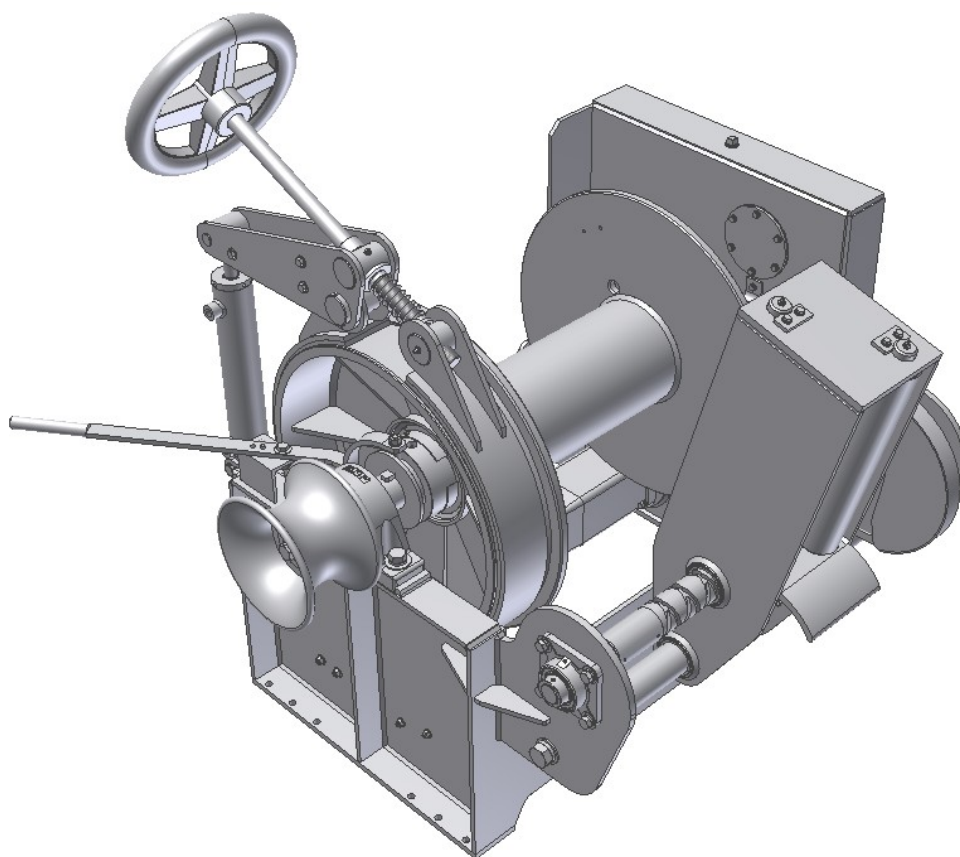




Hawboldt Industries (1989) Ltd.
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HSF-2226 ANCHOR WINCH

INSTALLATION, OPERATION & MAINTENANCE MANUAL



Customer: DEPARTMENT OF FISHERIES & OCEANS	Sales Order: 31399
Purchase Order: AC07018525	Serial Number(s): 1244-1 1244-2 1244-3
Purchase Date: 19 OCT 2010	

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1.0: WARRANTY

This section contains the Hawboldt Industries (1989) Ltd. – Standard Terms and Condition of Sale.

Hawboldt Industries (1989) Ltd. – Standard Terms and Condition of Sale

HAWBOLDT INDUSTRIES (1989) LTD.

220 Hwy 14, Chester, NS B0J 1J0

herein referred to as “HAWBOLDT”

GENERAL CONDITIONS OF SALE

- I. Design and improvement of our equipment is a continuous process. Hawboldt, therefore, reserves the right to make design improvements after receipt of an order. Photographs and other illustrations or advertising matter represent generally the goods offered, but are not binding in detail.
- II. Delivery dates are estimated as accurately as possible, but are not guaranteed in any way unless otherwise specifically provided for in this proposal.
- III. Unless otherwise specifically provided for in this proposal, this offer does not include a penalty clause of any kind and acceptance of this offer may not create, by its terms, any such penalty clause.
- IV. Prices quoted herein are based on current duty and currency exchange rates where applicable, and Hawboldt reserves the right to adjust prices to compensate for any changes in these rates, should it be necessary to do so.
- V. Notwithstanding any conditions printed on the Purchaser's order form, in accepting this offer the Purchaser agrees to the following TERMS AND CONDITIONS OF SALE which are also detailed on the Hawboldt Acknowledgment and Acceptance of Order Form, and these Terms and Conditions only will apply unless otherwise specifically provided in this proposal.

TERMS AND CONDITIONS OF SALE

1. **CONTRACT OF SALE** - This order is accepted on, and is subject to, the terms and conditions set forth on the face hereof and below, none of which may be varied or added to except in writing, signed by HAWBOLDT'S duly authorized representative. Any inconsistent matters, terms or conditions in Purchaser's order or confirmation will not be binding on Hawboldt. HAWBOLDT HEREBY EXPRESSLY OBJECTS TO ANY ADDITIONAL OR DIFFERENT TERMS IN ANY OF PURCHASER'S DOCUMENTS.
2. **COMPLETION** - Unless otherwise provided on the face hereof, time for the completion of manufacture of the machinery and equipment covered by this order (hereinafter called the “Machinery”) shall be computed from the date of the Acknowledgment and Acceptance of Order, or from the date on which Hawboldt has received from the Purchaser any information, drawings, data, patterns, or other material which are to be supplied by the Purchaser and are necessary to proceed with the manufacture of the machinery, whichever is the latest. Hawboldt shall not be responsible for delays in delivery or any failure to deliver due to causes beyond its control including without limitations: acts of God or the public enemy; mobilization; blockades; embargoes; revolution; civil commotions, riots; fires; floods; winds; earthquakes; epidemics; quarantine restrictions; explosions; accidents; other catastrophes; strikes; slowdowns; lock-outs or other labour difficulties; the acts; laws or regulations of any government or governmental authority; federal, provincial, local or foreign, including safety, health and environmental regulations; unusual weather; delays of sub-contractors or suppliers; or inability to obtain shipping facilities, labour, raw materials, supplies, fuel or power.
3. **MINIMUM INVOICE** - The minimum single invoice or billing charge is \$150.00
4. **PAYMENTS** - If payment of any part of the purchase price is not made as provided on the face hereof, Hawboldt reserves the right to discontinue manufacture of the Machinery until such payment has been made and to revoke any further credit, whereupon Hawboldt shall have the right to receive payment before any further shipment of Machinery. In the case of any delay in payment or in establishing agreed security for payment, time for completion may, at Hawboldt's option, be extended for a corresponding period. When any payment is due upon shipment or delivery and shipment is delayed for any cause beyond Hawboldt's control, payment shall be made when the machinery is ready for shipment. Purchaser agrees that any letters of credit or other guarantee of payment shall be maintained fully valid until final payment has been made. IF PAYMENT IS NOT MADE WITHIN THIRTY DAYS FROM THE DATE OF SHIPMENT UNDER THE

TERMS OF THIS AGREEMENT, PURCHASER AGREES TO PAY HAWBOLDT AN ADDITIONAL SUM EQUAL TO 2% PER MONTH, 24% PER ANNUM OF THE UNPAID PURCHASE PRICE UNTIL PAYMENT IS MADE.

5. **SECURITY INTEREST** - Hawboldt retains a vendor's lien in the machinery to secure payment in full of the purchase price and any and all other payments which may be or become payable to Hawboldt hereunder. If possession of the Machinery is given to the Purchaser before full payment, the Purchaser shall execute any additional instruments including without limitation security agreements and financing statements necessary to perfect or maintain Hawboldt's vendor's lien and shall pay or reimburse Hawboldt for all filing and recording costs including without limitation, any taxes payable upon filing or recording. In the event of default in payment of any installment of the purchase price when due, the entire balance thereof shall, at Hawboldt's option, become immediately due and payable, and Hawboldt shall have and may exercise all the rights of a secured party then in force under the laws of the Province of Nova Scotia, Canada or such other province or state as may then have jurisdiction over the machinery, including without limitation the right to repossess the Machinery with or without legal process.
6. **DELIVERY AND PURCHASE PRICE** - Unless otherwise provided on the face hereof, delivery is to be made Ex-Works Hawboldt's plant, Chester, Nova Scotia, Canada. Risk of loss within the meaning of the Sale of Goods act of the Province of Nova Scotia shall pass to the Purchaser at the stated point of delivery. The purchase price includes ordinary packing for shipment, but if special packing or tie-down and blocking to anchor the machinery to the transport vehicle is required, Hawboldt is to be reimbursed for the cost thereof. The shipping charges are the responsibility of the customer. Unless otherwise stated in the purchase order, Hawboldt will select a suitable courier to deliver the goods. The goods will be delivered, with freight charges being on a “collect” basis. The goods will be insured unless otherwise specified by the customer. Any freight or insurance costs, which may be included in the purchase price, are based on rates at the date of the Acknowledgment and Acceptance of Order and any increase shall be paid by the Purchaser.
7. **WARRANTIES** - Hawboldt warrants that it will repair F.O.B. its factory or furnish without charge F.O.B. its factory, a similar part to replace any material in its machinery which, during the earlier of 1 year after the said machinery is put into operation or 18 months after the date of shipment of the machinery from its plant, is proved to the satisfaction of Hawboldt to have been defective at the time it was sold, provided that all parts claimed defective shall be returned, properly identified, to Hawboldt's factory, charges prepaid.
This Warranty to repair applies only to new and unused machinery, which, after shipment from the factory of Hawboldt, has not been altered, changed, repaired or treated in any manner whatsoever unless such alteration, change, repair or treatment has been previously authorized in writing by Hawboldt or has been performed by the authorized service representative of Hawboldt. This Warranty to repair is the only Warranty either express, implied, or statutory, upon which the said machinery is sold; the company's liability in connection with this transaction is expressly limited to the repair or replacement of defective parts, all other damages and warranties, statutory or otherwise, being hereby expressly waived by the Purchaser. Component parts and equipment not manufactured by Hawboldt are warranted only to the extent they are warranted by the supplier to Hawboldt. Hawboldt will use reputable suppliers.
Hawboldt shall not be liable for any incidental or consequential damages for breach of any warranty and the Purchaser's sole remedy for breach of any warranty or for any negligence of Hawboldt shall be as set forth herein. Hawboldt makes no warranty that the machinery shall be merchantable or fit for any particular purpose nor does it make any other warranty, express or implied except as is expressly set forth herein. Hawboldt warrants that the machinery will conform to the description on the face hereof; that it will convey good title thereto; that such goods will be delivered free from any lawful security interest or other lien or encumbrance unknown to the purchaser except as otherwise expressly provided herein. No representative of Hawboldt has authority to change this Warranty or this contract in any manner whatsoever and no attempt to repair or promise to repair or improve the machinery covered by this contract by any

Hawboldt Industries (1989) Ltd. – Standard Terms and Condition of Sale

representative of Hawboldt shall waive any consideration of the contract or change or extend this Warranty in any manner whatsoever.

8. **LIABILITY** - Purchaser agrees to hold Hawboldt harmless from, and to indemnify it against, any and all claims, demands, actions, and causes of action of any nature whatsoever, and any expenses incident to the defence thereof, for injury to or death of persons and loss of or damage to property arising in connection with the Machinery or the assembly, erection, operation, or use thereof.
Hawboldt shall be under no obligation after shipment to assemble, erect or test the machinery unless specifically provided for on the face hereof. If the contract provides for instruction or installation services, Hawboldt's sole obligation with respect thereto shall be to provide the purchaser at his expense, (unless otherwise provided herein) an experienced person or persons, who shall become the agent or agents of the Purchaser and remain such for the period provided. Hawboldt shall under no circumstances be liable to the Purchaser or anyone else for any acts or omissions of any such person or persons.
9. **TAXES** - All present and future sales, use, excise and similar taxes imposed by any federal, provincial, local or foreign government which Hawboldt may be required to pay or collect with respect to the machinery or the sale, transportation, storage, use or consumption thereof shall be for the account of the Purchaser to the extent permitted by law. Unless otherwise stated in the proposal, Federal and Provincial sales taxes are not included in prices quoted for domestic sale. With the exception of the province of Nova Scotia, the purchaser is responsible for remittance of Provincial taxes.
10. **NON-CANCELLABLE** - This order is not subject to cancellation or revision by the Purchaser except with Hawboldt's written consent. Cancellation charges will be:
 - (a) Fifteen percent (15%) of the total purchase price to cover Sales Administration and handling costs, plus
 - (b) The cost of all unfinished material and the shop labour with overhead plus component cancellation charges from Hawboldt's vendors if any, plus Engineering costs incurred with overhead, plus profit in proportion to the state of completion of the product at the time of cancellation of the order. Upon payment to Hawboldt as above provided, all equipment manufactured under the contract will become the property of the Purchaser.
11. **NON-ASSIGNABLE** - Neither this contract nor any interest herein is assignable or transferable without the express written consent of Hawboldt.
12. **WAIVER** - Any waiver by either the Purchaser or Hawboldt of a breach by the other of any provision of this contract of sale shall not be deemed a waiver of future compliance therewith, and all provisions shall remain in full force and effect, notwithstanding any such waiver.
13. **LIMITATION OF ACTION** - No action shall be brought by the Purchaser for any alleged breach by Hawboldt of this Contract of Sale more than one (1) year after the occurrence of the cause of such alleged breach of contract.
14. **APPLICABLE LAW** - This contract shall be governed and construed according to the law of the Province of Nova Scotia, Canada.
15. **DELAY IN SHIPMENT** - Prices quoted are based on shipment dates indicated. If shipment is delayed at the request of the customer, or because of incomplete shipping information/documentation, or a delay in receipt of customers order confirmation, or because of delay in receipt of Letter of Credit (if applicable), Hawboldt reserves the right to review extra costs resulting from delay and increase prices accordingly.
16. **INSPECTION AND TESTING** - The equipment quoted will be subject to standard Hawboldt inspection and testing before shipment. Any other inspection or testing required by the customer must be specified at time of the order and shall be at the customer's expense unless otherwise stated in the proposal. Customer will be responsible for costs of inspection and tests requested after Hawboldt's acceptance of the order and any costs resulting from delay in shipment.

17. **QUANTITIES** - Prices quoted are based on the purchase of the quantities indicated. Prices may be adjusted by Hawboldt if quantities other than those quoted are actually purchased.

SPECIAL CONDITIONS FOR EXPORT SALES

- A. **EXPORT LICENSE** - if any Canadian regulation requires an export license, Hawboldt will apply for such license at its expense, and Purchaser agrees to furnish all information required for such license application. In case Hawboldt is unable to secure an export license, the contract between the parties shall be cancelled without liability on either party.
- B. **IMPORT LICENSE** - If an import license is required, it is to be provided by Purchaser who will see that it remains valid and effective until the import has been completed.
- C. **REGULATIONS** - The making and performance of the contract between the parties are subject to compliance with all applicable laws and regulations of the Canadian Government and agencies thereof, and in case any such law or regulation should prevent Hawboldt from performing or completing the contract in accordance with the terms thereof, then the contract may be terminated by Hawboldt upon written notice to the Purchaser. In such event, Hawboldt and any surety for Hawboldt will be relieved of all further obligation to proceed; any guaranty deposit or surety bond furnished by Hawboldt shall immediately be returned to Hawboldt and Hawboldt is to be paid the proportion of the contract price, including profit, represented by the expenditure made and the obligations contracted to the date of such termination. Upon return to Hawboldt of any guaranty deposit or surety bond and payment to Hawboldt as above provided, all equipment manufactured under the contract will become the property of the Purchaser.
- D. **PAYMENT TERMS** - Unless other mutually agreed to payment terms are arranged in advance in writing, payment will be by Irrevocable Letter of Credit Confirmed by any Chartered Canadian Bank, payable at sight. Unless otherwise stated in the body of this proposal, equipment will be supplied ex-works (not including shipping preparation and loading) INCO International Chamber of Commerce, 2000 Revision, Publication 560, with payment to be made against the Confirmed Irrevocable Letter of Credit upon presentation of shipping documents. The Letter of Credit shall be established with Hawboldt's bank, all charges for the account of the Buyer.
- E. **SHIPMENT DATE** - Equipment offered in this proposal is "estimated" to be ready for shipment in the time frame indicated on the proposal. Shipment date is based on receipt of firm order, a Letter of Credit acceptable to Hawboldt, and down payment (if required) at our Chester, Nova Scotia Office. Shipping date will be confirmed at time of order.
- F. **CURRENCY AND TAXES** - Unless otherwise stated prices quoted are in Canadian funds, and do not include any import duties, customs fees or taxes of country of import. No Canadian taxes are applicable or included.
- G. **PACKAGING** - Unless otherwise stated prices quoted are on shipment in suitable ocean containers. However, Hawboldt has the facilities to partial crate or full crate the equipment quoted. Prices for this service can be quoted at the customer's request.
- H. **FEES** - All handling and freight forwarding fees are to the account of the buyer.
- I. **DOCUMENTATION REQUIREMENTS** - Received for Shipment Ocean Bills of Lading or Freight Forwarders Certificate of Receipt in cases where customer has specified use of a freight forwarder.

2.0: SPECIFICATION

2.1: DESCRIPTION

The model HSF-2226 ANCHOR WINCH is a single drum anchor winch with a warping head. It includes a levelwind for improved spooling and a clutch for freewheeling. The winch is powered by a hydraulic motor with a drive chain lubricated in an oil bath. It has a failsafe, hydraulically released brake. There is also manual control of the band brake that is actuated using a hand wheel. The winch is protected from corrosion by a hot dipped galvanized finish.

2.2: PERFORMANCE

The performance values shown below are the maximum and must not be exceeded.

Bare Drum Pull	3.5 tonnes
Bare Drum Speed	30 m/min
Warping Head Pull	1.5 tonnes
Warping Head Speed	15 m/min

2.3: SPECIFICATIONS

Hydraulic Input	24 GPM @ 2,500 PSI
Brake Capacity	4.3 tonnes @ Mid-Drum
Drum Capacity	137.5 m of 19 mm wire rope + 10 m of 19 mm chain

2.4: CERTIFICATIONS

The anchor winch is certified by BV (Bureau Veritas).

3.0: INSTALLATION

3.1: MOUNTING

The mounting base should allow for easy installation as well as ample drainage.

Fasten the frame to the vessel with Hex Head Cap Screws, Lock Washers and Flat Washers. See the chart below.

FASTENER	QUANTITY	TORQUE
1/2"-13 UNC Grade 8 Hex Head Cap Screw	12	80 ft-lbs (lubricated)

Refer to the General Arrangement drawing in the drawings section of this manual for footprint details.

In order to facilitate proper spooling, the centre of the winch drum must be aligned with the anchor roller.

3.2: CABLE CLAMPING

The anchor winch is delivered with the wire spooled on it. In case re-spooling is necessary, follow the procedure below.

Rotate the drum until the levelwind carriage is at the spooling screw dwell on the side of the drum with the cable clamp. Thread the cable between the levelwind rollers, then through the opening in the drum flange and clamp to the flange with the cable clamp and bolts.

3.3: CABLE SPOOLING

The anchor winch is delivered with the wire spooled on it. In case re-spooling is necessary, follow the procedure below.

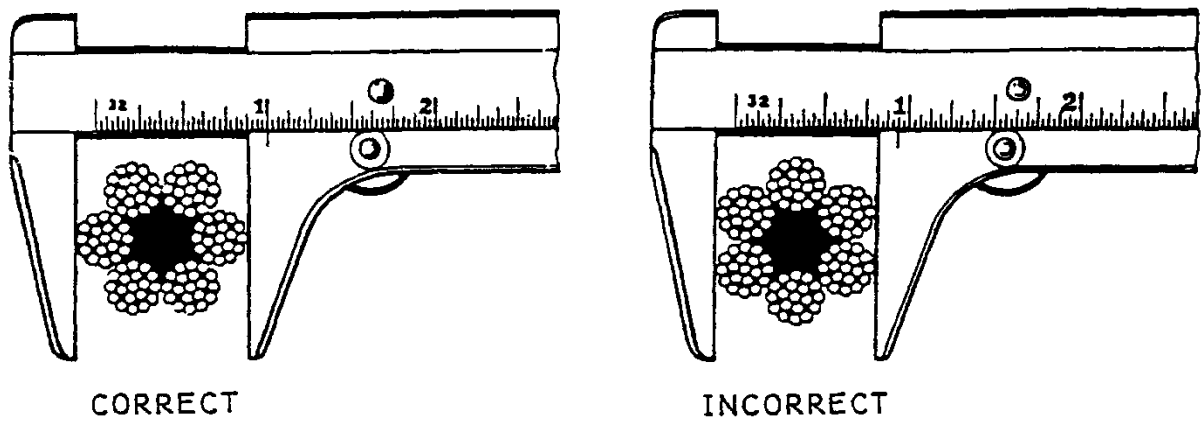
To spool the cable on the drum for the first time:

- 1 . Check the maximum diameter of the wire.
- 2 . Set the levelwind carriage in the spooling screw dwell on the cable clamp side of the drum.
- 3 . The wire tension should be between 5 – 10 % of winch pull on the first layer.
- 4 . Run the winch slowly and allow the wire to spool evenly across the drum.
- 5 . After the required number of revolutions for the first layer has been made, there should be a gap between the last wire and the flange approximately $\frac{1}{2}$ the wire diameter.
- 6 . If the gap is too small, the wire spacing on traverse is too large. Remove approximately $\frac{2}{3}$ wire and re-spool. Light tapping will cause the wire to “nest” and reduce the spacing. Never beat the wire in place. Only a slight change in wire spacing will significantly affect the gap between the wire and the flange.
- 7 . If the gap is too large, the wire spacing on traverse is too small. Remove approximately $\frac{2}{3}$ wire and re-spool. Use the blade of a screwdriver to increase spacing. Only a slight change in wire spacing will significantly affect the gap between the wire and the flange.
- 8 . The wire tension on the second layer should be between 15–20% of winch pull.
- 9 . The wire can now be automatically spooled to full drum.

3.4: SPOOLING PARAMETERS

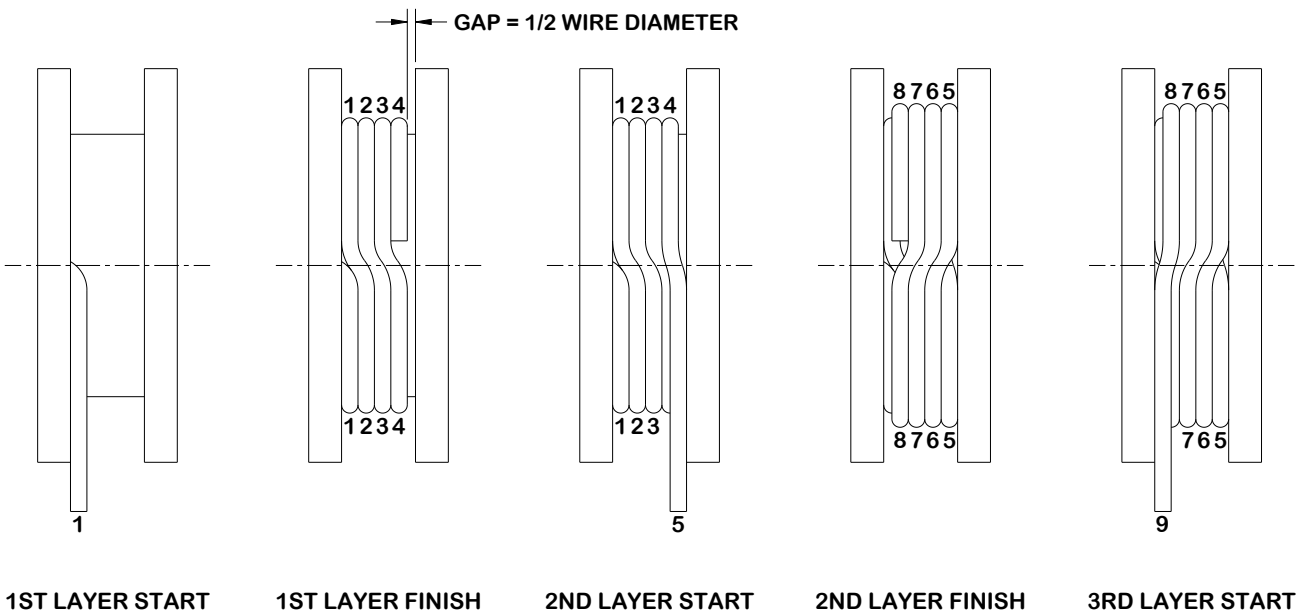
Nominal wire size	19 mm
Number of layers	7
Number of wires per layer	26
Number of drum rotations per layer	26
Number of screw pitches	10
Overall spooling ratio	26 to 10

3.5: PROPER WIRE DIAMETER MEASUREMENT



3.6: SPOOLING DIAGRAM

This is a generic diagram showing how cable should look as it spools onto a drum. Each layer has the same number of wraps. Refer to the Spooling Parameters section for the actual number of wires per layer for this equipment.



4.0: SAFETY

4.1: WARNINGS

Before operating this equipment familiarize yourself with all controls and their function. Equipment should only be operated by fully trained personnel.

The holding power of the brakes and proper functioning of all machine controls must be verified before the machine is operated to ensure the safe operating condition of the machine.

Do not disassemble the brake cylinder. This is very dangerous. The spring inside is under preload even when the cylinder rod is fully retracted.

4.2: SAFETY RECOMMENDATIONS

It is essential to take precautions to assure the safety of the operator and the crew while operating deck machinery. The operator is to have a thorough knowledge of the equipment's capabilities. The following recommendations are offered as a guide to safe operation:

- Deck machinery must be well maintained and be in good operating condition.
- Before starting the hydraulic system, be sure all controls move freely and are in the neutral position.
- Never attempt to clean or lubricate components while the drum is turning.
- Never operate the controls until it is certain that all crew are aware of moving gear.
- Never exceed the maximum load ratings.
- Operate the controls smoothly to prevent shock loads to both the equipment and rigging.
- Be sure the equipment is properly lubricated before use. See the lubrication section in this manual.
- Never use this equipment to carry or lift people. It is not designed for this purpose.

5.0: OPERATION

5.1: CONTROLS

The controls are supplied by others.

5.2: FAILSAFE BRAKE

The brake cylinder contains a spring under preload. The tension is adjusted by turning the hand wheel. See maintenance section for the proper setting. Hydraulic pressure is required to release the brake. When there is a loss of pressure or the winch control lever is in the neutral position, the brake is activated.

5.3: PAYING OUT AND HEAVING

To Pay Out & Heave:

- 1 . Ensure adequate oil supply and pressure.
- 2 . Operate the winch using the lever controller. Always use smooth, gradual motion to prevent shocks to the winch and cable.

Never pay out to the cable clamp. It is not designed to support the full load. Always leave at least three wraps of cable on the drum.

5.4: FREE WHEELING

To free wheel the drum:

- 1 . Ensure the brake is applied and the winch control lever is in the neutral position.
- 2 . Remove the clutch lock pin and disengage the clutch by pushing on the clutch lever arm.
- 3 . When the clutch is fully disengaged, insert the clutch lock pin.
- 4 . Slowly release the brake by turning the brake hand wheel counter-clockwise.

When you are done free wheeling:

- 1 . Apply the brake by turning the hand wheel clockwise. Turn until the appropriate tension is achieved. See maintenance section for details.
- 2 . Remove the clutch lock pin and engage the clutch by pulling on the clutch lever arm. You may have to jog the position of the drum to get the clutch teeth to align.
- 3 . When the clutch is fully engaged, insert the clutch lock pin.

5.5: WARPING HEAD

The warping head always turns with the drive shaft.

6.0: MAINTENANCE

6.1: STORAGE

It is the responsibility of the customer (shipyard) to assure deck machinery is properly stored and maintained once the goods are received.

The equipment may be stored out of doors provided that it is well greased and any damaged painted areas are repaired.

Precautions should also be taken when an installed system is shut down for long periods of time. If possible, the system should be started every two or three weeks to ensure internal parts are lubricated and to prevent the premature failure of seals and to reduce levels of condensation.

6.2: BRAKE TENSION

As the braking material wears over time, the braking force will be reduced. This can be restored by setting the winch controls to neutral, then turning the hand wheel until the correct braking force is achieved. Refer to drawing 34-00022-001, Sheet 2 for a dimension showing the proper extension of the cylinder rod in the failsafe braking position.

6.3: DECALS

Your equipment was shipped from the factory with a set of decals applied.

Should any of these decals be missing, they could prevent the proper operation and/or maintenance of the unit which may result in personal injury or property damage.

If any of these decals are missing, please contact us for a replacement.

Order the decal(s) by stating decal description, number, and quantity. A complete list of decals can be found in the drawings section of this manual.

6.4: SPARE PARTS

The following is a list of recommended spare parts:

HAWBOLDT PART NUMBER	QTY	MANUFACTURER	MODEL CODE	DESCRIPTION
5400194	1	SKF	SY 2-3/4 TF	Pillow Block Bearing
5400195	1	SKF	FY 2-3/4 MTF	Flanged Unit Bearing
5402172	1	HAWBOLDT	N/A	SEAL KIT FOR 34-00012-006 (COMPLETE)
5402431	2	SKF	FY 1-1/2 TF	Flanged Unit Bearing
5402433	1 BOX	Tsubaki	RS100	10' Roller Chain + Connecting Link
5402485	1 BOX	Tsubaki	RS60LS	10' Roller Chain + Connecting Link

6.5: LUBRICATION

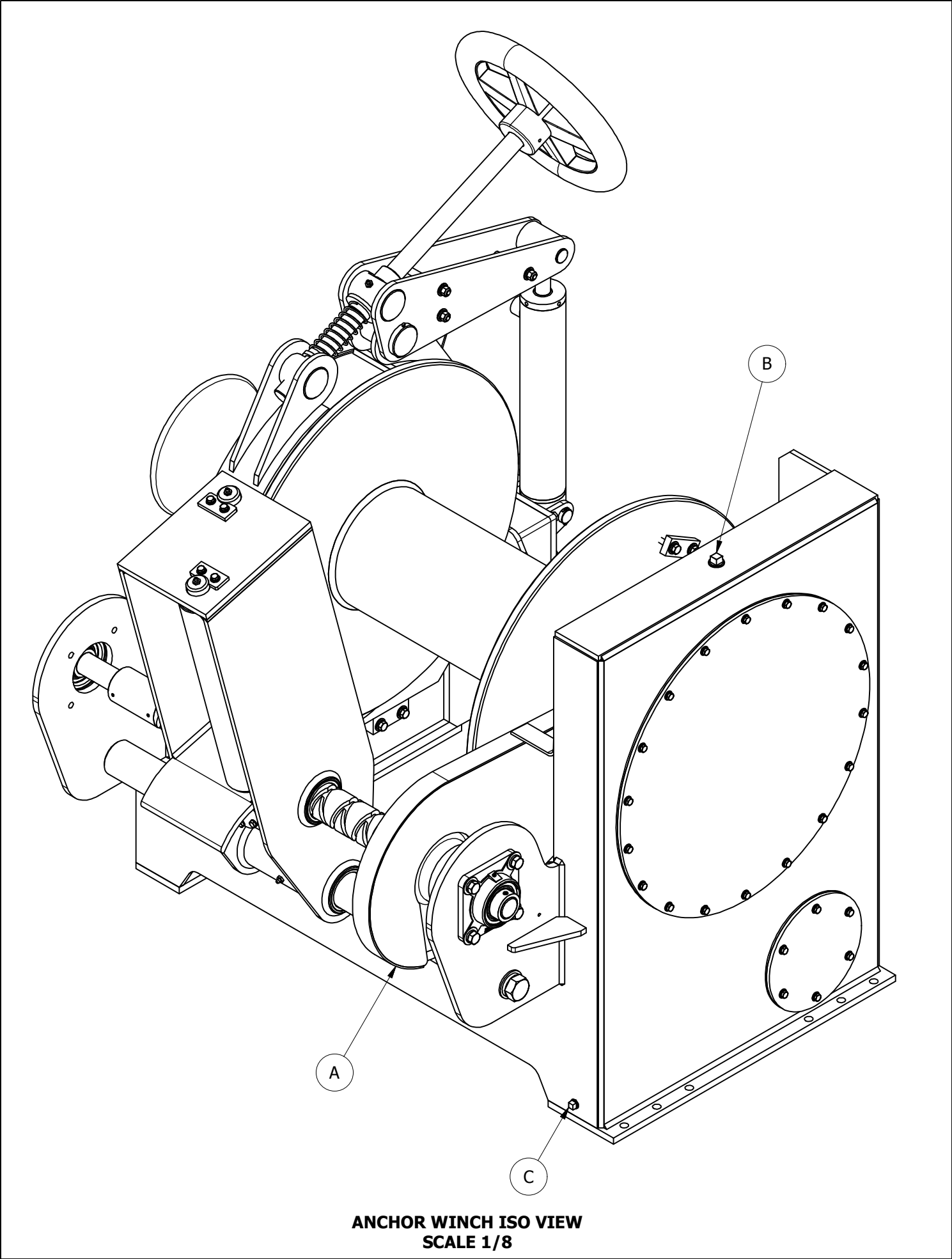
Although Hawboldt Industries uses materials and finishes well suited for use in severe marine environments it is imperative that a comprehensive lubrication maintenance program be utilized to assure long term reliability. If the unit is not used for extended periods, all points requiring periodic lubrication are to be attended to every 6 months and prior to restarting. Any excess grease is to be wiped off.

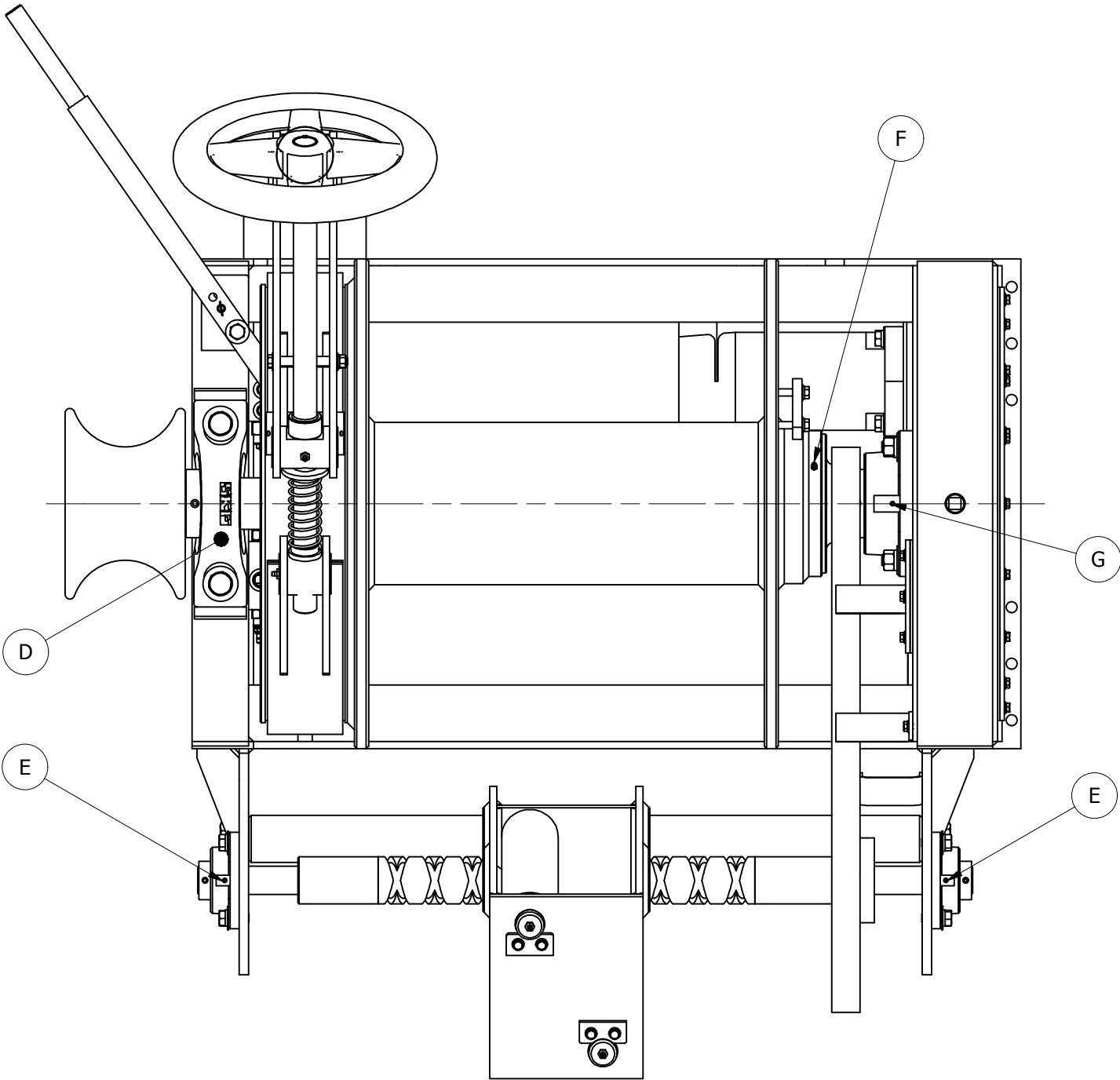
See the chart below for a lubrication schedule.

LOCATION	DESCRIPTION	QTY	LUBRICANT	FREQUENCY
A	Levelwind Roller Chain	1	EP-2 Grease	Maintain a layer of protective grease
B	Oil Bath Fill	1	ISO VG 32 Oil	Fill bath to center line of the motor shaft
C	Oil Bath Drain	1	N/A	N/A
D	Drive Shaft Pillow Block Bearing	1	EP-2 Grease	Every 30 hours of use
E	Levelwind Flange Bearing	2	EP-2 Grease	Every 30 hours of use
F	Drum Bushing	2	EP-2 Grease	Every 30 hours of use
G	Drive Shaft Flange Bearing	1	EP-2 Grease	Every 30 hours of use
H	Levelwind Roller	4	EP-2 Grease	Every 30 hours of use
I	Levelwind Blade & Screw Bushings	1	EP-2 Grease	Every 30 hours of use
J	Levelwind Guide Rod Bushings	1	EP-2 Grease	Every 30 hours of use
K *	Brake Pin (Plain)	1	EP-2 Grease	Every 30 hours of use
L *	Brake Pin (Threaded)	1	EP-2 Grease	Every 30 hours of use
M	Clutch Sliding Half Keyways	2	EP-2 Grease	Every 30 hours of use
N	Clutch Sliding Half Groove	1	EP-2 Grease	Maintain a layer of protective grease

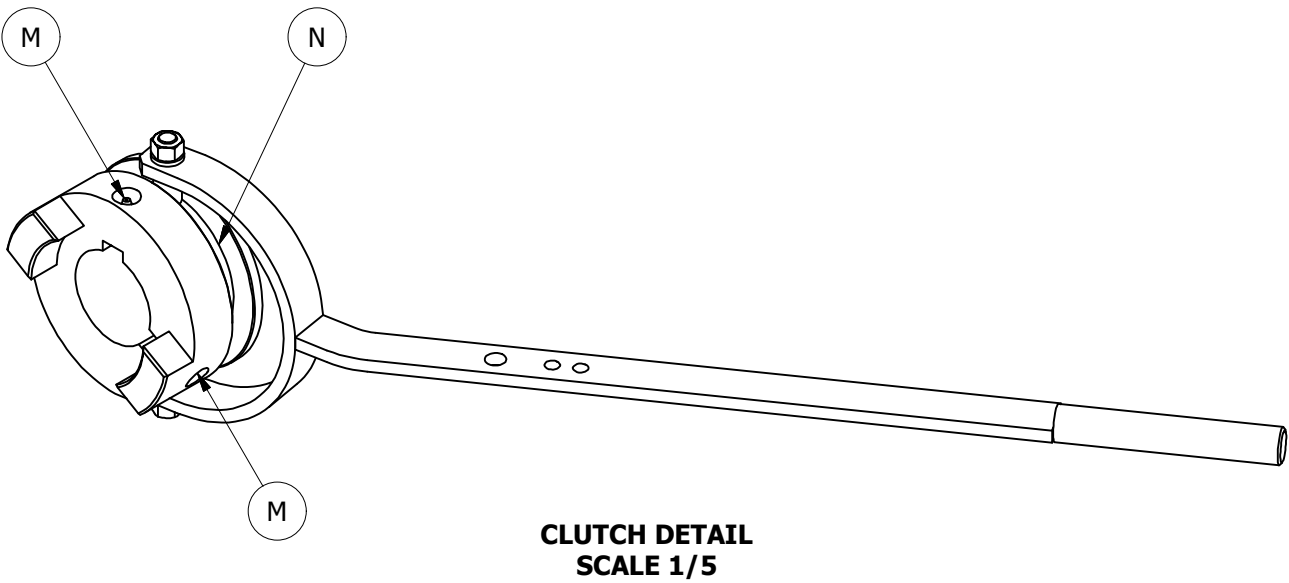
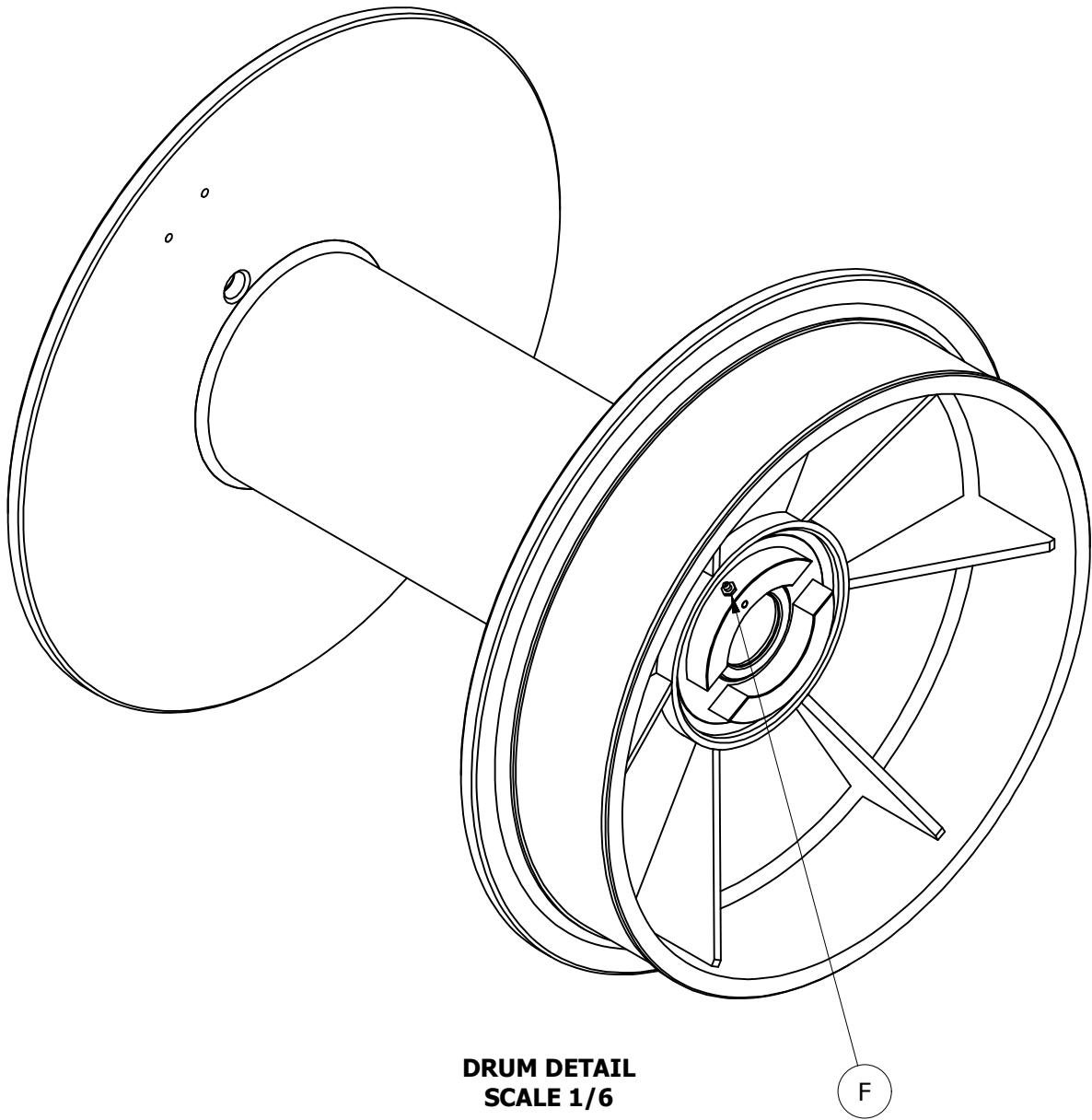
* Take special care not to get any grease on the brake drum's machined surface. This could cause the brake to slip.

