANTIFOULING. THIS WILL ENSURE MORE UNIFORM COVERAGE AND ALLOW A VISIBLE CHECK FOR SYSTEM DEPLETION AND NEED FOR RECOATING.</li><li>▪ NEW ANTIFOULING MUST BE COMPATIBLE WITH OLD ANTIFOULING.</li></ul>			
Definition(s):		<ol style="list-style-type: none"><li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(s):		CRHB = CHLORINATED RUBBER H.B. CFAF = COPPER FREE ANTIFOULING FOR ALUMINUM			

ALUMINUM VESSELS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
TOPSIDES			SYSTEM: ABRASION RESISTANT PURE EPOXY WITH POLYURETHANE FINISH		
SURFACE PREPARATION:		REBLAST: HIGH PRESSURE FRESHWATER WASH . WASH OFF OIL AND GREASE. BLAST OFF OLD COATINGS AND LIGHTLY ABRADEN SURFACE TO ACHIEVE 40µ (MICRONS) SURFACE PROFILE. NEW BUILDINGS: DEGREASE AND BLAST AS OUTLINED UNDER "PAINTING OF ALUMINUM" IMPORTANT NOTE:: IF, FOR ANY REASON, THE SURFACE TO BE PAINTED CAN NOT BE ABRADED BY BLASTING APPLY, 1 COAT ETCH PRIMER TO 12µ DFT. FOLLOW PRODUCT DATA SHEET CLOSELY WITH REGARDS TO APPLICATION AND OVER COATING TIMES.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	ARPE <sup>8</sup> PUF <sup>10</sup> OR AME		1 FULL 1 FULL	100 50	SEE ITEMS2.8 AND 2.9, PAGE 2
NOTE(S):					
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(S):		ARPE = ABRASION RESISTANCE PURE EPOXY PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

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TOPSIDES			<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY WITH POLYURETHANE FINISH		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW TWO OR MORE COATS TO BE APPLIED IN ONE DAY. (DEPENDENT ON TEMPERATURE.) ONE COAT OF EPOXY COATING, AS IN PRESENT SYSTEM, MAY ALSO BE USED.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
	APSTE PUF <sup>10</sup> OR AME		1 T/U 1 FULL OR 1 T/U	100 50	SEE ITEMS 2.8 AND 2.9, PAGE 2
NOTE(S):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
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▪ ALUMINUM VESSELS			▪ ON BOARD MAINTENANCE		
TOPSIDES			<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY WITH MODIFIED ACRYLIC TOPCOAT		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW TWO OR MORE COATS TO BE APPLIED IN ONE DAY. (DEPENDENT ON TEMPERATURE.) ONE COAT OF EPOXY COATING, AS IN PRESENT SYSTEM, MAY ALSO BE USED.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
	APSTE MAF		1 T/U 1 FULL OR 1 T/U	100 50	
NOTE(s):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
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SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. FOR MAINTENANCE, CHOOSE A MULTIPURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP MAF		1 T/U 1 FULL OR 1 T/U	75 40	
NOTE(S):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
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ABBREVIATION(S):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER MAF = MODIFIED ACRYLIC FINISH			

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	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS µ</b>	<b>COMMENTS</b>
	MPMAP AF		1 T/U 1 FULL OR 1 T/U	75 40	
<b>NOTE(S):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
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▪ ALUMINUM VESSELS			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
EXTERIOR DECKS			<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY (OPTIONAL POLYURETHANE TOPCOAT)		
SURFACE PREPARATION & COMMENTS:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. BLAST OFF OLD COATINGS AND LIGHTLY ABRASE SURFACE TO ACHIEVE 40μ (MICRONS) SURFACE PROFILE. NEW BUILDINGS: DEGREASE AND BLAST AS OUTLINED UNDER "PAINTING OF ALUMINUM" IMPORTANT NOTE:: IF, FOR ANY REASON, THE SURFACE TO BE PAINTED CAN NOT BE ABRADED BY BLASTING APPLY, 1 COAT ETCH PRIMER TO 12μ DFT. FOLLOW PRODUCT DATA SHEET CLOSELY WITH REGARDS TO APPLICATION AND OVER COATING TIMES.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
	ARPE <sup>8</sup>		1 FULL	100	
	ARPE <sup>8</sup>		1 FULL	75	NON-SKID COAT OPTIONAL
If A COSMETIC COAT IS DESIRABLE, APPLY:					
	PUF <sup>10</sup> OR AME		1 FULL	50	SEE ITEMS 2.8 AND 2.9, PAGE 2
NOTE(s):		▪ WHERE NON-SKID SURFACE IS DESIRABLE, ADD 3 KG (7LBS.) OF GLASS GRANULES TO 5 GAL (20 L) OF EPOXY COATING AND APPLY THIS AS A SECOND COAT. GRANULE COARSENESS OF 18-25 U.S. SCREEN SIZE GIVES A GOOD NON-SKID FINISH. ALUMINUM OXIDE GRIT CAN ALSO BE USED.			
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(s):		ARPE = ABRASION RESISTANCE PURE EPOXY PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

ALUMINUM VESSELS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ ON BOARD MAINTENANCE		
EXTERIOR DECKS			<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY (OPTIONAL POLYURETHANE TOP COAT)		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW TWO OR MORE COATS TO BE APPLIED IN ONE DAY. (DEPENDENT ON TEMPERATURE.) TWO COATS OF EPOXY COATING, AS IN PRESENT SYSTEM, MAY ALSO BE USED.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
	APSTE ARPE <sup>8</sup>		1 T/U 1 T/U	100 75	NON-SKID COAT OPTIONAL
IF A COSMETIC COAT IS DESIRABLE, APPLY					
	PUF <sup>10</sup> OR AME		1 FULL OR 1 T/U	50	SEE ITEMS 2.8 AND 2.9, PAGE 2
NOTE(s):		<ul style="list-style-type: none"><li>WHERE NON-SKID SURFACE IS DESIRABLE, ADD 3 KG (7LBS.) OF GLASS GRANULES TO 5 GAL (20 L) OF EPOXY COATING AND APPLY THIS AS A SECOND COAT. GRANULE COARSENESS OF 18-25 U.S. SCREEN SIZE GIVES A GOOD NON-SKID FINISH. ALUMINUM OXIDE GRIT CAN ALSO BE USED.</li><li>ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li></ul>			
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(S):		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY ARPE = ABRASION RESISTANCE PURE EPOXY PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

ALUMINUM VESSELS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:				Type of Specification:	
▪ ALUMINUM VESSELS				▪ ON BOARD MAINTENANCE	
EXTERIOR DECKS				<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY (OPTIONAL MODIFIED ACRYLIC TOPCOAT)	
SURFACE PREPARATION:		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW TWO OR MORE COATS TO BE APPLIED IN ONE DAY. (DEPENDENT ON TEMPERATURE.) TWO COATS OF EPOXY COATING, AS IN PRESENT SYSTEM, MAY ALSO BE USED.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
	APSTE ARPE <sup>8</sup>		1 T/U 1 T/U	100 75	NON-SKID COAT OPTIONAL
If A COSMETIC COAT IS DESIRABLE, APPLY:					
	MAF		1 FULL OR 1 T/U	50	
NOTE(s):		<ul style="list-style-type: none"> <li>WHERE NON-SKID SURFACE IS DESIRABLE, ADD 3 KG (7LBS.) OF GLASS GRANULES TO 5 GAL (20 L) OF EPOXY COATING AND APPLY THIS AS A SECOND COAT. GRANULE COARSENESS OF 18-25 U.S. SCREEN SIZE GIVES A GOOD NON-SKID FINISH. ALUMINUM OXIDE GRIT CAN ALSO BE USED.</li> <li>ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li> </ul>			
Definition(s):		<ol style="list-style-type: none"> <li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
ABBREVIATION(s):		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY ARPE = ABRASION RESISTANCE PURE EPOXY MAF = MODIFIED ACRYLIC FINISH			

ALUMINUM VESSELS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ ON BOARD MAINTENANCE		
EXTERIOR DECKS			<u>SYSTEM:</u> CHLORINATED RUBBER WITH MODIFIED ACRYLIC TOPCOAT		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. FOR MAINTENANCE, CHOOSE A MULTIPURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP MAF		1 T/U 1 FULL OR 1 T/U	75 40	
NOTE(S):		<ul style="list-style-type: none"><li>FOR THIN FILM TOP COATS SUCH AS ACRYLICS, USE GROUND NUT SHELLS 0.5 KG (1LB.) PER GAL. OR POLYPROPYLENE BEADS - 0.25 KG (8 OZ.) PER GAL. AS NON-SKID AGENTS.</li><li>ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li></ul>			
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(S):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF = ALKYD FINISH			

ALUMINUM VESSELS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ ON BOARD MAINTENANCE		
EXTERIOR DECKS			SYSTEM: ALKYD		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. FOR MAINTENANCE, CHOOSE A MULTIPURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP AF		1 T/U 1 FULL OR 1 T/U	75 40	
NOTE(S):		<ul style="list-style-type: none"><li>FOR THIN FILM TOP COATS SUCH AS ALKYDS, USE GROUND NUT SHELLS 0.5 KG (1LB.) PER GAL. OR POLYPROPYLENE BEADS - 0.25 KG (8 OZ.) PER GAL. AS NON-SKID AGENTS.</li><li>ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.</li></ul>			
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(S):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF = ALKYD FINISH			

### 4.2.3 ALUMINUM VESSELS: ABOVE WATER SYSTEMS

ALUMINUM VESSELS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
SUPERSTRUCTURE			<b>SYSTEM:</b> PURE EPOXY WITH POLYURETHANE FINISH		
SURFACE PREPARATION & COMMENTS:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. BLAST OFF OLD COATINGS AND LIGHTLY ABRASE SURFACE TO ACHIEVE 40µ (MICRONS) SURFACE PROFILE. NEW BUILDINGS: DEGREASE AND BLAST AS OUTLINED UNDER "PAINTING OF ALUMINUM" IMPORTANT NOTE:: IF, FOR ANY REASON, THE SURFACE TO BE PAINTED CAN NOT BE ABRADED BY BLASTING APPLY, 1 COAT ETCH PRIMER TO 12µ DFT. FOLLOW PRODUCT DATA SHEET CLOSELY WITH REGARDS TO APPLICATION AND OVER COATING TIMES.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	PE PUF <sup>10</sup> OR AME		1 FULL 1 FULL	100 50	SEE ITEMS 2.8 AND 2.9, PAGE 2
NOTE(s):					
Definition(s):		<ol style="list-style-type: none"><li>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(s):		PE = PURE EPOXY COATING PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			



ALUMINUM VESSELS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ ON BOARD MAINTENANCE / DOCKING		
SUPERSTRUCTURE			SYSTEM: PURE EPOXY WITH POLYURETHANE FINISH		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW TWO OR MORE COATS TO BE APPLIED IN ONE DAY. (DEPENDENT ON TEMPERATURE.) ONE COAT OF EPOXY COATING, AS IN PRESENT SYSTEM, MAY ALSO BE USED.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
	APSTE PUF <sup>10</sup> OR AME		1 T/U 1 FULL OR 1 T/U	100 50	SEE ITEMS 2.8 AND 2.9, PAGE 2
NOTE(S):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<div><div>1.</div><div>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</div></div> <div><div>2.</div><div>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</div></div> <div><div>3.</div><div>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div></div> <div><div>4.</div><div>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</div></div> <div><div>5.</div><div>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</div></div> <div><div>6.</div><div>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</div></div> <div><div>7.</div><div>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</div></div> <div><div>8.</div><div>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div></div> <div><div>9.</div><div>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</div></div> <div><div>10.</div><div>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</div></div>			
ABBREVIATION(S):		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

<b>ALUMINUM VESSELS: ABOVE WATER SYSTEMS</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			<b>Type of Specification:</b>		
▪ ALUMINUM VESSELS			▪ ON BOARD MAINTENANCE		
<b>SUPERSTRUCTURE</b>			<b>SYSTEM:</b> PURE EPOXY WITH MODIFIED ACRYLIC TOPCOAT		
<b>SURFACE PREPARATION &amp; COMMENTS:</b>		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW TWO OR MORE COATS TO BE APPLIED IN ONE DAY. (DEPENDENT ON TEMPERATURE.) ONE COAT OF EPOXY COATING, AS IN PRESENT SYSTEM, MAY ALSO BE USED.			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
	APSTE MAF		1 T/U 1 FULL OR 1 T/U	100 50	
<b>NOTE(S):</b>		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
<b>Definition(s):</b>		<ol style="list-style-type: none"> <li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li> <li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li> <li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li> <li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li> <li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li> <li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li> <li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li> <li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li> <li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li> </ol>			
<b>ABBREVIATION(S):</b>		APSTE                   = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY MAF                     = MODIFIED ACRYLIC FINISH			

ALUMINUM VESSELS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ ON BOARD MAINTENANCE		
SUPERSTRUCTURES			SYSTEM: CHLORINATED RUBBER WITH MODIFIED ACRYLIC TOPCOAT		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. FOR MAINTENANCE, CHOOSE A MULTIPURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP MAF		1 T/U 1 FULL OR 1 T/U	75 40	
NOTE(S):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<div><div>1.</div><div>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</div></div> <div><div>2.</div><div>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</div></div> <div><div>3.</div><div>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div></div> <div><div>4.</div><div>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</div></div> <div><div>5.</div><div>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</div></div> <div><div>6.</div><div>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</div></div> <div><div>7.</div><div>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</div></div> <div><div>8.</div><div>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div></div> <div><div>9.</div><div>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</div></div> <div><div>10.</div><div>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</div></div>			
ABBREVIATION(S):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER MAF = MODIFIED ACRYLIC FINISH			

ALUMINUM VESSELS: ABOVE WATER SYSTEMS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ ON BOARD MAINTENANCE		
SUPERSTRUCTURE			SYSTEM: ALKYD		
SURFACE PREPARATION & COMMETNS:		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. FOR MAINTENANCE, CHOOSE A MULTIPURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75μ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
	MPMAP AF		1 T/U 1 FULL OR 1 T/U	75 40	
NOTE(S):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<div><div>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</div><div>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</div><div>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div><div>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</div><div>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</div><div>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</div><div>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</div><div>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div><div>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</div><div>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</div></div>			
ABBREVIATION(S):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF = ALKYD FINISH			