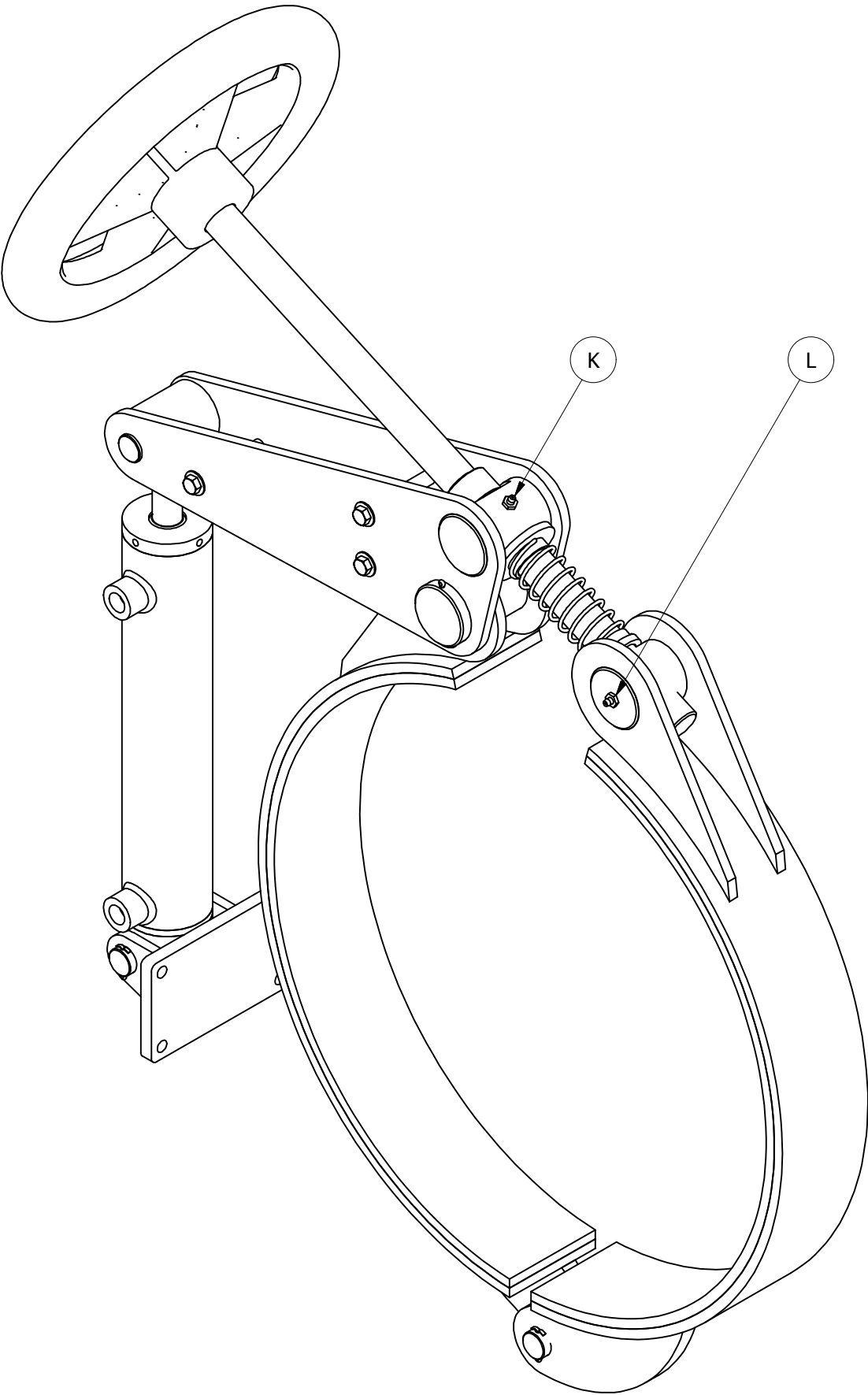
Refer to the diagrams on the following pages for locations requiring lubrication.



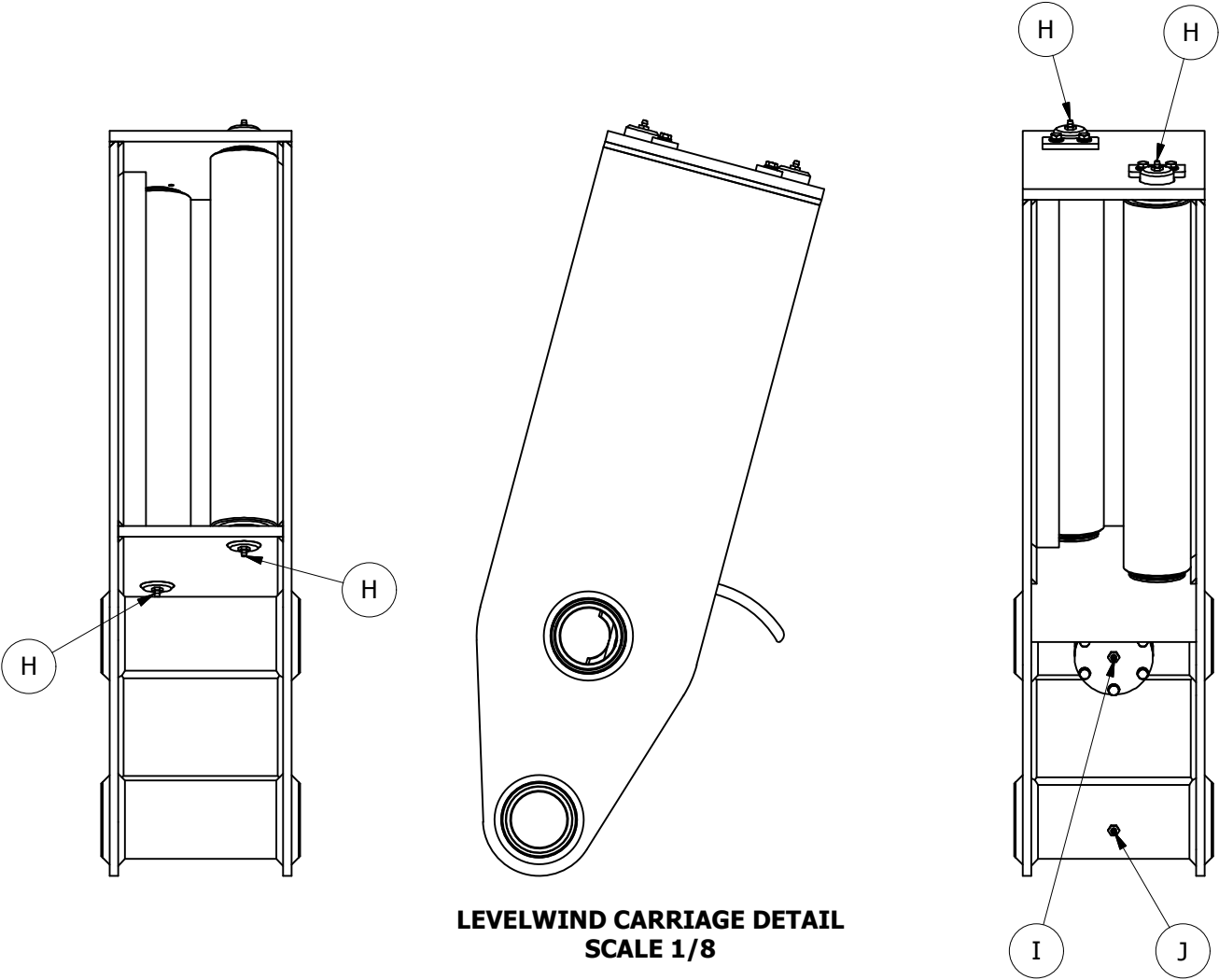


ANCHOR WINCH TOP VIEW
SCALE 1/8





BRAKE DETAIL
SCALE 1/5



7.0: FACTORY ACCEPTANCE TEST

This section contains the completed Factory Acceptance Test (FAT) reports.

8.0: COMPONENT LITERATURE

This section contains manufacturer's information for the following components:

MANUFACTURER	MODEL CODE	DESCRIPTION	HAWBOLDT PART NUMBER
Char-Lynn	112-1068	Hydraulic Motor	5400956
SKF	FY 1-1/2 TF	Flanged Unit Bearing	5402431
SKF	FY 2-3/4 MTF	Flanged Unit Bearing	5400195
SKF	SY 2-3/4 TF	Pillow Block Bearing	5400194
Sun	BGK/S	Manifold	5402432
Sun	CBEG-LCN	Counterbalance Valve	5401815
Sun	E2J	Manifold	5401655
Sun	PBDB-LBN	Pressure Reducing Valve	5400910
Tsubaki	RS100	Roller Chain	5402433
Tsubaki	RS60LS	Roller Chain	5402485

9.0: DRAWINGS

This section contains the drawings listed in the chart below.

DRAWING NUMBER	TITLE
34-00012-006	BRAKE CYLINDER
34-00022-000	HSF-2226 ANCHOR WINCH GENERAL ARRANGEMENT
34-00022-001	HSF-2226 ANCHOR WINCH GENERAL ASSEMBLY
34-00022-005	DRUM ASSEMBLY
34-00022-006	LEVELWIND CARRIAGE ASSEMBLY
34-00022-018	CLUTCH YOLK ASSEMBLY
34-00022-019	BRAKE SCREW ASSEMBLY
34-00022-023	HSF-2226 ANCHOR WINCH DECAL LAYOUT

WARRANTY & CERTIFICATES

SPECIFICATION

INSTALLATION

SAFETY

OPERATION

MAINTENANCE

FACTORY ACCEPTANCE TESTS

COMPONENT LITERATURE

DRAWINGS

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	MANUAL	HSF-2226 ANCHOR WINCH Installation, Operation & Maintenance Manual	Customer: DEPARTMENT OF FISHERIES & OCEANS PO: AC07018525 SN: 1244-1, 1244-2, 1244-3	Date: 19 OCT 2010 Sales Order: 31399
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	MANUAL	HSF-2226 ANCHOR WINCH Installation, Operation & Maintenance Manual	Customer: DEPARTMENT OF FISHERIES & OCEANS PO: AC07018525 SN: 1244-1, 1244-2, 1244-3	Date: 19 OCT 2010 Sales Order: 31399
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MANUAL

<div>HSF-2226 ANCHOR WINCH</div> <div>INSTALLATION, OPERATION & MAINTENANCE MANUAL</div>
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HAWBOLDT INDUSTRIES - HSF-2226 ANCHOR WINCH

HAWBOLDT INDUSTRIES - HSF-2226 ANCHOR WINCH



OPERATION, INSTALLATION & MAINTENANCE MANUAL

DEPARTMENT
OF FISHERIES &
OCEANS

PO#
AC07018525

19 OCT 2010

SO# 31399

Serial Number(s):
1244-1
1244-2
1244-3

HSF-2226 ANCHOR WINCH

HAWBOLDT INDUSTRIES - HSF-2226 ANCHOR WINCH

HAWBOLDT INDUSTRIES - HSF-2226 ANCHOR WINCH



OPERATION, INSTALLATION & MAINTENANCE MANUAL

DEPARTMENT
OF FISHERIES &
OCEANS

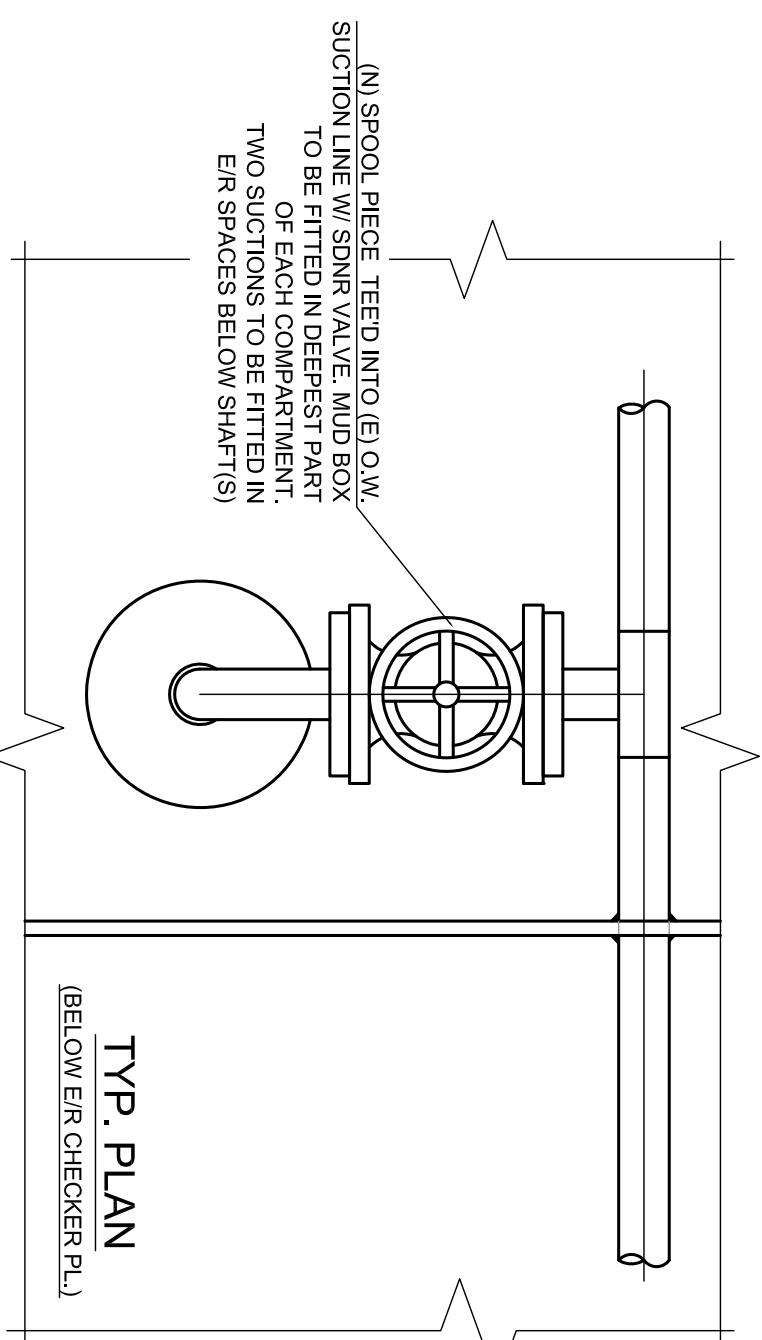
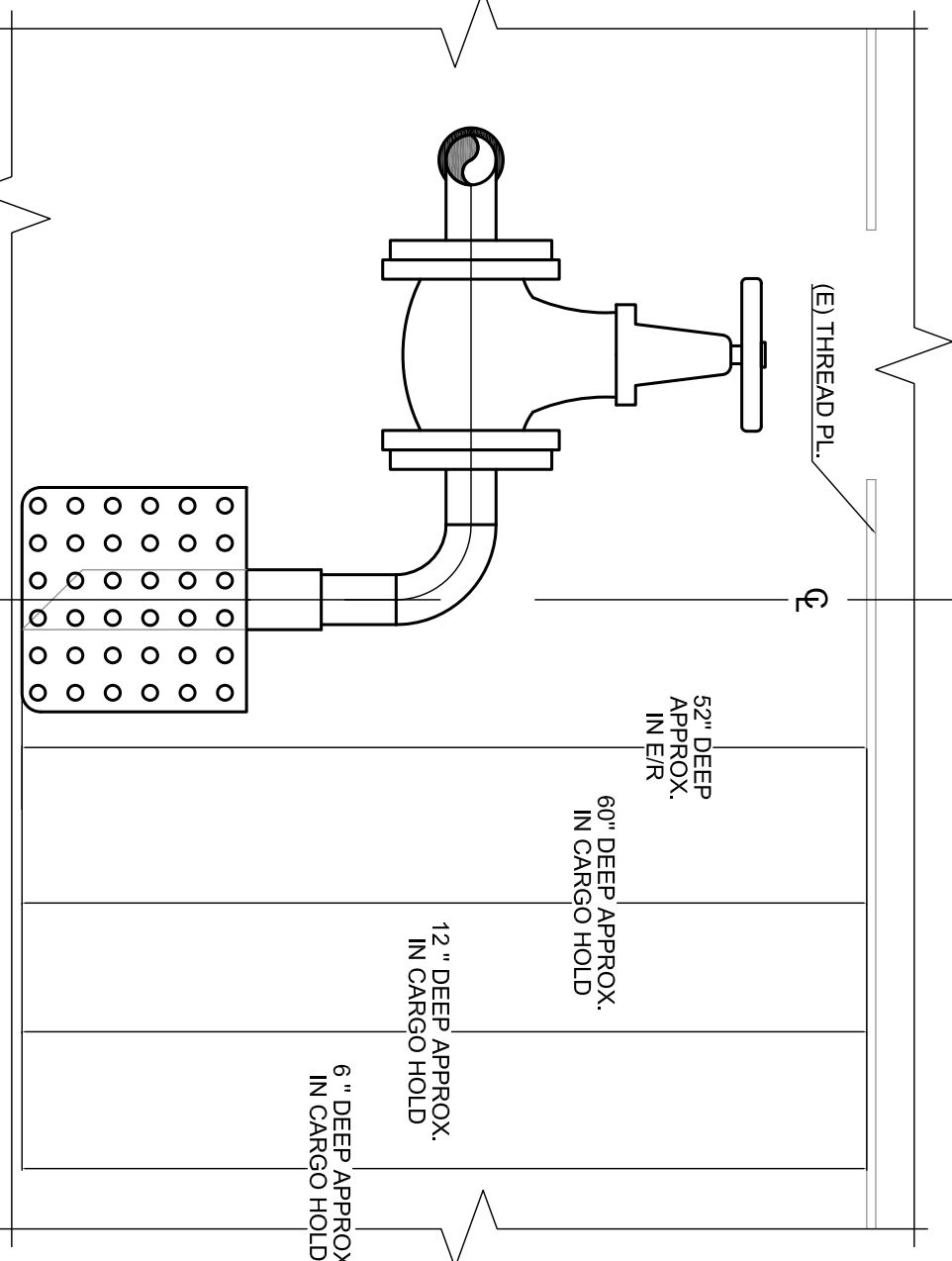
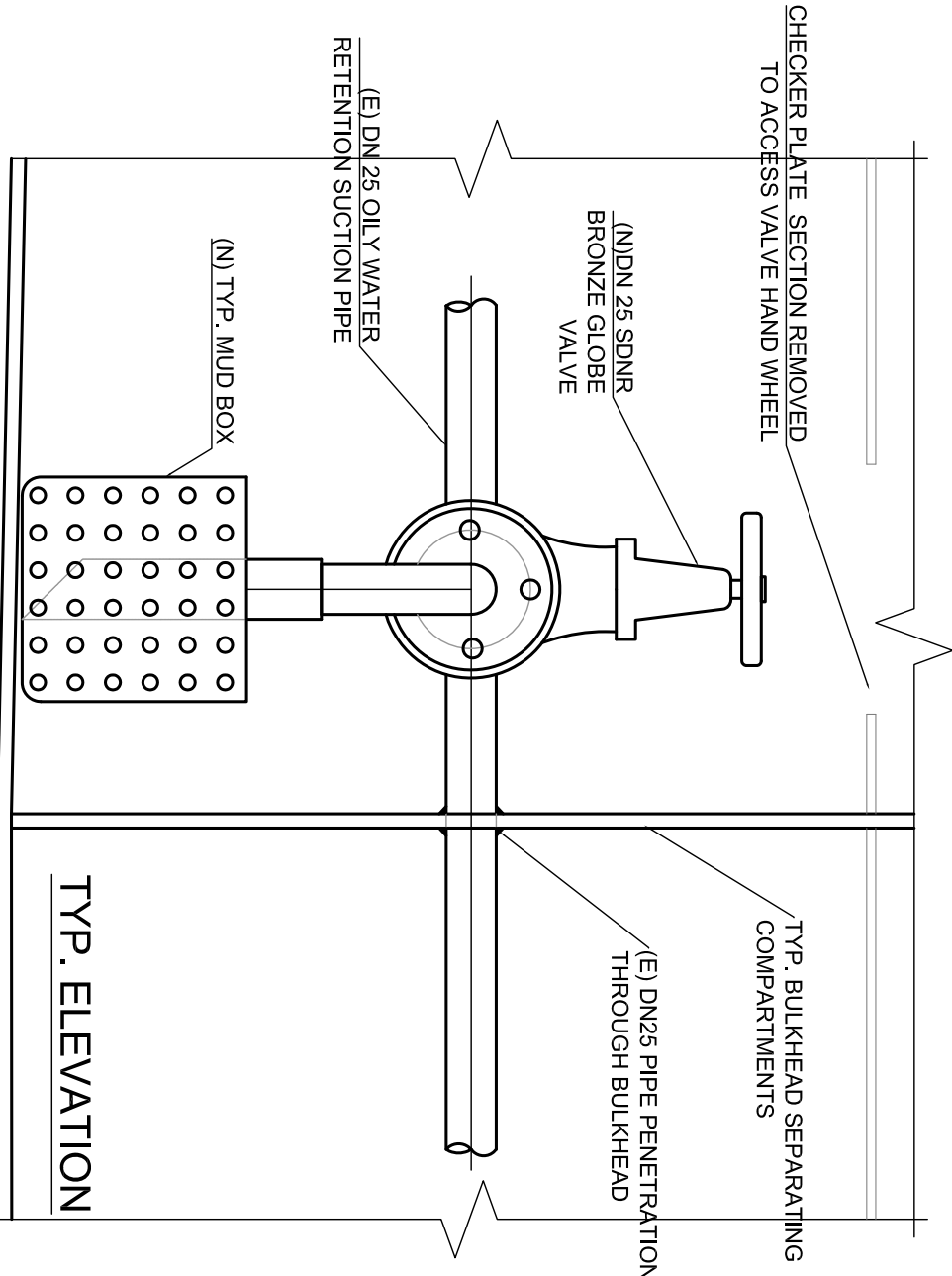
PO#
AC07018525

19 OCT 2010

SO# 31399

Serial Number(s):
1244-1
1244-2
1244-3

HSF-2226 ANCHOR WINCH



NOTE: TYPICAL ARRANGEMENT SHOWN FOR INSTALL OF SUCTION(S) IN DEEPEST PART OF EACH OF THE FOLLOWING SPACES:


- 2 x E/R SPACES UNDER EACH SHAFT.
- 1 x CARGO HOLD
- 1 x AUX MACHINERY SPACE
- 1 x STEERING GEAR SPACE

REFERENCE DRAWINGS/ RULES:

- MERIDIEN MARITIME REPARATION NEAR SHORE FISHERIES RESEARCH VESSELS SLUDGE-OILY WATER DIAGRAM. DWG. # 75000, REV.5 (3-SHEETS)
- BV RULES FOR SHIPS UNDER 500 T. NR566, CH.5, SEC 5
- BV RULES FOR THE CLASSIFICATION OF STEEL SHIPS. PART C, CH.1. SECTION 10.

GENERAL NOTES:

- ALL DIM. IN mm, U.N.O
- THE FOLLOWING DENOTATIONS ARE USED: (N)= NEW, (E) =EXISTING, U.N.O= UNLESS NOTED OTHERWISE
- ALL (N) PIPING MATERIALS TO BE ASTM A106 SCH. 40 PIPE
- ALL NEW PIPE CONNECTIONS TO BE AS PER EXISTING. (SEE REFERENCE DRAWINGS FOR DETAILS)
- ALL (N) WELDING PERTAINING TO THE MODIFICATION TO BE PERFORMED BY CWB APPROVED WELDERS AND SUBJECT TO 100% VISUAL AND UT INSPECTION. THE MODIFIED OILY WATER RETENTION SYSTEM TO BE PRESSURE TESTED TO 1.25 X THE SYSTEMS DESIGN PRESSURE.
- BRANCH SDNR VALVES TO BE KEPT IN A CLOSED POSITION UNTIL REQUIRED FOR USE.
- MODIFICATIONS TO THE OILY WATER RETENTION SYSTEM SUBJECT TO BV CLASSIFICATION SOCIETY ACCEPTANCE.



Marine Services

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197A Major's Path P.O.BOX 29132

St. John's, NL Canada A1A 5B5

Telephone 709 782 2700 Facsimile 709 782 2707

www.msintl.com

TITLE:

VLADYKOV- PROPOSED OIL Y WATER RETENTION SYSTEM
MODIFICATION .TYPICAL SPOOL PIECE DETAIL

CLIENT:

D.F.O VESSEL SUPPORT

DRAWN BY:

PAL

DATE DRAWN:

OCT. 2014

CHECK BY:

M.S.I

DATE CHECKED:

OCT. 2014

PROJECT NO.:

2601

SCALE:

1 : 5

DRAWING NO.:

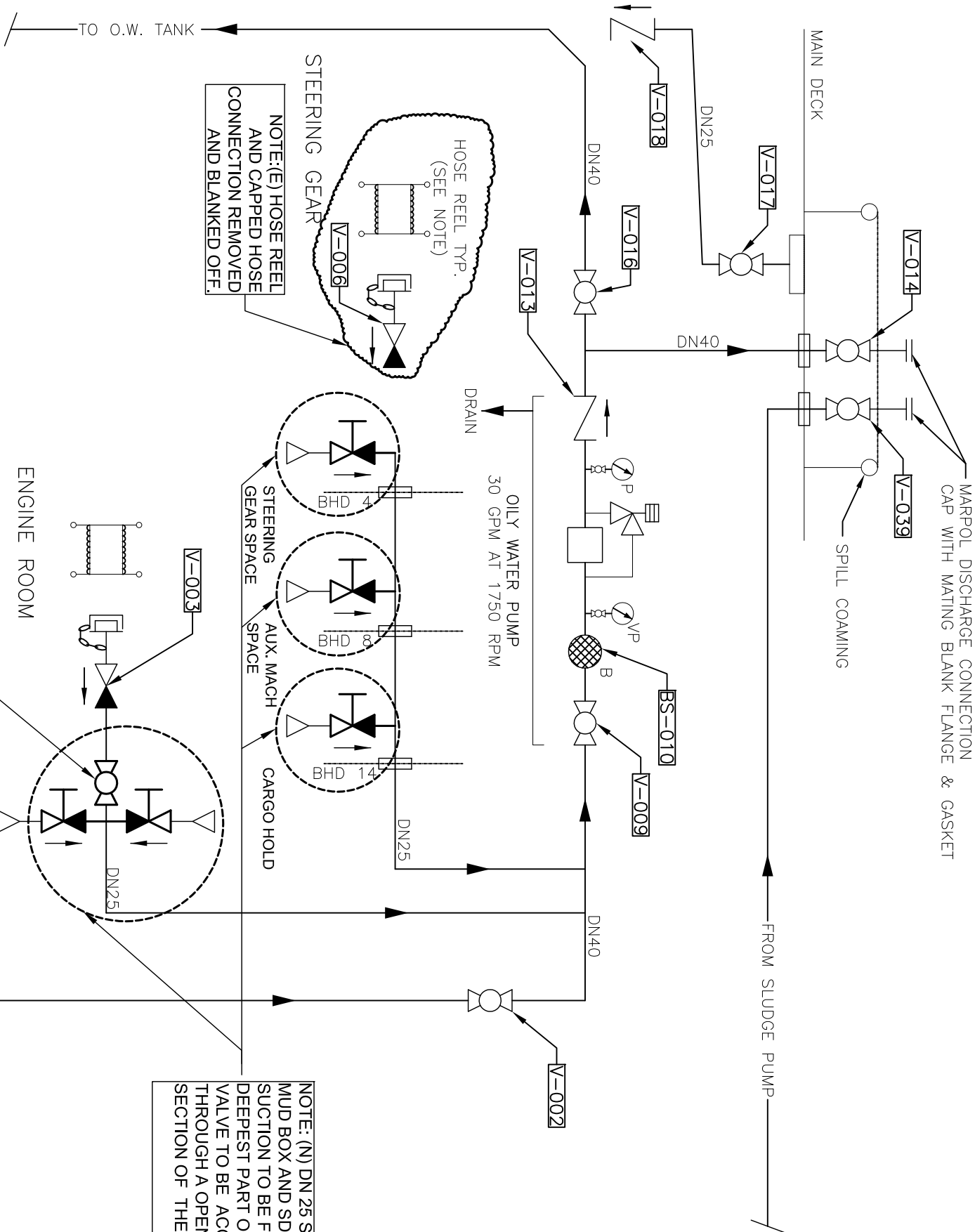
2601-02-00

REVISION NO.:

0

SHEET NO.:

2 OF 2



REFERENCE DRAWINGS/ RULES:

- MERIDIEN MARITIME REPAIRATION NEAR SHORE FISHERIES RESEARCH VESSELS SLUDGE-OILY WATER DIAGRAM. DWG. # 75000, REV.5 (3-SHEETS)
- BV RULES FOR SHIPS UNDER 500 T. NR566, CH.5, SEC 5
- BV RULES FOR THE CLASSIFICATION OF STEEL SHIPS, PART C, CH.1. SECTION 10.

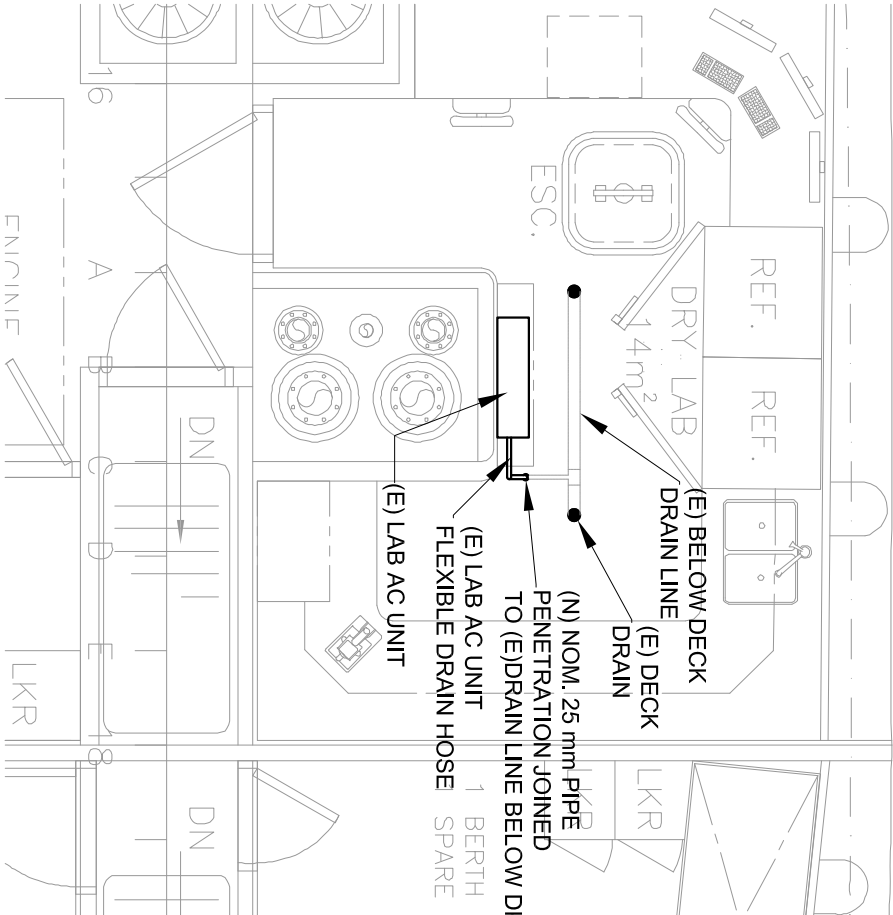
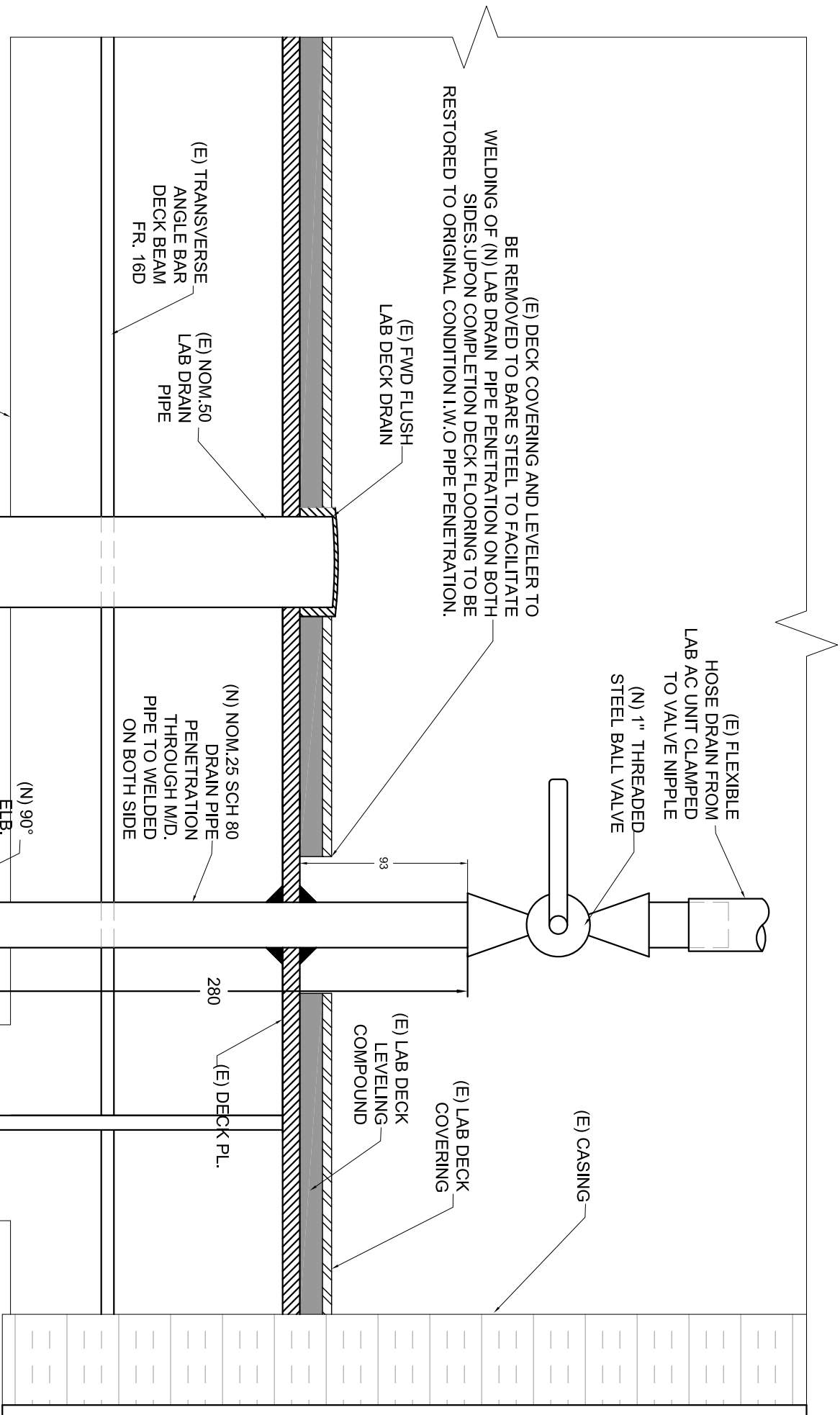
GENERAL NOTES:

- ALL DIM. IN mm, U.N.O
- THE FOLLOWING DENOTATIONS ARE USED: (N)= NEW, (E) =EXISTING, U.N.O= UNLESS NOTED OTHERWISE
- ALL (N) PIPING MATERIALS TO BE ASTM A106 SCH. 40 PIPE
- ALL NEW PIPE CONNECTIONS TO BE AS PER EXISTING. (SEE REFERENCE DRAWINGS FOR DETAILS)
- ALL (N) WELDING PERTAINING TO THE MODIFICATION TO BE PERFORMED BY CWB APPROVED WELDERS AND SUBJECT TO 100% VISUAL AND UT INSPECTION. THE MODIFIED OILY WATER RETENTION SYSTEM TO BE PRESSURE TESTED TO 1.25 X THE SYSTEMS DESIGN PRESSURE.
- BRANCH SDNR VALVES TO BE KEPT IN A CLOSED POSITION UNTIL REQUIRED FOR USE.
- MODIFICATIONS TO THE OILY WATER RETENTION SYSTEM SUBJECT TO BV CLASSIFICATION SOCIETY ACCEPTANCE.

REVISED O.W.R.S DIAGRAMMATIC

(N.TS)

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CLIENT: D.F.O VESSEL SUPPORT		DRAWN BY: PAL	DATE DRAWN: OCT. 2014
		CHECK BY: M.S.I	DATE CHECKED: OCT. 2014
PROJECT NO.: 2601		SCALE: 1 : 1 AND AS NOTED	
DRAWING NO.: 2601-02-00		REVISION NO.: 0	SHEET NO.: 1 OF 2



KEYPLAN

OUTLINE OF (E) A-CLASS INSULATION
AND BACKING STEEL MESH ON DECK
HEAD AND STRUTURE

(N) 50 mm THREADED
TEE JOINED TO (E) DRAIN LINE

(N) 50 mm X 25 mm
GALV. REDUCER

(N) NOM.25
GALV. SCH 40 PIPE

150mm APPROX.
T.B.D. ON SITE

(N) 90°
ELB.

(N) NOM.25 SCH 80
DRAIN PIPE
PENETRATION
THROUGH M/D.
PIPE TO WELDED
ON BOTH SIDE

(E) DECK PL.

(E) LAB DECK
LEVELING
COMPOUND

(E) LAB DECK
COVERING

(E) CASING

(E) FLEXIBLE
HOSE DRAIN FROM
LAB AC UNIT CLAMPED
TO VALVE NIPPLE
(N) 1" THREADED
STEEL BALL VALVE

AT FR. 16C LOOKING FWD

- ### GENERAL NOTES:
- ALL DIM. IN mm, U.N.O
 - DIMENSIONS TO BE CONFIRMED ON SITE.
 - THE FOLLOWING DENOTATIONS ARE USED: (N)= NEW, (E) =EXISTING, U.N.O= UNLESS NOTED OTHERWISE
 - ALL MATERIALS FOR PIPE PENETRATION TO BE NEW Ø 25 mm SCH.80 GALV. STEEL. BELOW DECK FITTINGS TO BE THREADED GALV. FITTINGS
 - ALL PIPE PENETRATION WELDING TO BE MIN. 9 mm DCFW AND WELDED ON UNDERSIDE AND TOP SIDE OF THE PIPE.
 - ALL BOUNDARY INSULATION AND STEEL BACKING MESH TO BE FITTED BACK IN PLACE TO MAINTAIN A-CLASS INTEGRITY OF DIVISION BETWEEN THE E/R AND THE LAB SPACE.
 - ALL WELDING SUBJECT TO 100% M.P.I INSPECTION.
 - T.B.D. = TO BE DETERMINED.

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CLIENT: D.F.O VESSEL SUPPORT		DRAWN BY: PAL	DATE DRAWN: OCT. 2014
		CHECK BY: M.S.I	DATE CHECKED: OCT. 2014
		PROJECT NO.: 2632	SCALE: N.T.S
		DRAWING NO.: 2632-01-00	REVISION NO.: 0
		SHEET NO.: 1 OF 1	



Using Acoustic Windows

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1 Introduction

RD Instruments (RDI) builds Acoustic Doppler Current Profilers (ADCP) for use on vessels. Installation of an ADCP in a vessel is done in many ways, but typically the ADCP transducer is mounted inside of a sea chest or well. The opening of the sea chest or well can be open to the ocean or an acoustic window can cover it.