**4.2.4 ALUMINUM VESSELS: INTERNAL AREAS**

ALUMINUM VESSELS: INTERNAL AREAS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
ALUMINUM SURFACES UNDER INSULATION AND LININGS			SYSTEM: PURE EPOXY		
SURFACE PREPARATION & COMMENTS:		REBLAST: WASH OFF OIL, GREASE AND DIRT, RINSE WITH FRESHWATER. BLAST OFF OLD COATINGS AND LIGHTLY ABRASE SURFACE TO ACHIEVE 40μ (MICRONS) SURFACE .□ NEW BUILDINGS: DEGREASE AND BLAST AS OUTLINED UNDER "PAINTING OF ALUMINUM" IMPORTANT NOTE:: IF, FOR ANY REASON, THE SURFACE TO BE PAINTED CAN NOT BE ABRADED BY BLASTING APPLY, 1 COAT ETCH PRIMER TO 12μ DFT. FOLLOW PRODUCT DATA SHEET CLOSELY WITH REGARDS TO APPLICATION AND OVER COATING TIMES.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
	PE	LIGHT	1 FULL	100	
NOTE(S):					
Definition(s):		<div>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</div> <div>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</div> <div>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div> <div>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</div> <div>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</div> <div>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</div> <div>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</div> <div>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div> <div>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</div> <div>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</div>			
ABBREVIATION(S):		PE = PURE EPOXY COATING			

ALUMINUM VESSELS: INTERNAL AREAS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
INTERIOR ACCOMMODATION, PAINTED SURFACES			SYSTEM: PURE EPOXY WITH POLYURETHANE FINISH		
SURFACE PREPARATION & COMMENTS:		REBLAST: HIGH PRESSURE FRESHWATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. BLAST OFF OLD COATINGS AND LIGHTLY ABRASE SURFACE TO ACHIEVE 40µ (MICRONS) SURFACE PROFILE. NEW BUILDINGS: DEGREASE AND BLAST AS OUTLINED UNDER "PAINTING OF ALUMINUM" IMPORTANT NOTE:: IF, FOR ANY REASON, THE SURFACE TO BE PAINTED CAN NOT BE ABRADED BY BLASTING APPLY, 1 COAT ETCH PRIMER TO 12µ DFT. FOLLOW PRODUCT DATA SHEET CLOSELY WITH REGARDS TO APPLICATION AND OVER COATING TIMES.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	PE PUF <sup>10</sup> OR AME		1 FULL 1 FULL	100 50	SEE ITEMS 2.8 AND 2.9, PAGE 2
NOTE(S):					
Definition(s):		<div><div>1.</div><div>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</div></div> <div><div>2.</div><div>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</div></div> <div><div>3.</div><div>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div></div> <div><div>4.</div><div>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</div></div> <div><div>5.</div><div>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</div></div> <div><div>6.</div><div>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</div></div> <div><div>7.</div><div>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</div></div> <div><div>8.</div><div>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div></div> <div><div>9.</div><div>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</div></div> <div><div>10.</div><div>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</div></div>			
ABBREVIATION(S):		PE = PURE EPOXY COATING PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

ALUMINUM VESSELS: INTERNAL AREAS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ ON BOARD MAINTENANCE		
INTERIOR ACCOMMODATION, PAINTED SURFACES			SYSTEM: PURE EPOXY WITH POLYURETHANE FINISH		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. IT IS RECOMMENDED THAT FOR ON BOARD MAINTENANCE OF EPOXY SYSTEMS A HIGH BUILD SURFACE TOLERANT ALUMINUM PIGMENTED EPOXY IS USED. THE PRODUCT SHOULD FEATURE FAST CURE, LOW TEMPERATURE CURE AND FAST OVER COATING TIMES. THIS WILL ALLOW TWO OR MORE COATS TO BE APPLIED IN ONE DAY. (DEPENDENT ON TEMPERATURE.) ONE COAT OF EPOXY COATING, AS IN PRESENT SYSTEM, MAY ALSO BE USED.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
	APSTE PUF <sup>10</sup> OR AME		1 T/U 1 FULL OR 1 T/U	100 50	SEE ITEMS 2.8 AND 2.9, PAGE 2
NOTE(S):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<div><div>1.</div><div>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</div></div> <div><div>2.</div><div>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</div></div> <div><div>3.</div><div>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div></div> <div><div>4.</div><div>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</div></div> <div><div>5.</div><div>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</div></div> <div><div>6.</div><div>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</div></div> <div><div>7.</div><div>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</div></div> <div><div>8.</div><div>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div></div> <div><div>9.</div><div>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</div></div> <div><div>10.</div><div>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</div></div>			
ABBREVIATION(S):		APSTE = ALUMINUM PIGMENTED SURFACE TOLERANT EPOXY PUF = POLYURETHANE FINISH AME = ACRYLIC MODIFIED EPOXY			

ALUMINUM VESSELS: INTERNAL AREAS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ MAJOR REFIT / REBLAST ▪ NEW BUILDINGS		
INTERIOR ACCOMMODATION, PAINTED SURFACES			SYSTEM: ALKYD		
SURFACE PREPARATION & COMMENTS:		REBLAST: WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. BLAST OFF OLD COATINGS AND LIGHTLY ABRASE SURFACE TO ACHIEVE 40µ (MICRONS) SURFACE PROFILE. NEW BUILDINGS: DEGREASE AND BLAST AS OUTLINED UNDER "PAINTING OF ALUMINUM" IMPORTANT NOTE:: IF, FOR ANY REASON, THE SURFACE TO BE PAINTED CAN NOT BE ABRADED BY BLASTING APPLY, 1 COAT ETCH PRIMER TO 12µ DFT. FOLLOW PRODUCT DATA SHEET CLOSELY WITH REGARDS TO APPLICATION AND OVER COATING TIMES.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	APHB AF		1 FULL 1 OR 2 FULL	85 40 EACH	
NOTE(S):		▪ ON DECKS IN PARTICULAR IT WOULD BE BENEFICIAL WITH TWO COATS ALKYD FINISH			
Definition(s):		<div><div>1.</div><div>HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</div></div> <div><div>2.</div><div>GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</div></div> <div><div>3.</div><div>HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div></div> <div><div>4.</div><div>LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</div></div> <div><div>5.</div><div>ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</div></div> <div><div>6.</div><div>VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</div></div> <div><div>7.</div><div>SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</div></div> <div><div>8.</div><div>ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div></div> <div><div>9.</div><div>POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</div></div> <div><div>10.</div><div>PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</div></div>			
ABBREVIATION(S):		APHB = ALKYD PRIMER H.B. AF = ALKYD FINISH			



ALUMINUM VESSELS: INTERNAL AREAS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ ALUMINUM VESSELS			▪ ON BOARD MAINTENANCE		
INTERIOR ACCOMMODATIONS, PAINTED SURFACES			SYSTEM: ALKYD		
SURFACE PREPARATION & COMMENTS:		WASH OFF OIL AND GREASE. FRESHWATER WASH AND RINSE TO REMOVE SALT AND DIRT. LIGHTLY BLAST DAMAGED AREAS, OR POWER DISC TO BRIGHT METAL. FOR MAINTENANCE, CHOOSE A MULTIPURPOSE MODIFIED ALKYD PRIMER. IT SHOULD BE SURFACE TOLERANT, FAST DRYING WITH RELATIVELY HIGH VOLUME SOLID CONTENT (40-50%) AND REASONABLE HIGH BUILD QUALITIES (50-75µ) AND FAST OVER COATING TIMES. THE PRIMER SHOULD ACCEPT TOP COATS OF ALKYD, ACRYLIC, CHLORINATED RUBBER, URETHANE, VINYL ESTER AND SOME EPOXY COATINGS. THE PRIMER SHOULD BE LEAD AND CHROMATE FREE.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS µ	COMMENTS
	MPMAP AF		1 T/U 1 OR 2 T/U OR FULL	75 40	
NOTE(S):		▪ ON BOARD MAINTENANCE IS OFTEN CARRIED OUT WITH BRUSH AND ROLLER. ENSURE THAT PROPER FILM THICKNESS IS APPLIED BY USING WET FILM THICKNESS GAUGE.			
Definition(s):		<div><div>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</div><div>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</div><div>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div><div>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</div><div>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</div><div>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</div><div>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</div><div>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</div><div>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</div><div>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NOT INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</div></div>			
ABBREVIATION(S):		MPMAP = MULTI-PURPOSE MODIFIED ALKYD PRIMER AF = ALKYD FINISH			

## **4.3 Fiberglass Vessels**

### **4.3.1 PAINTING OF FIBERGLASS**

When we talk about painting fiberglass vessels, we mean "bare" fiberglass or, the exterior layer of the vessel namely the gelcoat. The gelcoat is often coloured and sometimes mistaken for paint. The way fiberglass vessels are manufactured necessitates/dictates that a mold release agent is used in order to get the vessel, or parts of it, released out of the mold.

Theoretically, a new fiberglass vessel should not need to be painted, with exception perhaps of antifouling on the underwater area of the hull. Waxing and polishing can maintain a fiberglass vessel in reasonable condition for sometime. However, exposure to the elements promotes chalking and fading of the gelcoat, and wear and tear often makes painting a necessary maintenance.

Hull blistering may be another reason for painting fiberglass vessels. The blistering is caused by water permeating the gelcoat and being absorbed by dry laminate in the hull. The subject of repair and painting due to hull blistering will not be dealt with here. Let it suffice to say that application of high build epoxy coatings can drastically minimize the risk of blistering before it takes place. And if it has happened, repairs and dry out of the hull along with application of epoxy coatings can restore a hull to sound condition. Major marine coating manufacturers have available products and procedures for such repairs.

#### SURFACE PREPARATION:

The first step is to remove all traces of mold release agent and waxes. Wash and scrub the surface with a stiff brush, soap and water (preferably warm). Flush and rinse to remove soap or cleaner residue. Dry surface. Next, wipe surface with clean rags dampened with "solvent wash". This is a specific blend of solvents for this particular purpose. Change rags often to make sure wax or mold release agent is not merely "moved around" on the surface. To be sure all contaminants have been cleaned off, use the "water test" to check the surface. Flush or spray fresh water on the surface. The surface should be uniformly wet. If the water "curtains", "withdraws", or "beads up", wash the area affected with solvent wash again and until surface is clean.

The second step is to either abrade the surface or use an "etch type primer". These primers are called "fiberglass primers" or "no sanding primers". This type primer "etches" into the surface of the gelcoat to provide adhesion for subsequent coats of paint. The primer is applied by roller or brush, is fast drying and has a very short over coating time. Product data sheets and label directions must be followed in detail.

The alternative to the use of a fiberglass primer is to abrade the gelcoat thoroughly, using 80 grit production paper and sanding until a uniform flat surface is obtained. After sanding, wipe down surface with solvent wash to remove all sanding residue and dust. A sanded surface offers the most "fool proof" alternative and probably the best surface to ensure good adhesion of paint to fiberglass. It also eliminates the "no sanding primer" and the short over coating time, which often is a problem with the "etch type primer" method. However, the sanding option does have its own draw back. Apart from the labour involved, the sanding operation slightly reduces the thickness of the gelcoat. Below water, this may not be desirable from a hull blistering point of view. One should also make sure the builder's hull warranty is not being affected. If the slight loss of gelcoat thickness on the underwater hull is of concern, it can easily be rectified by the application of 1 or 2 coats of epoxy coating prior to application of antifouling paint.

If painting is to take place over surfaces that are scratched or chipped, fill imperfections with epoxy putty and/or fairing compound and sand smooth. Depending on the condition of the gelcoat, 1 or 2 coats of epoxy coating should be considered before the final paint system is applied.

The preceding recommendations and the following specifications are meant as a guide to obtain a good practical "work boat finish" using commercial heavy duty paint coatings.

## 4.3.2 FIBERGLASS VESSELS: UNDERWATER AREAS

FIBERGLASS VESSELS: UNDERWATER AREAS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ FIBERGLASS			▪ BARE GELCOAT OR RECOATING OF ANTIFOULING		
UNDERWATER HULL			<b>SYSTEM:</b> ABRASION RESISTANT PURE EPOXY (OPTIONAL) ANTIFOULING		
SURFACE PREPARATION:		FOR BARE GELCOAT PROCEED AS OUTLINED IN "PAINTING OF FIBERGLASS VESSELS". (SEE SECTION 4.3) FOR REPAIRS/RE-COATING: HIGH PRESSURE FRESH WATER WASH <sup>1</sup> . WASH OFF OIL AND GREASE. IF THERE IS NO DAMAGE TO THE COATING OR HULL, RE-APPLY 1 OR 2 COATS OF ANTIFOULING AS PER SYSTEM B. IF THERE IS DAMAGE, REPAIR WITH EPOXY PUTTY OR EPOXY COATINGS AS SPECIFIED IN SYSTEM A BEFORE RE-COATING WITH ANTIFOULING.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
A	ARPE <sup>8</sup>		1 FULL	125	2 COATS ARE BEST OPTIONAL 1 COAT AT 150μ
	VME <sup>8</sup>		1 FULL	125	
	CDPAF		1 FULL	75	
	CDPAF		1 FULL	75	
IF NOT DAMAGED:					
B	CDPAF		1 FULL	75	SEE NOTE ABOVE.
	CDPAF		1 FULL	75	
NOTE(S):		<ul style="list-style-type: none"><li>• ANTIFOULING SYSTEM SPECIFIED IS FOR 24 MONTHS SERVICE.</li><li>• NEW ANTIFOULING MUST BE COMPATIBLE WITH OLD ANTIFOULING.</li></ul>			
Definition(s):		<ol style="list-style-type: none"><li>1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM<sup>2</sup>) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.)</li><li>2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.)</li><li>3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013.</li><li>5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION.</li><li>6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME.</li><li>7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT.</li><li>8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS.</li><li>9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH/ HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING.</li><li>10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.</li></ol>			
ABBREVIATION(S):		ARPE = ABRASION RESISTANCE PURE EPOXY VME = VINYL MODIFIED EPOXY CDPAF = CONTROLLED DEPLETION POLYMER ANTIFOULING (TBT FREE)			

### 4.3.3 FIBERGLASS VESSELS: ABOVE WATER AREAS

FIBERGLASS VESSELS: ABOVE WATER AREAS					
VESSEL TYPE / CHARACTERISTICS:			Type of Specification:		
▪ FIBERGLASS			▪ BARE GELCOAT OR RECOATING		
ABOVE WATER AREAS			SYSTEM: POLYURETHANE (BEST PERFORMANCE) OR ALKYD OR MODIFIED ACRYLIC		
SURFACE PREPARATION:		PREFERRED METHOD IS SANDING METHOD AS DESCRIBED UNDER : "PAINTING OF FIBERGLASS VESSELS". (SEE SECTION 4.3) IF GELCOAT IS IN GOOD CONDITION, PROCEED TO THE PAINTING OPERATION. IF GELCOAT IS IN POOR CONDITION, SCRATCHES, CHIPS, AND CRACKS SHOULD BE REPAIRED USING EPOXY PUTTY AND FAIRING COMPOUND. REPAIRED AREAS SHOULD BE SANDED SMOOTH LIKE THE SURROUNDING AREA. SERIOUS CONSIDERATION SHOULD BE GIVEN TO APPLICATION OF 1 OR 2 COATS OF HIGH BUILD EPOXY PRIOR TO APPLICATION OF THE FINISH COAT. FOR REPAIRS/RE-COATING, WASH OFF OIL AND GREASE. WASH AND RINSE WITH FRESH WATER TO REMOVE DIRT AND SALT. REPAIR DAMAGED AREAS WITH EPOXY PUTTY AND FAIRING COMPOUND. SAND SMOOTH. TOUCH-UP REPAIRED AREAS WITH 1 OR 2 COATS OF THE FINISH COATING TO BE APPLIED. THEN APPLY 1 OR 2 COATS OF FINISH COATING. FOR NON-SKID FINISH ON DECK AREAS, USE GROUND NUT SHELLS 0.5 KG (1LB.) PER GAL OR POLYPROPYLENE BEADS, 0.25 KG (1/2 LB.) PER GAL., IN THE FINAL AND/OR BOTH COATS.			
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS μ	COMMENTS
A	(AR)PE <sup>8</sup> VME <sup>6</sup> PUF OR AME		1 OR 2 FULL	40 EA.	OPTIONAL OPTIONAL SEE ITEMS 2.8 AND 2.9, PAGE 2
B	OR AF		1 OR 2 FULL	40 EA.	
C	OR MAF		1 OR 2 FULL	40 EA.	
Definition(s):		1. HIGH PRESSURE FRESHWATER WASH SHOULD BE CARRIED OUT WITH A FAN JET LANCE PROVIDING NOZZLE PRESSURE OF APPROXIMATELY 3000 PSI (68 BAR / 210 KG/CM²) SUFFICIENT VOLUME OF WATER MUST BE PROVIDED. (SEE NOTES ON HYDROBLASTING UNDER SURFACE PREPARATION.) 2. GRITBLASTING AS USED IN THIS MANUAL MEANS BLAST CLEANING WITH VARIOUS TYPES OF GRIT, INCLUDING THOSE DERIVED FROM COPPER, NICKEL OR COAL BASED SLAG. OBSERVE STANDARDS FOR BLASTING MEDIA. (SEE NOTES UNDER SURFACE PREPARATION/ABRASIVE BLASTING.) 3. HARPE (HIGH ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 65-70 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1,000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS. 4. LFC (LOW FRICTION COATINGS) WITH VERY LOW DYNAMIC COEFFICIENT OF FRICTION WITH ICE, TYPICALLY -0.030 - 0.013. 5. ALL UNDERWATER ANTICORROSIVE COATINGS MUST BE COMPATIBLE WITH CATHODIC PROTECTION. 6. VME (VINYL MODIFIED EPOXY) TIECOAT INCREASE OVER COATING TIME BETWEEN PURE EPOXY COATINGS AND ANTIFOULING. IN SOME SYSTEMS, IT MAY FORM PART OF THE ANTICORROSIVE PAINT SCHEME. 7. SOME COATINGS MANUFACTURERS REQUIRE A SPECIFIC COATING SEQUENCE. ENSURE PROPER PRODUCT IS USED FOR FIRST AND SECOND COAT. 8. ARPE (ABRASION RESISTANT PURE EPOXY COATINGS) SHOULD HAVE A MAXIMUM 80-90 MG LOSS MEASURED ON TABER ABRASER USING A CS10 WHEEL, 1000 CL., 1000 GR. WEIGHT. HIGH TENSILE STRENGTH, GOOD EXTENSIBILITY AND GOOD IMPACT RESISTANCE ARE ALSO IMPORTANT FACTORS. SEE TABLE ON COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS. 9. POWER TOOL CLEANING WITH WIRE BRUSHES IS NOT NORMALLY RECOMMENDED. THIS METHOD TENDS TO POLISH THE SURFACE AND IS THUS DETRIMENTAL TO GOOD ADHESION OF COATINGS. IF/WHEN NEEDLE GUNS ARE USED THEY OFTEN PRODUCE A VERY ROUGH / HIGH SURFACE PROFILE. IT IS THEREFORE ADVISABLE TO LIGHTLY POWER DISC NEEDLE GUNNED AREAS PRIOR TO COATING. 10. PUF (POLYURETHANE FINISH) CAN BE ONE COMPONENT MOISTURE CURED TYPE OR TWO COMPONENT TYPE. HOWEVER, DO NO INTERMIX THE TWO TYPES IN ONE SYSTEM. MAKE SURE THE PRODUCT CHOSEN IS RE-COATABLE AND HAS INDEFINITE OVER COATING TIME. DO NOT CONFUSE THESE PRODUCTS WITH ONE COMPONENT POLYURETHANE MODIFIED ALKYD.			
ABBREVIATION(S):		ARPE = (ABRASION RESISTANCE) PURE EPOXY VME = VINYL MODIFIED EPOXY PUF = POLYURETHANE FINISH		AF = ALKYD FINISH MAF = MODIFIED ACRYLIC FINISH AME = ACRYLIC MODIFIED EPOXY	

**4.3.4 FIBERGLASS VESSELS: DECKS – WITH NO SKID EFFECT**

<b>FIBERGLASS VESSELS: DECKS – WITH NO SKID EFFECT</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			<b>Type of Specification:</b>		
▪ FIBERGLASS			▪ BARE GELCOAT		
<b>DECKS, WITH NO SKID EFFECT EMBOSSED IN GELCOAT</b>			<b>SYSTEM:</b> POLYURETHANE (BEST PERFORMANCE) OR ACRYLIC MODIFIED EPOXY OR ALKYD OR MODIFIED ACRYLIC		
<b>SURFACE PREPARATION:</b>					
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
<b>NOTE(s):</b>		<ul style="list-style-type: none"> <li>MANY DECKS HAVE A NON-SKID EFFECT MOLDED INTO THE GELCOAT. THIS AREA PRESENTS A PROBLEM TO PAINT BECAUSE IT NOT POSSIBLE TO CLEAN AND SAND AS DONE ON A SMOOTH SURFACE. IF PAINTING IS DEEMED DESIRABLE, WASH AND SCRUB SURFACE WITH A STIFF BRUSH, SOAP AND WATER (PREFERABLY WARM). FLUSH AND RINSE TO REMOVE ANY CLEANER RESIDUE. LET DRY. SCRUB SURFACE WITH BRONZE WOOL AND SOLVENT WASH, USING PLENTY OF CLEAN RAGS TO SOAK UP THE SOLVENT AFTER SCRUBBING. TREAT A SMALL AREA AT A TIME.</li> <li>WHEN SURFACE IS CLEAN AND DRY, APPLY 1 THIN COAT OF FIBERGLASS PRIMER, FOLLOWING INSTRUCTIONS ON THE CAN. WITHIN ALLOWABLE OVER COATING TIME, APPLY FIRST OF 1 OR 2 COATS OF SELECTED FINISH COAT. IF NECESSARY, GROUND NUT SHELLS, 0.5 KG (1 LB.) PER GAL OR POLYPROPYLENE BEADS, 0.25 KG (1/2 LB.) PER GAL., CAN BE ADDED TO THE PAINT FOR EXTRA NON-SKID EFFECT.</li> </ul>			
<b>Definition(s):</b>					
<b>ABBREVIATION(s):</b>					

## 4.4 Wood

### 4.4.1 PAINTING OF WOOD

<b>WOOD: (AS INSTALLED ON SHIPS)</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			Type of Specification:		
▪ ALL VESSELS, AS INSTALLED			▪ BARE WOOD		
<b>WOOD, PAINTED</b>			<b>SYSTEM:</b> CONVENTIONAL ALKYD OR MODIFIED ALKYD (SILICONE OR URETHANE MODIFIED)		
<b>SURFACE PREPARATION:</b>	<ul style="list-style-type: none"> <li>▪ SAND BARE WOOD WITH 80-100 GRIT PAPER. WIPE DOWN, USING LINT FREE RAG DAMPENED WITH MINERAL SPIRIT PAINT SOLVENT. IF OPEN GRAIN WOOD IS BEING PAINTED AND A SMOOTH FINISH IS DESIRED, USE A PASTE WOOD FILLER TO FILL THE GRAIN. SAND AGAIN AND WIPE DOWN. IF SOFT WOODS OR PLYWOOD IS BEING PAINTED, USE A KNOT AND WOOD SEALER TO SEAL THE SURFACE. FIR PLYWOOD IN PARTICULAR MUST BE SEALED. SEVERAL COATS OF SEALER MAY BE NECESSARY. APPLY SEALER COATS UNTIL THE POROUS GRAIN TAKES ON A GLOSSY APPEARANCE. ONCE GLOSS IS OBTAINED, SAND WITH 120 GRIT PAPER AND WIPE DOWN.</li> <li>▪ DEPENDING ON FINISH DESIRED, APPLY 1 OR 2 COATS OF UNDER COATER (OR PRIMER), SANDING BETWEEN COATS WITH 120 GRIT PAPER. NEXT, APPLY 2 COATS OF FINISH, SANDING BETWEEN COATS, USING 220 GRIT PAPER.</li> <li>▪ FOR INTERIOR USE, A 3-COAT SYSTEM WOULD BE CONSIDERED MINIMUM.</li> <li>▪ FOR EXTERIOR USE, A 4-COAT SYSTEM WOULD BE CONSIDERED MINIMUM.</li> </ul>				
	PRODUCT	COLOUR	NO. OF COATS FULL / TOUCH-UP	DRY FILM THICKNESS $\mu$	COMMENTS
<b>NOTE(S):</b>	<ul style="list-style-type: none"> <li>▪ TEAK IS NOT NORMALLY PAINTED. USE AN OIL FINISH TO MAINTAIN TEAK.</li> </ul>				
Definition(s):					
ABBREVIATION(S):					

## 4.4.2 VARNISHING OF WOOD

<b>WOOD: (AS INSTALLED ON SHIPS)</b>					
<b>VESSEL TYPE / CHARACTERISTICS:</b>			<b>Type of Specification:</b>		
▪ ALL VESSELS, AS INSTALLED			▪ BARE WOOD		
<b>WOOD, VARNISHED</b>			<b>SYSTEM:</b> <b>WOOD, VARNISHED</b>		
<b>SURFACE PREPARATION:</b>		<ul style="list-style-type: none"> <li>▪ A MULTITUDE OF DIFFERENT CLEAR FINISHES ARE AVAILABLE FOR BRIGHT WORK. A ONE COMPONENT POLYURETHANE VARNISH IS A GOOD CHOICE FOR INTERIOR WORK. THIS TYPE STAYS CLEAR WITH MINIMUM YELLOWING. FOR EXTERIOR WORK, CHOOSE A CONVENTIONAL BAKELITE VARNISH OR A POLYURETHANE TYPE WITH UV FILTER.</li> <li>▪ SAND THE WOOD WITH 80-100 GRIT PAPER. WIPE DOWN, USING LINT FREE RAG DAMPENED WITH MINERAL SPIRIT PAINT SOLVENT. OPEN GRAIN WOOD, SUCH AS MAHOGANY, MAY BE TREATED WITH A WOOD FILLER STAIN TO FILL THE GRAIN. AFTER FILLING, SAND AND WIPE DOWN. THE <u>FIRST COAT</u> OF VARNISH SHOULD BE THINNED 10-20% WITH APPROPRIATE SOLVENT. USE A SEPARATE CLEAN CAN FOR THE VARNISH THAT IS BEING THINNED FOR THE FIRST COAT. LET THE VARNISH STAND AFTER STIRRING UNTIL ALL BUBBLES HAVE DISAPPEARED. FOR SUBSEQUENT COATS, USE THIS CAN ON WHICH TO WIPE VARNISH BRUSH TO AVOID BUBBLES IN THE VARNISH CAN. USE THE BEST BRUSH AVAILABLE. WHEN FIRST COAT IS DRY, SAND LIGHTLY WITH 220-320 GRIT PAPER, THEN WIPE DOWN AND APPLY SECOND COAT. SAND AND WIPE DOWN BETWEEN EACH COAT.</li> <li>▪ <i>THE MORE COATS APPLIED THE DEEPER THE LUSTER OF THE BRIGHT WORK.</i></li> <li>▪ FOR INTERIOR USE, 4 COATS ARE CONSIDERED MINIMUM.</li> <li>▪ FOR EXTERIOR USE, 5 COATS ARE CONSIDERED MINIMUM.</li> </ul>			
	<b>PRODUCT</b>	<b>COLOUR</b>	<b>NO. OF COATS FULL / TOUCH-UP</b>	<b>DRY FILM THICKNESS <math>\mu</math></b>	<b>COMMENTS</b>
<b>NOTE(S):</b>		<ul style="list-style-type: none"> <li>▪ TEAK IS NOT NORMALLY VARNISHED. USE AN OIL FINISH TO MAINTAIN TEAK.</li> <li>• NO CLEAR COATING APPLIED ON WOOD WILL LAST FOR LONG PERIODS OF TIME. UV RAYS TEND TO PENETRATE CLEAR COATINGS AND DECOMPOSE THE WOOD FIBER TO WHICH THE VARNISH IS APPLIED. SHIELDING BRIGHT WORK FROM THE SUN "AS IN A BOAT HOUSE" GREATLY EXTENDS THE LIFE OF THE COATING.</li> </ul>			
<b>Definition(s):</b>					
<b>ABBREVIATION(S):</b>					

## 5.0 COMPARATIVE TECHNICAL DATA FOR ABRASION RESISTANT COATINGS

The figures below are given as a guidance in helping to choose the right coating for a particular application.