An acoustic window is a covering that can seal the opening of the sea chest but still allow the acoustic signal (both transmit and received signals) to be transferred through the window. The type, thickness, orientation, and other installation issues of the acoustic window are important to understand. If the wrong material is used or the wrong installation used then the performance obtained by the ADCP will be severely limited.

1.1 Background - Should I use an Acoustic Window?

Like any vessel-mount, acoustic system, the performance of the ADCP is sensitive to acoustic noise. For best performance, the transducer is mounted in its own well, recessed in the vessel hull, with an opening slightly larger than the transducer. An Acoustic Window, mounted across the well opening, is required to isolate the transducer face from flow noise, as the vessel moves through the water. Acoustic windows (or simply windows) can produce overall performance improvements in vessel-mounted ADCPs through the following advantages.

1.1.1 Advantages

- Well will not fill with air bubbles caused by the ship moving through the surface water.
- Flow noise is reduced.
- The well can be filled with fresh water to limit corrosion.
- Barnacles cannot grow on the transducer faces. Barnacle growth is the number one cause of failure of the transducer beams.
- The transducer is protected from debris floating in the water.

Although these advantages are important, it should be known that if the wrong window is used or if the window is not installed properly then the following disadvantages are possible.



1.1.2 Disadvantages

- The range of the ADCP can be reduced because the window will absorb some of the transmit and receive energy.
- The transmit signal could be reflected into the well, causing the well to “ring” like a bell. This will cause the data being collected during the ringing to be biased. Some ships have reported a loss in range as great as 50 meters. Applying sound absorbing material on the well walls may dampen the ringing.
- The transmit signal could be reflected off of the window and back into the other beams.

However, even though there are disadvantages possible our experience has shown that when the correct window is used and it is properly installed that the window advantages are far more important. The remainder of this Application Note will focus on how to choose the window for your vessel, how to mount the window, how to maintain the window, and any other associated concerns when using a window.

1.2 What Window should I use?

While we cannot claim to understand every window, we do believe that we can recommend a material that will work. We have developed a simple model for an acoustic window made from polycarbonate material. Over the past 2 decades we have obtained feed back from customers that has allowed us to prove the model is a fair estimation of what to expect for performance. Polycarbonate was chosen because it can provide enough strength for most installations, is readily available in most countries, it has been shown to last a long time (over 7 years in some installations), and it can be used on all ADCP models (NarrowBand (*NB*), BroadBand (*BB*), WorkHorse (*WH*), and Ocean Surveyor (*OS*)).

The type of ADCP model is very important when choosing a window. The bandwidth of the acoustic signal from the ADCP must be maintained. Different window materials have different losses over a band of frequencies. As an example, the Ocean Surveyor/Observer ADCP uses a bandwidth of 6% or 1% about the system's center frequency. A BroadBand or WorkHorse ADCP uses a bandwidth of 25% or 6% about the system's center frequency. The material polycarbonate has a fairly uniform loss about these frequency bandwidths.

It should be noted that we have no knowledge about the variability of polycarbonates. And so, the acoustic model that we run is for a particular poly-

carbonate manufactured by Zelux. This is a window-grade, polycarbonate and has a high tensile strength (~9000psi) to resist cracking.

Even when choosing this particular window it is important to choose the proper thickness of window material. A window will absorb sound and reduce the range of the ADCP. Therefore, we always recommend using the thinnest window possible. However, depending on your application a thicker material may be necessary. The following table indicates the expected loss (two-way) of polycarbonate at different frequencies and thickness.

Table 1: Expected Loss for ADCPs with 30Degree Beam Angle

Frequency (kHz)	Thickness mm (in.)	One-way loss @ 0°,20°,40°C (dB)			Two-way loss @ 0°,20°,40°C (dB)			Expected Loss in Range (meters)
38	76.2 (~3.0)	2.7	2.6	2.3	5.4	5.2	4.6	173
38	63.5 (~2.5)	3.0	2.9	2.5	6.0	5.8	5.0	192
38	50.8 (~2.0)	2.9	3.2	2.9	5.8	6.4	5.8	205
38	38.1 (~1.5)	1.4	1.2	1.0	2.8	2.4	2.0	90
38	25.4 (~1.0)	2.9	3.3	3.3	5.8	6.6	6.6	211
38	19.1 (~0.75)	1.0	0.9	0.8	2.0	1.8	1.6	64
38	12.7 (~0.5)	5.3	5.8	5.6	10.6	11.6	10.2	371
38	9.5 (~0.375)	1.8	1.8	1.8	3.6	3.6	3.6	115
38	6.4 (~0.25)	0.7	0.7	0.6	1.4	1.4	1.2	45
75	76.2 (~3.0)	4.2	4.3	3.8	8.4	8.6	7.6	138
75	63.5 (~2.5)	3.9	4.0	3.5	7.8	8.0	7.0	128
75	50.8 (~2.0)	3.6	3.6	3.0	7.2	7.2	6.0	115
75	38.1 (~1.5)	2.7	2.6	2.3	5.4	5.2	4.6	83
75	25.4 (~1.0)	3.1	3.3	2.9	6.2	6.6	5.8	106
75	19.1 (~0.75)	1.4	1.2	1.0	2.8	2.4	2.0	45
75	12.7 (~0.5)	3.1	3.5	3.3	6.2	7.0	6.6	112
75	9.5 (~0.375)	1.0	0.8	0.7	2.0	1.6	1.4	32
75	6.4 (~0.25)	5.9	6.3	5.5	11.8	12.6	11.0	202
150	50.8 (~2.0)	5.0	5.2	4.6	10.0	10.4	9.2	83
150	38.1 (~1.5)	4.2	4.4	3.8	8.4	8.8	7.6	70
150	25.4 (~1.0)	3.6	3.6	3.0	7.2	7.2	6.0	58
150	19.1 (~0.75)	2.7	2.6	2.3	5.4	5.2	4.6	43
150	12.7 (~0.5)	3.1	3.3	2.9	6.2	6.6	5.8	53
150	9.5 (~0.375)	1.4	1.2	1.0	2.8	2.4	2.0	22
150	6.4 (~0.25)	3.2	3.6	3.3	6.4	7.2	6.6	58
300	25.4 (~1.0)	5.0	5.2	4.5	10.0	10.4	9.0	42
300	19.1 (~0.75)	4.2	4.3	3.8	8.4	8.6	7.6	34
300	12.7 (~0.5)	3.6	3.6	3.0	7.2	7.2	6.0	29
300	9.5 (~0.375)	2.7	2.6	2.3	5.4	5.2	4.6	22
300	6.4 (~0.25)	2.9	3.4	3.2	5.8	6.8	6.4	27

RDI's recommended thickness is in **blue bold**. RDI's recommended maximum thickness is in **red italic and bold** in the above table. All other items will result in poor overall performance or a loss in range that most customers find unreasonable.



RD Instruments

Acoustic Doppler Current Profilers

Application Note

FSA-010 (December 2002)

One-way insertion loss curves for all items above in **bold** (RDI's recommended thickness) are found in Appendix A of this application note. All other plots are available from RDI upon request.

Note all of the losses and expected ranges are estimated and some of the assumptions we make may not be true in your installation. However, based on several actual installations the values shown have proven to be good estimations. Your actual loss may be higher or lower than what is shown.

Table 2: Expected Loss for ADCPs with 20Degree Beam Angle

Frequency (kHz)	Thickness mm (in.)	One-way loss @ 0°, 20°, 40°C (dB)			Two-way loss @ 0°, 20°, 40°C (dB)			Expected Loss in Range (meters)
38	76.2 (~3.0)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
38	63.5 (~2.5)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
38	50.8 (~2.0)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
38	38.1 (~1.5)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
38	25.4 (~1.0)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
38	19.1 (~0.75)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
38	12.7 (~0.5)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
38	9.5 (~0.375)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
38	6.4 (~0.25)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
75	76.2 (~3.0)	3.1	3.2	2.8	6.2	6.4	5.6	102
75	63.5 (~2.5)	2.7	2.8	2.6	5.4	5.6	5.2	90
75	50.8 (~2.0)	2.6	2.6	2.3	5.2	5.2	5.6	90
75	38.1 (~1.5)	2.0	2.0	1.8	4.0	4.0	3.6	64
75	25.4 (~1.0)	2.2	2.1	1.8	4.4	4.2	3.6	70
75	19.1 (~0.75)	0.9	0.9	1.0	1.8	1.8	2.0	32
75	12.7 (~0.5)	2.8	2.9	2.4	5.6	5.8	5.4	93
75	9.5 (~0.375)	1.0	0.9	0.8	2.0	1.8	1.6	32
75	6.4 (~0.25)	4.2	3.7	2.7	8.4	7.4	5.4	134
150	50.8 (~2.0)	3.6	3.8	3.4	7.2	7.6	6.8	61
150	38.1 (~1.5)	3.1	3.2	2.8	6.2	6.4	5.6	51
150	25.4 (~1.0)	2.6	2.6	2.3	5.2	5.2	4.6	42
150	19.1 (~0.75)	2.0	2.0	1.8	4.0	4.0	3.6	32
150	12.7 (~0.5)	2.2	2.1	1.8	4.4	4.2	3.6	35
150	9.5 (~0.375)	0.9	0.9	0.9	1.8	1.8	1.8	14
150	6.4 (~0.25)	2.9	2.9	2.3	5.8	5.8	5.6	46
300	25.4 (~1.0)	3.6	3.8	3.4	7.2	7.6	6.8	30
300	19.1 (~0.75)	3.1	3.2	2.8	6.2	6.4	5.6	26
300	12.7 (~0.5)	2.6	2.6	2.3	5.2	5.2	4.6	21
300	9.5 (~0.375)	2.0	2.0	1.8	4.0	4.0	3.6	16
300	6.4 (~0.25)	2.2	2.1	1.8	4.4	4.2	3.6	18

RDI's recommended thickness is in **blue bold**. RDI's recommended maximum thickness is in **red italic and bold** in the above table. All other items

will result in poor overall performance or a loss in range that most customers find unreasonable.

One-way insertion loss curves for all items above in **bold** (RDI's recommended thickness) are found in "[Insertion Loss](#)," page 15. All other plots are available from RDI upon request.

Note all of the losses and expected ranges are estimated and some of the assumptions we make may not be true in your installation. However, based on several actual installations the values shown have proven to be good estimations. Your actual loss may be higher or lower than what is shown.

1.2.1 Are there any Other Windows that I can consider?

RDI has only limited experience with other materials. As a result there is not much information we can provide about other materials. However, we can state that different materials will behave differently, depending on both the frequency and bandwidth of the acoustic ADCP signal. The absorption curves of various materials have significant amplitude fluctuations with frequency, which can change in both frequency and amplitude with changes in temperature.

Important acoustic properties of the window include acoustic refractive index (which should be as close as possible to that of water), insertion loss (which should be as small as possible) and speed of sound. There are two acoustic refractive indices: one for shear waves and one for plane waves. The acoustic refractive indices are simply the ratios of speed of sound in water to speed of sounds in the material. Insertion loss combines absorption and reflection of sound, and it depends on both the thickness and the material properties of the window. In particular, you should avoid using window thickness equal to odd multiples of shear mode quarter-waves (Dubbelday and Rittenmeyer, 1987; Dubbleday, 1986). Refer to Selfridge (1985) and Thompson (1990) for more information. Note that the speeds of sound in plastics decrease with increasing temperature and that causes the resonant frequencies to shift. This can be a large effect. Neither Selfridge nor Thompson has much information on the temperature coefficients of sound speeds.

- The life of the material must also be considered as well as its overall strength. We have had customers design their own windows out of Kevlar. They required Kevlar because they required a material that was very strong both for temperature and for strength against heavy seas, objects in the water, and striking the bottom or ice. Kevlar can provide this strength without having to be very thick thus minimizing loss.
- Kevlar windows have been successfully built and used by 2 different institutes (Monterey Bay Aquarium Research Institute

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(MBARI) in the United States, and the Institut National des Sciences de l'Univers (INSU) in France. The procedure to build the window is not known by RDI. The properties of the Kevlar windows are not well understood and so a lot of experimentation with different thickness windows was required before these customers were satisfied with the Kevlar window.

- INSU used a graduate student, Roche Frederic in 1997, to perform a study to determine the best thickness and composite of Kevlar to provide a window for a BB VM150kHz ADCP. The report states that the material KEVLAR K49 made with Resine Vinylester ATLAC 580 was used. The following French company produced this material:

Brest-Composite Industrie
124 Rue Auatole Frauce
29200 – Brest, France
Tel: 02-98-05-19-09
Fax: 02-98-34-06-02

RDI only knows that this single window was produced for INSU and does not know of any others who are using this material. It is RDI's understanding that the above-mentioned company can produce the Kevlar window but cannot give the acoustic properties required to determine the losses through the window. Contacting this company is done with the knowledge that RD Instruments is not recommending them, but only offering this as a source for the material.

1.3 What are the Acoustic Window Installation Considerations?

In [Section 1.2](#) we provided the recommended window material and thickness. In this section we will provide installation recommendations. Installation of the window must be done properly so that the best performance is possible. The following discussion is broken into sections so that each point can be considered individually.

1.3.1 What should the Window Shape be?

The window should be smooth without cracks or deformities. Typically the window is round and of a diameter that is large enough to clear all four beams. To determine the proper diameter of the window see [“Conceptual Transducer Well Design,” page 22.](#)

The acoustic window should be flat and parallel to the transducer mounting plate. This will result in a constant angle of 20 or 30 degrees (depending on the transducer beam angle) to the transducer on both the inside and outside window face.

Dome shaped windows have been used successfully. However, if the water temperatures inside the window and outside the window are not the same, all four beams will be refracted and actual velocity components will be rotated into a new coordinate system. In particular, some of the horizontal velocity will appear as a vertical velocity.

1.3.2 Can I Add Strengthening to the Window?

Adding a strengthening member across the window is not recommended because this can cause similar behavior as a cracked window (see [“If I find that the Window is Damaged Can I Keep Operating the ADCP?”](#), page 13) or can actually block the acoustic transmit and receive signals.

1.3.3 How do I Secure the Window to the Well Opening?

We recommend that a steel ring around the outside of the window be used because you do not want the screw heads to come in direct contact with the window material as it may crack under the strain.

It is recommended that the window be designed so that the ring will sit flush with the entire window face as shown in the [Figure 1](#). Flat headed bolts or recessed bolts should be used. All of these will maintain a smooth surface around the entire window and will prevent any chance for cavitation (see [“Do I Need to Worry About Air Bubbles When Using a Window?”](#), page 12 for more information).

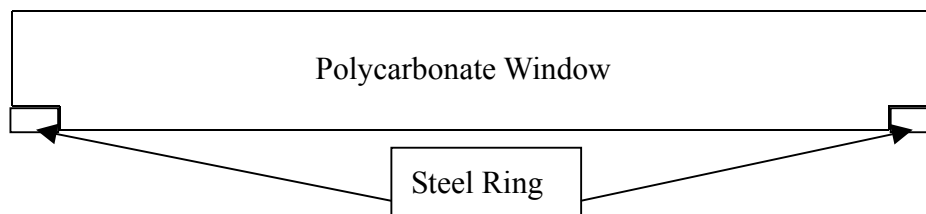


Figure 1. Conceptual Drawing of an Acoustic Window with Mounting Ring

Do not thread the polycarbonate window. Use bolt through holes spaced evenly around the window. The number of bolt through holes (typically 16 to 24 holes) should be enough to prevent leakage and will provide equal pressure on the window to prevent cracking.

The bolt circle should be located a distance from the edge of the window that is a minimum of twice the diameter of the bolt through holes, see [Figure 2](#), page 9.

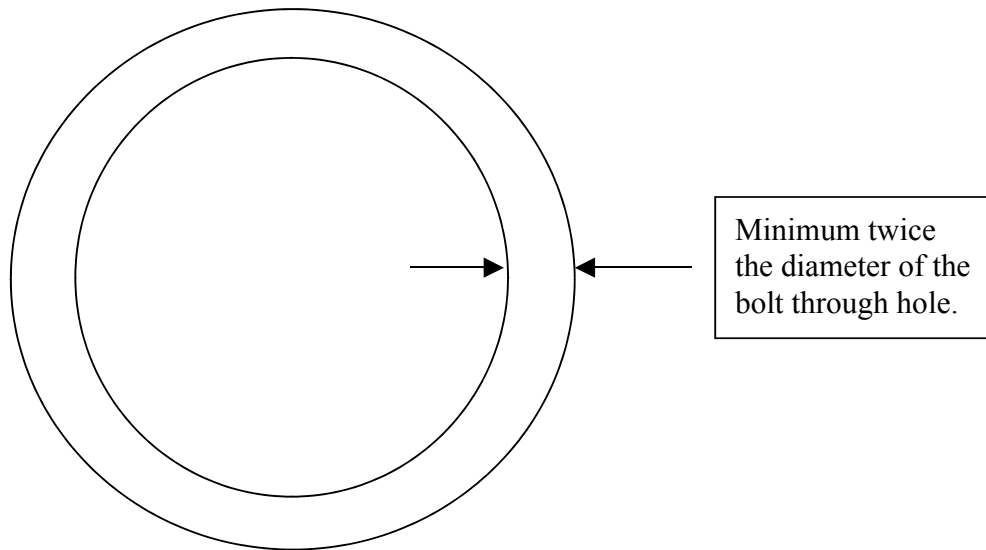


Figure 2. Location of the Window Bolt Hole Circle Diameter

1.3.4 How to Prevent the Window From Cracking When Going Into Dry Dock?

Using as thin a window as possible may mean that the window will not be able to support the water inside the sea chest when the vessel goes into dry dock. This means that you must either be sure to have a way to drain the sea chest prior to going into dry dock or allow a way for the water to drain out of the sea chest during dry dock. The former must be done as part of the sea chest design and the latter can be accomplished by placing holes in the window face.

The holes in the window face will allow water to freely flow in and out of the well. However, drilling holes in the window will increase your chances of flow noise, air bubbles in sea chest, corrosion, bio-fouling, and will make the sea chest non-hydrostatic. The bio-fouling will require that you have regular transducer inspections and cleanings. If you make the sea chest non-hydrostatic then in heavy seas the window can crack as it flexes from wave slamming. Dave Taylor Model Basin has measured slamming pressures as high as 300 psi with durations of a few milliseconds. If the sea chest behind the window is hydrostatic, no pressure gradient will exist across the window and no substantial deflections will occur.

With those considerations in mind you may still want to drill holes in the window. If you drill holes in the window then you must make sure that they are outside of the acoustic beam pattern of the beams, see [Figure 3, page 10](#).

As long as the holes remain outside of the beams they can be as large as is required to prevent the window from flexing when in heavy seas.

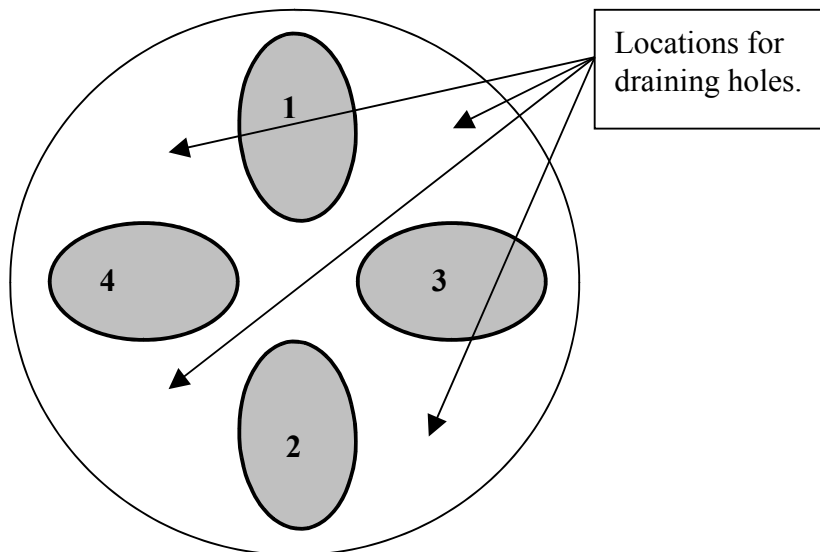


Figure 3. Draining holes locations around beams 1-4 intersection with the window.

1.3.5 How Much Space should I Have Between the Window and Transducer?

Never allow the transducer to touch the window. Separation is good for reducing the strength of the multiple fields of flow noise. However, we must limit the separation to prevent the reflection of a beam off of the window into another beam. This causes cross talk between the beams.

Therefore, with all ADCP models and frequencies the recommended distance between the transducer and the inside face of the window should be between 6.4mm to 12.7mm. This will ensure that there is no cross talk between beams and will provide adequate spacing to reduce flow noise. See [“Conceptual Transducer Well Design,” page 22](#) for more sea chest design issues.

1.4 What Other Issues should be Considered When Using an Acoustic Window?

Once you decide to use a window there are many issues that no longer are a worry but there other new things you do need to worry about. This section will outline each of these items and the issues related to them.



1.4.1 What Fluid Should I Fill the Sea Chest With?

If you have not placed holes in the window and you are not going to work in an area where freezing is an issue then the sea chest should be filled with fresh water. Fresh water decreases the issues of corrosion in the sea chest. If you will be in an area where freezing of fresh water would be an issue then seawater can be used.

Some users have placed ethylene glycol into the fresh water well to prevent freezing. Although this will not harm the transducers you will have to perform post processing on the data sets from the NB, BB, and WH ADCPs (this issue is not present for the OS ADCP). The NB, BB, and WH ADCPs must have the velocity data scaled properly based on the speed of sound in the sea chest. Ethylene glycol causes the water to have an inverted speed of sound change to that of fresh water or salt water. This means that RDI's standard software programs will not be scale the data properly. You will have to record separately the speed of sound in the sea chest and then in post processing correct the ADCP velocity data appropriately.

1.4.2 How Much Fluid Should I Use in the Sea Chest?

The transducers must be completely immersed in water. No air should be in front of the transducers and the pressure within the sea chest should be adjusted to keep the window from bowing in and out, and thereafter, the volume should be kept constant.

1.4.3 Should I Use Absorption Material When Using a Window?

The window causes some of the transmit signal to reflect back into the well due to the difference in impedance between the window and the water. When the transmit signal is reflected in the well it becomes trapped and this results in what is called ringing. To keep from processing this signal, the blanking of the ADCP will have to be increased.

However, in extreme cases, ringing can last a period that will cause the first 50-100 meters of data to be unusable. Therefore, a sound absorbing material should be used inside the sea chest to minimize the effects of sound ringing within the sea chest. The material should be a minimum of one wavelength thick (include the sound speed of the absorbing material when calculating the size of a wavelength). Approximate wavelengths of sound in seawater are given below in [Table 3, page 12](#). Using standard neoprene wet suit material has been found to work well with 75 and 150hKz frequency ADCPs.

Table 3: Wavelength of sound in seawater (1500 m/s sound speed)

Frequency (kHz)	Wavelength (mm)
38	40
75	20
150	10
300	5

1.4.4 Do I Need to Worry About Corrosion When Using a Window?

Corrosion is always possible. However, our transducers are made of a material that has shown to corrode very little over time when the above precautions are met. There is nothing that you can do to protect the transducer from corrosion. However, if the well is covered with a window and then filled with fresh water corrosion is can be further minimized. You should inspect the transducer regularly for signs of corrosion.

Note, never attach any anodes directly to the transducer head. Additional anodes or impressed voltage systems can cause the urethane to separate from the transducer (cathodic disbondment) or cause the material of the transducer to break down. Standard anode protection used for the ship should be installed outside of the well of the transducer head. Mounting of ship's standard anode protection outside of the transducer well will typically not cause any problems.

1.4.5 Do I Need to Worry About Air Bubbles When Using a Window?

All vessels create air bubbles in the water as the ship moves through the water. Ships with a deep draft or a non-flat bottom have fewer problems with bubbles. If you are using a window these bubbles will still be present. If the window is sealed then this air will not fill the sea chest. However, if the window is not sealed then air can fill the sea chest. You must make sure to vent air from the sea chest periodically if there is a possibility that air will become trapped in your sea chest.

To avoid air bubbles from getting into the front of the window you should mount the transducers below or away from the bubble layer. The flow layer is usually within the first two feet below the hull. Bubbles can be trapped in this layer. Mounting the transducer head amid ship on the fore-to-aft centerline may help. Another technique is to divert the bubble layer so it flows around the transducers. A fairing around the sea chest can help with this, but care must be taken so that you do not cause cavitation.



1.4.6 Do windows Improve Flow Noise Problems?

Water flowing over the transducer faces increases the acoustic noise level, which decreases the profiling range of the ADCP. A window reduces the coupling of flow noise to the transducer. This is because of the gap filled with fluid between the inside of the window face and the transducer faces attenuates the flow noise. By reducing flow noise you are increasing the signal to noise ratio. The higher the signal to noise ratio the better the stronger the returned signal will appear. This will result in better data reception and longer ranges.

1.5 What Maintenance is required when using Windows?

In general, a window provides protection to the transducer from the most common sources of problems such as bio fouling and corrosion. However, the window can still become covered with bio fouling or could become damaged. The following section discusses these issues.

1.5.1 How Often Should I Inspect the Window?

Since growth of mussels, barnacles, and other bio fouling occurs on all vessels the window should be inspected and cleaned by divers on a regular interval. This interval should be often enough to prevent the growth of anything on the window and to allow inspection for damage to the window. It is recommended that this interval be at least once per year, but may be required more often in areas that have heavy bio-fouling growth.

When inspecting the window you should inspect for bio-fouling growth, cracks, damage, for air pockets, and for mud on the inside of the window. We have seen cases where the inside of the well became filled with mud. The mud entered through a crack in the window and where the holes were drilled in the window. Bio fouling should be cleaned off, air should be purged from the sea chest, and mud should be removed from the sea chest.

1.5.2 If I find that the Window is Damaged Can I Keep Operating the ADCP?

In general, any window that is cracked or is damaged so that it is not smooth should be replaced as soon as possible.

A window that is damaged causes a problem with the acoustic transmission. The exact problem or problems seen because of this damage will vary depending on where the break is and the way a beam would strike the damage.

All windows have losses because of an impedance difference to the water inside the well and outside the well. There are also losses that are built up in the window. An important loss is due to the shear wave that is created as our acoustic signal passes through the window at an angle. This shear wave traps sound in the thickness of the window as the acoustic signal tries to pass through the window. If the window has a crack in it then the window can cause this trapped energy to bounce in all directions rather than remain trapped in the window. Depending on the size of the crack, the location of the crack, and what the window does around the crack this reflected energy may even go into other beams.

Regrettably, there is no way to predict on what can happen as a crack will have a strange pattern to it. A single beam or all four beams may be affected. However, in either case it is enough to know that a crack in the window is very bad and will cause the energy that is transmitted and received in a beam to be deflected at strange angles.

Additionally, cracks can cause the window to have a rough surface. This can result in cavitation around the window. Cavitation results in air being trapped near the crack. This air can cause energy to be reflected back into the transducer well instead of traveling through the water.

1.5.3 Does the Use of a Window Effect My Warranty?

The use of a window has no impact on warranty. The window is primarily an aid to optimal performance. A window isolates the transducer face from flow noise when the vessel is moving and provides protection from bio fouling. These all increase the performance and reliability of the transducer. The window will also absorb some of the transmitted and returned signals. This will have an adverse effect on performance. However, when the proper window is used this adverse effect is minimal compared to the benefits of using a window. RDI cannot be responsible for the acoustic design of the vessel, but that design and the installation of our transducer certainly can adversely affect the ADCP system performance.



1.6 Insertion Loss

The following section contains insertion (one-way) loss graphs for each of the ADCP frequencies at each transducer beam angle at 0°C. These graphs are provided as an example of the expected insertion loss.

The main beam of each ADCP system at its maximum bandwidth is displayed as the red line on each graph (the $\sin X/X$ is represented by the smaller bumps in red). The minimum and maximum frequencies used on the X-axis of the graph were chosen so that this bandwidth would be approximately centered on the graph.

The blue line represents the expected loss across this bandwidth of frequencies for this thickness of polycarbonate. The Y-axis of each graph represents the expected insertion loss. See the example below for descriptions.

Uniform Ave. IL represents the entire average insertion loss over the entire frequency (X-axis) shown. The Weighted Ave. IL represents the average insertion loss over the bandwidth of the ADCP frequency. The Weighted Ave. IL is used to complete [Table 1, page 4](#) and [Table 2, page 5](#) of this document.

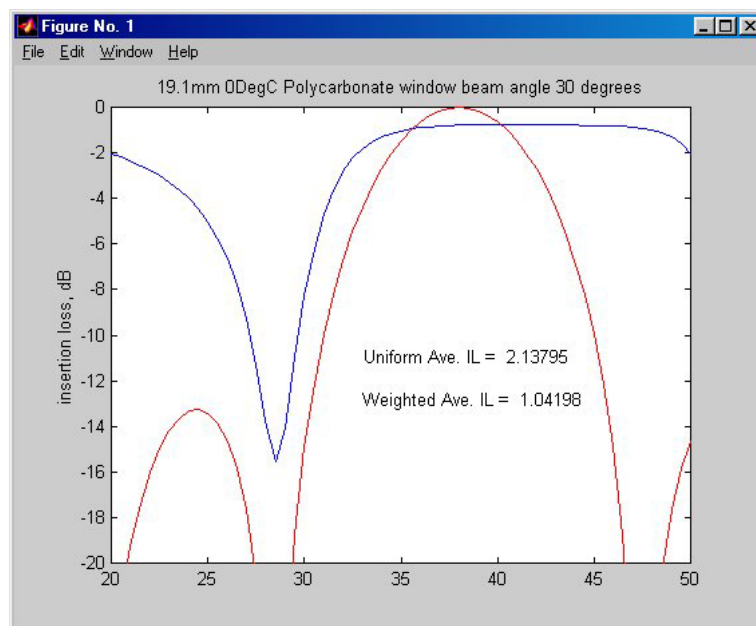


Figure 4. 38kHz Insertion Loss (one-way) with a 19.1mm window at 0°C

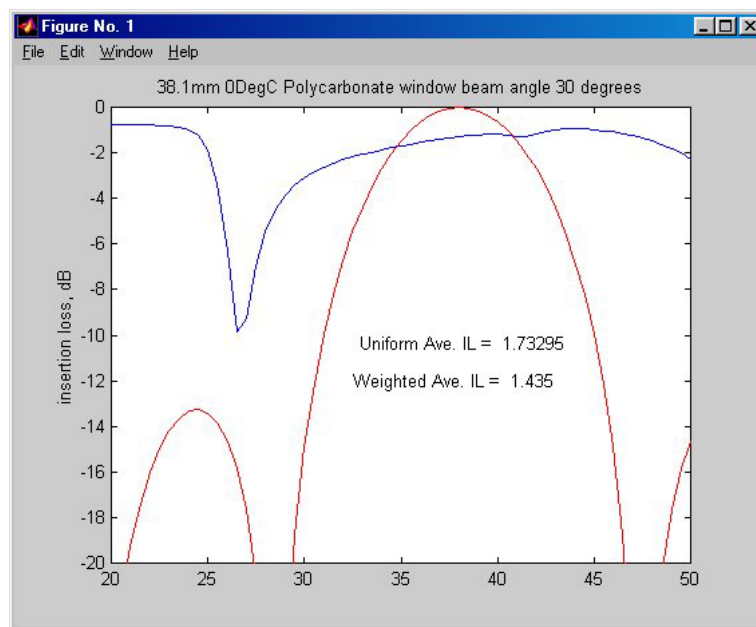


Figure 5. 38kHz Insertion Loss (one-way) with a 38.1mm window at 0°C

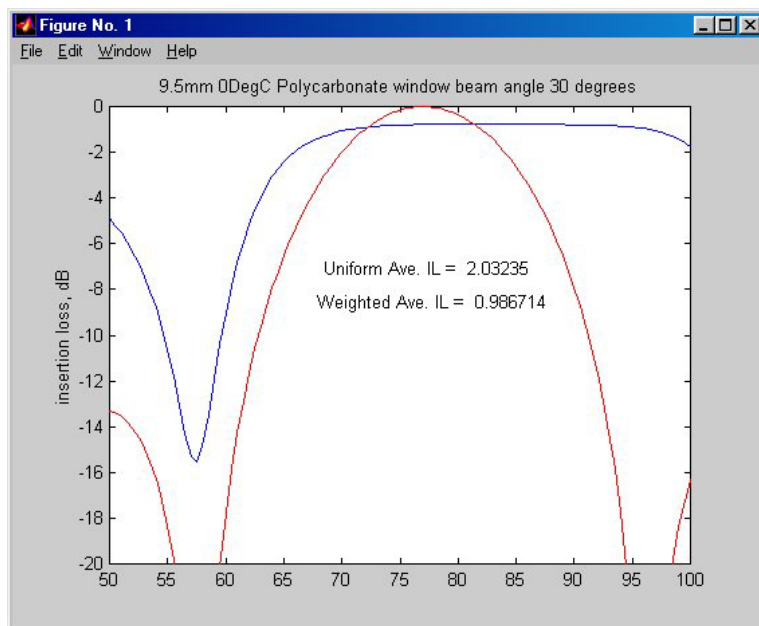


Figure 6. 75kHz Insertion Loss (one-way) with a 9.5mm window at 0°C

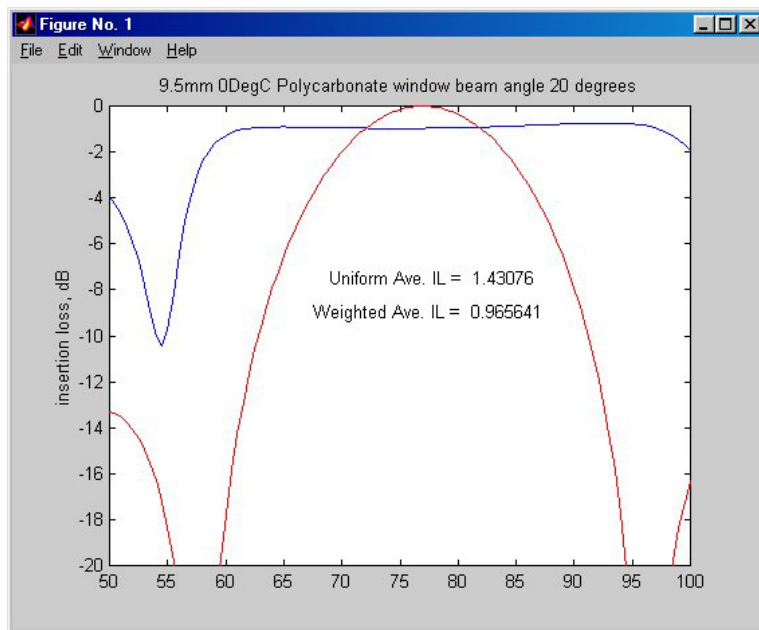


Figure 7. 75kHz Insertion Loss (one-way) with a 9.5mm window at 0°C

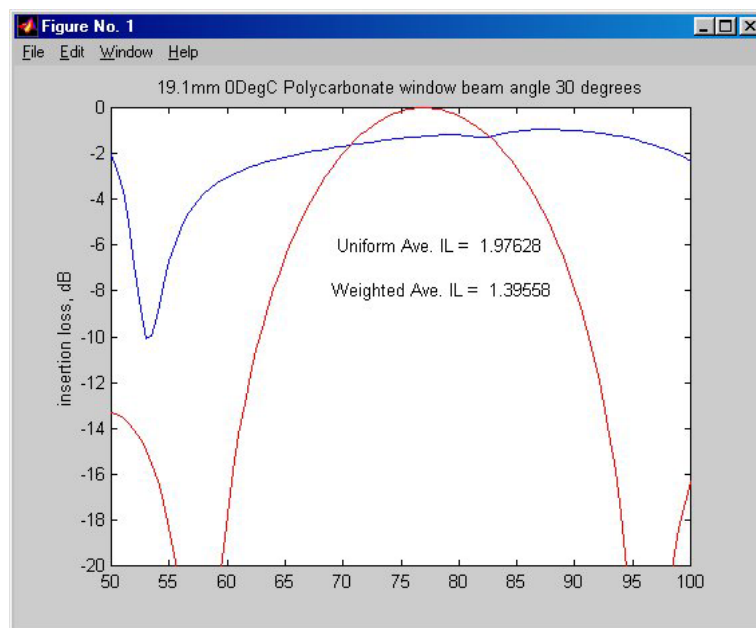


Figure 8. 75kHz Insertion Loss (one-way) with a 19.1mm window at 0°C

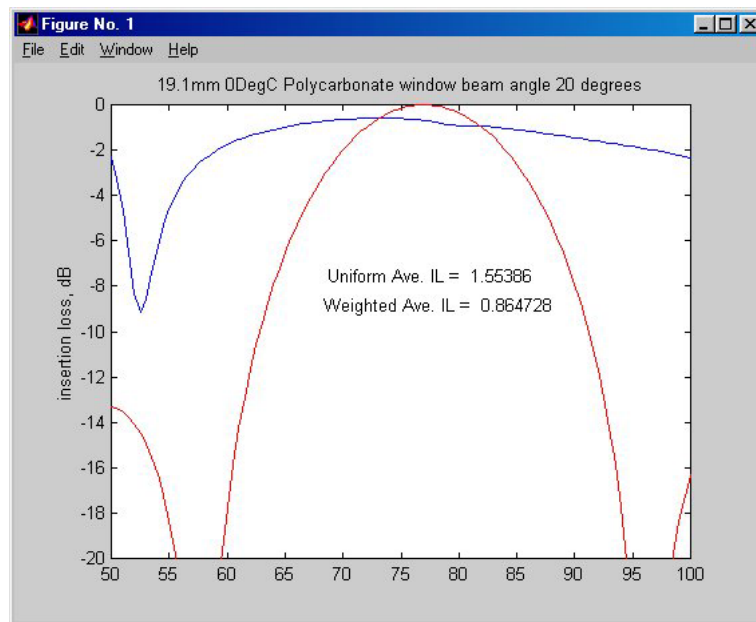


Figure 9. 75kHz Insertion Loss (one-way) with a 19.1mm window at 0°C



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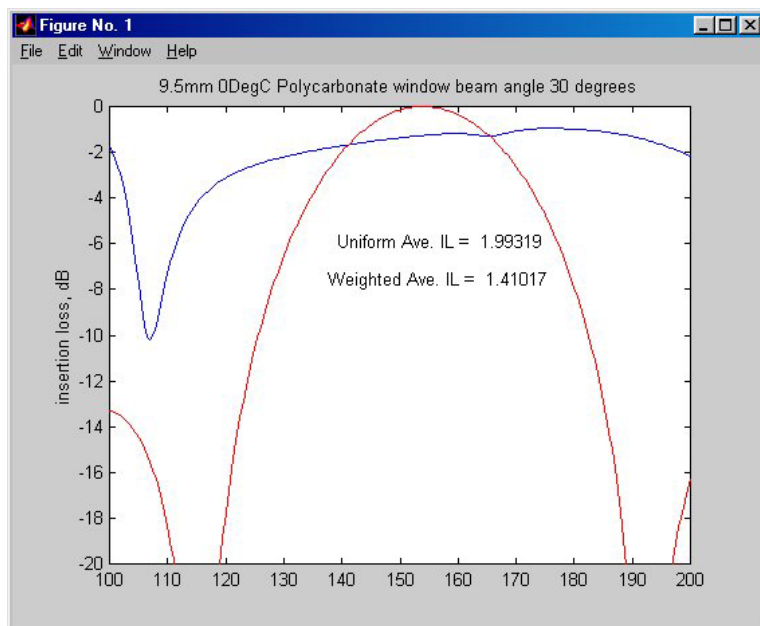