PRODUCT TYPE	TENSILE <sup>1</sup> STRENGTH N/MM <sup>2</sup>		EXTENSIBILITY <sup>2</sup> % INCREASE BEFORE FRACTURE		TABER VALUE <sup>3</sup> RESISTANCE TO EROSIVE WEAR MG/LOSS RANKING		RELATIVE <sup>4</sup> IMPACT RESISTANCE RANKING	DYNAMIC CO-EFFICIENT OF FRICTION	OVERALL ABRASION CAPABILITY (MAX = 20)
HIGH ABRASION RESISTANT / LOW FRICTION EPOXY COATING	24	3	3	3	60	4	4	0.030-0.013	14
HIGH ABRASION RESISTANT PURE EPOXY	25	3	2	2	65	4	4	N/A	13
ABRASION RESISTANT PURE EPOXY	30	4	2	2	85	2	4	N/A	12
NOTE(S):	TO ACHIEVE THE BEST PERFORMANCE FROM AN ABRASION RESISTANT COATING, SOUNDNESS OF SUBSTRATE AND ADHESION TO THAT SUBSTRATE ARE CRITICAL. AT MAINTENANCE / REPAIR DRY DOCKINGS THERE IS NO SUBSTITUTE FOR GRITBLASTING TO SA2½ STANDARD AND PRODUCING AN ANGULAR SURFACE PROFILE OF 75-100 MIC. THIS PREPARATION STANDARD IS THE OPTIMUM OVER WHICH ABRASION RESISTANT COATINGS WILL SOUNDLY ADHERE AND PERFORM TO THEIR MAXIMUM.								
1 & 2	ASTM D2370-68 ON INSTRON TENSOMETER. HIGHER VALUES INDICATE GREATER STRENGTH OR EXTENSIBILITY.								
3	MEASURED ON TABER ABRASER USING CS10 WHEELS, 1000 CL. A LOWER VALUE DENOTES BETTER RESISTANCE TO EROSION WEAR.								
4	ASTM D2794-69 ON GARDNER IMPACT TESTER. HIGHER VALUES DENOTES BETTER IMPACT RESISTANCE.								
5	OVERALL ABRASION CAPABILITY; GOOD RESISTANCE OF A COATING TO MECHANICAL DAMAGE IS TYPIFIED BY HIGH TENSILE STRENGTH, EXTENSIBILITY AND IMPACT RESISTANCE, COUPLED WITH A LOW TABER VALUE. THE OVERALL ABRASION CAPABILITY OF A COATING SCHEME IS THE SUM OF THE RANKINGS AND INDICATES THE OVERALL RESISTANCE OF A SYSTEM TO MECHANICAL DAMAGE IN SERVICE. FOR ICE BREAKER COATINGS WITH LOW FRICTION QUALITIES OTHER KEY FEATURES INCLUDE LOW TEMPERATURE OPERATION CAPABILITIES, LOW FRICTIONAL RESISTANCE IN ICE AND GOOD RESISTANCE TO ICE ADHESION.								



## 6.0 CATHODIC PROTECTION

The surface of steel plate is not electrically neutral overall, but is characterised by points of relatively high electrical potential.

When the steel plate is immersed in water, an electric current commences and corrosion occurs at those points where the current leaves the metal and enters the water (i.e. anodic areas). The remainder of the surface (i.e. cathodic areas) acts as a receiver of current and remains protected. This, in very broad terms, forms the basis of the corrosion cell.

In recent years, it has become common practice to preserve the steel by means of the superimposition of an artificially contrived current which tends to render the entire surface cathodic. In the case of the steel hull of a ship, the electrical potential is made some 150 to 200 millivolts, more negative than it was originally, by means of either sacrificial anodes or by a current generated from within the vessel and introduced via electrodes fitted in the hull.

To take the simpler case of the sacrificial anode system, the net result can be simply regarded as the zinc or aluminum anode material taking the place of the previously anodic steel surface, so that all of the steel is effectively more cathodic and therefore unlikely to corrode. Thus, this method of corrosion prevention is named cathodic protection.

An increasingly common fault is to refer to the degree of cathodic protection as "milliamps per square foot" or similar units. This unit is in fact a measure of the current required to raise the hull to the more negative potential and is largely dependent on the condition of the paint, the speed through the water, and the temperature of the water.

When referring to the degree of cathodic protection, the correct units are those of electrical potential, and are usually around 800 to 850 millivolts relative to the silver chloride reference electrode which is normally used to make such measurements.

### CORRECT CHOICE OF PAINT SYSTEM:

One of the side reactions of the above general process is that of alkali formation at the cathodic surface. This occurs under normal cathodic protection conditions, and is increased where over-protection (i.e. potentials more negative than 900 mv) occurs. Where an unsuitable paint system, or too high a potential, is used, the alkali causes saponification and degradation of the coatings, and electro-osmotic blistering frequently occurs.

It is therefore essential to be selective in the choice of coating. The various available systems are listed below, together with their relative suitability. It should be borne in mind that areas such as the boottop and lower topsides are affected by cathodic protection, as well as the bottom.

▪ Paints based on Alkyds, Epoxy Ester, Oleoresinous and Similar Resins:	These coatings contain oils or fatty acids, which are saponifiable, (i.e., attached by alkali). For this reason, they are not recommended for use on boottop, lower topsides or bottoms, in conjunction with any form of cathodic protection.
▪ Bituminous Aluminum, Chlorinated Rubber, Vinyl Tar and Vinyl Coatings:	These coatings are fully compatible with zinc and aluminum anode systems, and with impressed current cathodic protection (except in the vicinity of the impressed current anode) provided that a sufficient dry film thickness has been applied. With magnesium anodes, Coal Tar Epoxy system is recommended.
▪ Epoxy, Epoxy Hydrocarbon and Coal Tar Epoxy Systems:	These systems have perhaps the highest resistance to cathodic protection, and are fully compatible with both impressed current and sacrificial anode systems.

STRAY CURRENT CORROSION:

The opposite effect to cathodic protection is sometimes seen on vessels where, after electrical work on board, mounds of rust cover the immersed steel and deep pits are found beneath the rust.

The most likely cause of the problem is stray current corrosion. A leak of an alternating system is much less likely to cause corrosion of steel as the polarity changes rapidly and the steel surface alternates from being anodic to being cathodic. A direct current leak, such as that from welding, could make the hull of the vessel an anode and steel would tend to go into solution.

The rate of steel loss would be controlled by three factors:

- 1) The continuity of the coating (pinholes or areas of low thickness and low electrical resistance) and the amount of bare metal.
- 2) The voltage applied and the current available.
- 3) The relative resistance of the route to earth through the ship's ground and the leakage route through steel and seawater to earth.

In the absence of suitable cathodic protection, which is capable of ensuring the entire hull is maintained at all times at a negative potential, anodic steel will always corrode as the path to earth through bare metal or pinholes will always take some current as no matter how massive a ground or how short the path to earth, its resistance can never be reduced to zero. The low resistance of copper grounding wires might seem to eliminate the problem as:

- Copper has a resistance of 1.7 microhm-cm.
- Steel varies with composition, but 12 microhm-cm would be typical.
- Seawater varies with salinity, but 35,000 microhm-cm will serve as an example.

This indicates that seawater conducts electricity 20,000 times more poorly than copper. However, in practice, the current flow to ground is almost exclusively through seawater when the ship has limited grounding, because the area of bare metal is often much greater than the cross sectional area of grounding cables.

If there is a leak from the welding process, there is little resistance to steel going into solution. Iron has an atomic weight of 55.847 and an equivalent weight of 27.9235 (converting to the ferrous state).

A Faraday which is 96,489 coulombs will liberate 1 gram equivalent. Thus, one coulomb (amps x seconds) will dissolve  $27.9235 / 96,495$  grams of iron. A leak of 1 amp for 1 hour will liberate  $27.9235 \times 60 \times 60 / 96,495$  g or about 1.04 grams. Thus, each amp of current flowing through the hull to ground dissolves about 1 gram of steel per hour.

In six weeks (eight hour day: 5 days per week) a 10 amp leak would dissolve about 2.4 kilos of steel. As iron has an S.G. of 7.874, this corresponds to a volume of about 0.3 litres. This could translate into thousands of small pinholes or a 6" hole in one location.

If there are few pinholes in the coating and bare areas, the hull may well perforate as the metal loss would be concentrated. A perfect paint coating without a single pinhole or detached area could prevent such a problem, but this is virtually impossible to achieve.

The only way to prevent such mishaps is not to weld afloat or to have massive grounding, a deep water berth, extending the distance of the ship from the dock and putting multiple anodes over the side using heavy cables to limit the electrical resistance. These anodes may damage the paint coating. However, a damaged paint system is more easily repaired than a perforated hull and many high build epoxy and coal tar systems have excellent resistance to the effects of cathodic protection.

## 7.0 SURFACE PREPARATION

No paint system will give optimum performance over a poorly prepared surface. Painting over rust, grease or contaminated surfaces can be wasteful in terms of time and material. All paint systems fail prematurely unless applied over a suitably prepared surface.

### POOR PREPARATION MEANS COATING FAILURE:

In marine conditions, a paint system relies on a number of fundamental properties to give and maintain protection. These are:

- Compatibility with the surface to which it is applied.
- Resistance to water penetration.
- Resistance to attack by the elements and other agents in contact with it.
- Resistance to "wear and tear" in service.

### WHAT EFFECTS DO CONTAMINANTS AND RUST HAVE ON THOSE PROPERTIES?

Contamination and the products of corrosion, etc., can destroy or seriously impair adhesion. A paint system on an unsuitable surface will not have a secure foundation to resist abrasion or other mechanical stress to which it may be subjected.

Paint systems are not completely impermeable to water; salts in rust or on the steel surface may encourage blistering by osmosis. Contamination trapped between coats can cause adhesion failure and accelerate water penetration or penetration by other aggressive agents.

Corrosion products formed under the film have a larger volume than the steel from which they originated and can cause the film to rupture.

In all methods of preparation, the aim is to remove contamination and corrosion as far as practically possible to provide a sound and clean substrate for paint.

## 7.1 Surface Preparation Standards

### 7.1.1 Steel

The performance of the coating is dependent upon the proper and thorough preparation and pretreatment of the basic metal. Some of the various methods of surface preparation are listed below, but it should be noted that these are described in a condensed form. For more explicit details, please refer to full specifications such as:

- *Steel Structures Paint Council (SSPC), Pittsburgh, PA, USA*
- *Swedish Standard SIS 05 5900 - Pictorial Surface Preparation Standards for Painting Steel Surfaces*
- *Shipbuilding Research Association of Japan - Standard for the Preparation of Steel Surfaces prior to Painting*

### BLAST CLEANING

There are three well known commercial grades of blast cleaning. The recommended grade for a particular painting specification is determined by several inter-related factors, the most important being the coating system selected to protect the steel in the environment in which it is to be used. The approximate equivalence of the American, Japanese and Swedish Standards are:

**Surface Preparation Standards Comparison**

SYSTEM	AMERICAN	SWEDISH	JAPANESE
Solvent Clean	SSPC-SP1		
Hand Tool Clean	SSPC-SP2	St. 2 (approx.)	
Power Tool Clean	SSPC-SP3	St. 3	PT2:
Flame Clean (New Steel)	SSPC-SP4		
White Metal Blast	SSPC-SP5	Sa. 3	Sd3: and Sh3:
Commercial Blast	SSPC-SP6	Sa. 2	Sd1: and Sh1:
Brush Off Blast	SSPC-SP7	Sa. 1	Ss:
Pickling	SSPC-SP8		
Near White Metal Blast	SSPC-SP10	Sa. 2½	Sd2: and Sh3:
Power Tool to Bright Metal	SSPC-SP11		PT3:

#### WELDS

Welds too often receive but scant attention before painting. Surface preparation is most important here. Welding fluxes are strongly alkaline and residues are found after welding on or near the weld area which act as very efficient paint removers. The surface of the weld is usually rough with a range of high and low spots, and if painted in this condition, an inadequate coating of paint will result. Both welding flux and a rough finish can cause premature rusting and film failure. Correct treatment should include removal of all flux by water washing and grinding of welds and weld spatter. The use of some shop primers will greatly reduce the problem with weld spatter. It is also good practice to apply an extra coat of paint on weld areas.

The standard of blasting should be to the approved visual standard and degree of roughness. The profile of roughness will depend upon the abrasives used, the air pressure and the techniques employed, such as open blasting, vacuum blasting or automatic methods.

#### SURFACE PROFILE

The term surface profile or surface anchor is used to describe the height of the metal that extends from the pit or valley to the peak of the metal after blast cleaning and is influenced by the type of abrasive used, as shown in the following table:

ABRASIVE TYPE	MESH SIZE	MAXIMUM HEIGHT OF PROFILE
Very fine non metallic	80	37.5µ (1.5 mils)
Large non metallic	12	70 µ (2.8 mils)
Iron grit No G.16	12	200 µ (8.0 mils)
Iron shot No. S390	14	90 µ (3.6 mils)

### **7.1.2 SHOP PRIMED STEEL**

Because the use of a shop primer is so common in shipyards today, it is important to have a standard for secondary surface preparation of shop primed surfaces, welds and damages prior to protective painting.

The following standards are from the Japanese publication "*JSRA - Standard for Preparation of Steel Surfaces Prior to Painting*" (SPS 1984):

JSRA PT1	}	Power tool cleaning standards.
JSRA PT2		
JSRA PT3		

When using power tooling: at new construction, the JSRA Pt standards are more relevant whereas at maintenance and repair, the Swedish St standards are more relevant.

Shop primers must be treated correctly before over coating to ensure optimum performance.

### 7.1.3 Non Ferrous Metals

#### ALUMINUM

Solvent cleaning, steam cleaning and recognized chemical pretreatments are acceptable methods of surface preparation. For large vessels a light abrasive blast is the preferred surface preparation. Application of an etch primer is sometimes recommended before painting. See also section on Painting of Aluminum.

#### GALVANIZED STEEL

Solvent cleaning to remove surface contaminants is necessary before painting new galvanized surfaces. A pretreatment with an etch primer or a zinc dust based primer is also recommended.

Galvanized steel which has been treated with a proprietary chromate or silicate product immediately after galvanizing must be allowed to weather for several months before pretreatment with an etch or zinc dust primer. An alternative method is to abrade the surface to remove the surface treatment.

#### COPPER AND LEAD

Solvent cleaning and abrasion or very careful abrasive blasting using low pressure and non-metallic abrasives are satisfactory methods of preparing the surface.

#### OTHER NON FERROUS METALS

Solvent cleaning and an application of an etch primer is recommended before painting.

## 7.2 Technique for Surface Cleaning

#### BLASTING

A corroded or "dirty" steel surface can be very rapidly and effectively cleaned by abrasive blasting. Using a medium (air is most common), abrasive particles (grit, sand, etc.) are propelled at high speed through a nozzle to impact on the surface, removing corrosion and contamination.

A grit size in the range 0.3 - 1.5 mm (12-60 mils) has proven to be the most cost effective in terms of production rates and in achieving specified standards especially when preparing pitted surfaces.

The rate of cleaning using mineral slags (grit) is usually greater than when using sand and reduces the health risk associated with silica.

#### SPOT BLASTING

This localized abrasive cleaning is often carried out on the outside of the hull of a vessel where patchy corrosion has occurred. It will effectively remove corrosion and yield surfaces cleaned to standards described in the Swedish pictorial booklet. In practice there are some precautions which need to be taken in order to prevent subsequent breakdown:

- The surrounding paint film can be undercut by the abrasive particles and the edges around the blasted patch loosened from the steel surface. If this occurs, the loose edges must be removed by thorough scraping or feathering, using a rotary disc.

**Surface Preparation**

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- The surrounding paint will be peppered by stray abrasive particles and the protective value of the scheme in the vicinity may be destroyed. In making good the protective coating system, it is necessary to treat the area of damage around the blasted patch.
- Damage can also occur in the areas between patches if the jet of abrasive particles is played across the surface. Blasting should be discontinued whilst moving from one patch to the next. Any damage which is sustained in this way should be made good as described above.
- It is recommended that, whenever possible, the patches to be blasted should be defined by "chalking in" the boundaries.

GRIT BLASTING

When large areas of a vessel's hull or tanks are cleaned by grit blasting, a variety of steel surface conditions will be found. Previously coated or superficially corroded steel, can be readily cleaned to Sa2½. However cleaning heavily corroded or pitted surfaces is more difficult and Sa2½ may not be practically achievable.

The effectiveness of various types and particle sizes of abrasives has been examined in carefully controlled practical trials and the most efficient grit particle size for corroded steel is found to be mineral slag with a range of 0.3 - 1.5 mm (12-60 mils).

After blasting, surface dust must be removed. In open conditions, blowing with dry compressed air from the blasting kettle is satisfactory. Tanks however require careful cleaning, normally using vacuum cleaners to remove all grit and dust particles.

SWEEP BLASTING

Sweep blasting is the treatment of a surface by the sweeping of a jet of abrasive across the surface. Its effectiveness depends on the nature and condition of the surface, the type and particle size of the abrasive and above all, the skill of the operator.

a) Light sweeping

Rapid sweep blasting will clean the surface of contamination or loose coatings. It may be used to etch the surface of an existing hard and tough coating to improve the adhesion of the following coat. Superficial corrosion such as that found on weathered shop primed steel also responds well to this type of treatment, but more deep seated corrosion is not removed. Where such removal is required, Sa 2½ by "full blasting" is most suitable when the paint surface under treatment is not to be destroyed (grit or sand particle size -0.2 - 0.5 mm (8-20 mils).

b) Hard/heavy sweeping

The old coating is removed to shop primer or bare steel. The surface standard of steel exposed will vary but all standards, nevertheless, are satisfactory provided rust scale has been removed. Particle size considerations are the same as those described in the sections dealing with blasting/grit blasting.

HIGH PRESSURE FRESHWATER CLEANING

The operation consists of directing a high pressure freshwater jet at the surface. As with sweep blasting, the effect will depend on the nature and condition of the surface and also on the pressure of water. Distance of the nozzle from, and angle of the jet to the surface, will also have an effect. Usually for removing surface contamination or weed fouling, pressures in the range 2000 - 3000 psi (140-210 kg./ sq.cm.) are employed. Shell fouling may resist the water jet. See the section on Shell Fouling.

Pressures as high as 5000 psi (350 kg./sq.cm.) are used when weak or poorly adhering coatings are to be removed. Even at these high pressures, firmly adhering paint will not be damaged.

#### WATERBLASTING WITH ABRASIVE (SLURRY BLASTING)

For slurry blasting, abrasive is introduced into the freshwater stream. It can be used for the removal of tenacious and tough coatings and corrosion scale to give satisfactory results. There are various types of equipment on the market which vary in the method of mixing the abrasive and the water.

Normally this method is restricted to pressures up to 3000 psi (210 kg./sq.cm.). By careful selection of abrasive and adjustment of pressure, precise results can be obtained such as removal of spent antifouling from anticorrosive without undue damage to the anticorrosive surface. If damage to the underlying coatings does occur, the broken areas should be made good.

Flash rusting on exposed steel surfaces is normal after slurry blasting. The cleaned surface will oxidize rapidly whilst wet. Some proprietary inhibitors have been used by operators to prevent flash rusting, but at present these are not recommended. Particularly not on under water areas and must be removed by freshwater hosing prior to coating application. It is recommended that loose deposits produced on the surface should be removed by rotary wire brushing. The remaining firmly bonded ginger coloration provides an acceptable surface for most exterior coatings.

#### POWER ROTARY WIRE BRUSHING

The brushes used on this type of equipment consist of steel bristles which bend in contact with the surface. As a result, rust scale is often polished rather than broken away from the surface.

Rust scale is not easily removed and a method such as this fails to give a clean surface. However, it does have some value in the treatment of superficially rusted surfaces, such as the flash rusting present after water blasting and the superficial corrosion on the peaks of shop primed steel where breakdown is still at an early stage.

#### ROTARY POWER DISCING

This method is effective in producing a surface suitable for the application of most types of coating. The silicone carbide pads will effectively abrade the rust scale from the surface of the steel substrate. To penetrate deep pits, conical carborundum heads must be used. When this method is employed for complete removal of corrosion in localized areas, it can be efficient, but the physical effort required is great, particularly when overhead surfaces are treated. Although theoretically this method can be used for large areas, the operator's endurance limits its use and constant control is required because effectiveness is so closely allied to operator effort.

#### MANUAL TREATMENTS

The term "slicing" refers to manual scraping using a sharp bladed implement. This together with wire brushing and chipping are the traditional, but ineffective methods of removing corrosion. Scraping has been used for many years to remove the more obvious loose rust scale and loose paint coatings. However, it fails to remove the compacted scale and the salts which are contained within that scale. Chipping can remove scale in small areas but a considerable portion remains fixed to the surface and this layer is probably the most chemically reactive part of the scale. Hand wire brushing will remove loose, powdery, superficial corrosion but is inadequate for the removal of corrosion scale.

#### MECHANICAL CHISELS

These instruments, usually air-driven, consist of either vibrating needles or chisel edges which pound the surface to break away corrosion scale. This method is more effective than hand cleaning, but a proportion of scale will still be left on the surface and cleaning is only effective at the point of contact.

Points of impact can show as bright points of steel particularly with the chisel edge device, but the areas between these points could still bear a layer of corrosion.

### **7.3 Common Surface Contaminants**

#### OIL AND GREASE

The presence of even a very thin layer of oil or grease can destroy or seriously impair adhesion of paint. Solvents (e.g., paraffin or mineral spirit) can be used to dissolve the grease, but the problem then becomes one of completely removing the solution of oil in the solvent. Drying with cloths is only effective if two or three treatments are carried out, each time drying with clean cloths. A single treatment is rarely satisfactory and can aggravate the situation by spreading the oil or grease over an area greater than originally affected.

Commercial chemical cleaners are available but before they are used it must be determined that they will not adversely attack the painted surface. It is usual to apply sufficient cleaner to incorporate the contaminant, leave for a few minutes and then hose down thoroughly with fresh water. It is imperative that all traces of the cleaner should be removed before painting.

#### SALTS

Sea salts are fairly easily dissolved by fresh water. Surfaces should therefore be thoroughly hosed with fresh water.

The major difficulty however, is not the solubility of the salt but surface irregularities and porosity. Fine hair cracks in a paint surface can hold salt quite tenaciously. Spent and spongy antifouling films also prevent easy salt removal.

For this reason, high pressure freshwater washing should always be used to flush out all the salt from the surface cracks and crevices. If high-pressure freshwater washing is not available then normal fresh hosing with thorough scrubbing should be employed. This is time consuming, but necessary, as to paint over salt residues will certainly lead to detachment or blistering of the fresh paint.

#### WEED FOULING

The term "weed fouling" is meant to encompass not only those organisms which are readily recognized as marine weeds, but also the algal slimes which are often only visible when wet.

They are most effectively removed by high pressure freshwater washing, the pressure being in the range of 2000-5000 psi (140-350 kg./sq.cm.).

If high pressure freshwater washing equipment is not available, scraping, hosing and scrubbing should be employed. Results are not as good as high pressure freshwater washing, but with care and attention, a satisfactory result can be achieved. It must be remembered that with manual methods, the final phase of the operation should be to thoroughly hose the surface with fresh water.



SHELL FOULING

Acorn barnacles, tubeworms, etc., are much more difficult to dislodge from a surface than weed. Quite often high pressure water washing will not remove acorn barnacles, although other species such as goose necked barnacles, tubeworms and hydrozoa may be removed. In all cases, the first step should be to determine the effect of high pressure freshwater cleaning.

Those organisms which resist removal by high pressure freshwater washing should be removed by scraping, although in many cases it will be found that either shell bases remain or else the underlying paint coatings are broken. After scraping, the surface should be re-washed to clear away all the shell splinters, tissue remnants and soluble material.

## **7.4 Abrasive Blasting**

The subject of abrasive blasting and selection of the abrasives used in this operation is large and complex. Detailed information can be found in special publications such as those issued by SSPC and NACE.

It is an accepted fact that the performance and service life one can expect from high performance coatings is directly linked to the "surface standard" over which they are applied. On ships, the most critical areas are the immersed areas such as the underwater area of the hull and areas in tanks, double bottoms, etc. High abrasion resistant low friction coatings used on ice breakers demand exact surface standards. To achieve this standard, the right type and size of abrasive must be used along with proper air pressure and blasting nozzle. It is up to the contractor carrying out the job to supply the necessary materials and equipment to achieve the specified standard. It is up to the shipowner to ensure the end result is as specified.

Before blast cleaning takes place, deposits of oil, grease and salt must be removed. It is wrong to think that salt on a ship's bottom will be removed by the abrasive blasting operation. Clean dry compressed air, free of oil, must be used for blasting. Moisture separators, oil separators, traps or other equipment may be necessary to achieve this requirement. Abrasives used should have the following characteristics:

- |    |  |                        |
|----|--|------------------------|
| 1. | Low soluble salt content                             | 0.05% maximum          |
| 2. | Low oil content (if applicable)                      | 10 mg/kg maximum       |
| 3. | Hardness factor                                      | 6 - 7 MOHS range       |
| 4. | Shatter index (low dust)                             | 18-25 Range            |
| 5. | Low silica content                                   | 1% free silica maximum |
| 6. | Qualities that offer minimum grit impingement        |                        |
| 7. | Correct grit size to obtain desired surface profile. |                        |

The surface profile produced by a certain grit is not only dependent on the size of the grit but also on factors such as air pressure at nozzle, distance of nozzle from surface, etc. The supplier of the abrasive should furnish all necessary details prior to the start of blasting.

The following table, compiled from various sources, may be of some guidance:

ABRASIVE TYPE	MESH SIZE PRODUCT DESIGNATION	EXPECTED SURFACE PROFILE IN MICRONS (AT APPROXIMATELY 100 PSI)
Mineral, very fine	80	40
Mineral, fine	40	50
Mineral, medium	18	65
Mineral, heavy	12	70
Steel Grains, G80	40	30 – 75
Steel Grains, G50	25	85
Steel Grains, G40	18	90
Steel Grains, G25	16	100
Steel Grains, G16	12	200
<b>Copper, Nickel, Copper Based Slag:</b>		
▪ Black Beauty	4016R	60 – 75
▪ Black Beauty	4016M	60 – 75
▪ Black Beauty	400M	40 – 50
▪ Black Beauty	400R	60 – 75
▪ Black Lightening	20/40	50 – 60
▪ Black Lightening	12/40	85 – 100
▪ Pure Grit	20/40	40 – 60
▪ Pure Grit	16/30	60 – 85
▪ Ebony Grit	EG20	60 – 75
▪ Ebony Grit	EG12	85 – 100
▪ Ebony Grit	EG8	100 – 112
▪ Bar Shot	#50	40 – 50
▪ Bar Shot	#30	60 – 85
▪ Bar Shot	#20	100 – 125

## 7.5 Hydroblasting

Hydroblasting is increasing in popularity due to several advantages it has over dry abrasive blasting. The term hydroblasting, hydrojetting and water jetting essentially describe the same process. However, there can be confusion over the difference of water washing and hydroblasting. To clarify the difference, below are listed terms from SSPC/NACE standard.

- **Low pressure water washing:**  
Operates at pressures less than 1,000 psi (68 bar)
- **High pressure water washing:**  
Operates at pressures between 1,000 - 10,000 psi (68-680 bar)  
(3,000 psi is recommended for high pressure freshwater wash of ships.)
- **High pressure hydroblasting:**  
Operates at pressures between 10,000 - 25,000 psi (680-1,700 bar)
- **Ultra high pressure hydroblasting:**  
Operates at pressures above 25,000 psi (1,700 bar) with most machines operating in the 30,000 - 36,000 psi range (2,000 - 2,500 bar)

Hydroblasting is a technique for cleaning surfaces, which relies entirely on the energy of water striking a surface to achieve its cleaning effect. Abrasives are not used in hydroblasting operations. Consequently, the problem caused by dust pollution and by the cleaning up and disposal of spent abrasives are eliminated. Two different hydroblasting operating pressures are commonly encountered.

- **High pressure and ultra high pressure (see above):**  
Excellent results can be achieved by hydroblasting and surface preparation standards have been established, similar to those for dry abrasive blasting. Visual standards (pictorial standards) are available from major marine coatings manufacturers many of whom today produce high performance coatings designed to be applied to hydroblasted surfaces.

## 8.0 PAINT APPLICATION

The object in applying a paint coating is to provide a film which will give protection and decoration to the surface being painted. The success of any paint application will be governed by a number of parameters, including, surface preparation, film thickness, conditions during application, and methods of application.

### SURFACE PREPARATION

The importance of surface preparation to the success of a paint system cannot be over-emphasized. A separate section on surface preparation has been included in this manual.

### FILM THICKNESS

An adequate film thickness is essential for the success of any coating system. Under application will generally result in premature failure for obvious reasons. However, the old adage of "the more paint, the better" can be equally dangerous. The gross over application of modern high technology paint coatings can lead either to solvent entrapment and subsequent loss of adhesion, or to splitting of primer coats. With the majority of coatings, the limits of acceptable dry film thickness allow for reasonable practical variation, but the correct film thickness should always be the target during application.