Figure 10. 150kHz Insertion Loss (one-way) with a 9.5mm window at 0°C

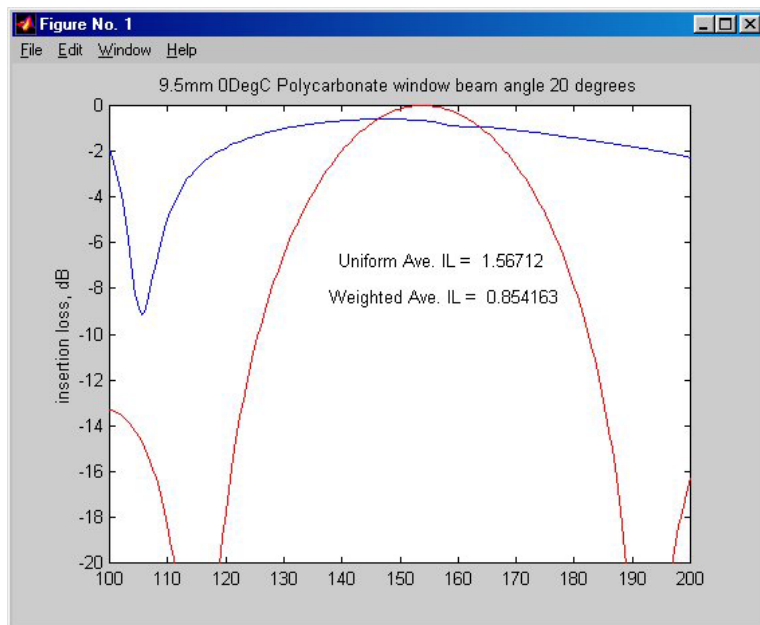


Figure 11. 150kHz Insertion Loss (one-way) with a 9.5mm window at 0°C

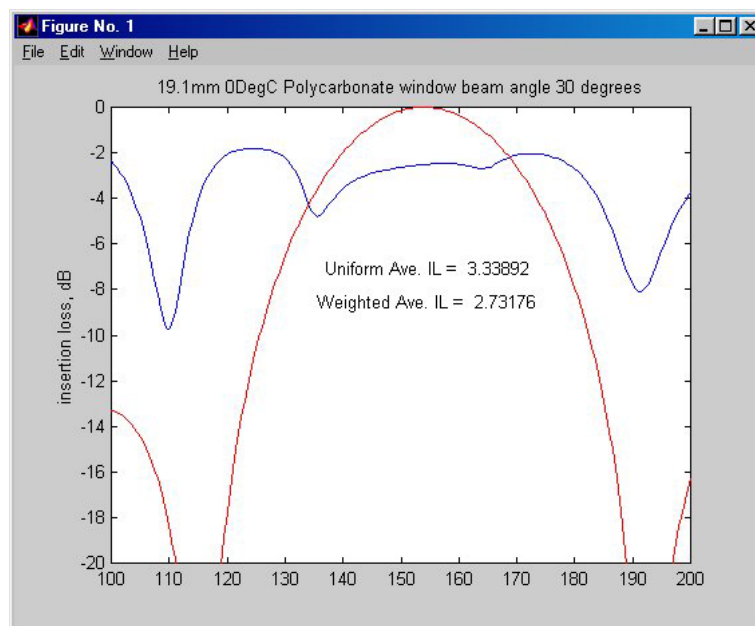


Figure 12. 150kHz Insertion Loss (one-way) with a 19.1mm window at 0°C

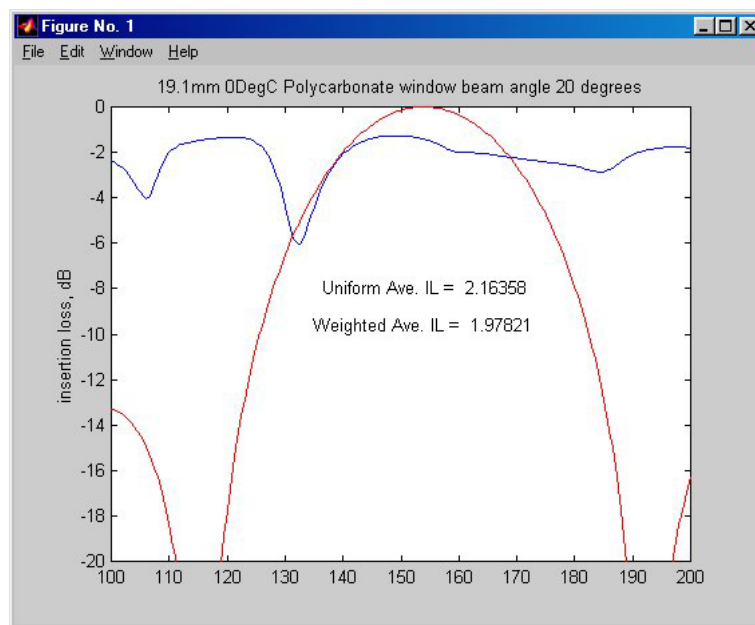


Figure 13. 150kHz Insertion Loss (one-way) with a 19.1mm window at 0°C



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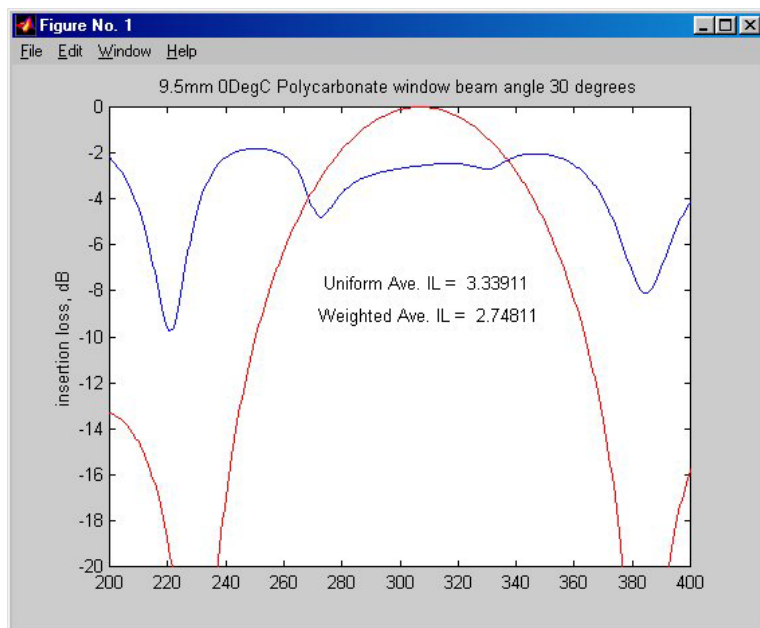


Figure 14. 300kHz Insertion Loss (one-way) with a 9.5mm window at 0°C

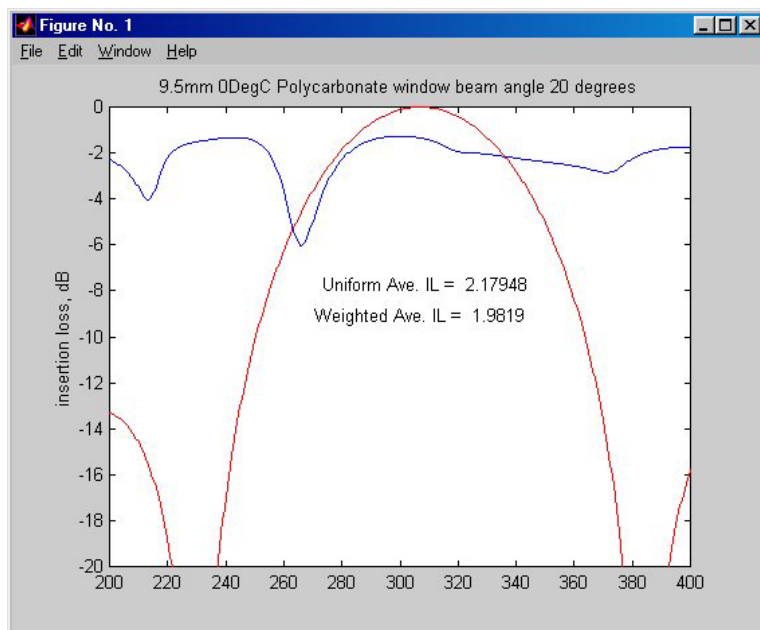


Figure 15. 300kHz Insertion Loss (one-way) with a 9.5mm window at 0°C

2 Conceptual Transducer Well Design

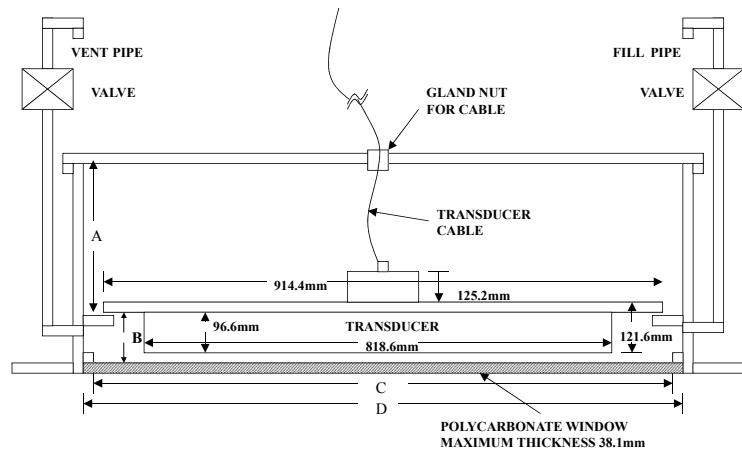


Figure 16. Inside Vessel Mounting - OS 38khz Transducer

Dimension Letter	Option 1 Minimum Dimension	Option 2 Maximum Dimension
A	384mm	738mm
B	103.0mm	109.5m
C	908mm	921mm
D	1010mm	1023mm

Special Notes:

- No liability is assumed by RD Instruments for users using this conceptual well drawing. Users realize that this drawing is provided as a basis for the user to construct their own well. It is expected that the user will have their well design inspected and approved by a naval architect.
- The top plate of the well is intended as the primary seal for the vessel. The window and transducer can provide additional seal but should not be considered the primary sealing mechanism for the vessel.
- This conceptual well drawing is designed such that it would be possible to remove the transducer from inside the vessel. For safety, it is strongly recommended that divers fit a steel plate either over the window or in place of the window before installing or removing the transducer.
- The listed minimum and maximum dimensions are recommendations based on maintaining the clearance for the transducer as well as providing the smallest well possible.
- The gasket material between the transducer housing and the vessel flange should be used that will both seal and provide electrical isolation between the transducer housing and the vessel flange. Typical gasket material used is silicone rubber 3-6.35mm thick.
- Inserts in the transducer housing mounting holes may be used to provide additional isolation from vessel.
- The walls of the well should be coated with a material to absorb reflected sound in the well. Material such as 3mm wet suit material glued to the inside well walls is satisfactory for this purpose.
- Vent and fill pipes should be above the water line of the vessel and it is recommended that a gate valve be installed to seal off these pipes.
- Window thickness should not exceed 38.1 mm of Polycarbonate material. Thinner Polycarbonate window is OK.
- Window faces should be parallel to the transducer face to within 2 degree for best performance; angle should never exceed 5 degrees.



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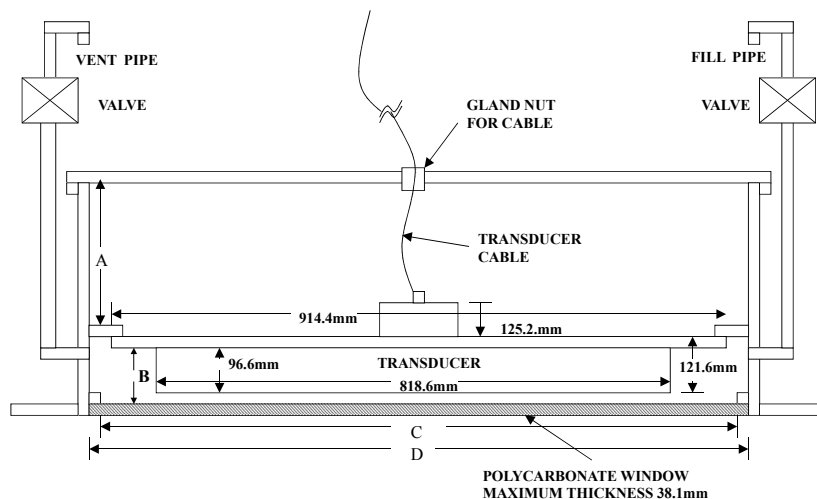


Figure 17. Underneath Vessel Mounting - OS 38khz Transducer

Dimension Letter	Option 1 Minimum Dimension	Option 2 Maximum Dimension
A	384mm	738mm
B	103.0mm	109.5m
C	1016mm	1016mm
D	1118mm	1118mm

Special Notes:

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- Window thickness should not exceed 38.1 mm of Polycarbonate material. Thinner Polycarbonate window is OK.
- Window faces should be parallel to the transducer face to within 2 degree for best performance; angle should never exceed 5 degrees.

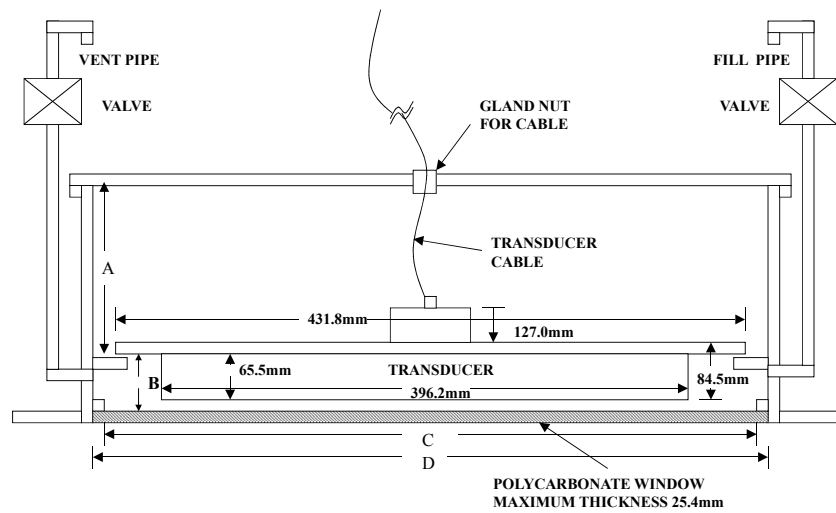


Figure 18. Inside Vessel Mounting - OS 75kHz Transducer

Dimension Letter	Option 1 Minimum Dimension	Option 2 Maximum Dimension
A	384mm	738mm
B	71.9mm	78.2mm
C	461mm	474mm
D	563mm	576mm

Special Notes:

- No liability is assumed by RD Instruments for users using this conceptual well drawing. Users realize that this drawing is provided as a basis for the user to construct their own well. It is expected that the user will have their well design inspected and approved by a naval architect.
- The top plate of the well is intended as the primary seal for the vessel. The window and transducer can provide additional seal but should not be considered the primary sealing mechanism for the vessel.
- This conceptual well drawing is designed such that it would be possible to remove the transducer from inside the vessel. For safety, it is strongly recommended that divers fit a steel plate either over the window or in place of the window before installing or removing the transducer.
- The listed minimum and maximum dimensions are recommendations based on maintaining the clearance for the transducer as well as providing the smallest well possible.
- The gasket material between the transducer housing and the vessel flange should be used that will both seal and provide electrical isolation between the transducer housing and the vessel flange. Typical gasket material used is silicone rubber 3-6.35mm thick.
- Inserts in the transducer housing mounting holes may be used to provide additional isolation from vessel.
- The walls of the well should be coated with a material to absorb reflected sound in the well. Material such as 3mm wet suit material glued to the inside well walls is satisfactory for this purpose.
- Vent and fill pipes should be above the water line of the vessel and it is recommended that a gate valve be installed to seal off these pipes.
- Window thickness should not exceed 25.4 mm of Polycarbonate material. Thinner Polycarbonate window is OK.
- Window faces should be parallel to the transducer face to within 2 degree for best performance; angle should never exceed 5 degrees.



RD Instruments

Acoustic Doppler Current Profilers

Application Note

FSA-010 (December 2002)

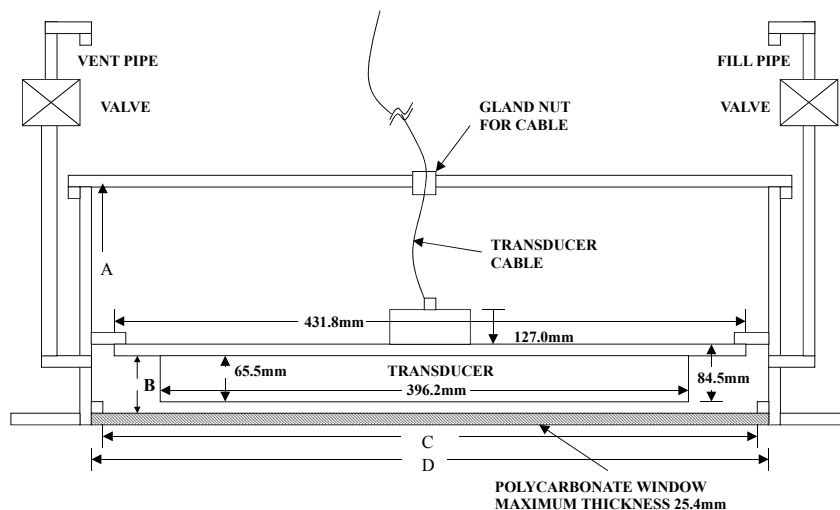


Figure 19. Underneath Vessel Mounting - OS 75kHz Transducer

Dimension Letter	Option 1 Minimum Dimension	Option 2 Maximum Dimension
A	384mm	738mm
B	71.9mm	78.2mm
C	533.4mm	533.4mm
D	635mm	635mm

Special Notes:

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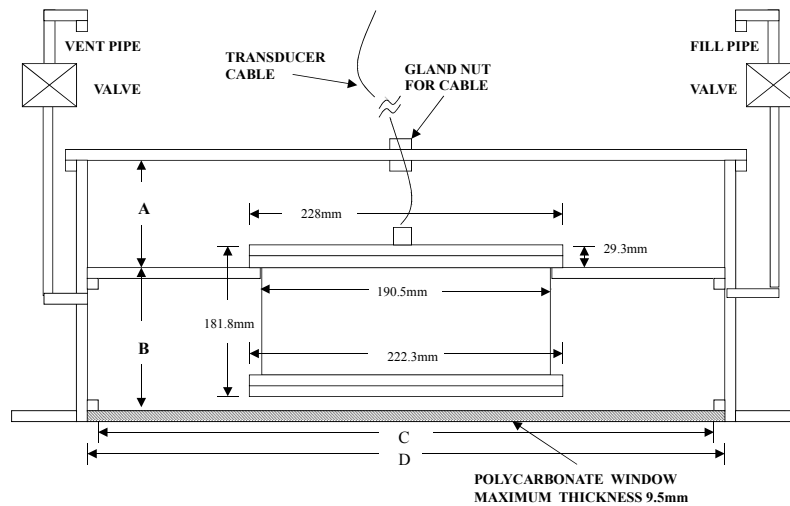


Figure 20. Inside Vessel Mounting - OS 150kHz Transducer

Dimension Letter	Option 1 Minimum Dimension	Option 2 Maximum Dimension
A	220mm	400mm
B	158.9mm	165.2mm
C	255mm	268mm
D	356.6mm	369.6mm

Special Notes:

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- The walls of the well should be coated with a material to absorb reflected sound in the well. Material such as 3mm wet suit material glued to the inside well walls is satisfactory for this purpose.
- Vent and fill pipes should be above the water line of the vessel and it is recommended that a gate valve be installed to seal off these pipes.
- Window thickness should not exceed 9.5 mm of Polycarbonate material. Thinner Polycarbonate window is OK.
- Window faces should be parallel to the transducer face to within 2 degree for best performance; angle should never exceed 5 degrees.



RD Instruments
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Application Note FSA-010 (December 2002)

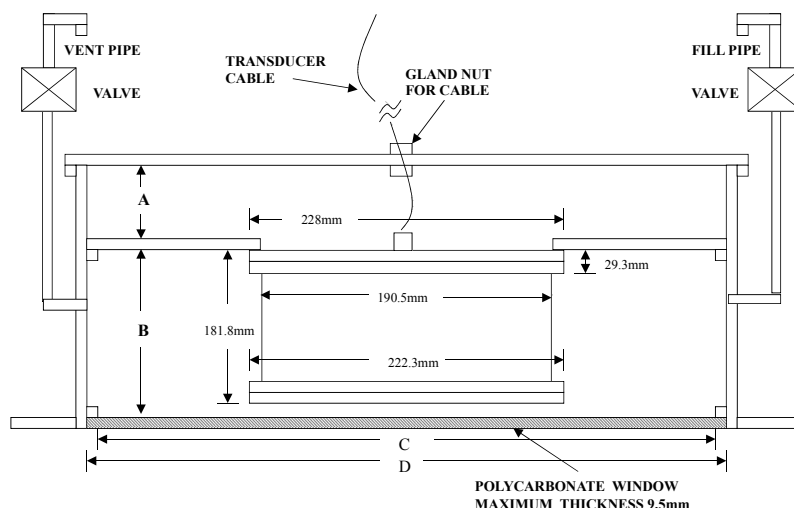


Figure 21. Underneath Vessel Mounting - OS 150kHz Transducer

Dimension Letter	Option 1 Minimum Dimension	Option 2 Maximum Dimension
A	195mm	375mm
B	188.2mm	194.5mm
C	324.6mm	324.6mm
D	426.2mm	426.2mm

Special Notes:

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- Window faces should be parallel to the transducer face to within 2 degree for best performance; angle should never exceed 5 degrees.

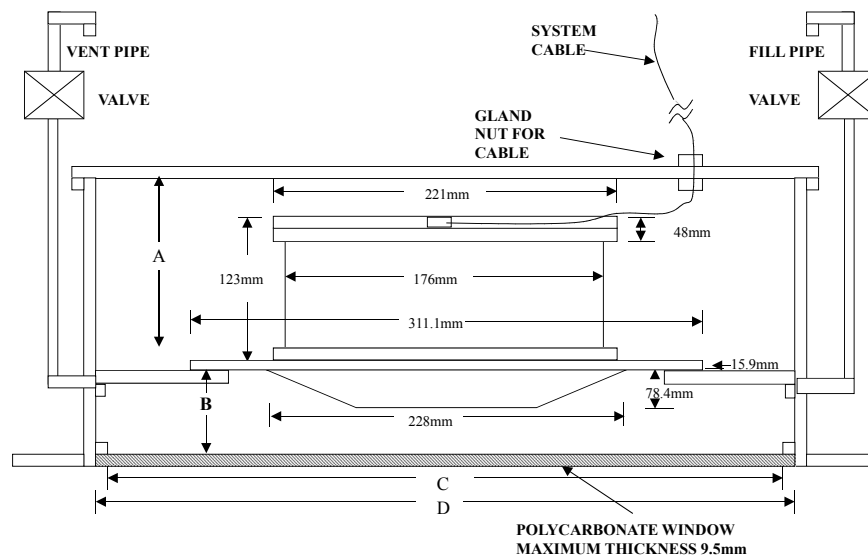


Figure 22. Inside Vessel Mounting - WH Mariner 300khz Transducer

Dimension Letter	Option 1 Minimum Dimension	Option 2 Maximum Dimension
A	275.4mm	275.4mm
B	84.7mm	91.1mm
C	362mm	362mm
D	412mm	412mm

Special Notes:

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- Inserts in the transducer housing mounting holes may be used to provide additional isolation from vessel.
- The walls of the well should be coated with a material to absorb reflected sound in the well. Material such as 3mm wet suit material glued to the inside well walls is satisfactory for this purpose.
- Vent and fill pipes should be above the water line of the vessel and it is recommended that a gate valve be installed to seal off these pipes.
- Window thickness should not exceed 9.5 mm of Polycarbonate material. Thinner Polycarbonate window is OK.
- Window faces should be at an angle of 20 degrees +/- 2 degrees to all of the transducer faces degree for best performance; angle should never exceed +/- 5 degrees.



RD Instruments
Acoustic Doppler Current Profilers

Application Note FSA-010 (December 2002)

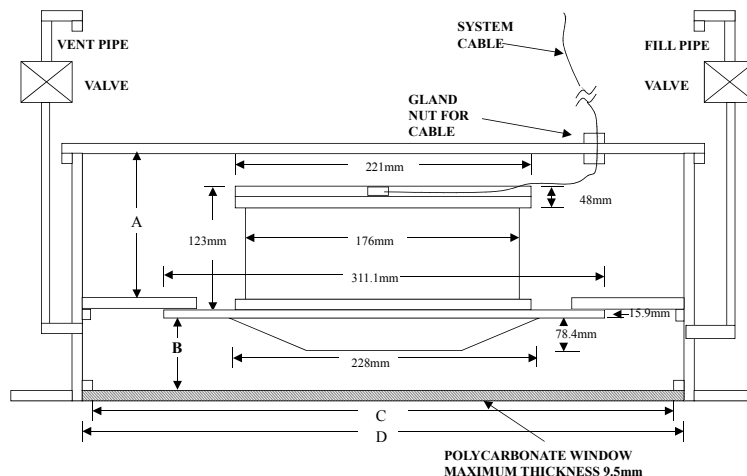


Figure 23. Underneath Vessel Mounting - WH Mariner 300khz Transducer

Dimension Letter	Option 1 Minimum Dimension	Option 2 Maximum Dimension
A	275.4mm	275.4mm
B	84.7mm	91.1mm
C	362mm	362mm
D	412mm	412mm

Special Notes:

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NOTES

Application Note 7

Revision date - October 29, 1998



RD Instruments
Acoustic Doppler Current Profilers

Conceptual Design of a Sea Chest

1 Introduction

This application note describes a conceptual design for a sea chest in which to mount the transducer of an RDI transducer. The sea chest design is intended to allow the following:

- a. Proper functioning of the ADCP.
- b. Diver-assisted installation and removal of the transducer without requiring dry-dock.
- c. Access to the transducer electronics from within the vessel without requiring removal of the transducer assembly (requires optional adapter plate, 303A1066).
- d. Installation of the sea chest in the shipyard or dry dock followed by installation of the transducer assembly at an alternate time when the vessel is dockside in a port.

The note shows conceptual drawings and lists considerations for producing a detailed design of a sea chest for an RDI transducer. Detailed drawings of RDI's transducers are available upon request from RDI.

Figure 1 shows a side view of a transducer and sea chest, and Figure 2 shows the sea chest in more detail. Figure 3 and 4 shows an alternate sea chest/gate valve installation. Figure 5 shows a plan view of the profiler dome.

2 Definitions

Hull: the outer skin of the vessel.

Profiler Dome: this is a streamlined cover that protrudes below the hull. It is used to protect the transducer, to allow it to be mounted horizontally on a sloping hull, and to position the transducer on the hull so that its beams pass unobstructed by the hull. The streamlined shape can help divert bubbles away from the transducer beams. In many installations, particularly where the hull is flat and horizontal, a profiler dome may not be used.

Sea Chest: this fixture surrounds and holds the transducer, protecting it from debris in the water. The bottom of the sea chest must be open to seawater to allow the acoustic beams to pass through without any obstruction of any kind.

Well: this is the cavity inside the sea chest in which the transducer cup assembly is located.

Spool: this is the cylindrical part of the sea chest that surrounds the transducer. The Top Flange is used to bolt on the Top Mounting Plate, and the Lower Flange is used to bolt on the Bottom

Cover Plate. The Lower Flange has two alignment marks defining a line that should be parallel to the keel of the vessel. The mark that is to be positioned forward is indicated with the mark 'FWD'.

Bottom Cover plate: this may be used to cover the sea chest to allow the transducer assembly to be removed from the sea chest and withdrawn inside into the vessel. The cover plate is intended to be installed by a diver. It is equipped with handles to assist diver installation and removal.

Top Mounting Plate: this plate is part of the sea chest and it is used to mount the transducer. The plate is equipped with two eyebolts to allow lifting the transducer/plate assembly during installation or removal.

Top Cover Plate (not shown): this is a blank plate that can be mounted in place of the transducer and Top Mounting Plate to allow operation of the vessel when the transducer and the Bottom cover Plate are removed.

Transducer: this is supplied as part of the ADCP, and it transmits and receives the acoustic signals used to measure water velocity.

Transducer Cup Assembly: this is the part of the transducer below the Transducer Adapter Plate that is in contact with the seawater, and it contains the transducer acoustic elements that transmit and receive the acoustic signals. Each cup holds one transducer piezoelectric ceramic.

Transducer Adapter Plate: this is a round plate that is an optional part of the transducer used for attaching the transducer to the Top Mounting Plate.

Transducer cable: this is a 23-mm diameter cable that is run from the ADCP system electronics to the transducer.

Top Hat: this is the top part of the transducer that covers the transducer electronics printed circuit boards. It is designed to allow these circuit boards to be removed for servicing from inside the vessel without having to remove the transducer.

Vent Pipe and Vent Ball Valve: these allow air trapped inside the well to bleed off so that air will not build up and interfere with acoustic transmission. The Vent Ball Valve allows the Vent Pipe to be closed for servicing.

Drain Pipe and Drain Valve: these are used to allow excess water to be drained from the well and to test watertightness of the Bottom Cover Plate seal, just after it is installed. The Drain Pipe also allows the well to be pressurized to test watertightness of the Top Cover Plate or Top Mounting Plate after they are installed

3 Design Considerations

The following are general design considerations for designing a sea chest for an RDI ADCP. Individual situations will differ, and there may be additional factors to be considered in the design.

1. Transducer location

The transducer should be located as close as possible to the keel of the vessel, and located somewhere in the middle third of the vessel, between the bow and the propellers. The transducer should be far from the propellers to minimize noise caused by propeller cavitation, and it should be far from the bow to minimize the amount of bubbles entrained under the ship's hull at the bow.

2. Sloping hull

The transducer may be mounted in a sloping hull as long as there is no possibility of interference with the acoustic beams. This means that a 15° cone around the beams must be kept clear, as shown in Figure 5.

3. Height of the Transducer inside the Sea Chest

The transducer should be held inside the Sea Chest in a position where it will not be able to collide with debris passing by the vessel in the water. Generally this means that the bottom of the transducer can be about even with the opening at the bottom of the Sea Chest.

4. Orientation of the transducer

The Sea Chest should be positioned so that the transducer is horizontal when the ship is underway at a normal speed.

The Transducer Adapter Plate, the Top Mounting Plate and the Spool all have alignment holes drilled for spring pins to align them relative to one another. The Sea Chest must be aligned with the axis of the vessel; if it is aligned perfectly, then the alignment holes will ensure that the transducer also aligns within 0.05° of the axis.

Note, however, that it is possible to determine the orientation of the transducer relative to the axis of the ship by statistically analyzing data collected by the ADCP over a period of time, say a few weeks or a month. RDI's data acquisition system is able to correct data for different alignments.

5. Vent Pipe

The Vent Pipe should be attached near the top of the Spool where air bubbles will collect. It must be terminated above the water line, and left open to allow air to vent from the well. The pipe diameter must be large enough to ensure that the pipe does not become clogged. The wall thickness of the pipe should be large to ensure that the pipe will withstand corrosion during the lifetime of the ship. The top termination of the pipe should have a means for attaching a water hose so that the pipe can be periodically flushed to clear out collected debris.

6. Drain Pipe and Drain Valve

The Drain Pipe should be attached to the Spool near where the Vent Pipe is attached. It should be terminated well below the water line of the vessel and it should have a means for attaching a water hose to allow the well to be pressurized when testing the seal. Because the Drain Pipe is terminated below the water line, the Drain Valve should be difficult to open (e.g. requiring a wrench), it should open slowly (i.e. as would a gate valve) so that a worker is not surprised by a

sudden onrush of cold water, and the Drain Pipe outlet should be directly next to the valve (so that the worker can see the consequence of his actions when opening the valve). The pipe diameter and thickness requirements for the Drain Pipe are the same as for the Vent Pipe.

7. Bottom Cover Plate Attachment Screw Holes

The screw holes in the spool must be protected when the bottom cover plate is not attached. This is done by filling the screw holes with polysulfide sealant, screwing stainless steel set screws into the holes and filling over the set screws with polysulfide sealant.

8. Assisting Diver Installation

There should be several padeyes welded to the hull near the sea chest to which the diver may attach rope or cables. These will allow him to obtain leverage when installing or removing screws for the cover plate, and for temporarily supporting the cover plate while preparing to install it. The padeyes should have a low profile to minimize the chances that they would be torn off while the vessel is in operation.

9. Sealing Against Seawater

All joints exposed to seawater should be sealed with an appropriate gasket material.

10. Installation of Vent and Drain Pipes

Both pipes should be welded in place with welds both on the inside and on the outside of the Sea Chest.

11. Paint

All welded surfaces and any other surfaces where paint is damaged should be cleaned and repainted.

12. Corrosion Protection

The Top Mounting Plate requires a reliable electrical connection to the hull, such as a grounding strap. The remainder of the sea chest assembly is protected by the ship's cathodic protection system. The transducer is manufactured with naval bronze and does not require cathodic protection.

13. Access to the Transducer

The transducer assembly must be accessible from within the inside of the vessel to allow installation and removal of the assembly. There must be sufficient headroom to allow the transducer to be fully withdrawn from the well. The deck above the transducer should have eyebolts or other means to attach ropes to lift the transducer and there should be sufficient room for people to work in.

14. Protrusion of the Profiler Dome

The Profiler dome should protrude about 10 cm below the hull to get it below layers of bubbles that might follow the hull while the ship is underway. Bubbles can also be steered away from the well by streamlining the dome with the shape reducing to points both fore and aft (Figure 3).

15. Dimensional Considerations; Clearances

Each vessel installation will have its own dimensional considerations depending on the type of system to be installed, the kind of use the vessel typically gets and the size, shape and

construction of the vessel. The inner dimensions of the well are controlled by the transducer. The transducer should not protrude outside the well but may be flush with the bottom of the well. The clearance between the well and the transducer must only be large enough for simple installation.

In some cases, the well may be made larger than is required so that a larger, lower-frequency transducer could be installed in the future. Above the well there must be adequate room for the transducer cable and to allow the transducer to be removed. There must also be adequate working space for the persons who will have to work on the transducer.

For bolting the Top Cover Plate or the Top Mounting Plate to the Top Flange, there should be adequate clearance to handle nuts located under the flange. If there is inadequate room to reach the nuts, an alternative is to tap the Top flange and to install studs.

4 Procedure for Installing and Removing the Transducer

The following sequence is in proper order for removal of a transducer. The same procedure, in reverse, should be used to install the transducer.

1. Checking the Drain Pipe for Obstructions

The Drain Pipe should be checked for obstructions by opening the Drain Valve to see if water flows freely. If the hydrostatic pressure of the seawater is insufficient to drive a steady flow, attaching a water hose to the end, opening the valve and applying water pressure of at least 50 psi should clean the drain valve.

2. Installation of the Bottom Cover Plate

Divers should first clean marine growth from the Lower Flange on the Spool of the Sea Chest. Then they should remove the setscrews from the Lower Flange of the Spool. For leverage, the divers may attach handholds to padeyes welded to the hull near the Sea Chest.

Divers may carry the Bottom Cover Plate to the Sea Chest with the help of flotation. Once there, the plate should be supported with ropes attached to padeyes on the hull and eyebolts on the plate. The plate may be maneuvered into position, then attached to the Lower Flange with bolts. The plate should be sealed with a rubber gasket. After the plate is installed, the ropes supporting the plate may be removed.

3. Testing the Bottom Cover Plate Seal

Close the Vent Ball Valve, then fully open the Drain Valve. If the Bottom Cover Plate is sealed, then there will be no drainage from the Drain Pipe except for perhaps a small amount at first. Any steady drainage indicates that the seal is imperfect. If the seal is acceptable, open the Vent Ball Valve and drain excess water in the Vent Pipe out of the Drain Pipe into a bucket.

4. Removal of the Top Cover Plate

Remove the bolts attaching the Top Cover Plate to the Spool and remove the entire plate and transducer assembly. Bail excess water out of the well.

5. Installation of the Transducer to the Top Mounting Plate

Attach the Top Mounting Plate to the Transducer Adapter Plate with lock nuts, using a gasket between the plates. Use spring pins to align the two plates. Position the transducer and

Transducer Adapter Plate assembly over the Sea Chest, supporting it with ropes through the Top Mounting Plate eyebolts. Orient the assembly in the approximate position that it will be installed in, and lower it into place. Use roll pins to align the assembly with the Top Flange of the Spool. Seal the joint with a gasket. Fasten the Top Mounting Plate to the Top Flange with bolts and nuts.

6. Testing the Seal

Close the Vent Ball Valve and attach a water hose to the Drain Pipe. Apply at least 50-psi pressure to the water hose and inspect the joints. If no leakage or dampness is visible around the seal areas, then the seal is acceptable. If the well is filled with air, then soapy water should be brushed onto the seal to see if air bubbles leak out.

7. Checking the Valves

At this time, both the Vent Ball Valve and the Drain Valve should be checked to be sure that the Vent Ball Valve is open and the Drain Valve is closed. ***If the Drain Valve is left open, the compartment will flood when the Bottom Cover Plate is removed.*** If the Vent Ball Valve is closed, then air will not properly bleed from the well and ADCP performance will be affected.

8. Removal of the Bottom Cover Plate

Divers should first attach ropes between the Bottom Cover Plate handles and the padeyes on the hull to support the cover plate once its bolts are removed. The bolts may be removed and the cover plate allowed to dangle out of the way on a single line. Polysulfide sealant should then be applied inside the bolt holes, filling them, and the stainless steel setscrews should be screwed back in. Excess sealant will be extruded from the holes. After the setscrews are in place, additional sealant should be used to fill and seal the remaining cavity. The cover plate may then be carried back to the dock with the help of flotation.

9. Flushing the Vent Pipe

After the Bottom Cover Plate is removed, attach a hose to the outlet of the Vent Pipe and apply at least 50-psi water pressure. This flow of water will clear any material that has collected inside the pipe, freeing any clogs. The sound of the water flowing should be easily detected; if the pipe is clogged, then it must be unclogged. This procedure should be repeated periodically to keep the pipe open.

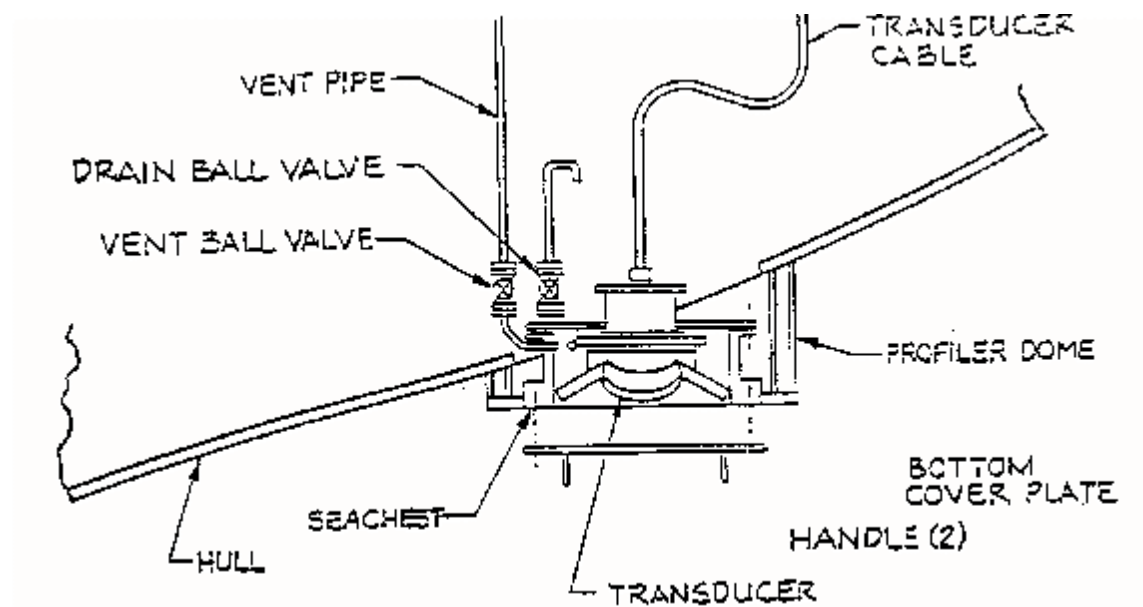


Figure 1. Side View of Transducer and Sea Chest in a Sloping Hull

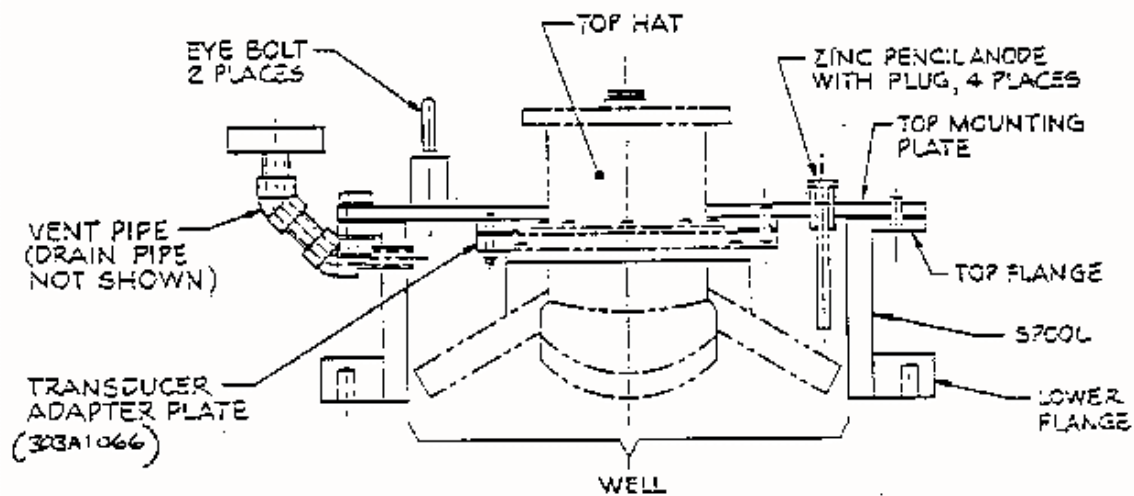


Figure 2. Expanded View of a Sea Chest

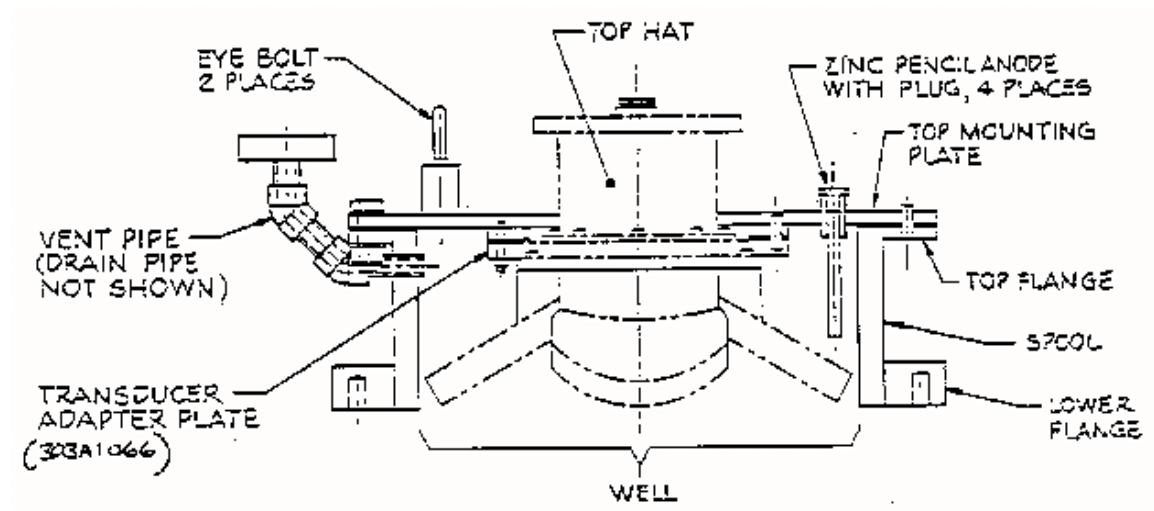


Figure 3. Stemmed Transducer using a Three Inch Gate Valve

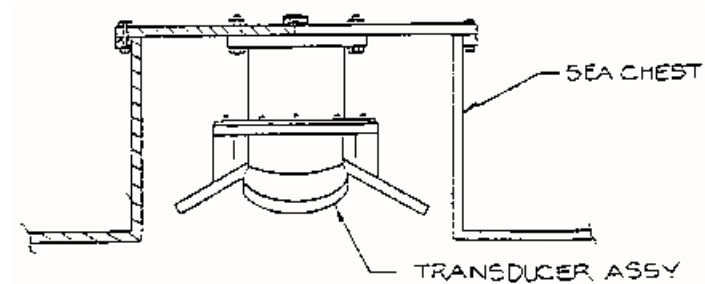


Figure 4. Transducer Without Stem

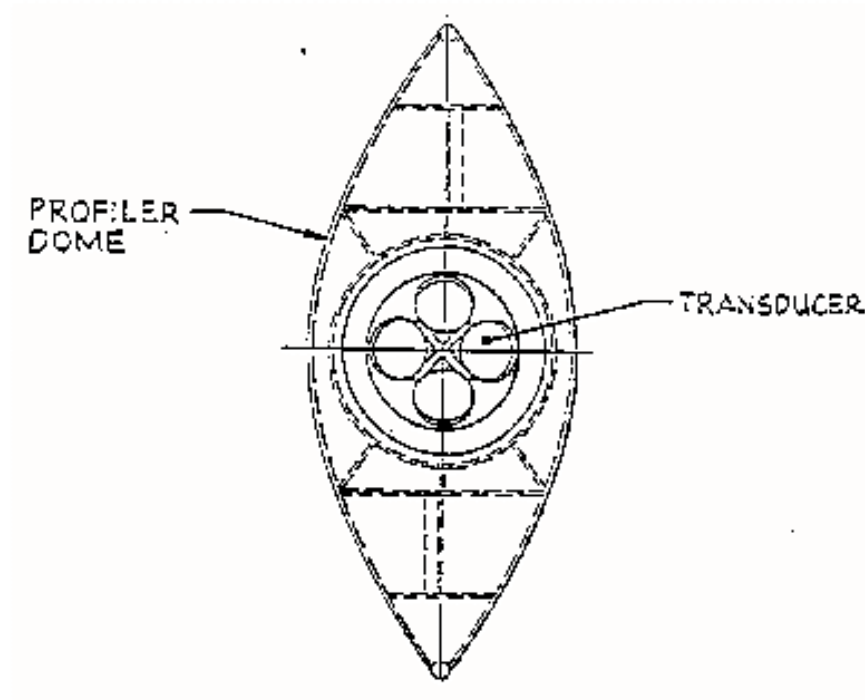


Figure 5. Profiler Dome



VESSEL EXTERIOR COATINGS AREA C.C.G.S. VLADYKOV

Issued
September 8, 2014

Completed By:

Marine Services International Ltd.
197A Majors Path
P.O. Box 29132
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Completed For:

Geoffrey Stewart,
Project Officer
DFO Vessel Support
280 Southside Road
P.O. Box 5667
St. John's, A1C 5X1

Project Number 2617

Revision 0

Back Ground

At the request of Mr. Geoffrey Stewart, Project Officer, DFO Vessel Support, Marine Services International (2008) Ltd did determine the overall areas on the exterior surface of the vessel C.C.G.S. Vladykov for the purpose of approximating the quantity of coatings necessary for painting of complete vessel hull, deckhouse, wheelhouse and fittings. These areas were determined with the use of vessel drawings as supplied by Mr. Stewart.

VESSEL COATINGS AREA

Item	Description	Area(m ²)	Area(ft ²)
1	Hull - Bottom of Keel to D.W.L.	285	3066.6
2	Hull - D.W.L. To Main Deck	59	634.8
3	Hull - M.D. to Forecastle Dk. (Includes Exterior Bulwark & cap surface only)	140	1506.4
4	M.D. Bulwark (Interior Bulwark & Shelter stbd side Surface only)	61	656.4
5	Forecastle Deck Bulwark (Interior Bulwark Surface only)	33	355.1
6	Aft Main Deck	90	968.4
7	Underside of aft Shelter overhang	12.5	134.5
8	Aft Main Deckhouse bulkhead	32	344.3
9	Forecastle Deck	105	1129.8
10	Forecastle Dk. - Wheelhouse Port Side	35	376.6
11	Forecastle Dk. - Fwd Wheelhouse Bhd.	22.5	242.1
12	Forecastle Dk. - Wheelhouse Stbd Side	31	333.6
13	Forecastle Dk. - Aft wheelhouse Bhd.	19.5	209.8
14	Wheelhouse top	55	591.8
15	Hand rails	10	107.6
16	A-Frame (Approximation of Area)	30	322.8
17	Mast (Approximation of Area)	15	161.4
Total Area		1035.5	11142.0

Notes:

1. All portlights and deckhouse windows included in above noted areas.
2. White Stripe Area of 9m² on each side included in hull area.



MARINE ELECTROTECHNOLOGY

MAX II Alarm & Monitoring System

System Binder



MÉRIDIEN MARITIME

ISV009-ISV010

INSHORE SCIENCE VESSEL

Revision 0

REVISION

Rev	Name	Date of revision	Description
0	S.L.	2013-02-20	First Emission & as commissioned



Revision	Editor's signature	Auditor's signature
00	 Samuel Leclerc, jr.Eng	 Marc Therrien, Eng

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MARINE ELECTROTECHNOLOGY

IFDS Système de détection d'incendies

Manuel d'instructions



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Revision 1

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1.0 TERMINOLOGIE

La terminologie suivante sera utilisée au fil du document.

“UCT”: Nom donné au noyau de traitement du système.
(Unité Centrale de Traitement)

INTERFACE “UCT”: Interface de l'opérateur.

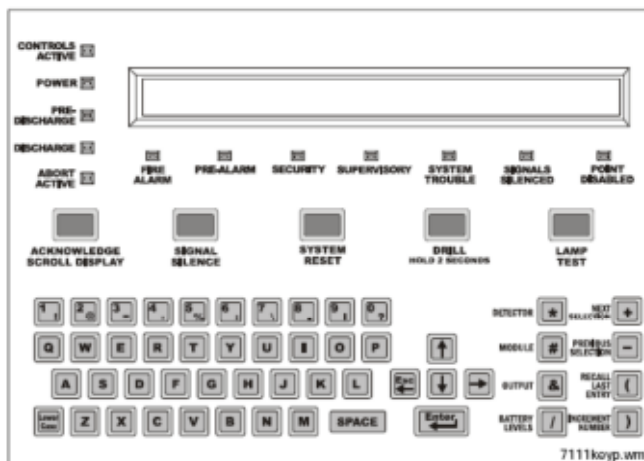


Figure 1: Interface de l'UCT

PANNEAU DE DÉTECTION D'INCENDIES: Enceinte physique.



Figure 2: Panneaux de détection d'incendies

BASE DE DÉTECTEUR:

Base de montage du détecteur.



Figure 3: Base de montage sans bride

DÉTECTEUR AUDIBLE AVEC BASE:

Détecteur audible muni d'une base avec résonateur.



Figure 4: Détecteur de fumée audible muni d'une base de montage avec bride

DÉTECTEUR DE FUMÉE:

Détecteur avec une chambre optique conçue pour détecter la fumée produite par plusieurs sources de combustion.



Figure 5: Détecteur de fumée avec base de montage et bride

DÉTECTEUR THERMIQUE:

Dispositif de détection thermique qui offre la détection à température fixe et la détection de chaleur à taux d'augmentation de chaleur.



Figure 6: Détecteur de chaleur avec une base de montage sans bride

**AVERTISSEUR D'INCENDIE
MANUEL:**

Station d'alarme de feu manuelle



Figure 7: Avertisseur d'incendie manuel

DÉTECTEUR À L'ÉPREUVE DES EXPLOSIONS: Détecteur en fonte d'aluminium pour utiliser dans des endroits plus dangereux.



Figure 8: Détecteur de chaleur à l'épreuve des explosions

DÉTECTEUR DE FLAMME: Détecteur répondant aux radiations infrarouges.



Figure 9: Détecteur de flamme

ISOLATEUR: Protège le système contre les courts-circuits fil à fil sur les boucles de détections SLC.



Figure 10: Isolateur

MODULE DE SURVEILLANCE: Module de surveillance utilisé pour interfacer un contact sec.

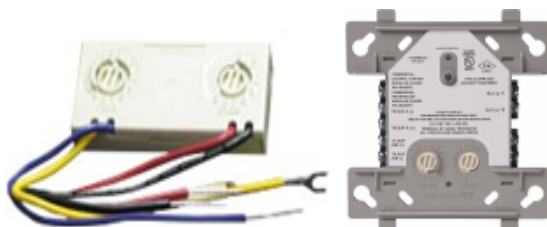


Figure 11: Module de surveillance miniature et standard

MODULE DE RELAIS: Module de relais procure au système une sortie à contact sec servant à activer une variété d'appareils auxiliaires.



Figure 12: Module de relais

MODULE DE CONTRÔLE: Module de contrôle procure aux systèmes un circuit de commande destiné aux appareils d'avertissement.



Figure 13: Module de contrôle

CLOCHE: Pour les signaux sonores.



Figure 14: Cloche

KLAXON ET LUMIÈRE CLIGNOTANTE: Pour signaux visuels et auditifs.



Figure 15: Klaxon et lumière clignotante

AFFICHEUR ET CONTRÔLEUR DÉPORTÉ: Affiche l'état du système et permet le contrôle à distance.



Figure 16: Indicateur d'affichage

AMS: Système d'alarme et de surveillance

APPAREIL DE COMMUNICATION:



Figure 17: Serveur RS-232

MONITEUR: Interface utilisateur de l'AMS



Figure 18: Affichage de l'AMS

SOURCE DE COURANT:	Alimentation électrique nécessaire pour le système de détection d'incendies
SLC:	Circuit de signalisation individuel
NAC:	Circuit d'appareil d'avertissement.

2.0 PROCÉDURES

2.1 PROCÉDURE DE DÉMARRAGE

Sur le panneau d'alimentation du bateau, fermer le disjoncteur qui fournit l'alimentation à l'IFDS. Ensuite, référez-vous aux dessins de distribution électrique pour localiser les fusibles qui doivent être activés. Lorsque le panneau est alimenté, soit par les batteries ou par l'alimentation principale (Vac), le CPU2-640 va d'abord vérifier sa mémoire et effectuer des tests internes. Il va également afficher la version du logiciel installé. Durant cette première étape, la sirène locale sur le panneau va sonner durant environ 15 secondes. Dans la deuxième étape, le panneau de détection d'incendies va vérifier toutes les boucles connectées et va confirmer que tous les détecteurs programmés sont bien initialisés et signaler si il y a un alarme ou une défaillance du système d'incendie.

2.2 PROCÉDURE DE FERMETURE

Soulever les fusibles appropriés selon les dessins de Techsol.

3.0 SPÉCIFICATIONS SUR LE PROJET COURANT

Les informations suivantes sont applicables seulement sur le projet courant.

Type d'UCT:	CPU2-640
Dimension du cabinet:	B
Localisation du panneau d'incendie:	Timonerie
Affichage et Contrôleur déporté:	Salle des machines
Délais avant d'initier une alarme d'incendie:	2 min sur tous les détecteurs de fumée et de chaleur
Arrangement des boucles:	Style 6
Section du manuel ne s'appliquant pas:	Détecteur à l'épreuve des explosions Détecteur de flamme

4.0 DESCRIPTION DU SYSTÈME IFDS

4.1 UCT ET INTERFACE DE L'UCT

L'UCT surveille les zones de feu en utilisant des capteurs comme des détecteurs de fumée, des détecteurs thermiques et avertisseurs d'incendie manuels localisés un peu partout sur le navire. Un message s'affichera sur l'interface de l'UCT dans le cas d'un incendie et/ou d'une défaillance du système. Il y a aussi des lumières indicatrices sur l'interface de l'UCT.

Indicateur	Couleur	Lorsqu'active	Pour éteindre
POWER	Vert	S'allume lorsque la source d'alimentation primaire est appliquée. Demeure allumée lorsqu'il y a du courant.	Toujours allumée lorsqu'il y a du courant.
FIRE ALARM	Rouge	Clignote lorsqu'une alarme de feu n'a pas été acceptée. Cesse de clignoter lorsque l'alarme est acceptée.	Régler l'état d'alarme et appuyer sur le bouton de remise à zéro (SYSTEM RESET).
PRE-ALARM	Rouge	Clignote lorsqu'une pré-alarme de feu n'est pas acceptée. Cesse de clignoter lorsque la pré-alarme est acceptée.	Régler l'état de pré-alarme et appuyer sur le bouton de remise à zéro (SYSTEM RESET).
SECURITY	Bleu	Clignote lorsqu'une alarme de sécurité n'a pas été acceptée. Cesse de clignoter lorsqu'elle est acceptée.	Régler l'état d'alarme de sécurité et appuyer sur le bouton de remise à zéro (SYSTEM RESET).
SUPERVISORY	Jaune	Clignote lorsqu'une alarme de surveillance n'a pas été acceptée. Cesse de clignoter lorsqu'elle est acceptée.	Régler l'état d'alarme
SYSTEM TROUBLE	Jaune	Clignote lorsqu'une alarme de trouble du système n'a pas été acceptée. Cesse de clignoter lorsqu'elle est acceptée.	Régler la condition de trouble du système.
SIGNALS SILENCED	Jaune	S'allume après l'occurrence d'une alarme d'incendie et après que vous ayez pesé sur « SIGNAL SILENCE ».	Appuyer sur SYSTEM RESET. Le bouton DRILL va également éteindre le voyant.
POINT DISABLED	Jaune	S'allume quand une ou plusieurs composantes du système sont désactivées.	Activer la composante ou enlever la composante désactivée du système.

4.2 PANNEAU DE DÉTECTION D'INCENDIE

Le panneau de détection d'incendie est localisé dans la station principale de contrôle d'incendie. Ce panneau, qui peut être de différentes grosseur, contient plusieurs équipements comme l'UCT, l'interface de l'UCT, les batteries, les outils de communication, etc...

4.3 BASE DE DÉTECTEUR

Base de montage sur laquelle vous pouvez installer des têtes de détecteurs de fumée et de chaleur. Le détecteur audible avec base adressable donne la possibilité d'avoir une alarme sonore locale lorsqu'un capteur est déclenché.

4.4 DÉTECTEUR DE FUMÉE

Ce détecteur de fumée photoélectrique intelligent possède une chambre optique conçue pour détecter la fumée produite par plusieurs sources de combustion. Il est adressable et ajusté à l'aide de deux sélecteurs rotatifs. Il est aussi muni d'un voyant lumineux DEL à deux couleurs qui clignote à chaque fois que le détecteur est adressé et devient rouge constant lorsqu'il est en alarme.

4.5 DÉTECTEUR THERMIQUE

Les détecteurs thermiques peuvent détecter une augmentation rapide de chaleur et/ou une température fixe. Ils sont paramétrables et leurs adresses peuvent être ajustées à l'aide de deux sélecteurs rotatifs. Ils sont aussi munis d'un voyant lumineux DEL à deux couleurs qui clignote à chaque fois que le détecteur est adressé soit de couleur rouge constante lorsqu'il est en alarme.

4.5.1 DÉTECTEUR DE TEMPÉRATURE FIXE

Ce détecteur de chaleur va déclencher une alarme lorsque le plafond de température atteint 135°F ou 190°F dépendamment du modèle.

4.5.2 DÉTECTEUR DE TAUX THERMOVOLUCIMÉTRIQUE

Ce détecteur de chaleur va déclencher une alarme lorsque le plafond de température atteint 135°F ou si la température augmente de plus de 15°F par minute.

4.6 AVERTISSEUR D'INCENDIE MANUEL

Ce dispositif à levier double action, lorsqu'elle est enclenchée, se barre en place et peut être déverrouillée avec la clé qui vient avec l'unité. Il est adressable et son adresse peut être ajusté à l'aide de deux sélecteurs rotatifs. Il est aussi muni d'un voyant lumineux à deux couleurs qui clignote à chaque fois que l'avertisseur est adressé et est de couleur rouge fixe lorsqu'il est en alarme. Un modèle non-paramétrable est aussi disponible et doit être utilisé avec un module de surveillance.

4.7 DÉTECTEUR À L'ÉPREUVE DES EXPLOSIONS

Ce détecteur fait en fonte d'aluminium est conçu pour l'utilisation dans des endroits plus dangereux tels que les salles de batteries ou les compartiments à peinture. Les détecteurs thermiques sont les plus couramment utilisés. Des contacts normalement ouverts vont se fermer lorsque le plafond de température augmente à un rythme minimum de 8.4 degrés Celsius par minute. La fermeture du contact initie la séquence d'alarme d'incendie. Indépendante du mode de détection de taux d'augmentation de chaleur, la détection de température fixe est faite d'un piston avec un ressort qui se relâche lorsque le plafond de température atteint 93 degrés Celsius. Il doit être utilisé avec un module de surveillance. Si le détecteur est testé ou est déclenché par une augmentation de température, il sera réinitialisé (remis à zéro) que lorsqu'il refroidira.

4.8 DÉTECTEUR DE FLAMME

Ce détecteur d'infrarouge est conçu pour détecter le rayonnement de la longueur d'onde de 4,45 micron, pour répondre à la norme communément appelé "CO2 spike". La caractéristique des hydrocarbures qui brûlent est l'émission anormale d'un haut niveau de radiation infrarouge dans la portion étroite du spectre de rayonnement.

4.9 ISOLATEUR

Module qui protégera le système contre les courts-circuits de type fil à fil sur les loupes. Il protège jusqu'à 25 unités (détecteurs, station manuelles, etc.) qui sont connectés à l'isolateur et se remettent à zéro "on correction of short". Il est muni d'un voyant lumineux qui clignote en condition normale et qui devient stable lorsqu'un court-circuit est détecté. Par exemple, dans le cas où un feu brûlerait un fil et causerait un court-circuit sur la loupe, seulement les détecteurs qui sont entre les mêmes isolateurs seraient perdus.

4.10 MODULE DE SURVEILLANCE

Les modules de surveillances sont utilisés pour superviser les circuits d'entrées à contacts sèches, comme les détecteurs de chaleur conventionnels et les stations manuelles. Ils sont paramétrables et munis d'un sélecteur rotatif.

4.11 CLOCHE, KLAXON ET LUMIÈRE CLIGNOTANTE.

Dispositif auditif et visuel conçu pour donner un signal approprié en cas d'incendie. Les klaxons et lumière clignotante sont localisés dans des endroits bruyants comme les espaces de machinerie. Dépendamment du type de navire et du type d'alarme d'incendie, un délai avant l'activation de ces dispositifs peut être ajouté (voir section 3.0). Ces dispositifs ne sont pas disponibles dans les emplacements de type passager. (si applicable).

4.12 INDICATEUR D'AFFICHAGE.

L'indicateur d'affichage vous permet de remettre à zéro, d'accepter, de réduire au silence le panneau de contrôle à distance.

4.13 AMS, DISPOSITIFS DE CONTRÔLE ET DE SURVEILLANCE.

Le système d'alarme et de surveillance peut communiquer avec l'UCT de détection d'incendie par le dispositif de communication et d'affichage sur son moniteur (voir section 8).

4.14 SOURCES D'ALIMENTATION

La section d'alimentation est composée de deux sources. La première source provient du bateau soit en mode 120 ou 240Vac dépendamment du type d'UCT. Si pour une raison quelconque cette source est défaillante, la deuxième source va alimenter le système. Cette alimentation vient de la banque de batteries 24Vdc (la plus part du temps localisée dans le panneau d'incendie). En cas d'urgence, le système est alimenté par cette source. Les batteries ont une autonomie minimum de 18 heures de surveillance et de 30 minutes en mode alarme. Le système alterne d'une source à l'autre sans interruption. Les deux sources d'alimentation sont constamment surveillées et ce, dans l'éventualité d'une défaillance, elle sera reportée sur l'affichage du système pour une attention immédiate.



L'autonomie requise du panneau dépend de la société de classification.



Les conditions des batteries peuvent affecter l'autonomie du panneau. Voir maintenance.

4.15 SLC

La communication entre le panneau de contrôle et les dispositifs de contrôle prend place à travers un circuit de signalisation individuel (SLC), qui peut être câblé de plusieurs manières.

4.15.1 STYLE 4

Style 4 permet un branchement en "T". Chacune des branches isolées sont sur des zones de feu séparées..

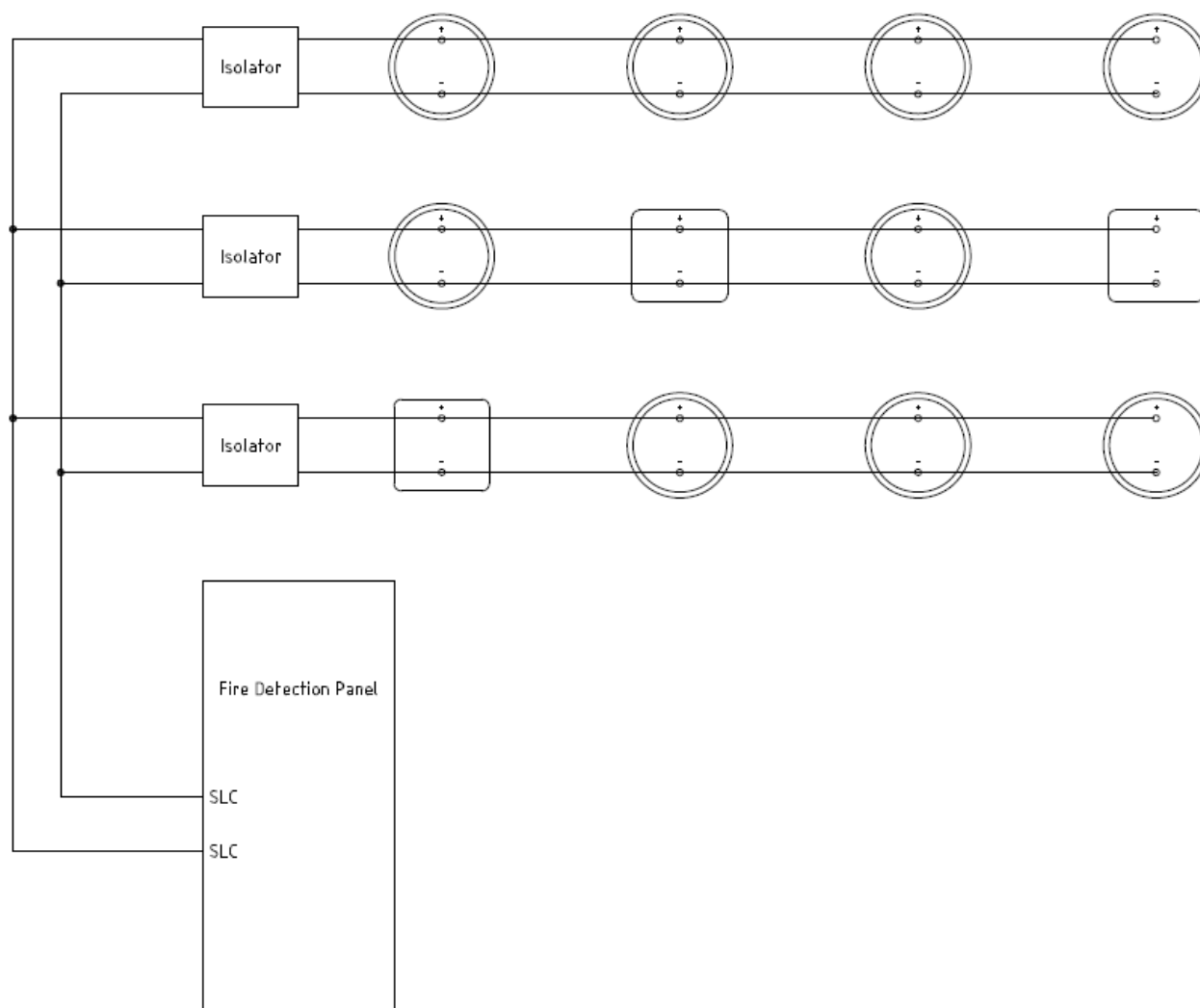


Figure 19: Filage SLC Style 4

Un seul fil coupé aura pour effet de couper la communication avec chacun des détecteurs qui suivent. S'il y a un fil en court-circuit, la communication sera perdue avec les détecteurs localisés dans la même zone de feu.

4.15.2 STYLE 6

Style 6 ne permet pas le branchement en "T". Chaque détecteur localisé entre 2 isolateurs est sur une zone de feu séparée.

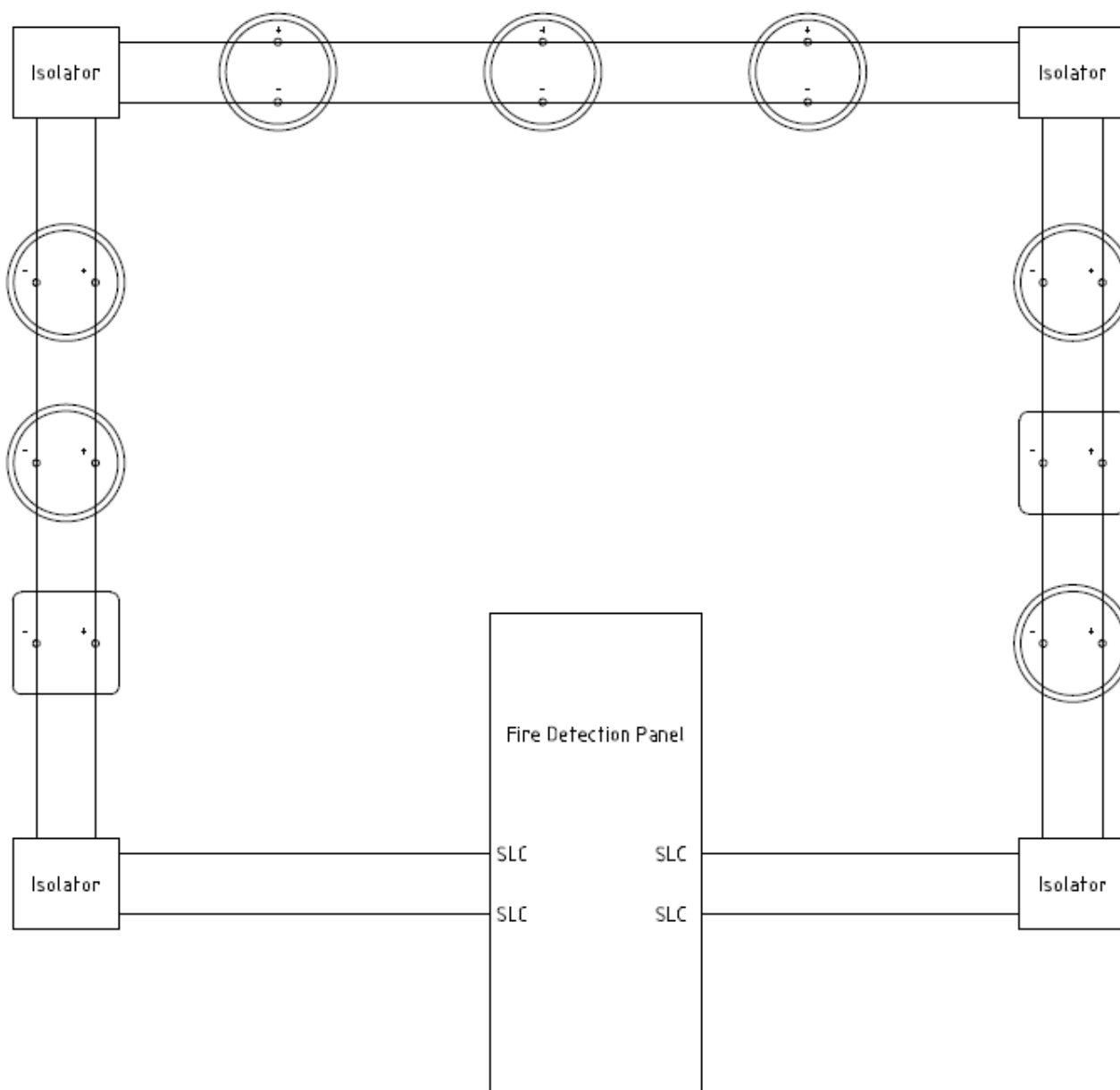


Figure 20: Filage SLC Style 6

Un fil coupé n'a aucun effet sur le SLC. Un message de trouble apparaîtra sur l'affichage de l'UCT mais le système restera complètement opérationnel. S'il y a un fil court-circuité, vous perdez seulement les détecteurs localisés dans la même zone de feu.

4.16 NAC

Un circuit d'appareil d'avertissement (NAC) transmet une notification auditive et visuelle à l'unité de contrôle du système de détection d'incendie.

5.0 DÉCLENCHEMENT D'ALARME

Le système répond à une alarme ou une condition problématique en donnant des signaux auditifs et visuels à la localisation/zone.

5.1 SYSTÈME EN CONDITION NORMAL

Le système opère en mode dit normal lorsqu'il y a aucune alarme ou problème existant. En mode normal, le panneau de contrôle affiche un message « System Normal ».

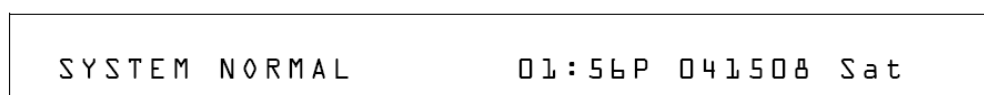


Figure 21: Exemple de message de « System Normal »

En mode normal, le panneau de contrôle exécute les fonctions suivantes à intervalles réguliers :

- Sonde tout les périphériques et les quatre NAC pour valider les réponses d'alarmes, les troubles, l'intégrité du circuit, la supervision de signaux et etc.....
- Vérifie les troubles d'alimentation et les batteries à intervalles de 10 secondes
- Rafraîchi l'affichage LCD
- Balayage des entrées de données sur les claviers ou avec les clés de contrôle
- Effectue un test d'opération automatique pour les détecteurs
- Teste la mémoire du système
- Surveille la défaillance des microcontrôleurs.

5.2 ANNONCE D'ALARME D'INCENDIE

Lorsqu'un dispositif (détecteur ou module de surveillance) s'active, le panneau de contrôle fait les choses suivantes :

- Émet un son stable
- Active le relais du système d'alarme
- Fait clignoter la DEL de l'alarme d'incendie
- Affiche un code qui indique le type de dispositif qui a activé l'alarme d'incendie
- Affiche « ALARM » dans la bannière d'état sur l'affichage DEL, en plus des informations spécifiques à ce dispositif tel que démontré ci-dessous :

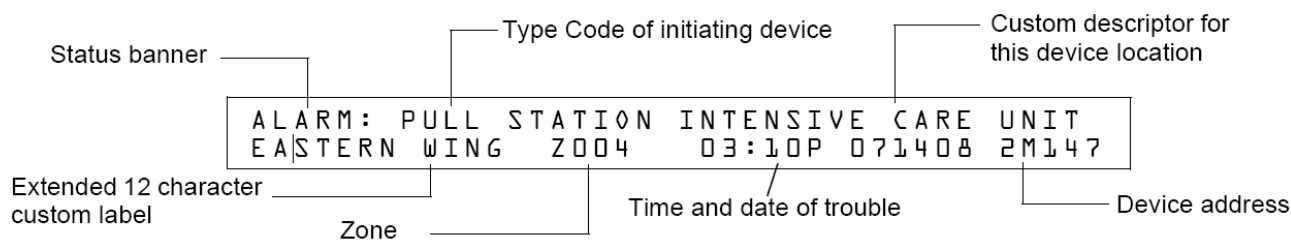


Figure 22: Exemple d'affichage d'alarme d'incendie

- Envoie un message d'alarme à l'affichage DEL.
- Bascule le panneau de contrôle dans l'alarme.



Vous ne pouvez retourner le panneau de contrôle en mode d'opération normal tant que vous ne corrigez pas l'état de l'alarme et ne la remettez pas à zéro dans le panneau de contrôle.

5.3 ANNONCE D'ALARME EN FAUTE

Le système tombe en mode faute lorsque le panneau de contrôle détecte une faute électrique. Si aucunes alarmes n'existent, le panneau de contrôle effectue les tâches suivantes :

- Produit un son à pulsations
- Active le relais de trouble.
- Fait clignoter la DEL « SYSTEM TROUBLE »
- Affiche un code qui indique le type de dispositif ayant le problème.
- Affiche « TROUBLE » dans la bannière d'état sur l'affichage DEL, en plus des informations spécifiques à ce dispositif tel que démontré ci-dessous :

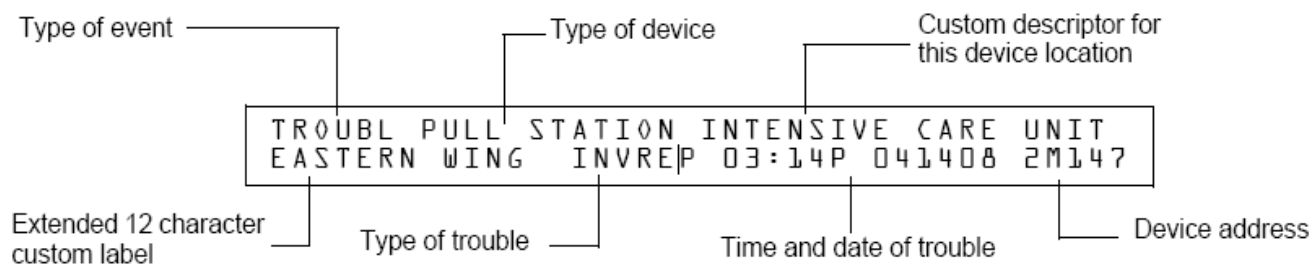


Figure 23: Exemple de message de trouble



Si une alarme d'incendie et une faute de système sont activés, la DEL « SYSTEM TROUBLE » s'allume et le message d'alarme de feu est affiché.

6.0 FONCTIONS DU PANNEAU D'ALARME

6.1 RÉDUIRE UNE ALARME AU SILENCE

Utilisez le bouton « SIGNAL SILENCE » pour réduire une alarme au silence et pour arrêter tous les dispositifs auditifs et visuels connectés au circuit de notification des dispositifs (Notification Appliance Circuits). Lorsqu'appuyé, le panneau de contrôle effectue les tâches suivantes :

- Éteint l'avertisseur sonore (sounder) du panneau;
- Éteint tous les circuits à sorties muettes (silenceable output circuits)
- Allume la DEL « SIGNALS SILENCED LED ».



Tout les sorties muettes vont sonner à nouveau si il y a une nouvelle détection d'incendie

6.2 ACCEPTER UNE ALARME

Utilisez le bouton « ACKNOWLEDGE/SCROLL DISPLAY » pour répondre à une nouvelle alarme ou un signal de trouble. Lorsqu'appuyé, le panneau de contrôle effectue les tâches suivantes :

- Réduit au silence l'avertisseur sonore du panneau;
- Tous les indicateurs DEL cesse de clignoter; et restent allumés en continu.
- Envoie un signal d'alarme pour réduire au silence les avertisseurs sonores des LCD-80

Vous pouvez également appuyer sur ce bouton pour afficher multiples alarmes ou fautes. Si plus d'une alarmes sont actives, le panneau de contrôle affiche la prochaine alarme pour 3 secondes (ou jusqu'à ce que vous appuyez sur « ACKNOWLEDGE/SCROLL DISPLAY »), et affiche ensuite la prochaine alarme.

6.3 EXERCISE D'INCENDIE (DRILL)

Utilisez le bouton « DRILL » pour activer manuellement toutes les sorties muettes et les circuits de notification des dispositifs (silenceable outputs and Notification Appliance Circuits). Pour prévenir l'Activation accidentelle, ou devez appuyer sur le bouton « DRILL » pendant 2 secondes. Lorsqu'appuyé, le panneau de contrôle effectue les tâches suivantes :

- Allume tous les NAC muets;
- Éteint le voyant « SIGNALS SILENCED »

6.4 REDÉMARRAGE DU PANNEAU DE CONTRÔLE

Utilisez le bouton « SYSTEM RESET » pour redémarrer le panneau de contrôle. Lorsqu'appuyé, le panneau de contrôle effectue les tâches suivantes :

- Efface TOUS les entrées actives
- Interrompt les sources d'alimentation qui peuvent être redémarrés.

Si une alarme existe après avoir appuyé sur « SYSTEM RESET », tous les circuits d'appareil d'avertissement (NAC) et les indicateurs auditifs et visuels du panneau vont se réactiver.



Les troubles actifs ne seront pas effacés et vont quand même être reporté si on appui sur RESET.

6.5 TEST DE LAMPE

Utilisez le bouton « LAMP TEST » pour tester les DEL du panneau de contrôle, tous les circuits de panneau installés et l'avertisseur sonore du panneau. Lorsqu'appuyé, le panneau de contrôle effectue les tâches suivantes :

- Allume tous les DEL du panneau de contrôle;
- Allume l'avertisseur sonore du panneau;
- Allume tous les segments de l'affichage LCD. Quand le bouton « LAMP TEST » est tenu pour plus de 5 secondes, le LCD va afficher les révisions du logiciel;
- Allume tous les circuits de panneau.

7.0 PROCÉDURES

7.1 TESTER LES DÉTECTEURS

Tous les capteurs doivent être testés après leur installation et de manière périodique par la suite. Les méthodes de test doivent être conformes aux autorités ayant juridiction.

7.1.1 TESTER À L'AIDE D'UN AIMANT, LES DÉTECTEURS DE FUMÉE ET DE CHALEUR

Appliquer, tel que montré dans la figure suivante, l'aimant contre la couverture dans la zone de test afin d'activer la fonction de test. Le DEL du détecteur doit s'allumer à l'intérieur de 10 secondes, indiquant qu'une alarme a été signalée au panneau principal. Vérifiez que l'alarme d'incendie est activée pour cette zone; des signaux auditifs et visuels devraient être en marche (il se peut qu'il y ait un délai avant que les signaux se mettent en marche). Vérifier que l'alarme d'incendie est générée sur le panneau d'incendie principal. Confirmez que la bonne zone est identifiée dans le message. Redémarrer le détecteur à l'écran del'UCT.

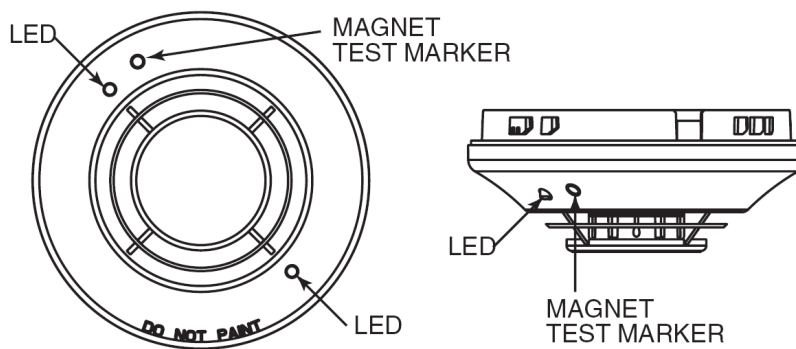


Figure 24: Vues montrant la position du test de l'aimant.

7.1.2 DÉTECTEUR DE FUMÉE – TEST FONCTIONNEL RÉEL

D'une distance de 2 à 4 pieds, (0.6 – 1.2m), à l'aide d'une fumée en aérosol, vaporisez de la fumée pendant 1-2 secondes dans le détecteur ou dans la ventilation. Les DEL devraient s'allumer à l'intérieur de 10 secondes, indiquant qu'une alarme a été déclenchée. Vérifiez que l'alarme d'incendie, auditive et visuelle, est activée pour cette zone (Il est possible qu'il y ait un délai avant que les indicateurs se mettent en marche). Vérifier que l'alarme d'incendie est générée sur le panneau d'incendie principal. Confirmez que la bonne zone est identifiée dans le message. Redémarrer le détecteur à l'écran del'UCT.



Les formules des cannes de fumée en aérosol vont varier d'un fabricant à l'autre. L'usage abusif ou inapproprié de ces produits peut avoir un effet néfaste sur les détecteurs de fumée. Veuillez consulter les instructions du fabricant pour plus d'information.

7.1.3 DÉTECTEUR DE CHALEUR – TEST FONCTIONNEL RÉEL

Du côté du détecteur, utilisez un sèche-cheveux de 1000-1500 watts et dirigez la chaleur vers le capteur. Tenir la source de chaleur à une distance d'environ 6 pouces (15 cm) pour éviter les dommages durant la période de test. Les DEL devraient s'allumer lorsque la température du détecteur atteint le point d'alarme, ce qui déclenchera une alarme. Vérifiez que l'alarme d'incendie, auditive et visuelle, est activée pour cette zone (Il est possible qu'il y ait un délai avant que les indicateurs se mettent en marche). Vérifier que l'alarme d'incendie est générée sur l'écran principal du panneau d'incendie, affichages auxiliaires ainsi que tous les systèmes auxiliaires montrant les bonnes indications. Le message devrait clignoter jusqu'à ce qu'il soit accepté. Redémarrer le détecteur à l'écran de l'UCT.

7.1.4 AVERTISSEUR D'INCENDIE MANUEL

Initiez l'avertisseur d'incendie manuel en suivant les instructions écrites dessus. La plupart du temps, elle devrait être poussée et tirée vers le bas. Vérifiez que l'alarme d'incendie, auditive et visuelle, est activée pour cette zone (Il est possible qu'il y ait un délai avant que les indicateurs se mettent en marche). Vérifier que l'alarme d'incendie est générée sur l'écran principal du panneau d'incendie, affichages auxiliaires ainsi que tous les systèmes auxiliaires montrant les bonnes indications. Le message devrait clignoter jusqu'à ce qu'il soit accepté. Redémarrer le détecteur à l'écran de l'UCT.