The actual dry film thickness recommended for a particular surface will depend on the type of paint system being used and the nature of the surface. Recommended dry film thicknesses for individual products are given on the Product Data Sheets and System Specification Sheets.

### CONDITIONS DURING APPLICATION

#### APPLICATION CONDITIONS

When applying marine paints, the most important factor to consider are the state of the surface, the surface temperature and the atmospheric conditions at the time of painting. When a vessel enters drydock, the hull temperature up to the floating line will usually be that of the sea water. Above the floating line, the steel temperature will be closer to atmospheric.

During the night, steel temperatures fall. They rise again during the day, but there is always a lag in movement of steel temperature compared to the atmospheric condition, so condensation on the steel surfaces is possible.

Condensation will occur if the steel temperature is below the dew point of the atmosphere. If this is likely to be a problem, the ship should be totally emptied of ballast water to reduce its thermal mass as soon as possible after entering drydock.

Bad weather is a familiar problem to those using marine paints. Relative humidity itself rarely creates a problem. Most paints will tolerate high humidities, but humidity should not be permitted to lead to condensation on the surface being painted. In order to determine whether or not a surface is wet, the steel temperature should be measured using a surface temperature thermometer and the dew point calculated after measurement of humidity with a hygrometer. Paint application should not take place when steel temperature is less than 3°C (5°F) above the dew point.

Paint should not be applied when surfaces are affected by rain or ice. Some two pack paints (certain epoxies for example) should not be applied at low temperatures as curing may be retarded.

#### EXTREME CONDITIONS

Generally, extreme conditions refers to temperatures below 5°C (41°F) or above 35°C (95°F).

Below 5°C (41°F), the curing of paints such as epoxies slows down dramatically and for some paints, curing stops altogether. However "Cold Curing Catalysts" are available for many epoxy coatings. These products can be successfully applied and will cure at temperatures as low as -7°C (19°F) to -10°C (14°F). Product data sheets should be consulted for curing times and limitations. Other marine paints are not so severely affected. Chlorinated rubbers and vinyls are quite suitable for use at temperatures below 0°C (32°F) provided that the surface is clean and free from ice or frost.

At the other extreme, 35°C (95°F) and above, the drying and curing of paints is rather rapid and care should be taken to avoid dry spray. This is caused by the too rapid loss of solvent from paint droplets between the spray nozzle and the surface. It can be overcome/avoided by:

1. Keeping the spray gun at the minimum suitable distance from the work piece, spraying consistently at 90° to the surface being painted.
2. Adding thinners, if necessary, up to a maximum of 5% by volume.

#### METHODS OF APPLICATION

##### AIRLESS SPRAY

An airless spray gun atomizes a paint stream by ejecting it at a high pressure from a specially designed tip.

All the normal range of marine paints for ship stores and maintenance can be applied by airless spray.

This is the quickest method of applying paint and higher film thicknesses can be obtained. Problems may arise if too little or too much paint is applied.

Some paints are designed to be applied at a high film thickness. Others, such as conventional finishing paints are not. The data sheet will show a typical film thickness. To avoid over-application, the recommendations for each product shown on the appropriate data sheet should be followed.

The area sprayed should be within a comfortable distance of the operator to avoid a long traverse of the jet or arcing of the gun.

It is essential that due regard be paid to safety because an airless spray gun ejects a paint stream under very high pressure, and injury can be caused if the jet is directed at someone close by. The skin can be easily penetrated.

##### CONVENTIONAL SPRAY

A conventional spray gun forms paint droplets by mixing air with the paint stream but turbulence will be rather higher than with airless spray. To ensure the paint is fully dispersed in fine droplets, its viscosity must be low. Conventional, decorative materials and water based zinc silicates are the most common conventionally sprayed marine coatings.

##### BRUSH/ROLLER APPLICATION

Brush Application	This method is relatively slow but is generally used for decorative paints or for coating small areas. It is particularly suitable for coating complex and complicated areas where the use of spray application can not be justified. With most high build coatings it is not possible to achieve the desired film thickness in the same number of coats as for example if the application was done by airless spray. Multi-coat applications may therefore be necessary to give the specific film build.
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**Roller Application** This method is faster than brush on large even surfaces and can be used for the application of most decorative paints. Control of film thickness is not easy to achieve however, and the same constraints as brush application generally apply. Particular care must be taken, by selection of the correct roller pile length, when coating rough or irregular surfaces.

## 8.1 Volume Solids

### 8.1.1 Volume Solids Measurement

The volume solids of a paint is the ratio of the volume of its non volatile components to its total wet volume and this determines the theoretical coverage or spreading rate on a flat substrate.

Traditionally, this figure was calculated from the paint formulation but, since this took no account of factors such as pigment packing, solvent retention, or film contraction, the actual number bore little relation to practical coverage. Also, since these factors vary in importance between paint types, the calculated volume solids can result in an under estimation of coverage on some generic types of paint and an over estimation on others.

To overcome this problem, many paint manufacturers use a more practical method to establish a paint's "volume solids".

The method used measures the dry film thickness obtained from a measured wet film thickness, and volume solids is given by:

$$\text{Volume solids} = \frac{\text{measured d.f.t.} \times 100}{\text{measured w.f.t.}}$$

### 8.1.2 Measurement of Volume Solids in the Laboratory

Utilizing the above method, the volume solids figures quoted in data sheets have been measured in the laboratory by applying paints at their recommended film thickness, allowing the film to dry at 23°C (± 1°C) for seven days, then determining the dry film thickness.

### 8.1.3 Special Situations - Zinc Paints

The volume solids of such paints are determined by different means because they are so highly pigmented. The high pigment loading means that the dry film contains voids and the extent of the voids is dependent, to some extent, on techniques of application. An alternative method of measuring volume solids has therefore been used to circumvent the variable void content of the dry film and thus provide a consistent figure.

### 8.1.4 Paint Losses - The Conversion of Theoretical (or Ideal) to a Practical Spreading Rate

It is very difficult to give accurate estimates of the quantity of paint required for a particular job in spite of the accurate data the paint manufacturer gives about the products. The data refers to paint in the can, but converting paint in the can to a film of paint involves variable "losses". Losses are defined as the difference between the quantity of wet paint actually used and the quantity of wet paint calculated as necessary from the theoretical spreading rate for the measured area involved. By far, the biggest discrepancy in practice results from an inability to distribute paint evenly. Measured dry film thickness at any one point is either well below or above the target thickness. It may be stipulated that the measured thickness should not fall below a minimum.

Typically, such guidelines takes the form: "95% of readings will be at the specified thickness or better and no reading will be less than 80% of specified". Attempts to ensure that the minimum thickness requirements are met everywhere means applying more paint than the calculated "theoretical". Experience shows that paint losses can be large. In the past, there has been a tendency to use loss factors which are too low, especially where minimum thicknesses are specified.

### 8.1.5 Excessive Use of Paint - Apparent Losses

#### EFFECT OF THE BLAST PROFILE

When steel is roughened by abrasive blasting and painted, if the thickness of applied paint is measured by a magnetic gauge, e.g., Elcometer (or similar instrument), the thickness actually measured is closer to the average thickness over peaks and valleys than it is to the thickness over the peaks. It is the thickness over the peaks in general however, which is important in relation to performance. Therefore, it can be considered that the paint which does not contribute to this thickness is "lost in the steel profile".

The surface roughness produced by the blasting and hence the extent of the paint loss is proportional to the dimensions of the abrasive used. Laboratory experiments have in fact shown that a loss in d.f.t. equivalent to half the blast profile amplitude usually applies. Where steel has been blasted by small round steel shot and shop primed, the influence of the fine surface roughness on paint loss is low, but when in-situ blasting is carried out, particularly with coarse grit, then the allowance necessary for paint "lost in profile" is considerable. The tabulated "losses" in dry film thickness are suggested for relevant roughness likely to be encountered.

Surface	Blast Profile	D.F.T. "Loss"
Steel prepared by wheelabrator using fine round steel shot and shop primed.	0 - 50 $\mu$	10 $\mu$
Fine open blasting (e.g. J. Blast Super).	50 - 100 $\mu$	35 $\mu$
Coarse open blasting (e.g. J. Blast A).	100 - 150 $\mu$	60 $\mu$
Old "honeycomb pitted" steel - reblasted.	150 - 300 $\mu$ (or more)	125 $\mu$

#### WET FILM THICKNESS MEASUREMENT

In addition to the magnetic gauge measuring closer to the average thickness over peaks and valleys, wet paint shrinks into valleys during drying. Wet film quoted on data sheets will only provide the correct dry film thickness on a smooth surface. The first coat on blasted steel should have additional wet paint applied depending upon the blast profile. As a rule of thumb, multiply half the average profile height by 100 and divide by the volume solids. A 3 mil profile and a 50% volume solids paint would require an additional 3 mils wet ( $3/2 \times 100/50$ ) to compensate for paint "losses" into the profile.

#### PAINT DISTRIBUTION LOSSES

This is the loss of paint resulting from over-application, when a competent painter is attempting to achieve the minimum paint thickness specified with reasonable certainty. The extra paint used over and above that calculated from the ideal spreading rate in this case is very dependent on the type of structure being painted, e.g., a simple (un-complicated) shape with a high proportion of flat surfaces should not incur heavy losses, but if the job is complicated by the presence of many stiffeners or if there is open lattice work involved, then, obviously losses will be high.

The following very approximate over-applications are suggested as being appropriate for the situations mentioned:

STRUCTURES	BRUSH & ROLLER "Loss"	SPRAY "Loss"
Simple	5%	20%
Complex (including stripe coat)	10 -15%	60% (single coat) 40% (two coats) 30% (three coats)

Where open lattice work is sprayed, no close estimate can be made of paint distribution loss.

### 8.1.6 PHYSICAL LOSS OF PAINT - ACTUAL "LOSSES"

#### APPLICATION LOSSES

This factor applies to a *real* loss of paint during the painting operation, i.e., paint which drips from a brush or roller during the transfer from the paint container to the surface to be painted. If the painter is careful, this can be discounted as a significant contribution to the overall "loss". The use of "extension handles" to extend the painter's reach, however, can increase this type of loss, and in an extreme case, could result in a 5% loss.

When application is by spray, losses are inevitable and their magnitude obviously dependent on the shape of the structure being painted together with conditions of air movement. The following losses are common:

Well ventilated, but confined space	5%
Outdoors, in almost static air	5 - 10%
Outdoors, in windy conditions	over 20%

Obviously, this last figure can become ridiculously high if painting is attempted in extremely windy conditions.

#### PAINT WASTAGE

Some paint wastage is inevitable even by a highly disciplined contractor; paint is spilt, a certain amount remains in the discarded containers and in the case of two pack materials, mixed paint may be left beyond its pot life. (This is most common with protective primers.) The following losses are common:

Single pack paints	No more than 5%.
Two pack paints	5 - 10%

## 8.2 Conversion of Theoretical to Practical Spreading Rate

These four distinctly separate factors must be considered when estimating the practical spreading rate for paint.

	FACTORS	
APPARENT LOSS	1.1	Surface roughness
	1.2	Distribution
ACTUAL LOSS	2.1	Application loss
	2.2	Wastage

*Factor 1.1* applies effectively to the first coat alone.

*Factors 1.1 and 1.2* should be added.

*Factors 2.1 and 2.2* should be compounded.

The most convenient way to assess the total "loss" from all factors is to calculate it in terms of dry film thickness. The following example will illustrate the calculation and choice of appropriate factors.

**Example:** Two coats of two-pack paint are applied by spray in a confined space to a shotblasted and shop primed surface to yield a d.f.t. per coat of 125 $\mu$  (i.e. 250 $\mu$  total d.f.t.). Theoretical spreading rate for the paint at the recommended film thickness is 5.0 m<sup>2</sup>/litre. What is the practical spreading rate?

Consider 1st coat	125 $\mu$ Required
Loss due to surface roughness	10 $\mu$
Loss due to distribution - 40% (i.e. 125 x 0.4)	<u>50<math>\mu</math></u>
	185 $\mu$
Loss due to application - 5% (i.e. 185 x 0.05)	<u>9.25<math>\mu</math></u>
	194.25 $\mu$
Loss due to wastage - 10% (i.e. 194.25 x 0.1)	<u>19.42<math>\mu</math></u>
	213.67 $\mu$
Extra paint used (213.67 - 125) = $\frac{88.67}{125} \times 100 =$	70.9%
<b>Consider 2nd coat</b>	<b>125<math>\mu</math> Required</b>
Loss due to surface roughness	50 $\mu$
Loss due to distribution - 40% (i.e. 125 x 0.4)	<u>175<math>\mu</math></u>
	175 $\mu$
Loss due to application - 5% (i.e. 175 x 0.05)	<u>8.75<math>\mu</math></u>
	183.75 $\mu$
Loss due to wastage - 10% (i.e. 183.75 x 0.1)	<u>18.37<math>\mu</math></u>
	202.12 $\mu$
Extra paint used: (202.12 - 125) = $\frac{77.12}{125} \times 100 =$	61.7%
Total loss for two coats: $\frac{70.9 + 61.7}{2} =$	66.3%
or $\frac{(213.67 + 202.12) - 250}{250} =$	66.3%

In other words, for the two coat system, 66.3% more paint has been needed than would have been calculated from the ideal spread rate.