7.1.5 DÉTECTEUR À L'ÉPREUVE DES EXPLOSIONS

Utilisez un pistolet à air chaud électrique ou un sèche-cheveux pour tester le détecteur thermique à l'épreuve des explosions. Dirigez le jet d'air chaud vers le détecteur thermique à une distance d'environ 12 pouces (30 cm). Utilisez une canne de fumée en aérosol pour tester le détecteur de fumée à l'épreuve des explosions. Vérifiez que l'alarme d'incendie, auditive et visuelle, est activée pour cette zone (Il est possible qu'il y ait un délai avant que les indicateurs se mettent en marche). Vérifier que l'alarme d'incendie est générée sur l'écran principal du panneau d'incendie, affichages auxiliaires ainsi que tous les systèmes auxiliaires montrant les bonnes indications. Le message devrait clignoter jusqu'à ce qu'il soit accepté. Redémarrer le détecteur à l'écran de l'UCT.



Un capteur qui ne passe pas un de ces tests devrait être remplacé.

Il y a une manière plus sécuritaire de tester les détecteurs sans les endommager. Vous avez besoin d'une bouilloire, d'un tissu et de gants de caoutchouc. Premièrement faite bouillir l'eau. Ensuite avec les gants de caoutchouc verser de l'eau sur le tissu et mettez le tissu en contact avec le côté du détecteur de chaleur à l'intérieur de la coque à l'épreuve des explosions jusqu'à ce qu'une alarme se fasse entendre (attendre environ 3-4 secondes). Vérifiez que l'alarme d'incendie, auditive et visuelle, est activée pour cette zone (Il est possible qu'il y ait un délai avant que les indicateurs se mettent en marche). Vérifier que l'alarme d'incendie est générée sur l'écran principal du panneau d'incendie, affichages auxiliaires ainsi que tous les systèmes auxiliaires montrant les bonnes indications. Le message devrait clignoter jusqu'à ce qu'il soit accepté. Redémarrer le détecteur à l'écran de l'UCT.

7.2 REMPLACER UN DÉTECTEUR

Pour remplacer un détecteur de fumée ou de chaleur, enlever la tête du vieux détecteur en la tournant dans le sens contraire des aiguilles d'une montre. Mettre la tête du nouveau détecteur. S'assurer que l'adresse de la nouvelle tête correspond avec l'adresse de la vieille tête en tournant les sélecteurs rotatifs pour avoir les chiffres appropriés (voir figure ci-dessous).

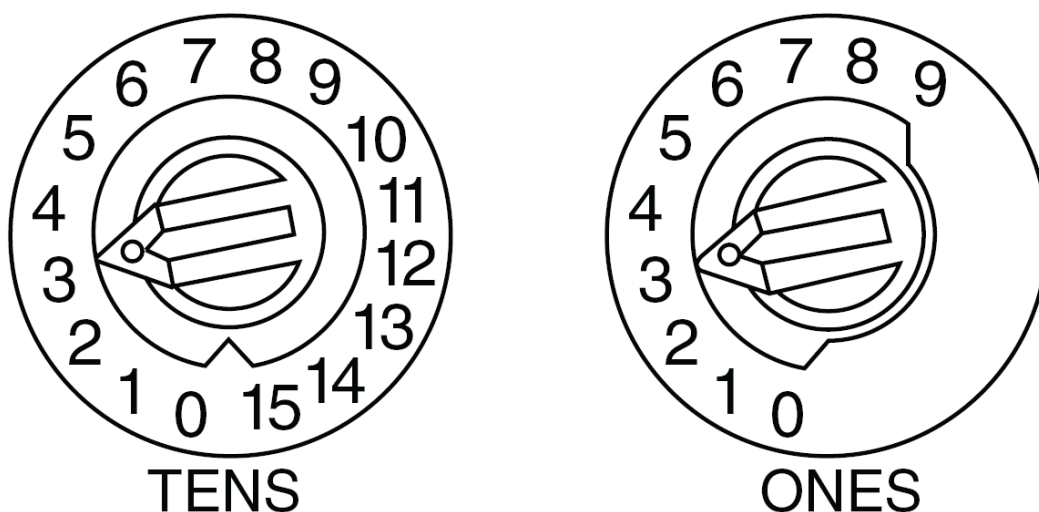


Figure 25: Sélecteurs d'adresses

Installer le capteur dans la base. Appuyer sur le capteur en le tournant dans le sens des aiguilles d'une montre pour le verrouiller en place.



Avant d'enlever le détecteur, aviser les autorités appropriées que le détecteur va subir une maintenance et sera temporairement hors service.

7.3 FIXER LA DATE ET L'HEURE

Appuyer sur ENTER sur le clavier du CPU DISPLAY et appuyez ensuite sur **1**. L'écran de mot de passe devrait apparaître. Entrez le mot de passe 1111 et appuyez sur ENTER. Appuyez sur **5** pour afficher l'écran de changement de date et d'heure. Suivez les instructions ci-dessous pour fixer la date et l'heure.

Pour	Faire ceci
Changer la date et l'heure	Entrez des valeurs sur le clavier numérique.
Changer A (AM) ou P (PM)	Appuyez + (Prochaine sélection) ou – (Sélection précédente)
Changer le jour	Appuyez + (Prochaine sélection) ou – (Sélection précédente)
Aller à un autre chiffre	Utilisez les flèches gauche et droite sur le clavier
Sauvegarder la date et l'heure et retour	Appuyez sur Enter
Retourner à l'affichage original	Appuyez sur ESC

8.0 INTERFACE

8.1 ALARME GÉNÉRALE ET APPEL GÉNÉRAL

Le système est conçu de manière à ce que si l'alarme générale est requise et que le système de détection d'incendies est déjà en alarme, les cloches et klaxons de ce dernier seront réduits au silence pour laisser la priorité au système d'alarme général. La même chose s'applique pour le système d'appel général. Le système d'appel général à une priorité plus grande que l'IFDS et l'alarme générale. Si le système d'appel général est requis, il va rendre tous les autres systèmes muets pour que tous puisse écouter le message. Le système de détection d'incendies peut utiliser les cloches d'alarme générales tant qu'elles ne sonnent pas dans l'espace des passagers (applicable sur des bateau où il y a des passagers).

8.2 PORTES COUPE-FEU

Des contacts sont disponibles à l'intérieur du panneau de détection d'incendies pour interagir avec les contrôles des portes coupe-feu. Ces contacts vont se déclencher en cas de détection d'incendie.

8.3 SYSTÈME D'ALARME ET DE SURVEILLANCE

Le système d'alarme et de surveillance peut communiquer avec le système de détection d'incendies pour donner des informations sur l'endroit de l'incendie avec un message(s) d'alarme(s) ou des animations graphiques. Le système de détection d'incendies communique avec le système d'alarme par un lien Ethernet connecté sur un réseau dédié. Par contre, l'IFDS n'a pas besoin de l'AMS pour opérer. Ceci est seulement une option et n'est pas nécessaire pour l'opération normale du navire.

8.3.1 DESCRIPTION D'ÉCRAN AMS –VUE D'ENSEMBLE DE DÉTECTION D'INCENDIE

En cas d'alarme, le même message d'alarme qui apparaîtra sur le panneau d'incendie apparaîtra également sur l'écran de visualisation d'alarmes. Dans la section "SystemStatus and Deck Selection", le nombre de fautes ou d'alarmes de feu va être augmenté sur le pont approprié. Dans cette section, vous pouvez avoir accès à la vue du dessus du pont en appuyant sur le pont approprié (voir section 8.3.2).

La section "System Control" est seulement disponible sur les écrans qui sont localisés dans la timonerie et dans le poste de surveillance des incendies. Vous avez un choix limité d'actions à distance qui peuvent être faites sur le panneau de détection d'incendies à travers l'affichage du système d'alarme et de surveillance. Qui sont : « Acknowledge, Reset et Silence ».



8.3.2 DESCRIPTION D'ÉCRAN DE L'AMS-VUE DE PONT - DÉTECTION D'INCENDIE

En cas d'alarme, vous pouvez localiser le détecteur qui a déclenché l'état d'alarme en regardant sur les différentes vues de pont disponibles. Si le dispositif est en alarme, il y aura une animation respectant le type d'alarme. Vous pouvez circuler à travers les différentes vues disponibles en appuyant sur les flèches du haut et du bas.



9.0 DÉPANNAGE

Cette section contient l'information requise pour permettre de localiser et d'isoler la faute dans le système de détection d'incendies.

9.1 ISOLATION DE LA FAUTE

Le système de détection d'incendie est un système supervisé, qui isolera la plupart des problèmes par lui-même. Le panneau d'incendie contient des indicateurs qui s'allumeront pour identifier une faute au système ou des détecteurs défectueux. L'affichage sera explicite quant à la description de la faute. Référez-vous au diagramme de filage.

9.2 LISTE DES POINTS

Il y a une variété de points ou de fautes du système qui peuvent apparaître en message d'erreurs. Les tables ci-dessous donnent les problèmes les plus communs ainsi que leurs causes.

9.2.1 TROUBLES DU DISPOSITIF

Un message de la colonne "Type de problème" dans la table suivante apparaîtra dans le coin supérieur droit de l'affichage du panneau quand un problème au niveau du point (dispositif) survient. Utilisez cette table pour vous aider à déterminer le problème.

Type de problème	Description du problème	Action
« ADRFLT »:	Il y a plus d'un dispositif d'un même type. (détecteur ou module) avec la même adresse SLC. Un module de détection peut partager la même adresse sur un SLC mais 2 détecteurs ou 2 modules ne peuvent pas. Notez que certains dispositifs adressables (ex : certains blocs d'alimentation et des XPIQ) peuvent ne pas sembler être des détecteurs ou des modules mais sont adressés sur le SLC comme tel.	Adresser à nouveau le dispositif incorrect en utilisant les dessins de Techsol.
« DIRTY 1 »:	Le détecteur est sale.	Remplacer la tête du détecteur.
« DIRTY 2 »:	Le détecteur est sale et porte un risque de fausse alarme.	Remplacer la tête du détecteur.

« INVREP »:	L'équipement a retourné une réponse inattendue au panneau.	Vérifier la fonctionnalité, l'adressage ainsi que le filage.
-------------	--	--

Type de problème	Description du problème.	Action
« NO SIG »:	L'équipement (module ou détecteur) ne répond pas. Soit le dispositif ne fonctionne pas ou est mal connecté.	Déterminez si l'équipement est fonctionnel, connecté et adressé correctement sur le SLC.
« OPEN »:	Le dispositif a un circuit ouvert sur son filage supervisé.	Vérifier les connexions des modules aux dispositifs d'entrée et de sortie de données auquel il est filé.

9.2.2 PROBLÈMES DU SYSTÈME

Un message de la colonne « Type de faute » de la table suivante apparaîtra dans l'affichage du panneau quand un problème se produit. Utilisez cette table pour vous aider à déterminer la cause du problème.

Type de problème	Description du problème	Action
« AC FAIL »:	Le bloc d'alimentation principal a perdu son alimentation.	Vérifier s'il y a une perte d'alimentation ou si le bloc d'alimentation est correctement connecté et installé.
« BATTERY »:	La batterie du bloc d'alimentation principale a une charge trop élevée ou trop basse.	Vérifier les batteries et les changer si nécessaire.
« CHARGER FAIL »:	Le chargeur de batteries du bloc d'alimentation principal ne fonctionne pas correctement.	Corrigez la faute.
« GROUND FAULT »:	Une faute de mise à la terre est survenue dans le panneau de distribution.	Localisez la faute et la réparer.
« 'LCD80 SUPERVISORY »:	La communication avec le LCD-80 a été perdue.	Vérifier les connexions avec l'afficheur déporté LCD-80.
« STYLE 6 POS. LOOP <u>X</u> »:	Il y a un circuit ouvert du côté positif de la boucle X. Style 6 est une méthode supervisée pour communiquer avec des dispositifs adressables. Si le panneau de contrôle détecte un problème (ouverture de circuit), il va maintenir la communication d'une manière non supervisée. Le problème apparaîtra sur le panneau comme un trouble Style 6 jusqu'à ce que le problème soit corrigé et que vous appuyez sur « RESET ».	

« STYLE 6 NEG. LOOP <u>X</u> »:	Il y a un circuit ouvert du côté négatif de la boucle X. Style 6 est une méthode supervisée pour communiquer avec des dispositifs adressables. Si le panneau de contrôle détecte un problème (ouverture de circuit), il va maintenir la communication d'une manière non supervisée. Le problème apparaîtra sur le panneau comme une faute Style 6 jusqu'à ce que le problème soit corrigé et que vous appuyez sur « RESET ».
« STYLE 6 SHORT LOOP <u>X</u> »:	Style 6 est une méthode supervisée pour communiquer avec des dispositifs adressables. Si le panneau de contrôle détecte un problème (ouverture de circuit ou court-circuit), il va maintenir la communication d'une manière non supervisée. Le problème apparaîtra sur le panneau comme un trouble Style 6 jusqu'à ce que le problème soit corrigé et que vous appuyez sur « RESET ».

10.0 MAINTENANCE

Le système est conçu d'une manière à faciliter la maintenance des équipements de détection d'incendie du système. Si un détecteur ou un module montre des signes de défaillances, il suffit de le remplacer par un nouveau détecteur ou module. Ces équipements ne sont pas dispendieux et ne demandent pas d'ajustements pour restaurer les opérations du système. Il est important par contre de remettre la même adresse sur la nouvelle unité lorsqu'un détecteur est remplacé. (Voir section 7.2).

10.1 HORAIRE DE MAINTENANCE

Le système devrait être inspecté et testé sur une base régulière pour assurer le fonctionnement fiable et des opérations sans problèmes. Des vérifications de routine sont requises pour inspecter visuellement le panneau d'incendie principal tout comme les détecteurs du système pour détecter des signes d'altération, de surchauffe ou de stress.

10.1.1 MENSUEL

- Une vérification mensuelle des circuits de contrôle du panneau d'alarme incendie en actionnant le bouton poussoir "lampe test" est recommandée. Observez que tous les indicateurs visuels sur le panneau de contrôle sont allumés. Tous les indicateurs modules (entrée et sortie) doivent être allumés et l'indicateur sonore devrait s'activer.

10.1.2 TRIMESTRIEL

- Faire les tests mensuels;
- Inspecter tous les détecteurs (fumée et chaleur) pour prévenir l'accumulation de poussière ou de saleté. Les composantes internes des détecteurs sont traitées avec des composés antistatiques pour réduire l'accumulation de saleté et de poussière.
- Inspecter les avertisseurs d'incendie manuel, les détecteurs et les modules pour s'assurer qu'ils ne sont pas endommagés.

10.1.3 ANNUEL

Le test du système annuel est utilisé pour vérifier les opérations de l'ensemble du système. Effectuez le test suivant pour vérifier les opérations du système:

- Vérifiez que le système de détection d'incendies est allumé.
- Appuyez sur le bouton-poussoir lampe de test et maintenez-le. Vérifiez que l'avertisseur sonore du panneau ainsi que les voyants de statues sont allumés. Relâchez le bouton-poussoir.
- Retirer un détecteur de fumée sur la zone 1 et vérifier qu'une faute est générée sur l'écran et que l'indicateur est allumé. Vérifiez qu'il y a le bon message de faute à l'écran du panneau principal d'incendie, aux écrans d'affichage auxiliaire et aux systèmes auxiliaires. Confirmer que la zone est bien identifiée. Le message devrait clignoter jusqu'à temps qu'il soit accepté.
- Répéter les étapes pour toutes les zones d'incendies.
- Tester chaque détecteur en se fiant à la section 7
- Appuyer sur le bouton « Drill » jusqu'à ce que la cloche sonne et vérifier que toutes les sorties fonctionnent (visuelles et auditives)

SECTION 1.2

English version



MARINE ELECTROTECHNOLOGY

IFDS Integrated Fire Detection System

Instruction Manual



MÉRIDIEN MARITIME
ISV008, ISV009, ISV010
INSHORE SCIENCE VESSEL

Revision 1

IMPORTANT INFORMATION

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Hardware and software in this document do not necessarily reflect the delivery. Please refer to section on current project specificities for details.

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1.0 TERMINOLOGY

The following terminology will be used throughout the document.

CPU: Name given to the processing core of the system.

CPU INTERFACE: Operator Interface.

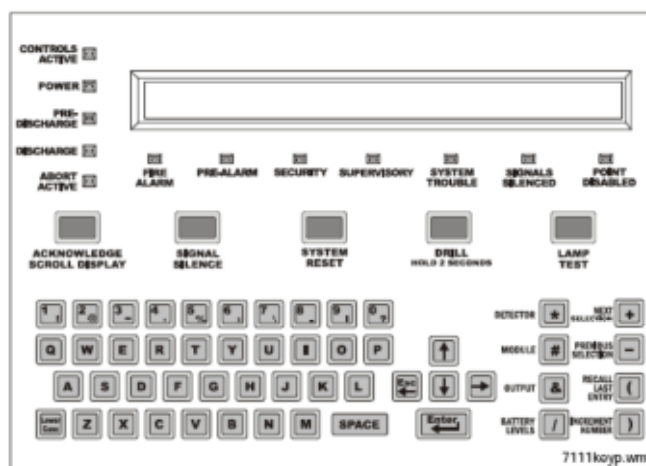


Figure 1: CPU Interface

FIRE DETECTION PANEL: Physical enclosure.



Figure 2: Fire Panel

SENSOR BASE: Detector mounting base.



Figure 3: Flangeless base

SENSOR SOUNDER BASE: Intelligent detector mounting base with integrated sounder device.

SMOKE DETECTOR: Detector with an optical sensing chamber that is engineered to sense smoke produced by a wide range of combustion sources.



Figure 4: Smoke Detector with flanged mounting base

HEAT DETECTOR:

Detector with a thermistor sensing circuit to produce a fixed-temperature and a rate-of-rise thermal detection.



Figure 5: Heat Detector with flangeless mounting base

MANUAL STATION:

Manual fire alarm station



Figure 6: Manual Pull Station

EXPLOSION PROOF DETECTOR: Detector in cast aluminum housing suitable for use in Hazardous Locations.



Figure 7: Heat Detector Explosion Proof

FLAME DETECTOR: Detector that respond to infrared radiation.



Figure 8: Flame Detector

ISOLATOR: Protect the system against wire-to-wire short circuits on the SLC loops.



Figure 9 : Isolator

MONITOR MODULE: Monitor module use to interface dry contact.



Figure 10: Miniature and Standard Size Monitor Module

RELAY MODULE: Relay module for activation of a variety of devices.



Figure 11: Relay Module

CONTROL MODULE: Control module to generate/provide output.



Figure 12: Control Module

BELL: For audible signalization.



Figure 13: Bell

HORN AND STROBE: For visual and audible signalization.



Figure 14: Horn and Strobe

DISPLAY ANNUNCIATOR: Remote display annunciator with deported control function.



Figure 15: Display Annunciator

AMS: Alarm and Monitoring System

COMMUNICATION DEVICE:



Figure 16: RS-232 Server

MONITOR:

AMS user interface to the system.



Figure 17: AMS Display

POWER SOURCE:

Electrical feeder necessary for the Fire Detection Panel.

SLC:

Signaling Line Circuit

NAC:

Notification Appliance Circuit

2.0 PROCEDURES

2.1 START-UP PROCEDURE

At the ship's Vac distribution power panels, close the circuit breaker that supplies the power source to the IFDS. Then please refer to the drawing(s) for power distribution of the system to locate fuses that need be pushed. When the panel is powered up, either by its batteries or from its Vac supply, the CPU2-640 will first check its memory and do internal tests. It will also show the software version present in it. During this first step, the local buzzer on the panel will sound, during approximately 15 seconds. In the second step, the Fire Detection Panel will scan all its loops connected on it and will confirm if all detectors that are programmed in its memory are correctly initialized and/or if there is an alarm.

2.2 SHUTDOWN PROCEDURE

Lift appropriate fuses according to Techsol's drawing.

3.0 CURRENT PROJECT SPECIFICITIES

Following information are applicable only on the current project.

Type Of CPU:	CPU2-640
Cabinet size:	B
Fire Panel Location:	Wheelhouse
Display Annunciator Location:	Engine Room
Delay before initiate fire alarm:	2 min on all smoke and heat detectors
Loop Arrangement :	Style 6
Section of manual that does not apply:	Explosion Proof Detector Flame Detector

4.0 IFDS SYSTEM DESCRIPTION

4.1 CPU AND CPU INTERFACE

The CPU is monitoring fire zones using sensors like smoke detectors, thermal detectors, and manual pull stations located all around the vessel. An intelligible message will be displaying on the CPU interface in case of fire and/or any failure on the system. There's also indicator lights on the CPU interface.

Indicator	Color	When Active	To Turn Off
POWER	Green	Lights when the proper primary AC power is applied. Remains lit while power is applied.	Always lit with AC power applied.
FIRE ALARM	Red	Flashes when a non-acknowledged fire alarm exists. Lights steadily after you acknowledge the fire alarm.	Clear the alarm condition and reset the system.
PRE-ALARM	Red	Flashes when a non-acknowledged fire Pre-Alarm exists. Lights steadily after you acknowledge the Pre-Alarm.	Clear the pre-alarm condition. (Action Pre-Alarm requires a system reset.)
SECURITY	Blue	Flashes when a non-acknowledged Security alarm exists. Lights steadily after you acknowledge the alarm.	Clear the Security alarm condition and reset the system.
SUPERVISORY	Yellow	Flashes when a non-acknowledged Supervisory condition exists. Lights steadily after you acknowledge the event.	Clear the condition
SYSTEM TROUBLE	Yellow	Flashes when a non-acknowledged system trouble exists. Lights steadily after you acknowledge the trouble.	Clear the trouble condition.
SIGNALS SILENCED	Yellow	Lights after a fire alarm condition occurs and after you press SIGNAL SILENCE.	Press SYSTEM RESET. DRILL will also turn off the led.
POINT DISABLED	Yellow	Lights when one or more system devices are disabled.	Enable the device or remove the disabled device from the system program.

4.2 FIRE DETECTION PANEL

The fire panel is located in the main fire control station. This panel, which can be from different size, contain several equipment like CPU, CPU interface, batteries, communication device, etc...

4.3 SENSOR BASE

Detector mounting base on which you can install smoke and heat detector head. Sensor sounder base give the possibility to have a local audible alarm when associated detector head is triggered.

4.4 SMOKE DETECTOR

This intelligent photoelectric smoke detector has an optical sensing chamber that is engineered to sense smoke produced by a wide range of combustion sources. It is addressable with a rotary selector and has a bicolor LED that blinks green every time the detector is addressed, and is illuminated steady red on alarm.

4.5 HEAT DETECTOR

The addressable thermal detector can be a rate-of-rise and/or fixed temperature type. It is addressable with a rotary selector and has a bicolor LED that blinks green every time the detector is addressed, and is illuminated steady red on alarm.

4.5.1 FIXED TEMPERATURE HEAT DETECTOR

This heat detector will trigger in alarm when the ceiling temperature reaches 135°F or 190°F depending of the model.

4.5.2 RATE-OF-RISE HEAT DETECTOR

This heat detector will trigger in alarm when the ceiling temperature reaches 135°F or if the temperature increases at a minimum rate of 15°F per minute.

4.6 MANUAL STATION

This double action manual station with a pull down lever, when operated, locks in position after activation of the alarm circuit and can be reset with the key that is supplied with the unit. It is addressable with a rotary selector and has a bicolor LED that blinks green every time the detector is addressed, and is illuminated steady red on alarm. There's also models that are not addressable which have to be used with a monitor module.

4.7 EXPLOSION PROOF DETECTOR

Detector made of a cast of aluminum housing suitable for use in hazardous locations like batteries room and paint locker. Heat detectors are the most commonly used. A set of normally open contacts will close when the ceiling temperature increases at a minimum rate of 8.4 Celsius degrees per minute. Closing the contact initiates the fire alarm sequence. Independent of the rate-of-rise operation, the fixed temperature portion consists of a spring-loaded plunger retained by a fusible alloy that releases when the ceiling temperature reaches 93 degrees Celsius. Must be use with a monitor module. If the detector is tested in a way to be triggered by rising temperature, it will be resettable by cooling it down. Otherwise, it will not be possible to do so.

4.8 FLAME DETECTOR

This detector is engineered to respond to the nominal 4.45 micron band of infrared radiation, which is commonly known as the CO₂ spike. A characteristic of burning hydrocarbons is the emission of unusually high levels of IR radiation in this narrow portion of the radiation spectrum.

4.9 ISOLATOR

Module that will protect the system against wire-to-wire short circuits on the loops. It protect up to 25 units (detectors, pull stations etc...) that are connected on it and automatically reset on correction of short. It also has a LED that blinks in normal condition and will become steady when a short circuit is detected. For example, in case that a fire burns a wire and causes a short circuit on the loop, only the detectors that are between the same isolator will be lost.

4.10 MONITOR MODULE

Monitor modules are used to supervise a circuit of dry-contact input devices, such as conventional heat detectors and pull stations. It is addressable with a rotary selector.

4.11 BELL, HORN AND STROBE.

Audible and visual device attended to give an appropriate fire alarm signal to qualified crew. Horn and strobe are located in noisy environment like machinery space. Depending of the ship's class and the type of fire alarm, a delay before the activation of these outputs device can be added (see Section 3.0). These devices are not available in passenger space (if applicable).

4.12 DISPLAY ANNUNCIATOR.

The display annunciator allows you to provide alarm, reset, acknowledge and silence the control panel from a remote location.

4.13 AMS, MONITOR AND COMMUNICATION DEVICE.

The Alarm Monitoring System can communicate with the Fire Detection CPU via the communication device and display information on its monitor (See also Section 8).

4.14 POWER SOURCES

The power supply section is composed of two different sources of supply. The first source (Primary) comes from the ship's 120 or 240Vac power depending of the type of CPU. If for any reason this source fails, the second source will supply the system. This power comes from the 24Vdc batteries bank (most of the time located in the fire panel). In emergency situations, the system is supplied from this source. Batteries are sized to give autonomy of a minimum of 18 hours in monitoring services and 30 minutes in alarm mode. The system switches from one source to the other without interruption of service. Both supply sources are constantly monitored and, in the event of a failure, it will be reported on the system's display for immediate attention.



Required autonomy of the panel depends of the classification society.



Condition of the batteries may affect autonomy of the panel. See Maintenance.

4.15 SLC

Communication between the control panel and intelligent addressable monitor and control devices takes place through a Signaling Line Circuit (SLC), which can be wired in two different styles.

4.15.1 STYLE 4

Style 4 allows T-tapping. Each isolated branch are on a separate fire zone.

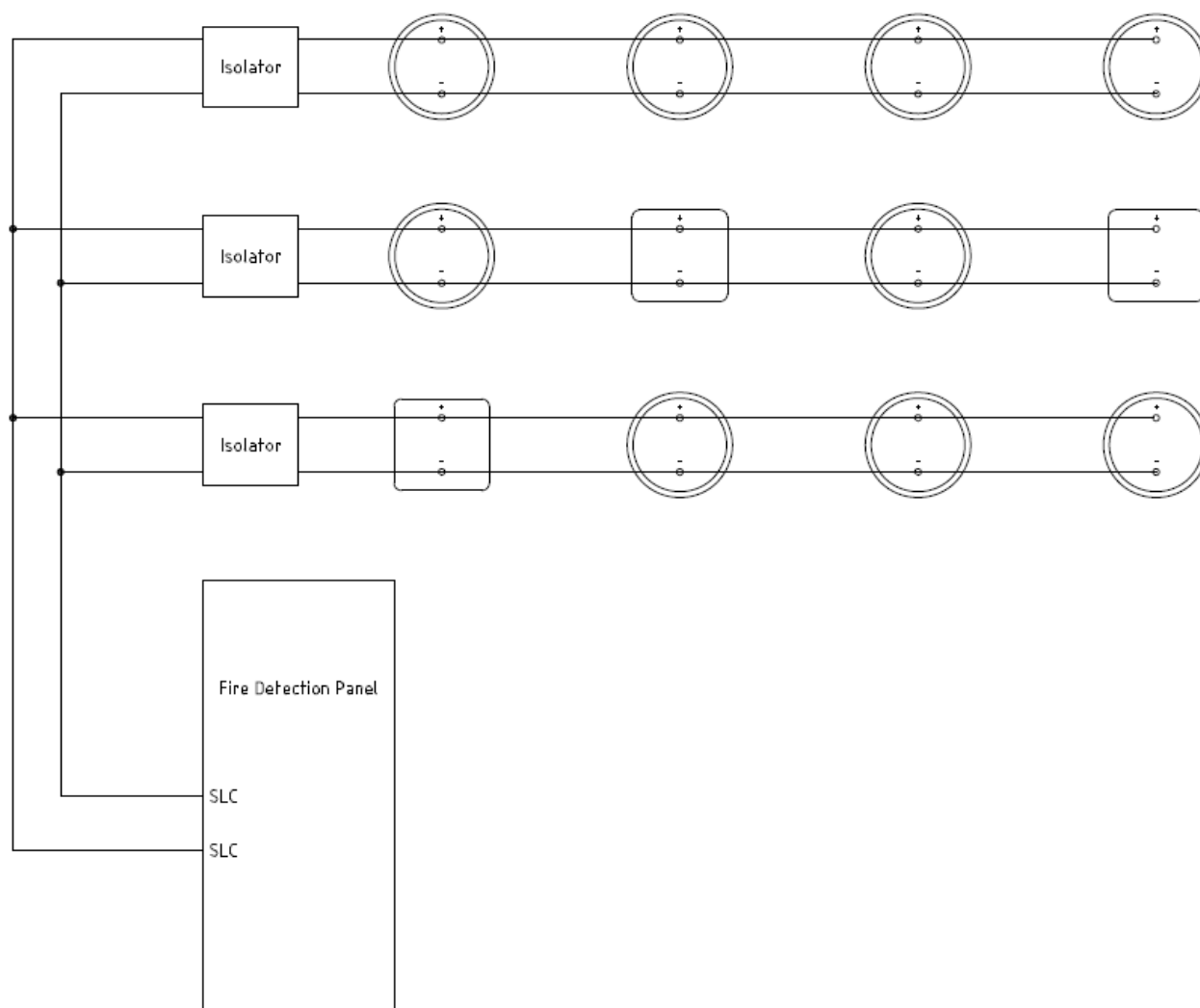


Figure 18: SLC Style 4 Wiring

A single wire break has for effect that communication will be lost with every detector after it. If there's a wire short, communication will be lost with detectors located in the same fire zone.

4.15.2 STYLE 6

Style 6 don't allows T-tapping. Each detectors located between two isolators are on a separate fire zone.

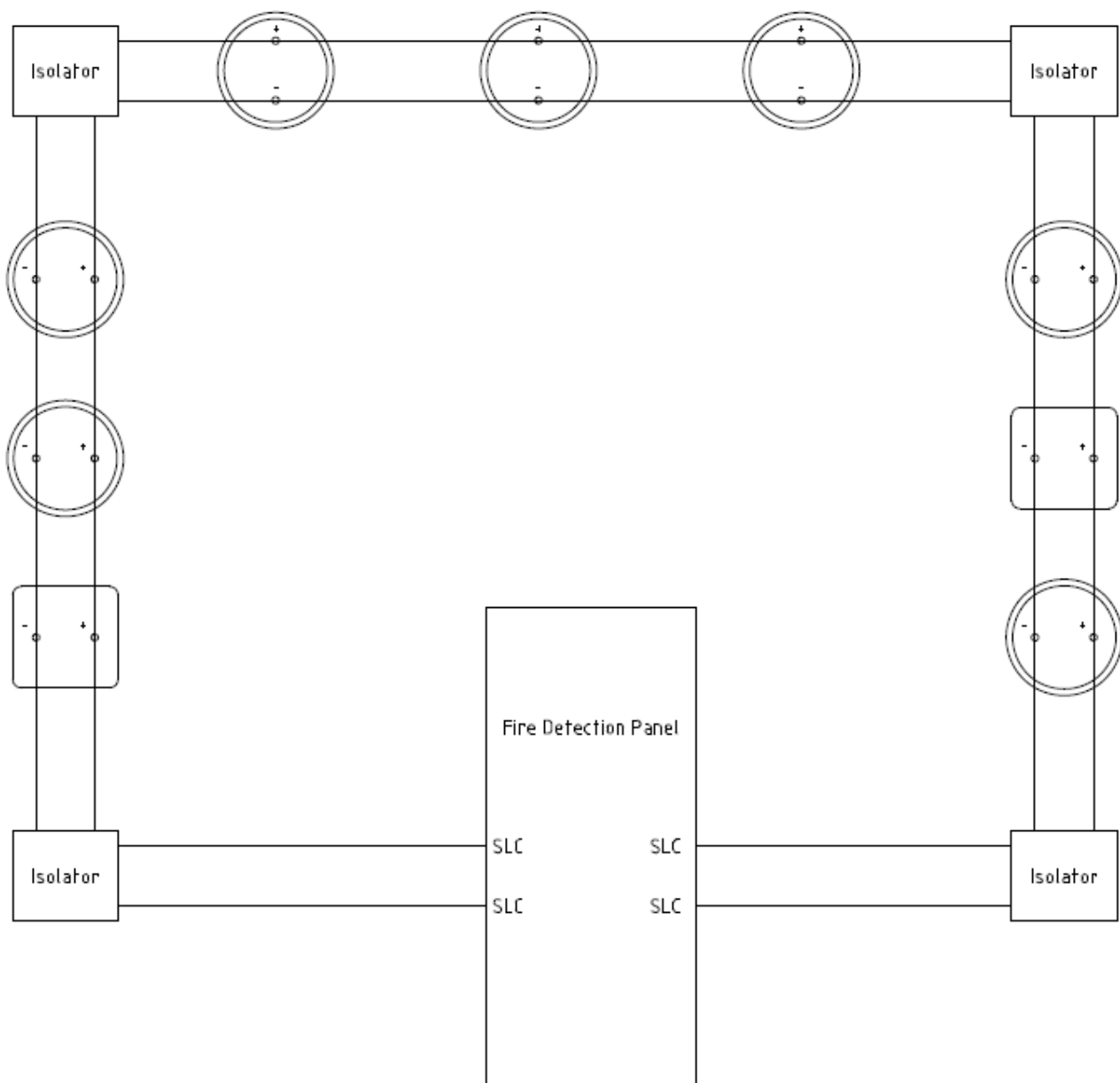


Figure 19: SLC Style 6 Wiring

A single wire break has no effect on the SLC. A trouble message will be raised on the cpu display, but the system will still be fully operational. If there's a wire short, you only lose the detector located in the same fire zone.

4.16 NAC

A Notification Appliance Circuit connect audible and visual notification appliances to the fire alarm system control unit.

5.0 ALARM GENERATION

The system responds to the alarm and trouble conditions by providing location/zone audible and visual annunciation.

5.1 SYSTEM NORMAL ANNUNCIATION

The system operates in Normal mode when no alarm or trouble exist. In Normal mode, the control panel displays a System Normal message.

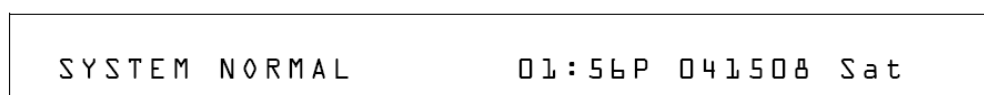


Figure 20: Sample System Normal Message

In Normal mode, the control panel does the following functions at regular intervals:

- Polls all SLC devices and the four NACs to check for valid replies, alarms, troubles, circuit integrity, supervisory signals, etc.
- Checks power supply troubles and batteries at 10-second intervals
- Refreshes the LCD display
- Scans for any keypad or Control Key entries
- Performs a detector automatic test operation
- Tests system memory
- Monitors for microcontroller failure

5.2 FIRE ALARM ANNUNCIATION

When an initiating device (detector or monitor module) activates, the control panel does the following:

- Produces a steady audible tone
- Activates the System Alarm relay.
- Flashes the Fire Alarm LED.
- Displays a Type Code that indicates the type of device that activated the fire alarm.
- Displays ALARM in the status banner on the LCD display, along with information specific to the device, as shown below:

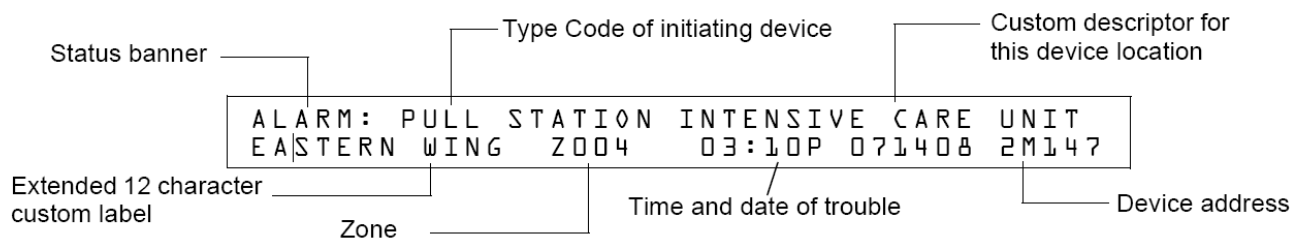


Figure 21: Sample Fire Alarm Display

- Sends an Alarm message to the LCD display.
- Latches the control panel in alarm.



You cannot return the control panel to normal operation until you correct the alarm condition and reset the control panel.

5.3 TROUBLE ALARM ANNUNCIATION

The system goes into system trouble when the control panel detects an electrical fault. If no fire alarm exists, the control panel does the following:

- Produces a pulsed audible tone
- Activates the Trouble relay.
- Flashes the SYSTEM TROUBLE LED.
- Displays a Type Code that indicates the type of device with a trouble.
- Displays TROUBL in the status banner on the LCD display as well as the type of trouble any information specific to the device.
- Sends a Trouble message to the LCD display as follow:

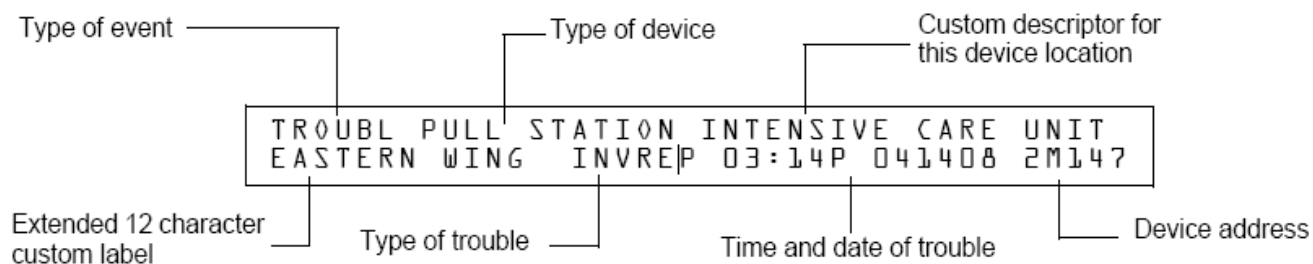


Figure 22: Sample Trouble Message



If a fire alarm exists when a trouble exists, the SYSTEM TROUBLE LED lights, but the alarm message appears in the LCD display.

6.0 ALARM PANEL FUNCTIONS

6.1 ALARM SILENCING

Use the SIGNAL SILENCE key to silence the panel sounder and turn off all audio and visual devices connected to Notification Appliance Circuits. When pressed, the control panel does the following:

- Turns off the panel sounder;
- Turns off all silenceable output circuits;
- Lights the SIGNALS SILENCED LED.



All silenceable output will resound if there's a new fire detection

6.2 ALARM ACKNOWLEDGMENT

Use the ACKNOWLEDGE/SCROLL DISPLAY key to respond to new alarm or trouble signal. When pressed, the control panel does the following:

- Silences the panel sounder;
- Changes all active LED indicators from flashing to steady;
- Sends a signal to silence the sounders on the LCD-80 and ACS annunciators.

You can also press this key to display multiple alarms or troubles. If more than one alarm or trouble exist, the control panel displays the next alarm or trouble for 3 seconds (or until you press the ACKNOWLEDGE/SCROLL DISPLAY key), then displays the next alarm or trouble.

6.3 DRILL

Use the DRILL key to manually activate all silenceable outputs and Notification Appliance Circuits. To prevent accidental activation, you must press the DRILL key for 2 seconds. When pressed, the control panel does the following:

- Turns on all silenceable NACs;
- Turns off the SIGNALS SILENCED LED.

6.4 SYSTEM RESET

Use the SYSTEM RESET key to reset the control panel. When pressed, the control panel does the following:

- Clears ALL active inputs;
- Interrupts resettable power.

If any alarm or trouble exists after you press the SYSTEM RESET key, all NACs, control outputs, and panel audio and visual indicators will reactivate.



Active trouble conditions will not be cleared and still be reported upon RESET.

6.5 LAMP TEST

Use the LAMP TEST key to test the control panel LEDs, all installed panel circuits, and the panel sounder. When pressed and held, the control panel does the following:

- Lights all control panel LEDs;
- Turns on the panel sounder;
- Lights all segments of the LCD display. When the LAMP TEST key is held for longer than five seconds, the LCD will display the Software Revisions;
- Lights all panel circuit LEDs.

7.0 PROCEDURES

7.1 DETECTOR TESTING

All sensors must be tested after installation and periodically thereafter. Testing methods must satisfy the authority having jurisdiction.

7.1.1 SMOKE AND HEAT DETECTOR MAGNET TEST

Apply the test magnet against the cover in the magnet test area, as shown in the next figure, to activate the test feature. The LEDs should latch on within 10 seconds, indicating alarm and annunciating the panel. Verify that the fire alarm is activated for that zone; both audible and visual alarms should be turned on (there may be a delay before the visual and audible alarm initiate). Check for a fire alarm to be generated on the main fire panel screen. Confirm that the right zone is identified on the message. Reset the detector at the cpu display.

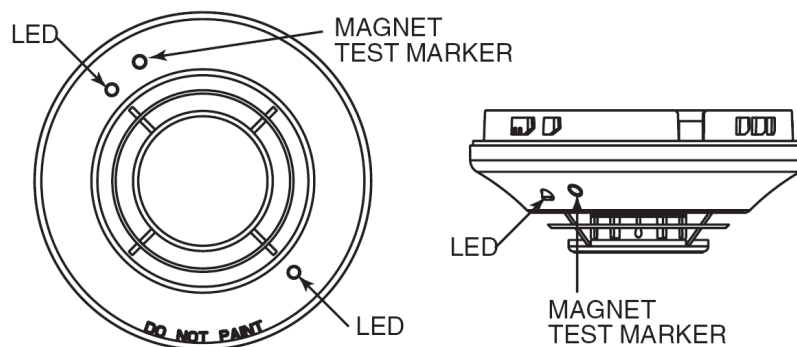


Figure 23: Views showing position of test magnet.

7.1.2 SMOKE DETECTOR TRUE FUNCTIONAL TEST

From a distance of 2 to 4 ft. (.6-1.2 m), using a canned aerosol smoke, aim spray for 1-2 seconds at the vents or side of the detector. The LEDs should latch on within 10 seconds, indicating alarm and annunciating the panel. Verify that the fire alarm is activated for that zone; both audible and visual alarms should be turned on (there may be a delay before the visual and audible alarm initiate). Check for a fire alarm to be generated on the main fire panel screen. Confirm that the right zone is identified on the message. Reset the detector at the cpu display.



Canned aerosol simulated smoke (canned smoke agent) formulas will vary by manufacturer. Misuse or overuse of these products may have long term adverse effects on the smoke detector. Consult the canned smoke agent manufacturer's published instructions for any further warnings or caution statements.

7.1.3 HEAT DETECTOR TRUE FUNCTIONAL TEST

From the side of the detector, using hair dryer of 1000-1500 watts, direct the heat towards the sensor. Hold the heat source about 6 inches (15 cm) away to prevent damage to cover during testing. The LEDs should light when the temperature at the detector reaches the alarm setpoint, indicating alarm and annunciating the panel. Verify that the fire alarm is activated for that zone; both audible and visual alarms should be turned on (there may be a delay before the visual and audible alarm initiate). Check for the right message to be generated on the main fire panel's screen, auxiliary display screen and that all auxiliary system showing the right indication. The message should be in a blinking text until acknowledged. Reset the detector at the cpu interface.

7.1.4 MANUAL STATION

Initiate the manual station by following the instruction on it. Most of the time it should be push in and pull down. Verify that the fire alarm is activated for that zone; both audible and visual alarms should be turned on (there may be a delay before the visual and audible alarm initiate). Check for a fire alarm to be generated on the main fire panel screen. Check for the right message to be generated on the main fire panel's screen, auxiliary display screen and that all auxiliary system showing the right indication. The message should be in a blinking text until acknowledged. Reset the detector at the cpu interface.

7.1.5 EXPLOSION PROOF DETECTOR

Use an electric heat gun or blow dryer to test the thermal explosion proof detector. Direct the heated air stream towards the thermal detector from a distance of approximately 12 inches. Use a smoke can to test smoke explosion proof detector. Verify that the fire alarm is activated for that zone; both audible and visual alarms should be turned on (there may be a delay before the visual and audible alarm initiate). Check for the right message to be generated on the main fire panel's screen, auxiliary display screen and that all auxiliary system showing the right indication. The message should be in a blinking text until acknowledged. Reset the detector at the cpu interface.



A sensor that fails any of these tests should be replaced.

A safer way to test the detectors without damaging them can be done. The material needed for the test is a kettle, rubber gloves and a rag or a cloth. First get the water inside the kettle at a boiling temperature. Then, using your rubber gloves, get wet rag in contact with side of heat detector inside explosion proof shell until an alarm is heard (expect roughly 3-4 seconds). Verify that the fire alarm is activated for that zone; both audible and visual alarms should be turned on (there may be a delay before the visual and audible alarm initiate). Check for the right message to be generated on the main fire panel's screen, auxiliary display screen and that all auxiliary system showing the right indication. The message should be in a blinking text until acknowledged. Reset the detector at the cpu interface.

7.2 REPLACING DETECTOR

To replace a smoke or a heat detector, remove the old detector head by turning it counter clockwise. Set the new detector head address with the same address as the old head by turning rotary address switches to appropriate number (See Next Figure).

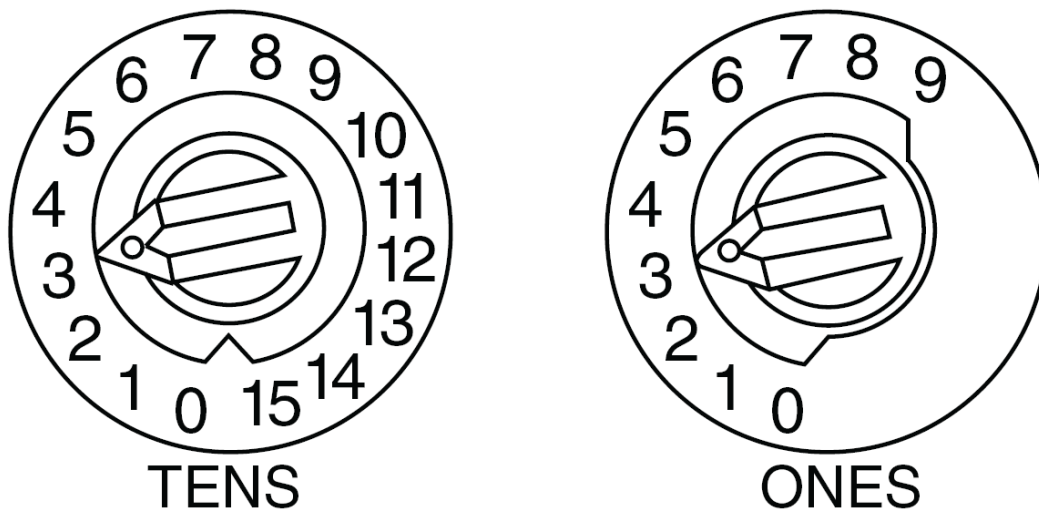


Figure 24: Address switches

Install the sensor into the sensor base. Push the sensor into the base while turning it clockwise to secure it in place.



Before removing the detector, notify the proper authorities that the detector is undergoing maintenance and will be temporarily out of service.

7.3 SETTING TIME AND DATE

Press ENTER on CPU Display then press **1**. You should be on password screen. Enter the password 11111 then press ENTER. Press the **5** key to display the Change Time/Date screens. Follow the instructions below to set time and date:

To	Do this
Change time and date values	Enter values from the numeric keys on the keypad.
Change A (AM) or P (PM)	Press + (Next selection) or – (Previous Selection)
Change the day	Press + (Next selection) or – (Previous Selection)
Move to another digit	Use the left and right arrows on the keypad
Save the time and date and return	Press Enter key
Return to Normal Display	Press ESC key

8.0 INTERFACE

8.1 GENERAL ALARM AND PUBLIC ADDRESS

The system is designed in a way that if the general alarm is required and the fire detection system was already on alarm, it will mute its bells and horns outputs to leave the first priority to the general alarm. The same is also applicable for the public address. Even more, the public address has the strongest priority over the IFDS and the general alarm. If the public address is required, it will mute the IFDS output so everyone can listen to the message. Fire detection system can use general alarm bells as long as it doesn't sound through passenger space (applicable on passenger boat).

8.2 DOOR HOLDBACK

Contacts are available inside the fire detection panel to interface with fire door holdback control. Those contacts will trigger in case of fire detection.

8.3 ALARM AND MONITORING SYSTEM

The Techsol alarm and monitoring system can communicate with the fire detection system to show information about fire location by alarm message description and graphical animation. The fire system communicates with the alarm system by a communication Ethernet link connected on a dedicated network. However, the IFDS doesn't need the alarm & monitoring system to operate. This is only an option and it is not necessary for the ship normal operation.

8.3.1 AMS SCREEN DESCRIPTION - FIRE DETECTION OVERVIEW

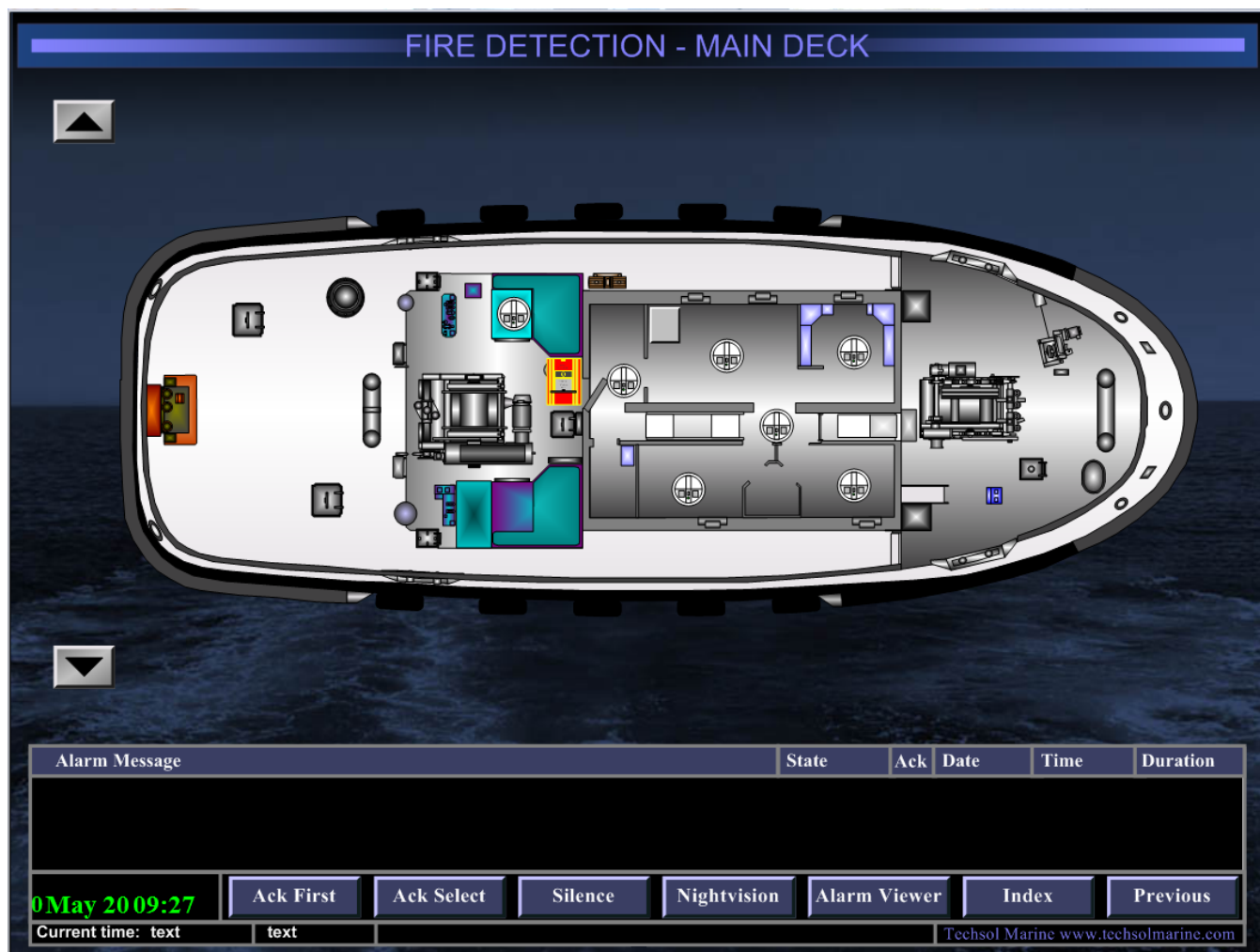
If an alarm occurs, the same alarm message that appears on the Fire Detection Panel will be shown on the alarm viewer. In the section ‘‘System Status and Deck Selection’’, the number of fire or fault alarm will be increased on the appropriate deck. In this section, you can access to deck top view by pressing on the appropriate deck (see section 8.3.2).

The section ‘‘System Control’’ is only available on screens that are located in wheelhouse and other fire control areas. You have a limited choice of remote actions that can be done on the fire detection panel through the alarm and monitoring display. Which are Acknowledge, Reset and Silence.



8.3.2 AMS SCREEN DESCRIPTION - FIRE DETECTION DECK VIEW

When an alarm occurs, you can locate the detector that had triggered in alarm state by looking on the different deck top view available. If the device is in alarm, there will be an animation representing the type of alarm. You can cycle through the different deck view available by pressing on the arrow button available on the different deck view.



9.0 TROUBLESHOOTING

This section contains the information required to enable the maintainers to localize and fault isolated malfunctions in the Fire Alarm System.

9.1 FAULT ISOLATION

The Fire Detection System is a supervised system, which essentially will self-isolate most problems in the system. The Fire Alarm Panel contains indicators which light up to identify a system trouble and/or failed detectors. The display will be self explanatory in regards to the fault description. Refer to the system wiring diagram.

9.2 POINT AND SYSTEM TROUBLES LISTS

There are a variety of point or system trouble types that may appear in a trouble message. The tables below give lists of the most common troubles and indications of their cause.

9.2.1 DEVICE TROUBLES

A message from the “Trouble Type” column in the following table will appear in the upper right corner of the panel display when a point (device) trouble occurs. Use this table to help determine what the trouble is.

Trouble Type	Trouble Description	Action
ADRFLT:	There is more than one device of a single type (detector or module) with the same SLC address. A detector and a module can share the same address on an SLC, but two detectors, or two modules, cannot. Note that some addressable devices (e.g. certain power supplies and XPIQs) may not appear to be detectors or modules, but are addressed on the SLC as such.	Readdress the incorrect device using Techsol drawings.
DIRTY 1:	The detector is dirty.	Replace detector head.
DIRTY 2:	The detector is dirty and it has a false alarm risk.	Replace detector head.
INVREP:	The device has returned a response to the panel that the panel did not expect.	Check the device for functionality, addressing and wiring.

Trouble Type	Trouble Description	Action
NO SIG:	The device (module or detector) is not responding to the poll. Either the device is not working or it is not connected properly.	Determine whether the device is functional, and connected and addressed properly on the SLC.
OPEN:	The module device has an open circuit on its supervised wiring.	Check the connections from the module to the input or output device to which it is wired.

9.2.2 SYSTEM TROUBLES

A message from the “Trouble Type” column in the following table will appear in the panel display when a system trouble occurs. Use this table to help determine the cause of the trouble.

Trouble Type	Trouble Description	Action
AC FAIL:	The main power supply has lost AC power.	Investigate whether there is an AC power loss, or whether the power supply is correctly installed and wired.
BATTERY:	The main power supply’s battery charge is too high or too low.	Check batteries, replace if necessary.
CHARGER FAIL:	The main power supply’s battery charger is not working properly.	Correct the fault.
GROUND FAULT:	A ground fault has occurred within the panel.	Locate the ground fault and repair.
LCD80 SUPERVISORY:	Communication has been lost with the LCD-80.	Check connections to the LCD-80 Annunciator.
STYLE 6 POS. LOOP <u>X</u> :	There is an open circuit on the positive side of loop x. Style 6 is supervised methods of communicating with addressable devices. If the control panel detects a trouble (open), it will drive both ends of the loop, maintaining communication in an unsupervised method. The latching trouble will display on the panel as a Style 6 trouble until you correct the condition and press RESET.	
STYLE 6 NEG. LOOP <u>X</u> :	There is an open circuit on the negative side of loop x. Style 6 is supervised methods of communicating with addressable devices. If the control panel detects a trouble (open), it will drive both ends of the loop, maintaining communication in an unsupervised method. The latching trouble will display on the panel as a Style 6 trouble until you correct the condition and press RESET.	
STYLE 6 SHORT LOOP <u>X</u> :	Style 6 is supervised methods of communicating with addressable devices. If the control panel detects a trouble (open or short), it will drive both ends of the loop, maintaining communication in an unsupervised method. The latching trouble will display on the panel as a Style 6 trouble until you correct the condition and press RESET.	

10.0 MAINTENANCE

The system is built to facilitate fire detection equipment maintenance. If a detector or module shows signs of failure, it only needs to be replaced by another. These equipment are not expensive and don't require adjustments to restore system operations. It is important to put back the same address on the unit when it is replaced. (Voir section 7.2).

10.1 MAINTENANCE SCHEDULE

The system should be inspected and tested on a scheduled basis to insure reliable trouble free operation. Routine checks are required to visually inspect the main fire panel, as well as detectors in the system for signs of tampering, over heated or stressed components.

10.1.1 MONTHLY

- Monthly checks of the supervisory circuits at the Fire Alarm Panel by operating the lamp Test push button are recommended. Observe that all visual indicators on the control panel are lighted. All modules' healthy indicators (input and output) should be on and the audible should sound.

10.1.2 QUARTERLY

- Do the monthly tests;
- Inspect all detectors (smoke and heat) for accumulation of dust or dirt. The internal components of the detectors are treated with anti-static compound to reduce attraction of dust and dirt;
- Inspect manual fire pull stations and heat (E/P) detectors and modules for damages.

10.1.3 ANNUALLY

The annual system test is used to verify the total system's operations. Perform the following test procedure to verify system's operations:

- Verify that the Fire Detection Systems is ON;
- Press the lamp test push button and hold. Verify that the panel's buzzer, the engine room's horn and strobe are on, and that the main fire panel and trouble indicators are lit. Release the push button;
- Remove one smoke detector on zone 1 and check for the trouble alarm to be generated on the screen and that the trouble indicator is lit. Check the text message on the main fire panel's screen, auxiliary display's screen and that all auxiliary system showing the right indication and confirm that the right zone is identified. The message should be in a blinking text until acknowledged;
- Repeat step for all fire zones;
- Test each detector according with section 7
- Press Drill key until bell ring and check if all output device work properly.

SECTION 2

System Drawings

(Refer to drawing Binder)

SECTION 3

Point List

Integrated Fire Detection System

Point List

ISV008, ISV009, ISV010

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Date: 2013/02/20 *S.L.*

Canadian Coast Guard

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As Commissioned

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0	F.T.	2010-09-09	Original Release
1	C.T.	2011-04-26	Drawings Update
2	A.F.	2011-07-25	ISV0008, ISV009 and ISV 0010 intergrated on the same point list
3	A.F.	2011-07-26	Modification of fire zone values
4	F.T.	2012-07-19	Add a Cover page
5	F.T.	2012-08-23	The name of the detector 1D031 <<1 Berth - Main Deck>> Changes to <<Chief Engineer Cabin - Main Deck>>
6	S.L.	2013-02-13	Comments for detector 1D031 added, so the point list can be used for all vessel
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POINT LIST

IFDS (Integrated Fire Detection System)

ISV008, ISV009, ISV010 Inshore Science Vessel

Sensor	Channel Type	Slave Server	Slave Address	Drawing	Detector Address	Sensor Type	LOW Alarm	LOW Warning	HI Warning	HI Alarm	Delay (Sec.)	AMS Pager Alarm	Fire Zone	Units	Supplied by	Comment
Wheelhouse Port - Fo'c'sle Deck	DI	Nport	190.1.1.233	FD01BA	1M001	Pull Station (FMM)	1 = Alarm	0	x	1				Techsol		Focsle Deck
Wheelhouse Port Fixed Fire Extinguishing Door Open - Fo'c'sle Deck	DI	Nport	190.1.1.233	FD01BA	1M017	Door Switch (FMM)	1 = Alarm	0	x	1				Techsol		Focsle Deck
Wheelhouse Center Aft - Fo'c'sle Deck	DI	Nport	190.1.1.233	FD01BA	1M002	Pull Station (FMM)	1 = Alarm	0	x	1				Techsol		Focsle Deck
Wheelhouse Stbd Aft - Fo'c'sle Deck	DI	Nport	190.1.1.233	FD01BA	1D003	Smoke	1 = Alarm	0	x	1				Techsol		Focsle Deck
Wheelhouse Stbd - Fo'c'sle Deck	DI	Nport	190.1.1.233	FD01BA	1M004	Pull Station (FMM)	1 = Alarm	0	x	1				Techsol		Focsle Deck
Wheelhouse Center - Fo'c'sle Deck	DI	Nport	190.1.1.233	FD01BA	1D005	Smoke	1 = Alarm	0	x	1				Techsol		Focsle Deck
Stairways Main Deck Fwd - Main Deck	DI	Nport	190.1.1.233	FD01BA	1D006	Smoke	1 = Alarm	0	x	1				Techsol		Main Deck
Stairways Main Deck Fwd - Main Deck	DI	Nport	190.1.1.233	FD01BA	1M007	Pull Station (FMM)	1 = Alarm	0	x	1				Techsol		Main Deck
Stairways Hold Fwd - Hold Deck	DI	Nport	190.1.1.233	FD01BA	1D008	Smoke	1 = Alarm	0	x	1				Techsol		Hold Plan
Stairways Hold Fwd - Hold Deck	DI	Nport	190.1.1.233	FD01BA	1M009	Pull Station (FMM)	1 = Alarm	0	x	1				Techsol		Hold Plan
Lower Accommodation Room 3 - Hold Deck	DI	Nport	190.1.1.233	FD01CA	1D010	Smoke	1 = Alarm	0	x	2				Techsol		Hold Plan
Lower Accommodation Room 4 - Hold Deck *	DI	Nport	190.1.1.233	FD01CA	1D011	Smoke	1 = Alarm	0	x	2				Techsol		Hold Plan (*Present only on ISV008)
Lower Accommodation Bathroom Stbd - Hold Deck	DI	Nport	190.1.1.233	FD01CA	1D012	Heat	1 = Alarm	0	x	2				Techsol		Hold Plan
Bow Thruster Compartment - Hold Deck	DI	Nport	190.1.1.233	FD01CA	1D016	Smoke	1 = Alarm	0	x	2				Techsol		Hold Plan
Lower Accommodation Bathroom Port - Hold Deck *	DI	Nport	190.1.1.233	FD01CA	1D013	Heat	1 = Alarm	0	x	2				Techsol		Hold Plan (*Present only on ISV008)
Lower Accommodation Room 2 - Hold Deck	DI	Nport	190.1.1.233	FD01CA	1D014	Smoke	1 = Alarm	0	x	2				Techsol		Hold Plan
Lower Accommodation Room 1 - Hold Deck	DI	Nport	190.1.1.233	FD01CA	1D015	Smoke	1 = Alarm	0	x	2				Techsol		Hold Plan
Mess Aft - Main Deck	DI	Nport	190.1.1.233	FD01DA	1M020	Pull Station (FMM)	1 = Alarm	0	x	3				Techsol		Main Deck
Mess Aft - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D021	Smoke	1 = Alarm	0	x	3				Techsol		Main Deck
Galley - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D022	Heat	1 = Alarm	0	x	3				Techsol		Main Deck
Mess Fwd - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D023	Smoke	1 = Alarm	0	x	3				Techsol		Main Deck
Mess Fwd - Main Deck	DI	Nport	190.1.1.233	FD01DA	1M024	Pull Station (FMM)	1 = Alarm	0	x	3				Techsol		Main Deck
Freezer Store - Main Deck	DI	Nport	190.1.1.233	FD01DA	1M025	Heat (FMM)	1 = Alarm	0	x	3				Techsol		Main Deck
Dry Store - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D026	Smoke	1 = Alarm	0	x	3				Techsol		Main Deck
Bosun's Stores - Main Deck	DI	Nport	190.1.1.233	FD01DA	1M027	Heat (FMM)	1 = Alarm	0	x	3				Techsol		Main Deck

POINT LIST

IFDS (Integrated Fire Detection System)

ISV008, ISV009, ISV010 Inshore Science

Sensor	Channel Type	Slave Server	Slave Address	Drawing	Detector Address	Sensor Type	LOW Alarm	LOW Warning	HI Warning	HI Alarm	Delay (Sec.)	AMS Pager Alarm	Fire Zone	Units	Supplied by	Comment
Cooler Stores - Main Deck *	DI	Nport	190.1.1.233	FD01DA	1D028	Heat	1 = Alarm	0	x		3			Techsol		Main Deck (*Present only on ISV008)
Captain Cabin - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D029	Smoke	1 = Alarm	0	x		3			Techsol		Main Deck
Bathroom Captain Cabin - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D030	Heat	1 = Alarm	0	x		3			Techsol		Main Deck
Chief Engineer Cabin - Main Deck*	DI	Nport	190.1.1.233	FD01DA	1D031	Smoke	1 = Alarm	0	x		3			Techsol		Main Deck (* ID "1 Berth" for ISV008)
Dry Lab Fixed Fire Extinguishing Door Open - Main Deck	DI	Nport	190.1.1.233	FD01EA	1M047	Door Switch (FMM)	1 = Alarm	0	x		4			Techsol		Main Deck
Dry Lab - Main Deck	DI	Nport	190.1.1.233	FD01EA	1D040	Smoke	1 = Alarm	0	x		4			Techsol		Main Deck
Dry Lab - Main Deck	DI	Nport	190.1.1.233	FD01EA	1M041	Pull Station (FMM)	1 = Alarm	0	x		4			Techsol		Main Deck
Wet Lab - Main Deck	DI	Nport	190.1.1.233	FD01EA	1M042	Pull Station (FMM)	1 = Alarm	0	x		4			Techsol		Main Deck (*Present only on ISV008)
Wet Lab - Main Deck *	DI	Nport	190.1.1.233	FD01EA	1D043	Heat	1 = Alarm	0	x		4			Techsol		Main Deck (*Present only on ISV008)
Wet Gear - Main Deck	DI	Nport	190.1.1.233	FD01EA	1M044	Pull Station (FMM)	1 = Alarm	0	x		4			Techsol		Main Deck
Wet Gear - Main Deck	DI	Nport	190.1.1.233	FD01EA	1D045	Smoke	1 = Alarm	0	x		4			Techsol		Main Deck
Bathroom Wet Gear - Main Deck *	DI	Nport	190.1.1.233	FD01EA	1D046	Heat	1 = Alarm	0	x		4			Techsol		Main Deck (*Present only on ISV008)
ER Stairways Main Deck - Main Deck	DI	Nport	190.1.1.233	FD01FA	2M001	Pull Station (FMM)	1 = Alarm	0	x		5			Techsol		Main Deck
ER Stairways Main Deck - Main Deck	DI	Nport	190.1.1.233	FD01FA	2D002	Smoke	1 = Alarm	0	x		5			Techsol		Main Deck
ER Center - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2M003	Pull Station (FMM)	1 = Alarm	0	x		5			Techsol		Hold Plan
Port Main Engine - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2D004	Heat	1 = Alarm	0	x		5			Techsol		Hold Plan
Port Generator - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2D005	Heat	1 = Alarm	0	x		5			Techsol		Hold Plan
Engine Room Port Aft - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2M006	Pull Station (FMM)	1 = Alarm	0	x		5			Techsol		Hold Plan
Harbour Generator - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2D007	Heat	1 = Alarm	0	x		5			Techsol		Hold Plan
Stbd Main Engine - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2D008	Heat	1 = Alarm	0	x		5			Techsol		Hold Plan
Stbd Generator - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2D009	Heat	1 = Alarm	0	x		5			Techsol		Hold Plan
Workshop Space - Hold Deck	DI	Nport	190.1.1.233	FD01GA	2M020	Pull Station (FMM)	1 = Alarm	0	x		6			Techsol		Hold Plan
Workshop Space - Hold Deck	DI	Nport	190.1.1.233	FD01GA	2D022	Smoke	1 = Alarm	0	x		6			Techsol		Hold Plan
Aux. Machinery Space - Hold Deck	DI	Nport	190.1.1.233	FD01GA	2M023	Pull Station (FMM)	1 = Alarm	0	x		6			Techsol		Hold Plan
Aux. Machinery Space - Hold Deck	DI	Nport	190.1.1.233	FD01GA	2D024	Smoke	1 = Alarm	0	x		6			Techsol		Hold Plan

POINT LIST

IFDS (Integrated Fire Detection System)

ISV008, ISV009, ISV010 Inshore Science

[illegible]

SECTION 4

Bill of Materials

Integrated Fire Detection System

BOM (Bill of Material)

ISV009, ISV010

Author:

François Tremblay, ing. jr

Verified by:

Samuel Leclerc, ing. Jr

Date: 2013/02/20 *S.L.*

Canadian Coast Guard

P10-0502-FD, P10-0503-FD

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Tel que mise en marche
As Commissioned

Date: 2013/02/20

	Name	Date of Revision	Description
0	F.T.	21/07/2011	Original Release
1	F.T.	2012-06-20	Replace type of the Freezer detector (CR-135) for a CR-135MP and Add a Cover Page
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TECHSOL INC.

770A, St-Joseph Est
Québec (Québec) G1K 3C3
Tél.: (418) 688-2230 Fax: (418) 688-2233

No COMMANDE DU CLIENT / CUSTOMER ORDER
CCGS Inshore Science Vessel , ISV009 & ISV010

DATE
July 21, 2011

LISTE DE MATÉRIEL / BILL OF MATERIAL

ELEMENT	MANUFACTURIER	NUMERO PIECE	NUMERO DE SERIE	DESCRIPTION	QTÉ	REFERENCE
ITEM	MANUFACTURER	PART NUMBER	SERIAL NUMBER	DESCRIPTION	QTY	REFERENCE
1	Notifier	CPU2-640	N/A	Control Module for NFS-640E	1	See Dwg FDZZAA
2	Notifier	LEM-320	N/A	Loop Expansion Module	1	See Dwg FDZZAA
3	Notifier	CHS-M2	N/A	Rack for CPU-640	1	See Dwg FDZZAA
4	Notifier	DP-DISP2	N/A	Top Slot Plate	1	See Dwg FDZZAA
5	Notifier	SBB-A4	N/A	Size 'A' Enclosure	1	See Dwg FDZZAA
6	Notifier	BP-4	N/A	Battery Cover	1	See Dwg FDZZAA
7	Notifier	DR-A4	N/A	Door, lock and Key	1	See Dwg FDZZAA
8	Notifier	BMP-1	N/A	Side Plate CPU-640 KDM-R2 Display	2	See Dwg FDZZAA
9	Notifier	KDM-R2	N/A	Display 80 char	1	See Dwg FDZZAA
10	Notifier	PE12V18B1	N/A	Battery 12Vdc 18 Amp Hours	2	See Dwg FDZZAA
11	Notifier	KMS-6-24A	N/A	Bell	9	See Dwg Series FD
12	Notifier	WBB-C	N/A	Surface Box for Bell	8	See Dwg Series FD
13	Notifier	MPS-950B	N/A	Manuel Pull Station	15	See Dwg Series FD
14	Notifier	NBS-950	N/A	Manuel Pull Station Base	15	See Dwg Series FD
15	Notifier	P4RHKA B	N/A	Horn & strobe (Outdoor, 4 Wires)	1	See Dwg Series FD
16	Notifier	FSP-851A	N/A	Flashscan Photoelectric Sensor	19	See Dwg Series FD
17	Notifier	FST851RA	N/A	Heat Detector, rate-of-rise, Adres.	8	See Dwg Series FD
18	Notifier	CR-135	N/A	Heat Detector, rate-of-rise,	1	See Dwg Series FD
19	Notifier	B710LPA	N/A	Low Profile Sensor Detector Base	28	See Dwg Series FD
20	Notifier	FMM-101A	N/A	Addressable Module Standard mini	16	See Dwg Series FD



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DATE
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LISTE DE MATÉRIEL / BILL OF MATERIAL

ELEMENT	MANUFACTURIER	NUMERO PIECE	NUMERO DE SERIE	DESCRIPTION	QTÉ	REFERENCE
ITEM	MANUFACTURER	PART NUMBER	SERIAL NUMBER	DESCRIPTION	QTY	REFERENCE
21	Notifier	ISO-XA	N/A	Isolation Module	11	See Dwg Series FD
22	Notifier	FMM-1A	N/A	Addressable module	4	See Dwg Series FD
23	Notifier	FRM-1A	N/A	Addressable Relay module	1	See Dwg Series FD
24	Notifier	FCM-1A	N/A	Addressable Control Module	1	See Dwg Series FD
25	Notifier	LCD-80	N/A	Auxiliary Annunciator Display	1	See Dwg FD01AB
26	Notifier	ABF-1DB	N/A	Auxiliary Annunciator Flush Box	1	See Dwg Series FD
27	Moxa	NPORT 5110A	N/A	RS-232 serial device To TCP/IP	1	See Dwg FDZZAA
28	Releco	C9-A40X-24V	N/A	Relay 24 Vdc 4 Poles	2	See Dwg FDZZAA
29	Releco	S9-M	N/A	Relay Socket	2	See Dwg FDZZAA
30	Panasonic	PM5S-A-24-240V	N/A	Timer	1	See Dwg FDZZAA
31	Federal	450-024-31	N/A	Outdoor Horn 24Vdc	1	See Dwg Series FD
32	Federal	WB	N/A	Siren Weatherproof Backbox	1	See Dwg Series FD
33	Notifier	CR-135MP	N/A	Heat Det., rate-of-rise, Weat. Proof	1	See Dwg Series FD
34						
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SECTION 5

N/A

SECTION 6

N/A

SECTION 6.1

N/A

SECTION 6.2

N/A

SECTION 7
Specifications
(Located on Techsol CD)

SECTION 7.2

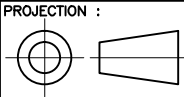
Technical Data Sheets

(Located on Techsol CD)

SECTION 8
Certifications
(Located on Techsol CD)

CE PLAN EST BASÉ SUR LE PLAN NO. 209-028. IL A ÉTÉ DÉVELOPPÉ UNIQUEMENT PAR MERIDIEN MARITIME À DES FINS DE PRODUCTION AVEC LA PERMISSION ÉCRITE DE ROBERT ALLAN LTÉE. ROBERT ALLAN LTÉE N'ASSUME AUCUNE RESPONSABILITÉ QUELLE QU'ELLE SOIT POUR CE PLAN MODIFIÉ. LA PROPRIÉTÉ INTELLECTUELLE DU PLAN CI-DÉCRIT APPARTIENT UNIQUEMENT À ROBERT ALLAN LTÉE ET AU CANADA. IL EST DÉFENDU DE REPRODUIRE LES PLANS ET LES DEVIS, CI-INCLUS, EN ENTIER OU EN PARTIE, OU DE LES PARTAGER AVEC UN TIERS SANS LA PERMISSION ÉCRITE DES PROPRIÉTAIRES.



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11	AS CONSTRUCTED	MM	JAN 2012
10	ADD AUX. GREY WATER TANK 18 AND MODIF FUEL CONSUMPTION DATA	AD	JUNE 2011
9	MOVE TANK 15	AD	JUNE 2011
8	LAYOUT MODIFIED IN RELATION WITH LACK OF SPACE FOR VARIOUS EQUIPMENT & DESIGN OPTIMIZATION.	AD	SEPT 2010
REV.	REVISIONS	BY	DATE
		Garde côtière canadienne Canadian Coast Guard	
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MRO9-1113	DRAWING FILE : ISV25-10130RMM11.DWG	DATE : 31/01/2012	
DRAWN BY :	DRAWING # : 10130	REV : 	SHEET : 1 OF 3

ENGINE DATA/ DONNÉES DES MOTEURS		
MAIN ENGINE/ MOTEUR PRINCIPAL		
MAIN ENGINE MCR/ PUISSANCE MAXIMALE CONTINUE (PMC) DU MOTEUR PRINCIPAL	357	kW
NUMBER OF MAIN ENGINES/ NOMBRE DE MOTEURS PRINCIPAUX	2	
SPECIFIC FUEL CONSUMPTION AT 100% MCR/ CONSOMMATION SPÉCIFIQUE DE CARBURANT À 100% PMC	211.3	g/kW-hr
LUBE OIL CONSUMPTION/ CONSOMMATION D'HUILE DE GRAISSAGE	0.35	g/kW-hr
LUBE OIL SUMP CAPACITY/ CAPACITÉ DU PUISARD D'HUILE DE GRAISSAGE	0.08	m³
GENSET POWER/ PUISSANCE DE LA GÉNÉRATRICE	170	kW
NUMBER OF GENSETS RUNNING/ NOMBRE DE GÉNÉRATRICES EN MARCHÉ	1	
SPECIFIC FUEL CONSUMPTION/ CONSOMMATION SPÉCIFIQUE DE CARBURANT	220	g/kW-hr
LUBE OIL CONSUMPTION/ CONSOMMATION D'HUILE DE GRAISSAGE	0.35	g/kW-hr
LUBE OIL SUMP CAPACITY/ CAPACITÉ DU PUISARD D'HUILE DE GRAISSAGE	0.02	m³
ASSUMED FUEL OIL DENSITY/ DENSITÉ THÉORIQUE DU CARBURANT	870	kg/m³
ASSUMED LUBE OIL DENSITY/ DENSITÉ THÉORIQUE DE L'HUILE DE GRAISSAGE	900	kg/m³
FUEL DAY TANK CAPACITY/ CAPACITÉ DES RÉSERVOIRS JOURNALIERS DE CARBURANT		
MAIN ENGINE/ MOTEUR PRINCIPAL		
AVERAGE POWER FACTOR/ MOYENNE DU FACTEUR DE PUISSANCE	0.85	MCR/ PMC
MAIN ENGINE SPECIFIC FUEL CONSUMPTION/ CONSOMMATION SPÉCIFIQUE DE CARBURANT DES MOTEURS PRINCIPAUX	211.3	g/kW-hr
MAIN ENGINE FUEL CONSUMPTION/ CONSOMMATION DE CARBURANT DES MOTEURS PRINCIPAUX	0.0899	m³/hr
REQUIRED RUNNING HOURS/ NOMBRES D'HEURES DE FONCTIONNEMENT REQUISES	24	hrs
REQUIRED CAPACITY IN DAY TANK/ CAPACITÉ REQUISE DES RÉSERVOIRS JOURNALIERS	2.158	m³
GENSET/ GÉNÉRATRICE		
AVERAGE POWER FACTOR/ MOYENNE DE FACTEUR DE PUISSANCE	0.85	
GENSET SPECIFIC FUEL CONSUMPTION/ CONSOMMATION SPÉCIFIQUE DE CARBURANT DES GÉNÉRATRICES	229.83	g/kW-hr
GENSET FUEL CONSUMPTION/ CONSOMMATION DE CARBURANT DES GÉNÉRATRICES	0.04	m³/hr
REQUIRED RUNNING HOURS/ NOMBRES D'HEURES DE FONCTIONNEMENT REQUISES	24	hrs
REQUIRED CAPACITY IN DAY TANK/ CAPACITÉ REQUISE DES RÉSERVOIRS JOURNALIERS	0.88	m³
MINIMUM CAPACITY PER DAY TANK/ CAPACITÉ MINIMUM POUR CHAQUE RÉSERVOIR JOURNALIER		
REQUIRED CAPACITY PER DAY TANK/ CAPACITÉ REQUISE POUR CHAQUE RÉSERVOIR JOURNALIER	3.038	m³
CAPACITY OF DAY TANK PROVIDED/ CAPACITÉ FOURNIE DE CHAQUE RÉSERVOIR JOURNALIER	2.85	m³
LUBE OIL TANK CAPACITY/ CAPACITÉ DES RÉSERVOIRS D'HUILE DE GRAISSAGE		
REQUIRED ENDURANCE PERIOD/ AUTONOMIE REQUISE	14	days/jours
	336	hrs
MAIN ENGINE AVERAGE POWER FACTOR/ MOYENNE DU FACTEUR DE PUISSANCE DES MOTEURS PRINCIPAUX	0.85	MCR/ PMC
GENSET AVERAGE POWER FACTOR/ MOYENNE DU FACTEUR DE PUISSANCE DES GÉNÉRATRICES	0.85	MCR/ PMC
SINGLE MAIN ENGINE LUBE OIL CONSUMPTION/ CONSOMMATION D'HUILE DE GRAISSAGE DE CHAQUE MOTEUR PRINCIPAL	0.04	m³
MAIN ENGINE LUBE OIL CONSUMPTION/ CONSOMMATION TOTALE D'HUILE DE GRAISSAGE DES MOTEURS PRINCIPAUX	0.08	m³
GENSET LUBE OIL CONSUMPTION/ CONSOMMATION TOTALE D'HUILE DE GRAISSAGE DES GÉNÉRATRICES	0.02	m³
NUMBER OF MAIN ENGINE LUBE OIL CHANGES/ NOMBRE DE CHANGEMENT D'HUILE DE GRAISSAGE DES MOTEURS PRINCIPAUX	2	
NUMBER OF GENSET LUBE OIL CHANGES/ NOMBRE DE CHANGEMENT D'HUILE DE GRAISSAGE DES GÉNÉRATRICES	2	
LUBE OIL FOR SINGLE MAIN ENGINE CHANGE/ VOLUME D'HUILE DE GRAISSAGE REQUIS POUR UNE VIDANGE DU MOTEUR PRINCIPAL	0.08	m³
LUBE OIL FOR SINGLE GENSET CHANGE/ VOLUME D'HUILE DE GRAISSAGE REQUIS POUR UNE VIDANGE DE LA GÉNÉRATRICE	0.02	m³
MINIMUM RECOMMENDED USED OIL CAPACITY/ CAPACITÉ MINIMUM RECOMMANDÉE DU RÉSERVOIR D'HUILE USÉE	0.20	m³
CAPACITY OF USED OIL TANK PROVIDED/ CAPACITÉ FOURNIE DU RÉSERVOIR D'HUILE USÉE	0.30	m³
MINIMUM RECOMMENDED LUBE OIL CAPACITY/ CAPACITÉ MINIMUM RECOMMANDÉE DU RÉSERVOIR D'HUILE DE GRAISSAGE	0.30	m³
CAPACITY OF LUBE OIL TANK PROVIDED/ CAPACITÉ FOURNIE DU RÉSERVOIR D'HUILE DE GRAISSAGE	0.30	m³
FUEL OVERFLOW TANK CAPACITY/ CAPACITÉ DU RÉSERVOIR DE DÉBORDEMENT DE CARBURANT		
GUIDELINE/ DIRECTIVE: MARPOL 73,78		
FUEL OIL TRANSFER PUMP CAPACITY/ CAPACITÉ DE LA POMPE DE TRANSFERT DE CARBURANT	5	m³/hr
PUMP OVERFLOW TIME/ TEMPS DE DÉBORDEMENT DE LA POMPE	10	min.
RECOMMENDED FUEL OVERFLOW TANK CAPACITY/ CAPACITÉ RECOMMANDÉE DU RÉSERVOIR DE DÉBORDEMENT DE CARBURANT	0.8	m³
CAPACITY OF OVERFLOW TANK PROVIDED/ CAPACITÉ FOURNIE DU RÉSERVOIR DE DÉBORDEMENT DE CARBURANT	0.97	m³