#### LOSS FACTORS

In the example, the theoretical spreading rate is one litre of paint per 5 sq. meters. In practice, 1.66 litres of paint can be expected to cover 5 sq. meters.

$$\text{Practical spreading rate} = \frac{5}{1.66} = 3 \text{ m}^2/\text{litre}$$

It has been customary in our industry to refer to "loss factors" i.e., the difference between theoretical spreading rate and practical spreading rate expressed as a percentage of the theoretical spreading rate. In the above example,

$$\text{Loss factor} = \frac{5 - 3}{5} \times 100 = 40\%$$



### 8.3 Coating Calculations

The calculation of the theoretical coverage or spreading rate of a paint is determined from the volume solids. The volume solids is determined by the coatings manufacturer and listed on the product data sheets. In metric measure, one litre of paint with a 100% volume solids content will cover 1000 square meters at a dry film thickness of one micron. Therefore, the theoretical coverage of any paint can be calculated as follows:

$$\frac{1000 \times \% \text{ vol. sol.}}{100 \times \text{DFT } \mu} = \text{Theoretical coverage in square meters per litre.}$$

In Imperial measure, one Imperial gallon of paint 100% volume solids will cover 1926 sq. ft. at a dry film thickness of one mil. (0.001"). Therefore we have:

$$\frac{1926 \times \% \text{ vol. Sol}}{100 \times \text{DFT mils}} = \text{Theoretical coverage in sq. ft. / Imperial gallon.}$$

In US measure, one US gallon of paint at 100% volume solids will cover 1604 sq. ft. at a dry film thickness of one mil. (0.001").

$$\frac{1604 \times \% \text{ vol. sol.}}{100 \times \text{DFT mils.}} = \text{Theoretical coverage in sq.ft. / US gallon.}$$

For example for an epoxy coating with a volume solids content of 80% and a specification that calls for a DFT of 5 mils (125 $\mu$ ).

$$\frac{1604 \times 80}{100 \times 5} = 257 \text{ sq.ft. / US gallon}$$

Other useful calculations are:

$$\frac{\text{DFT} \times 100}{\% \text{ sol. vol.}} = \text{wet film thickness (mils)} \\ \text{(needed to be applied to reach desired DFT)}$$

$$\frac{1604 \times \% \text{ sol. vol.}}{100 \times \text{coverage (sq.ft. / US gal.)}} = \text{dry film thickness (mils)}$$

$$\frac{1604 \text{ sq.ft.}}{\text{wet film thickness}} = \text{spreading rate}$$

$$\% \text{ vol. sol.} \times 1604 \text{ sq.ft.} = \text{coverage at 1 mil}$$

$$\frac{\text{cost per gal.}}{\text{coverage at 1 mil}} = \text{cost per mil/sq.ft.}$$

$$\frac{\text{cost per gal.}}{\text{coverage at } x \text{ mil}} = \text{cost per sq.ft. at } x \text{ mil}$$

**Note:** 1 mil = 25 microns ( $\mu$ )



## 9.0 PAINT INSPECTION

The potential life of a coating system can be realized if it is correctly applied to a suitably prepared surface, under the correct environmental condition. Preparation and the subsequent coating application is labour intensive and therefore subject to operator abuse. The process itself is susceptible to adverse environmental influences throughout all stages of the work. Inspection is an important requirement to ensure the success of the coating operation. This section is intended as a guide to operations that can be carried out in paint inspection, and is not a comprehensive guide to inspection procedures.

### SURFACE PREPARATION

Before any preparation operations commence, the surface must be free of oil and grease, substrate defects and where possible, sharp edges removed.

After the cleaning operation the procedures for inspection are mainly visual, with the degree of cleanliness and surface character evaluated with standards or comparators.

### SURFACE CONTAMINATION

Visual testing is to ensure that dust or dirt has been removed from the surface. Use can also be made of adhesive tapes, especially on blast cleaned surfaces, which will pick up any contamination from the profile.

### RESIDUAL MILL SCALE

Visual examination will normally indicate the presence of residual mill scale. If necessary, however, a copper sulphate test can be carried out on new steel that has been blast cleaned. The copper sulphate will *plate out* with a bronze deposit on steel, but not on mill scale. Good test on new steel, but not effective on old, well rusted steel.

### SOLUBLE IRON SALTS

A qualitative test can be carried out in accordance with BS 5493, Appendix G. The test consists of potassium ferricyanide papers, which are yellow in colour, being pressed onto a dampened surface. If blue spots occur then the soluble iron salts are present. The test is simply a go/no go procedure, and no concentration is given as to the level of iron salts.

### STANDARDS OF CLEANLINESS

Steel	Most common method is visual comparison of the steel surface with the photographic standards included in Swedish Standard SIS 05 5900 (1967), and the Steel Structures Painting Council Guide to Visual Standard No.1.
Shop Primed Steel	The Japanese SPSS standards give guidance on secondary surface preparation, describe and illustrate standards which can be obtained during the grit sweeping of shop primed surfaces.
Surface Profile	Surface profile will be best achieved by using grit of the correct dimension. It can, however, be measured optically or by a needle probe (provided only the maximum values are considered). The use of an optical method is preferred using a profile comparator such as the Keane Tator Surface Profile Comparator which consists of a five vaned disc, each vane blasted to a different profile. Different discs are available for shot, grit and sand.

To carry out the comparison, the reference disc should be placed on the surface and examined with an illuminated magnifier. The reference section most closely matching the profile of the surface being tested is selected.

Another useful technique is to use the Press-o-film tape technique (Keane-Tator Inc.) which can measure profiles up to 114µ (4.5 mils).

### WET FILM THICKNESS

Estimates of the ultimate dry film thickness can be obtained by measuring the wet film thickness applied, and is therefore a good method of controlling the application. Measurement is most commonly carried out using a comb gauge.

The gauge consists of a number of calibrated teeth which are pressed firmly into the wet coating material at 90° to the surface. The wet film thickness is the last tooth to be wetted by the coating material. Gauges are available with different combinations of calibration, and should be selected in the range of the correct wet film thickness. It is important that the calibrated teeth are kept clean and are free from dry paint.

The most satisfactory approach is to establish the application technique required to achieve the specified wet film thickness at the start of the operation. This is commonly done to establish how many passes of the spray gun are necessary. Spot checks can then be carried out during the course of the operation to ensure the thickness is being maintained.

Wet film quoted on data sheets will only provide the correct dry film thickness on a smooth surface. The first coat on blasted steel should have additional wet paint applied depending upon the blast profile. As a rule of thumb, multiply half the average profile height by 100 and divide by the volume solids. A 3 mil profile and a 50% volume solids paint would require an additional 3 mils wet ( $3/2 \times 100/50$ ) to compensate for paint "losses" into the profile.

### DRY FILM THICKNESS

After the film is sufficiently dry or cured for inspection the dry film should be examined. The initial inspection is visual, and an accurate appraisal of the quality of work can be quickly established. Visual inspection will also reveal application defects such as over spray, misses, dirt inclusion, blisters, sags, runs or other defects.

The dry film thickness can be obtained by either destructive or non-destructive methods. The most popular instruments for non-destructive testing employ the magnetic principle. A permanent magnet is mounted at the end of a balanced, pivoted arm assembly with a coil spring attached to the pivot and to a calibrated rotatable dial. When used the instrument must be firmly placed on the substrate and the rotatable dial moved forward until the probe sticks to the surface. Variations in film thickness above the steel substrate will alter the attractive force of the magnet. When the dial is rotated slowly backward a tension will be applied to the spring. When the spring tension exceeds the magnetic force, the magnet breaks contact with the coated surface, and the film thickness is shown on the calibrated dial. These types of instruments are known as "Banana" gauges due to their shape, with the most common instrument, the Inspector Gauge manufactured by Elcometer, and the Mikrotest manufactured by ElectroPhysik.

These types of gauges have an accuracy of  $\pm 10\%$ . Care must be taken to inspect the hemispherical tipped magnet for dirt, paint or wear before use. With older instruments, the film thickness must be recorded as the magnet breaks contact.

Another version of the magnetic principle involves instruments which utilize a magnetic reluctance technique. The probe contains a permanent magnet as a flux source, which when placed on the substrate forms a magnetic current the size of which is relative to the thickness of the coating. This is displayed on the meter scale. This type of gauge is portable and battery operated, the most common of which is the Minitector manufactured by Elcometer, and the Mikrotest manufactured by Elektro Physik.

The other method of portable gauge currently available utilizes the eddy current principle. The probe contains a coil of wire in the tip which is energized with a high frequency alternating current. When the tip is brought into close proximity to a coated steel surface, eddy currents are induced altering the electrical characteristics of the probe. The change in electrical characteristics is measured and displayed on the meter scale. This instrument can also be used on non-ferrous substrates.

Recently more sophisticated instruments have become available which utilize micro processors. These have additional characteristics such as digital read-outs, memories and print-out capabilities.

When comparing the different gauges, the type "banana" is the cheapest and the most robust, but accuracy is limited. The Minitector or Minitest are more accurate and are easier to read, but are prone to damage which can distort the results.

#### OPERATING TECHNIQUE

1. Before readings are taken the paint film must be firm enough to accept the gauge without forming an impression. Also the surface must be dry and free from contamination.
2. Prior to use, the instruments should always be calibrated using thickness "shims" of known thickness. Calibration should be in the range that is anticipated and carried out on a smooth surface. For readings over blast cleaned steel using a Mikrotest or Minitector, the zero can be used as a measure of blast profile and allowances made in subsequent readings. This would then be a measure of thickness over the peaks of the metal profile.
3. When using battery operated instruments ensure that the battery is not run down.
4. The greatest difficulty is the accurate assessment of the dry film thickness. Some specifications may stipulate the number of measurements to be taken, but usually the assessment of the number of readings required is personal judgment. On large areas the initial readings taken should give an indication of the evenness of the thickness. If the readings constantly agree with the requirements, without wide variations, assessment should continue to be random. If, however, the readings are low or spasmodic, more readings will be required to determine the extent of any low areas. Experienced personnel will also be able to identify where low thickness can be expected, i.e., backs of bars, flanges, etc., and inspect accordingly. The other method of checking dry film thickness is a destructive technique. This technique involves the cutting of a V-shaped notch in the coating with a precision ground cutter. The thickness of the coating, or each coat of paint, is measured geometrically by viewing through an illuminated microscope. This technique is used where the thickness of each coat is required or thickness on concrete surface. It must always be recalled that the coating should be repaired.

A number of other tests can also be carried out on dry films; the most important of which are as follows:

#### HOLIDAY DETECTION

When protective coatings are applied there is a possibility that flaws have occurred due to the presence of trapped air, or voids and pinholes. Of these defects only the largest can be detected visually. A series of battery operated field instruments are available.

1. Low Voltage Detectors  
The wet sponge method is most commonly used. This is suitable for coatings up to approximately 375µ (15 mils). The method of operation is to draw the moistened sponge over the surface. Where a defect has occurred a small current will flow and activate an audible alarm. Excessive wetting of the sponge should be avoided.
2. High Voltage (Spark) Detectors  
For thicker film a higher voltage is required for flaw detection. Two types are used, either with AC or DC voltages. The AC type is not totally satisfactory, as the coating is subject to cyclic stresses which can cause fatigue and subsequent breakdown of some coatings. The DC types produce a continuous current. Care must be taken with high voltage (spark) detectors to ensure that the test voltage selected is not excessive for the coating thickness. It is possible to destroy the coating and in some cases the retained solvent is conductive enough to provide a current flow through the paint film.

#### DEGREE OF CURE

An indication regarding the cure of two component materials, such as zinc silicates or epoxies, can be obtained by solvent swabbing. If no coating is removed after scrubbing the surface with relatively strong solvents, the cure will be well advanced. Your paint supplier should be consulted regarding the solvent composition and test method.

#### ENVIRONMENTAL CONDITIONS

The process of surface preparation and paint application are all influenced by environmental conditions. In order to ensure the success of the operation the following should be monitored.

#### STEEL TEMPERATURE

Various types of coating have differing minimum curing/drying or film forming temperatures. In each case, the surface temperature should be above the minimum at the time of application. If the steel temperature is below the specified minimum problems can occur with solvent entrapment, retardation of the cure with two component products, etc. Also, with low temperature the minimum and maximum re-coat intervals will be extended. High temperatures present different problems such as dry spray, solvent boiling, etc., however, these can often be solved at site. It must be noted that minimum and maximum re-coat intervals will be reduced when steel temperature is high.

Two methods are commonly used to measure steel temperature, namely a battery operated thermocouple, or a contact thermometer that is simply clamped to the surface with a magnet. With both instruments it is important that time must be allowed for the device to reach a stable temperature. This could be up to 15 minutes for the contact type. Also a representative area should be selected.

#### RELATIVE HUMIDITY AND DEW POINT

There is a variable amount of water vapour in the atmosphere. The maximum amount air can hold before precipitation occurs is dependent on temperature and atmospheric pressure. The warmer the air, the more water it can hold. Relative humidity takes into account these factors, although from a practical viewpoint atmospheric pressure is taken as a constant. If the substrate is of a lower temperature than the air, the air in contact with the substrate will be cooled. A point can be reached where the air in contact with the substrate is at such a low temperature that it cannot hold its water vapour. This temperature is known as the dew point.

As the dew point is a temperature where water is spontaneously deposited, the substrate temperature must always be a minimum of 3°C (5°F) above the dew point if paint is to be applied to a dry surface. This even refers to coating with moisture tolerant properties, because these materials displace moisture at the time of application, and then lose it to the atmosphere.

Many types of instruments exist which will give readings of relative humidity, one of which is the Whirling Hygrometer.

This instrument consists of two thermometers mounted in a frame, with one thermometer attached by a wick to a water container. Prior to use, the water container should be filled with distilled water, ensuring the wet bulb is properly wetted. The instrument should then be whirled again until successive readings are equal. The wet/dry bulb temperatures can then be used to calculate relative humidity and the dew point from either psychrometric charts or a dew point calculator.

Another product now available is the Surface Humidity Monitor. (From Wymark Technical Products Ltd.).

This instrument is attached to a steel surface by a magnet. The user can read off the instruments various scales;

- Surface Humidity,
- Surface Temperature,
- Air Temperature,
- Dewpoint.

There is no need for psychometric charts or dew point calculations.

As stated previously, the dew point is the temperature at which spontaneous condensation occurs, often referred to as "sweating". Inaccuracies due to Hygroscopic surfaces require a safety margin of dew point plus 3°C (5°F).





## 10.0 HEALTH AND SAFETY

These notes concern health and safety requirements, industrial hygiene and potential hazards involved in handling paint and thinners. They are not intended to be exhaustive and do not cover all eventualities during the application and storage of paint.

Advice on local and/or national regulations covering the use and storage of paints and solvents should be obtained and full recognition made of the regulations. The disposal of waste and empty containers are also subject to regulations and it is in our common interest to ensure these regulations are followed to protect our fragile environment.

### PERSONAL PROTECTION:

Material Safety Data Sheets on all products are available on request. These sheets and all precautionary statements on the product container(s) should be read before handling and applying the product. When two component products are activated, the activated mixture will have the hazards of both components.

### FIRE AND EXPLOSION:

The majority of paints contain flammable organic solvents. As soon as a paint container is opened, solvent vapours are released.

The flash point is the lowest temperature at which a liquid gives off sufficient vapour to form a flammable mixture in contact with air.

If the flash point of the paint is lower or close to the temperature of the air there is a very considerable risk of fire or explosion. It only needs a spark of flame to set it off. If the flash point exceeds the air temperature there is still a risk of fire. Therefore no naked flames, cigarettes or matches should be allowed near the area where paint is being applied or stored. Precautions should also be taken to avoid sparks caused by metal to metal contact or from electrical appliances. If a fire involving paint does occur:

1. Use a dry chemical, foam, or CO<sub>2</sub> extinguisher.
2. Protect yourself from the fumes with breathing apparatus.
3. Do not extinguish with water, as paint solvents float on water and this helps to spread the fire.

Paint soaked rags left in heaps can build up heat within the pile and self-ignite. Maintain good housekeeping conditions at all times.

Explosion of solvent vapours can be prevented by adequate ventilation. Ventilation maintains the solvent vapours below the Lower Explosion Limit (LEL), reduces the concentration of the vapours to below the minimum level at which they can be ignited in the air. The LEL of a paint, especially with regard to spray application, is independent of the flash point. However, this level of ventilation is much less than that required to reduce the concentration of the fumes to below the Threshold Limit Values (TLV's) of the vapours and spray mists.

The TLV represents conditions under which it is believed that workers may repeatedly be exposed during their working hours without adverse effect to health. The TLV's for paints and paint solvents are much lower than the safe explosion limits, and ventilation to the TLV is often impractical. Ventilation to the LEL together with the use of air fed hoods or masks is therefore advisable.

### SPILLAGE

If paint is spilled, the following precautions should be taken:

1. Ventilate the area to remove the fumes.
2. Mop up all spilled paint with absorbent material, ensuring that all materials used to mop up the paint are disposed of in closed metal containers.
3. Ensure that spilled paint is prevented from entering drains or contaminating soil in the area of the spill.

### SKIN AND EYE CONTACT

It is recommended that the following precautions should be taken to prevent paint coming into contact with the skin and eyes:

1. Select sensible working clothes that cover as much of the body as possible. Replace soiled clothing as quickly as possible, especially when using materials which are toxic and can be absorbed through the skin.
2. Always wear gloves and eye protection. Replace/clean eye shields, etc., frequently when spraying to prevent accidents due to obscured vision.
3. Do not touch your mouth or eyes with your gloves.
4. Remove rings and watches before starting work as they can trap paint or solvent next to the skin.
5. Read and observe precautionary notices on paint containers and the MSDS.
6. Eyes are particularly sensitive, so if you are splashed in the eyes by paint or thinners, flood them immediately with fresh water for the least 15 minutes and seek medical advice immediately.
7. If paint should splash on your skin, remove it with soap and water or an industrial cleaner. Never use solvent.
8. Remember to wash hands and rinse mouth after working with paint.
9. Despite these precautions, paint can still come into contact with the skin or eyes (e.g., spray mist, excessive splashing), so a non-greasy barrier cream is recommended for all exposed skin. Remember the objective is to avoid skin contact. If your clothes become soaked in paint, change them immediately and thoroughly wash the affected garments with soap and water. Such precautions help prevent skin conditions, which tend to persist once they occur.

### INHALATION

The inhalation of fumes, dust and paint vapours must be avoided. Please follow the precautions listed and read the MSDS for specific details.

1. When removing rust or old coatings by manual dry abrading techniques, wear eye protection and a dust mask. If blast cleaning, flame cutting or welding, an air fed hood is recommended.
2. Ensure that ventilation is available to remove solvent fumes.
3. If spaces are difficult to ventilate efficiently, wear an air fed hood/mask.
4. Think about where the fumes are being vented. They could affect other people in adjacent spaces.

Remember solvent fumes are heavier than air, they displace breathable air upwards. They can flow down drains or ventilation ducts.

5. If dizziness, drunkenness or headaches are experienced, this could indicate you are being affected by solvent fumes. Move into the fresh air and do not return until the ventilation has improved.
6. If breathing fumes results in the collapse of a painter, he should be carefully moved into fresh air and allowed to recover gradually. Forced exercise is inadvisable.
7. Never enter a space where fumes have or could have accumulated without wearing breathing apparatus.
8. Remember, if you are not wearing an air fed hood or mask, you are relying on ventilation to provide fresh air.

To prevent the inhalation of spray mists:

9. The mist of paint particles created when spraying should not be inhaled.
10. In well ventilated spaces, an organic vapour plus dust cartridge respirator can filter out these particles of paint effectively. (Replace the cartridge regularly.)
11. If ventilation is poor, an air fed hood or mask is essential. If any doubt whatsoever exists, wear an air fed hood/mask.
12. Never filter spray mists through rags wrapped over the mouth. The rags can get soaked and allow paint to come into direct contact with the mouth. The rags are most inefficient filters.

#### INGESTION

Food and drink should not be consumed, stored or prepared in areas where paint is stored or being applied.

In the case of accidental paint ingestion, medical attention should be obtained at once.

#### AIRLESS SPRAY

This method of application uses very high pressures. The paint jet can easily penetrate the skin if used without proper care. Always wear gloves, coveralls and eye protection. Equipment should be grounded to prevent build up of static electricity.

### **10.1 WHMIS Information \***

Canada's Hazardous Materials regulations are intended to make the workplace safer by what is essentially a workers' education program. Hazardous materials must be labeled in a certain way; a Material Safety Data Sheet (MSDS) must be available for industrial users and workers must be trained to understand what the warnings and precautions on labels and MSDS mean, so that they can adopt safe working practices.

#### LABELS ON CONTAINERS

- Labels will now fall into three classifications:
  1. Domestic paints which are covered by the Hazardous Products Act.
  2. Antifoulings which are covered by the Pest Control Products Act.
  3. Commercial paints for industrial users which must comply with WHMIS.
- Industrial labels will now show:
  1. First aid message.
  2. Precaution message.
  3. Warning message.
  4. Pictograms for:
    - a. flammable
    - b. toxic or
    - c. very toxic
    - d. corrosive
    - e. oxidizer
    - f. dangerously reactive
  5. Transport of Dangerous Goods (TDG) classifications

\* (Curtesy of International Paints Canada Limited.)

6. Directions for use:
- a) generic statement about surface preparation
  - b) catalyst, if appropriate
  - c) mixing ratio, if appropriate
  - d) low temperature catalyst, if appropriate
  - e) thinner
  - f) cleaner, if different
  - g) generic statement to see spec sheet and data sheet
  - h) warning on freezing, if appropriate
- Antifouling paint labels will show additional information as required by the Pest Control Products Act.

#### MATERIAL SAFETY DATA SHEETS

The MSDS is divided into nine sections, each one covering a different aspect of safety. MSDS are not required for domestic products or antifouling but a conscientious manufacturer will make them available to all industrial users.

##### Section 1. Material Identification and Use

This section contains the company's name, address and telephone number together with the description of the product, its code number and a very simple material use. More detailed information on product use is contained in the Product Data Sheets.

##### Section 2. Preparation Information

This section requires the name of the person who prepared the form, when it was issued and the sources used.

##### Section 3. Hazardous Ingredients

In this section, the hazardous ingredients are listed, plus ingredients which are contained in the Government's Hazardous Ingredient List. Non-hazardous materials will not appear and cut-off points of 0.1% or 1.0% ensure very small amounts of hazardous materials will not have to be included. The cut-off point for many chemicals is set by the Government's Hazardous Ingredient List.

One problem with this list is that powders, which are a problem as dusts, but not in paints, will erroneously show up as hazardous ingredients.

##### *Headings:*

- %
  - Shows the approximate content or range of concentration in the formulation.
- CAS No
  - Identifies the chemical in a world wide listing (chemical abstracts).
- LD<sub>50</sub>
  - Indicates the dose that kills 50% of the animals used in a test and indicates whether the ingredient was given orally or absorbed through the skin. Most toxicity information is available for oral toxicity which is not really relevant for paint coatings except perhaps for ingestion of lead, etc.
  - Dermal absorption is often more important but often unavailable. Very few people are going to ingest significant quantities of liquid paint, but droplets and dust can be taken into the body if proper personal protection equipment is not employed.
- LC<sub>50</sub>
  - Is the concentration of vapour or dust that will kill 50% of test animals. The time of the test is also shown. This is important for solvents and paint fumes.

- TLV      • Is the threshold limiting value and is an accepted safe working level for an eight hour day. It is based not only on animal studies, but on clinical effects noted on workers who have been exposed to these chemical. The tlv of some paint ingredients can be measured during application by sampling.

#### Section 4.      Physical Data

This section simply identifies the physical state of material (solid, liquid, gas), odour and appearance, S.G. and the amount of volatile material. In most cases, no information is available on Odour Threshold, pH, vapour pressure, etc.

#### Section 5.      Fire or Explosion Hazard

If the product has a flash point, the MSDS is marked to indicate the product is flammable, a standard message is printed, and the means of extinction boxes are marked. A flash point is the temperature at which solvent vapour will ignite if an open flame or spark is present.

The special procedures indicate problems for fire fighters. Warnings are based on the flash point or presence of chlorinated solvent. Unopened paint cans can explode in a fire and burning paint should be extinguished with foam or other non-aqueous extinguisher but not with water which tends to spread the fire.

The TDG flammability Class is based upon the flash point. The upper and lower explosive limits are not usually available for mixed solvents or paints, but all paints, especially those with a flash point below 30°C, should be used with great care in enclosed spaces as typically 1% of solvent vapour in air forms an explosive mixture. One litre of xylene will produce 185 litres of vapour.

A standard phrase for Hazardous Combustion products is shown if the material is flammable or uses chlorinated solvent. Smoke is toxic, regardless of its composition, so the message is simple. Self contained breathing apparatus is needed to enter a smoke filled area.

#### Section 6.      Reactivity Data

Most paints are not very chemically reactive. The few which are reactive include:

- zinc and aluminum which may react with water to produce hydrogen gas which swells the can and may blow the lid off the container.
- polyester, vinyl esters, acrylic monomers which may react with free radical initiators, get very hot and burn.
- isocyanates which react with amines or other bases, may also get very hot and burn.
- peroxides used as catalysts for polyesters can explode in certain conditions.
- unthinned liquid epoxies can exotherm when mixed with amines.

#### Section 7.      Toxicological Properties

This is the section that is going to worry most paint applicators and lead to lots of questions. Warnings suggesting "Can or may cause cancer.", "May cause lung cancer.", "May cause liver cancer.", "May be toxic to fetus.", "May cause birth defects.", "May cause heritable genetic damage.", etc. , may appear on the MSDS due to the presence of a hazardous ingredient.

The evidence for some of these statements is often much weaker than that associated with cigarette smoking and lung cancer or heart disease. Much evidence (but not all) relates to large doses given to lab animals, but nevertheless provide a warning to workers that should not be ignored.

Why risk your health by ignoring the risks associated with the use of chemicals such as paint? Personal protection will fully protect the worker against any of these potential health problems.

#### *Route of Entry*

This shows how toxic material could enter the body. In most cases, all boxes will be ticked except skin absorption. Paint or its vapours can obviously be taken into the eyes, lungs or mouth and most prolonged skin contact can be harmful.

#### *Irritancy*

Each ingredient has been assessed for irritancy. Worst case logic will pick the most irritating ingredient to select the warning. Avoid contact to protect yourself.

#### *Carcinogenicity*

Chromate pigments and carbon tetrachloride in chlorinated rubber will trigger a "Can cause cancer." message as will coal tar. Human, suspect human or animal carcinogens present in an amount over 0.1% will produce a warning message.

#### *Mutagenicity*

This is the ability to cause chromosome damage. Certain products could trigger the message "May cause heritable genetic damage." or "Positive Ames Test.", if one of the ingredients shows this tendency.

#### *Teratogenicity*

Many chemicals such as phthalidimide can cause birth defects and a teratogenic ingredient will trigger "May cause birth defects.", even if present in small quantities.

#### *Reproductive Toxicity*

In this section, worst case logic has been used with fetal death rating the highest followed by fetal toxic. Sterility is included but may not show up because of priority given to an ingredient which shows fetal toxicity. In this case, sterility will be shown under the effect of chronic exposure.

#### *Sensitization*

Sensitization means that lung or skin tissue is affected by the chemical and that afterwards much smaller doses can cause the condition to reappear often more seriously than during the first reaction. Isocyanates are a good example of the problem of sensitization but other chemicals can cause a similar problem.

#### *Acute Effects*

Acute effects are the short term immediate effects such as nausea, headache, burns, etc., Any effect from each ingredient is added to a list of possible problems.

#### *Chronic Effects*

Effects are the permanent, long term problems caused by exposure to chemicals. Obviously there are so many medical conditions, we cannot list them all on an MSDS. For each raw material, we indicate an effect on a major body part and in addition, we indicate that the product "may cause" a limited number of health problems such as cancer, sterility, blindness, etc.

These potential long term effects are documented for your guidance. Most solvents will cause acute and chronic effects if breathed in high concentrations over a period of time. This is equivalent to "glue sniffing" in immature adolescents. These effects are easily avoided by the use of proper personal protection equipment.

#### *Exposure Limits*

No limits have been determined on any of our products except single solvent thinners. Therefore the TLV is not shown here but included with the information of LD<sub>50</sub>, etc.

**Section 8. Preventative Measures**

These are most important and paint applicators should follow them carefully. One cannot overemphasize the need for proper personal protection and ventilation. One would also like to stress the need to dispose of old paint and containers in a legal and responsible manner and to avoid all contamination of soil and water.

**Section 9. First Aid**

These are simple guidelines common to all MSDS, but if anyone has a health problem during or after application of paint, medical advice should be sought as soon as possible.

**10.2 Summary**

The major health problems associated with paint are:

- a) Fire or explosion, especially in confined spaces such as tanks
- b) Skin problems due to poor industrial hygiene
- c) Breathing in solvents due to poor ventilation or lack of an organic vapour mask
- d) Absorption through the skin of toxic materials such as amines
- e) Severe allergic reactions caused by isocyanates
- f) Ingestion or inhalation of heavy metal pigmented products (such as lead or chromium) during spraying, sanding or by blasting old paint.

One would like to stress most strongly to all users:

- 1) Avoid all sources of flames and sparks, especially in enclosed spaces.
- 2) Wear eye protection at all times.
- 3) Avoid paint contacting or remaining on you skin.
- 4) Wear organic vapour masks when the TLV is exceeded, and air fed masks in enclosed spaces or when suggested on the MSDS.
- 5) Remove paint from surfaces to be welded or flame cut, with the exception of thin films of certain preconstruction primers.