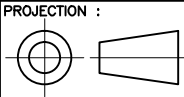
FUEL TANK CAPACITIES/ CAPACITÉS DES RÉSERVOIRS DE CARBURANT			
TANK/ RÉSERVOIR	DESCRIPTION	POSITION FRAME/COUPLE	CAPACITY/ CAPACITÉ AT/A 98% (m³)
3	DOUBLE BOTTOM TANK, CL./ RÉSERVOIR AXIAL À DOUBLE FOND	15 – 21	12.75
9P	WING TANK, PORT./ RÉSERVOIR LATÉRAL, BÂBORD	8 – 14	11.55
9S	WING TANK, STBD./ RÉSERVOIR LATÉRAL, TRIBORD	8 – 14	9.50
10P	DAY TANK, WING TANK, PORT./ RÉSERVOIR LATÉRAL JOURNALIER, BÂBORD	12 – 14	2.95
10S	DAY TANK, WING TANK, STBD./ RÉSERVOIR LATÉRAL JOURNALIER, TRIBORD	10.5 – 12	2.25
		TOTAL	38.00
MISCELLANEOUS TANK CAPACITIES/ CAPACITÉS DE RÉSERVOIRS DIVERS			
TANK/ RÉSERVOIR	DESCRIPTION	POSITION FRAME/COUPLE	CAPACITY/ CAPACITÉ AT/A 98% (m³)
2P	BLACK WATER, LOOSE TANK, PORT./ RÉSERVOIR NON-FIXÉ D'EAUX-VANNES, BÂBORD	21 – 24	1.08
2S	BLACK WATER, LOOSE TANK, PORT./ RÉSERVOIR NON-FIXÉ D'EAUX-VANNES, TRIBORD	21 – 24	1.08
4	OILY WATER, DB TANK, CL./ RÉSERVOIR AXIAL À DOUBLE FOND D'EAU MÉLANGÉE AUX HYDROCARBURES	14 – 15.5	1.80
5	SLUDGE, LOOSE TANK, STBD./ RÉSERVOIR NON-FIXÉ DES BOUES DE MOTEUR, TRIBORD	14 – 16.5	0.45
6P	GREY WATER, DB TANK, PORT./ RÉSERVOIR À DOUBLE FOND D'EAUX GRISES, BÂBORD	26 – 29	3.30
6S	GREY WATER, DB TANK, STBD./ RÉSERVOIR À DOUBLE FOND D'EAUX GRISES, TRIBORD	26 – 29	3.30
8	FO OVERFLOW/ RÉSERVOIR DE DÉBORDEMENT DE MAZOUT	12 – 14	0.97
13	LUBE OIL, LOOSE TANK, STBD./ RÉSERVOIR NON-FIXÉ D'HUILE DE GRAISSAGE, TRIBORD	C – D	0.33
14	USED OIL, LOOSE TANK, PORT./ RÉSERVOIR NON-FIXÉ D'HUILE USAGÉE, BÂBORD	C – D	0.33
15	HYDRAULIC OIL, LOOSE TANK PORT./ RÉSERVOIR NON-FIXÉ D'HUILE HYDRAULIQUE, BÂBORD	15 – 17	0.33
16	DECK EQUIP. EHPU HYDRAULIC TANK / RÉSERVOIR D'HUILE HYDRAULIQUE, ÉQUIPEMENT DE PONT	12 – 14	0.38
17	FISH. GEAR EHPU HYDRAULIC TANK / RÉSERVOIR D'HUILE HYDRAULIQUE, ÉQUIPEMENT DE PÊCHE	12 – 14	1.45
18	AUX. GREY WATER TANK / RÉSERVOIR AUX. D'EAUX GRISES	27 – 28	0.038
FRESH WATER TANK CAPACITIES/ CAPACITÉS DES RÉSERVOIRS D'EAU POTABLE			
TANK/ RÉSERVOIR	DESCRIPTION	POSITION FRAME/COUPLE	CAPACITY/ CAPACITÉ AT/A 98% (m³)
11P	LOOSE TANK, PORT/ RÉSERVOIR NON-FIXÉ, BÂBORD	4 – 8	3.1
11S	LOOSE TANK, STBD./ RÉSERVOIR NON-FIXÉ, TRIBORD	4 – 8	3.1
		TOTAL	6.2
WATER BALLAST TANK CAPACITIES/ CAPACITÉS DES RÉSERVOIRS DE BALLAST D'EAU			
TANK/ RÉSERVOIR	DESCRIPTION	POSITION FRAME/COUPLE	CAPACITY/ CAPACITÉ AT/A 98% (m³)
1	FORE PEAK TANK, CL./ RÉSERVOIR AXIAL DU COQUERON AVANT	32 – 35	6.80
12P	AFT PEAK, WING TANK, PORT./ RÉSERVOIR LATÉRAL DU PIC ARRIÈRE, BÂBORD	0 – 4	5.60
12S	AFT PEAK, WING TANK, STBD./ RÉSERVOIR LATÉRAL DU PIC ARRIÈRE, TRIBORD	0 – 4	5.60
		TOTAL	18.0

		Garde côtière canadienne Canadian Coast Guard	
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV25-10130RMM11.DWG	DATE : 31/01/2012	
DRAWN BY :	DRAWING # : 10130	REV : 	SHEET : 2 OF 3

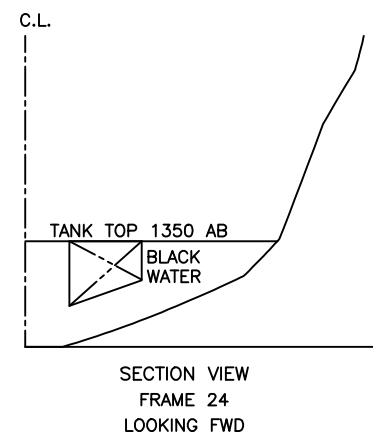
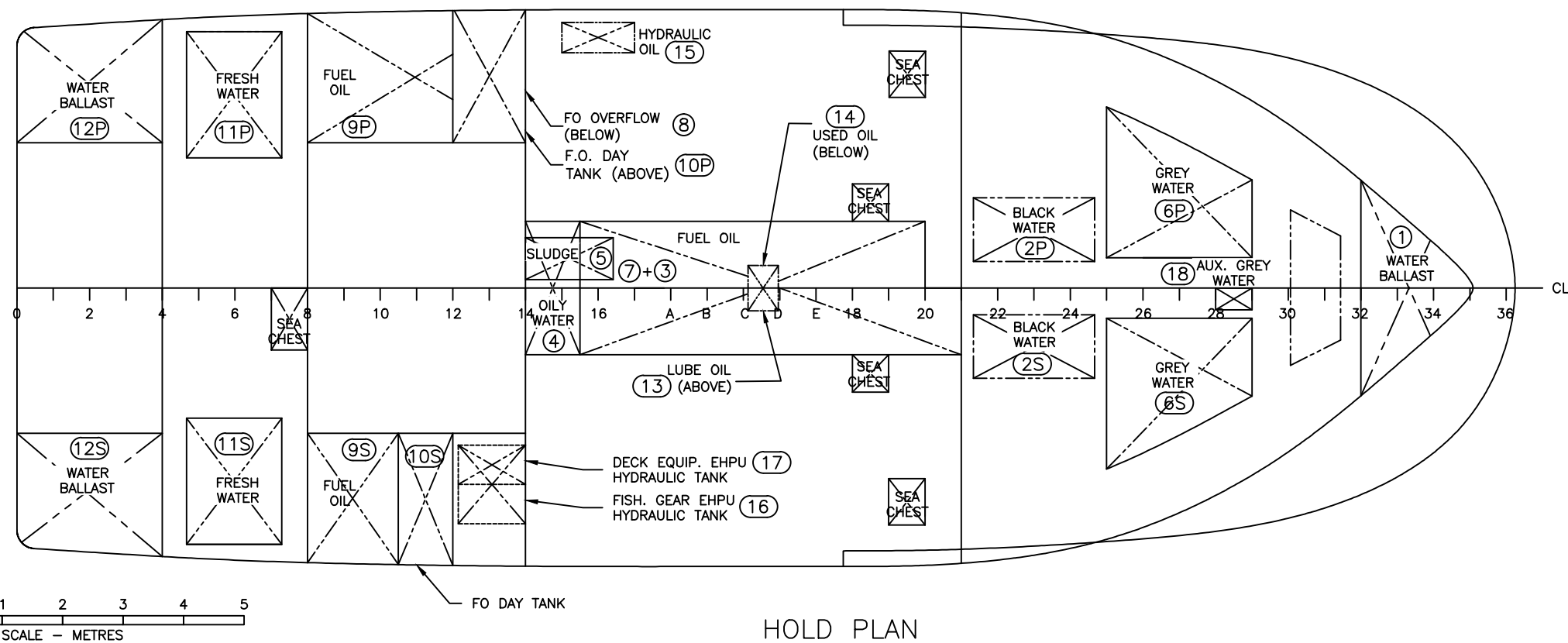
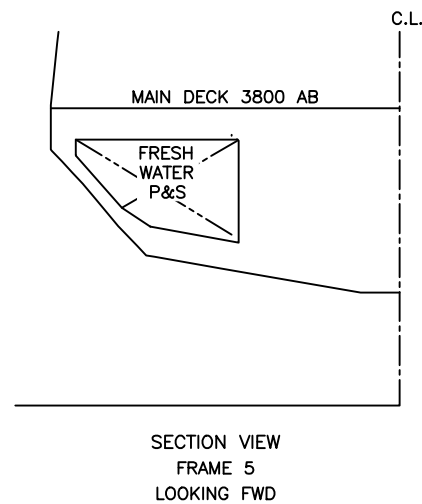
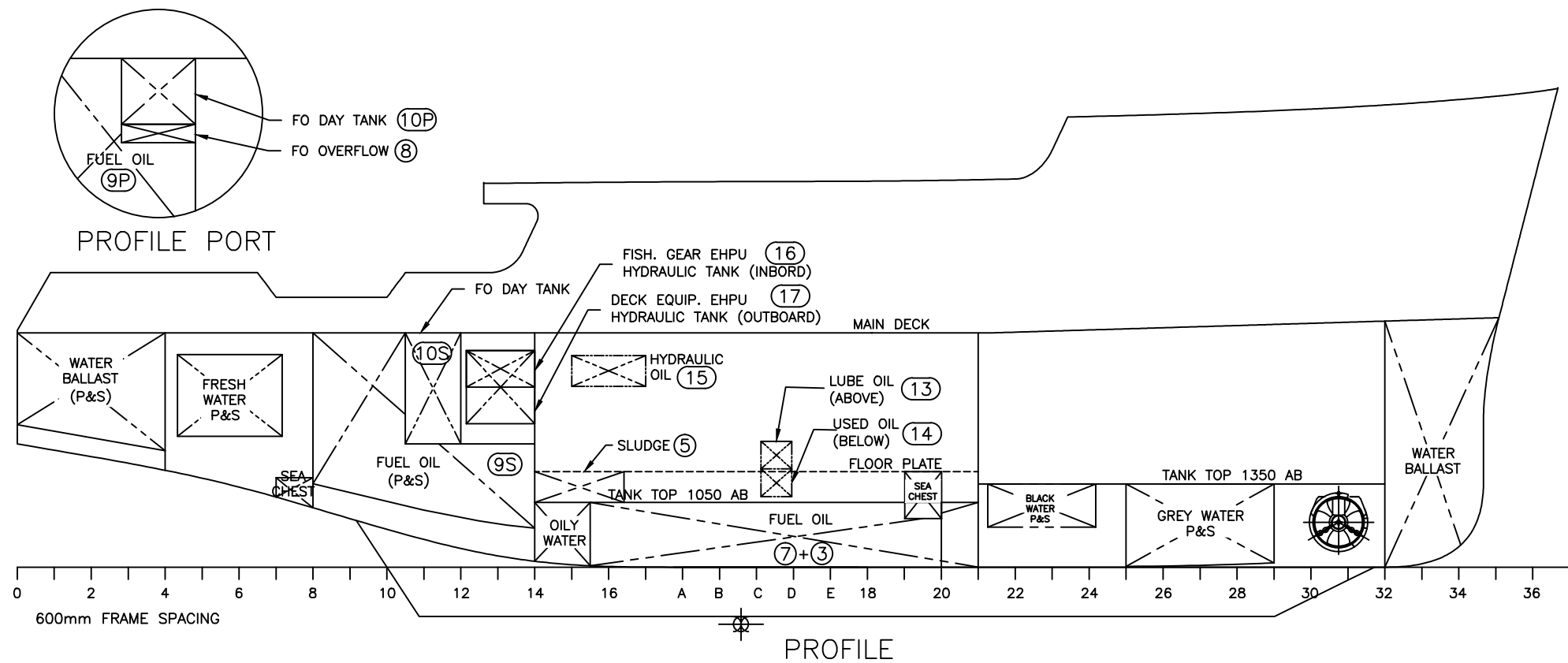


COMPANY : MÉRIDIEN MARITIME RÉPARATION	TITLE : TANK PLAN – 25M
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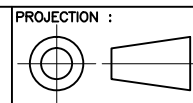
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DRAWN BY : MR09-1113		DRAWING FILE : ISV25-10130RMM11.DWG	
DATE : 31/01/2012		SHEET : 3 OF 3	



COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
TANK PLAN - 25M

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PROJECTION :



NOTES:

1. IN ADDITION TO CENTER LINE BLOCKS, PROVIDE SUFFICIENT TRANSVERSE SUPPORT AT THE BILGE TO COUNTER HEELING LOADS.
2. BUILDER TO UPDATE THIS DRAWING TO INCLUDE NUMBER, TYPE AND LOCATION OF ALL HULL FITTINGS AND EQUIPMENT, INCLUDING TRANSDUCERS, O/B DISCHARGES, SEA CHESTS, DOCKING PLUGS AND SACRIFICIAL ANODES.
3. BUILDER TO UPDATE THIS DRAWING TO SHOW THE LIGHT SHIP WATERLINE AS VERIFIED BY THE VESSELS INCLINING.
4. BUILDER TO UPDATE THIS DRAWING TO SHOW HULL DIMENSIONS AS VERIFIED BY THE VESSELS FINAL HULL FORM.

NOTES:

1. EN PLUS DES BLOCS AXIAUX, FOURNIR UN RENFORCEMENT TRANSVERSAL ADÉQUAT AU NIVEAU DE LA CALE AFIN DE CONTRER LES CHARGES DE GITE.
2. LE CONSTRUCTEUR DEVRA METTRE À JOUR CE PLAN AFIN D'INCLURE LE NOMBRE, LE TYPE, ET LA POSITION DE TOUTES LES PIÈCES DE FIXATIONS ET ÉQUIPEMENTS, INCLUANT LES TRANSDUCTEURS, LES REFOULEMENTS À LA MER, LES PRISES D'EAU À LA MER, LES PRISES DE QUAI, ET LES ANODES SACRIFICIELLES.
3. LE CONSTRUCTEUR DEVRA METTRE À JOUR CE PLAN AFIN D'INCLURE LA LIGNE DE FLOTTAISON DE DÉPLACEMENT LÈGE RÉELLE VÉRIFIÉE LORS DE L'ESSAI D'INCLINAISON.
4. LE CONSTRUCTEUR DEVRA METTRE À JOUR CE PLAN AFIN D'INCLURE LES DIMENSIONS RÉELLES ET VÉRIFIÉES DE LA COQUE.

CE PLAN EST BASÉ SUR LE PLAN NO. 209-028. IL A ÉTÉ DÉVELOPPÉ UNIQUEMENT PAR MERIDIEN MARITIME À DES FINS DE PRODUCTION AVEC LA PERMISSION ÉCRITE DE ROBERT ALLAN LTÉE. ROBERT ALLAN LTÉE N'ASSUME AUCUNE RESPONSABILITÉ QUELLE QU'ELLE SOIT POUR CE PLAN MODIFIÉ. LA PROPRIÉTÉ INTELLECTUELLE DU PLAN CI-DÉCRIT APPARTIENT UNIQUEMENT À ROBERT ALLAN LTÉE ET AU CANADA. IL EST DÉFENDU DE REPRODUIRE LES PLANS ET LES DEVIS, CI-INCLUS, EN ENTIER OU EN PARTIE, OU DE LES PARTAGER AVEC UN TIERS SANS LA PERMISSION ÉCRITE DES PROPRIÉTAIRES.



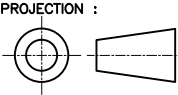
COMPANY :



MÉRIDIEN MARITIME
RÉPARATION

TITLE :

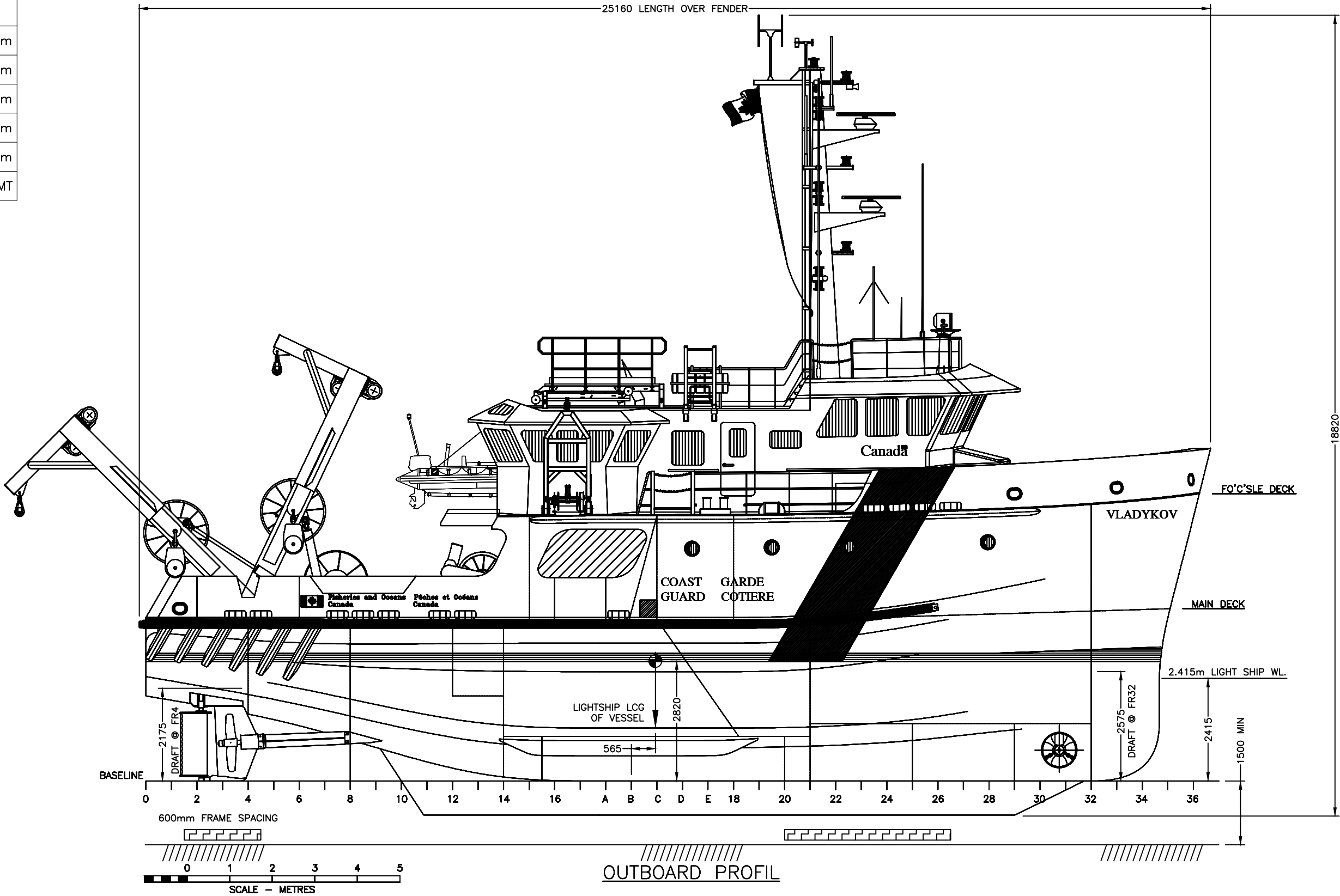
DOCKING PLAN – 25M

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3	AS CONSTRUCTED	MM	JAN 2012
REV.	REVISIONS	BY	DATE
	Garde côtière canadienne Canadian Coast Guard		
NAVIRE 25M VESSEL COQUE # / HULL # 008	PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels		
PROJECT # : MRO9-1113	DRAWING FILE : ISV25-14110RMM3.DWG	DATE : 31/01/2012	
DRAWN BY :	DRAWING # : 14110	REV : 	SHEET : 1 OF 4

GENERAL PARTICULARS:	
LENGTH OVERALL	25.0 m
BEAM, MOULDED	9.2 m
BEAM, EXTREME	9.5 m
DEPTH, MOULDED	3.8 m
DRAFT, NAVIGATIONAL	3.6 m
LIGHTSHIP DISPLACEMENT	259.5 MT



Garde côtière canadienne
Canadian Coast Guard

NAVIRE 25M VESSEL
COQUE # / HULL #
008

PROJECT TITLE :
Navire semi-hauturier de recherche halieutique
Near Shore Fisheries Research Vessels

PROJECT # :
MR09-1113

DRAWING FILE :
ISV25-14110RMM3.DWG

DATE :
31/01/2012

DRAWN BY :

DRAWING # :
14110

REV :
3

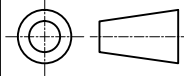
SHEET :
2 OF 4

COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
DOCKING PLAN - 25M

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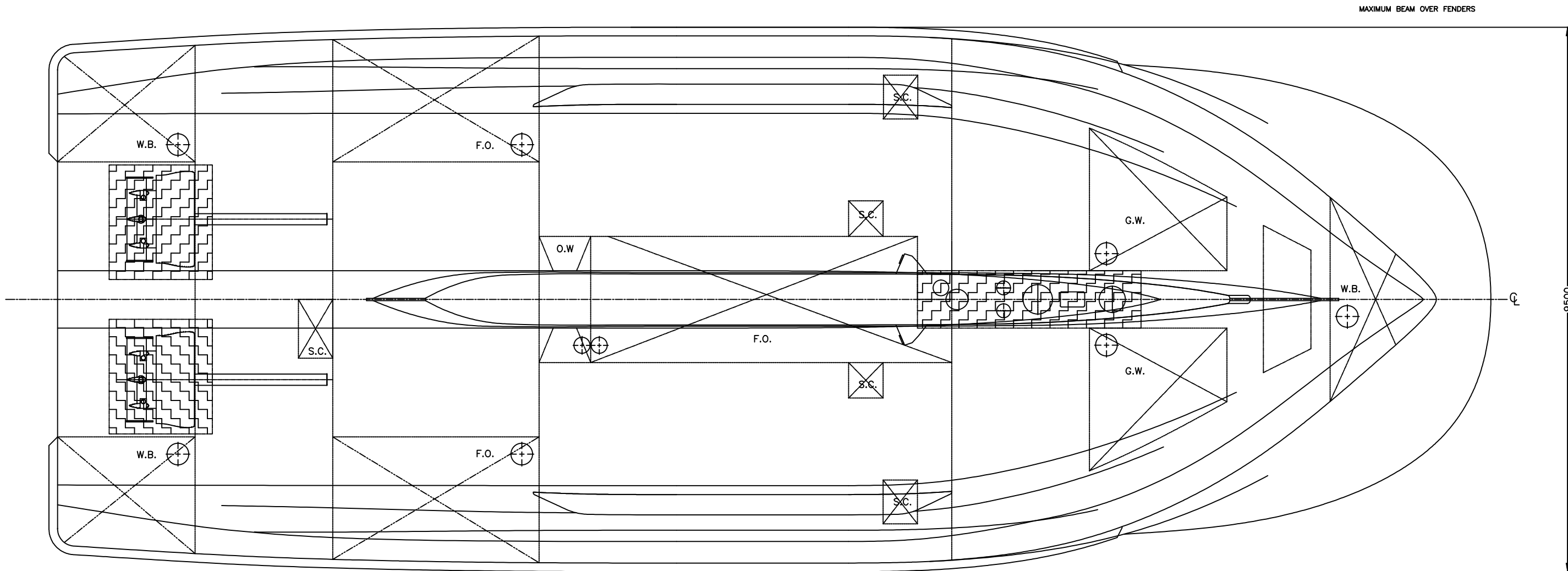




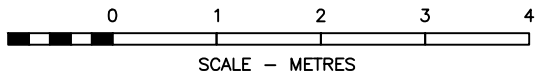
—NO BLOCKING AREA



—DOCKING PLUG NOMINAL LOCATION
BUILDER TO FINALIZE LOCATIONS TO MATCH AS BUILT VESSEL.



BOTTOM PLAN



Garde côtière canadienne
Canadian Coast Guard

NAVIRE 25M VESSEL
COQUE # / HULL #
008

PROJECT TITLE :
Navire semi-hauturier de recherche halieutique
Near Shore Fisheries Research Vessels

PROJECT # :
MR09-1113

DRAWING FILE :
ISV25-14110RMM3.DWG

DATE :
31/01/2012

DRAWN BY :

DRAWING # :
14110

REV :
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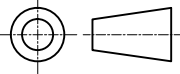
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3 OF 4

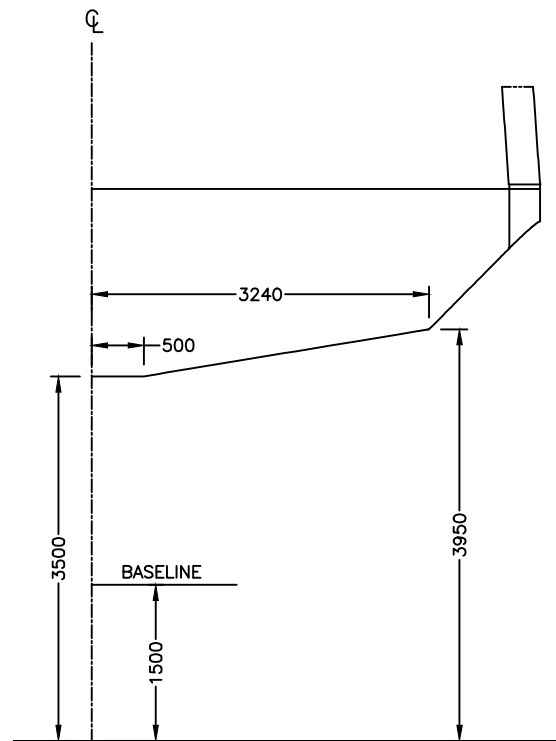
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MÉRIDIEN MARITIME
RÉPARATION

TITLE :
DOCKING PLAN - 25M

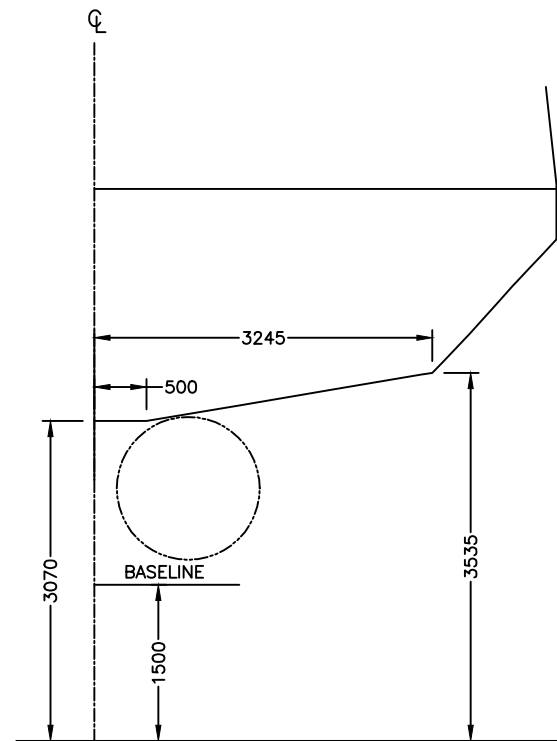
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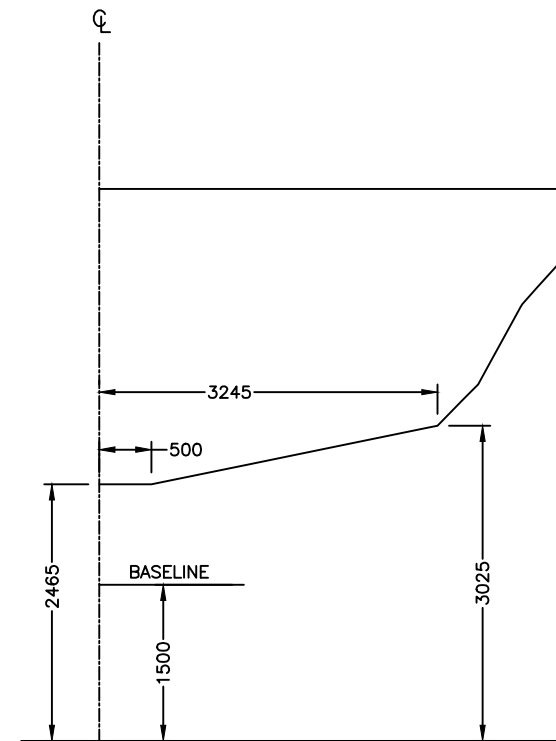




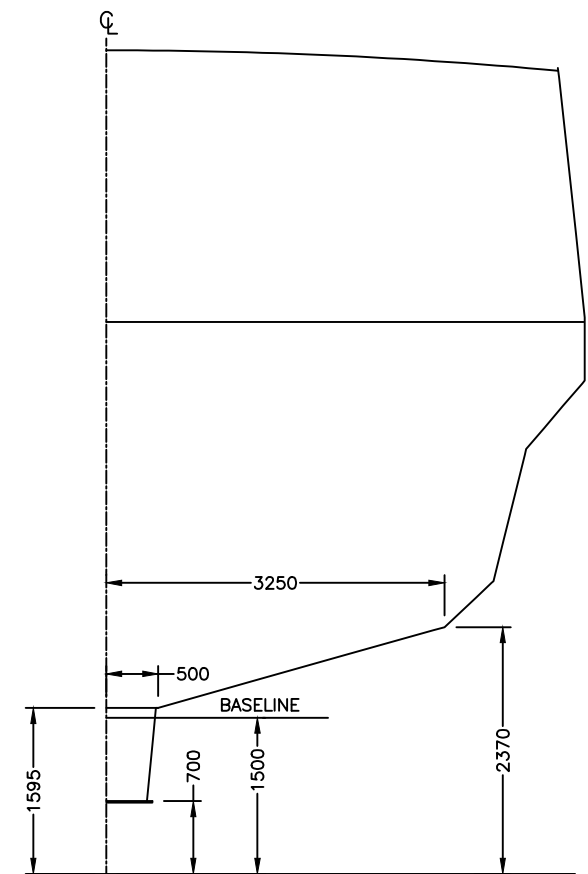
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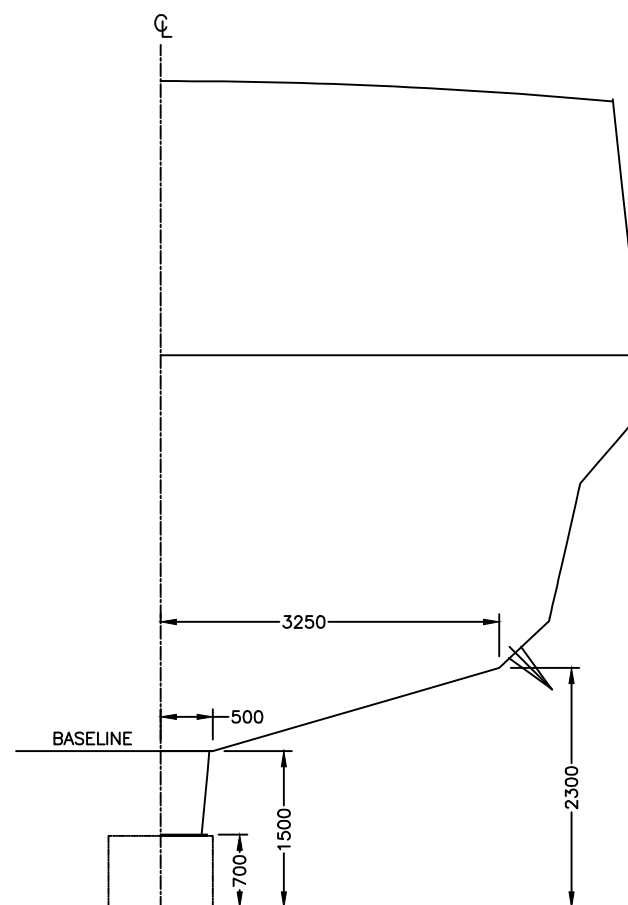
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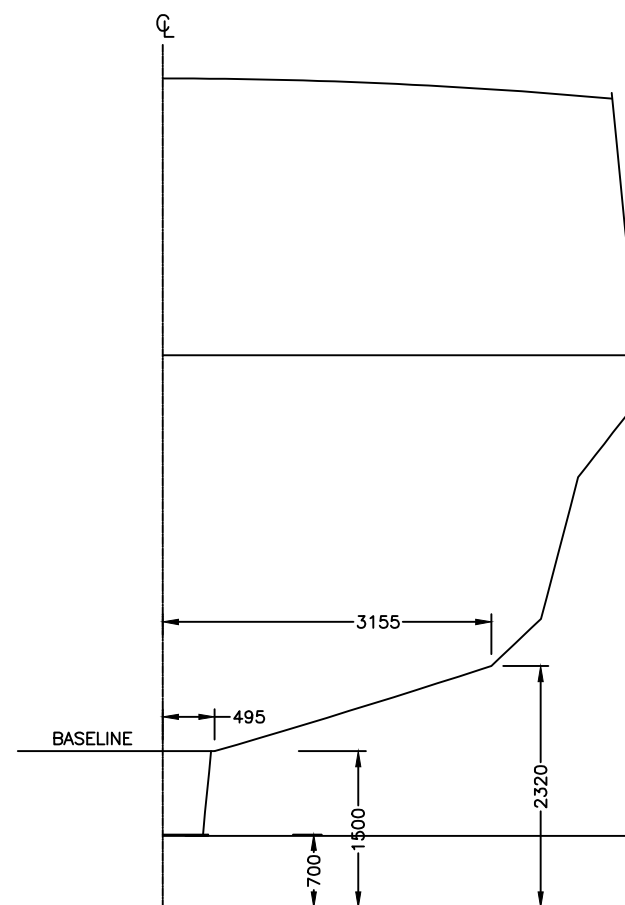
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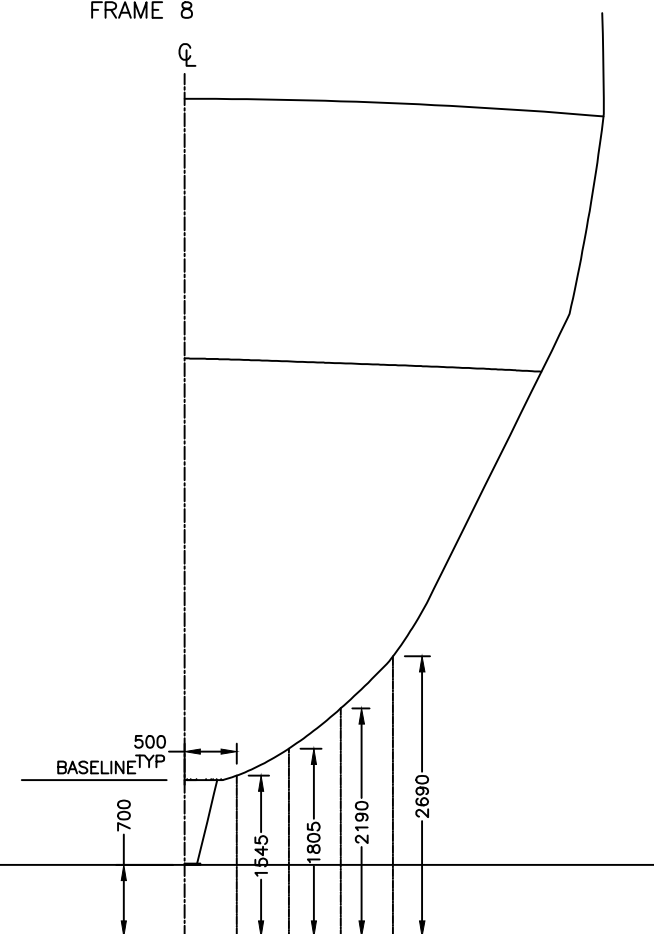
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FRAME "A" TO 18

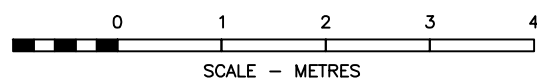


FRAME 21



FRAME 28

* ALL DIMENSIONS ARE MOLDED
BUILDER TO VERIFY ALL DIMENSIONS WITH THE
FINAL LOFTED HULL FORM.



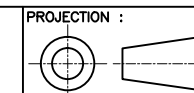
SCALE - METRES

		Garde côtière canadienne Canadian Coast Guard	
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # :	DRAWING FILE :	DATE :	
MR09-1113	ISV25-14110RMM3.DWG	31/01/2012	
DRAWN BY :	DRAWING # :	REV :	SHEET :
	14110	3	4 OF 4

COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
DOCKING PLAN - 25M

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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SPECIFIED
2. REFERENCE DRAWINGS: 21210 "SKEG STRUCTURE" AND 21010 "STRUCTURAL ARRANGEMENT"
3. REFER TO THE TRANSDUCER MANUFACTURER DOCUMENTS FOR MOUNTING DETAILS AND INSTRUCTIONS
4. FINALIZE ALL TRANSDUCER DIMENSIONS AND MOUNTING METHODS WITH SUPPLIER INFORMATION OF THE PURCHASED EQUIPMENT.
5. INSTALL ALL TRANSDUCERS FLUSH WITH BOTTOM OF SKEG SHOE AND FILL ALL GAPS WITH SUITABLE SEALANT TO MINIMIZE BUBBLE PROPAGATION WHERE POSSIBLE.
6. FINALIZE ALL TRANSDUCER LOCATIONS WITH FINAL LOFTED HULL FORM AND SKEG SHAPE.
7. MAINTAIN WATERTIGHT SEAL BETWEEN SKEG AND HULL FORM. PROVIDE SUITABLE GLAND NUTS FOR ALL CABLE PENETRATIONS THROUGH KEEL PLATE.
8. WHERE IT IS NECESSARY TO CUT KEEL PLATE STRUCTURE IN WAY OF TRACKLINK 1500 TRANSDUCER, FIT COAMINGS WITH GLAND NUT TO ENSURE WATERTIGHT SEAL IS MANTAINED.

FOR ACOUSTIC DOPPLER CURRENT PROFILER (ADCP):

9. SECURE WELL CAP WITH EQUALLY SPACED STAINLESS STEEL BOLTS, WASHERS AND NYLOK NUTS.
10. SECURE ACOUSTIC WINDOW AND RETAINING RING WITH EQUALLY SPACED STAINLESS STEEL FLAT HEAD MACHINE SCREWS FLUSH MOUNTED WITH SKEG SHOE.
11. SECURE ADCP TO ADCP MOUNTING PLATE WITH EQUALLY SPACED STAINLESS STEEL BOLTS WASHERS AND NYLOK NUTS.
12. SECURE ADCP MOUNTING PLATE TO TRANSDUCER WELL USING EQUALLY SPACED STAINLESS STEEL FLAT HEAD MACHINE SCREWS.
13. PROVIDE 10mm THICK SOUND ABSORBING MATERIAL, NEOPRENE OR EQUAL, ON ALL INNER WELL STEEL SURFACES BELOW THE ADCP MOUNTING PLATE.
14. PROVIDE REMOVABLE SILICON–RUBBER GASKET OR O–RING TYPE BETWEEN WELL CAP, ACOUSTIC WINDOW AND TRANSDUCER WELL, SUITABLE FOR THE INTENDED ENVIRONMENTAL CONDITIONS.
15. PROVIDE REMOVABLE SILICON–RUBBER GASKET FOR ELECTRONIC ISOLATION BETWEEN THE ADCP AND WELL.
16. FILL ALL GAPS WITH SUITABLE SEALANT TO ACHIEVE SMOOTH BOTTOM SURFACE.
17. PROVIDE WATERTIGHT GLAND NUT ON ADCP WELL CAP SUITABLE FOR ENVIRONMENTAL CONDITIONS.
18. PROVIDE VENT AND FILL PIPES, WITH VALVES, TO DRY LAB SPACE TERMINATING AT LEAST 2 METRES ABOVE WATERLINE. REFER TO DRAWING 70500 FILL, VENT AND SOUNDING.
19. FILL TRANSDUCER WELL WITH FRESH WATER/GLYCOL SOLUTION TO ADCP MANUFACTURER’S RECOMMENDATION.

NOTES:

1. TOUTES LES DIMENSIONS SONT EN MILLIMÈTRE, À MOINS D’AVIS CONTRAIRE.
2. SE REPORTER ÉGALEMENT AUX PLANS SUIVANTS: 21210 "SKEG STRUCTURE", ET 21010 "STRUCTURAL ARRANGEMENT"
3. POUR LES DÉTAILS ET LES INSTRUCTIONS DE MONTAGE, CONSULTER LES DOCUMENTS DU FABRICANT DU TRANSDUCTEUR.
4. FINALISER LES DIMENSIONS ET LES MÉTHODES DE MONTAGE DU TRANSDUCTEUR SELON L’INFORMATION DU FABRICANT DES PIÈCES ACQUISES.
5. INSTALLER LES TRANSDUCTEURS À PLAT AVEC LE TALON DE CROSSE ET REMPLIR LES ESPACES D’UN MASTIC DE SCELLEMENT AFIN DE MINIMISER LA PROPAGATION DE BULLES D’AIR.
6. FINALISER L’EMPLACEMENT DES TRANSDUCTEURS SELON LE TRACÉ FINAL DE LA COQUE ET LA FORME DE LA CROSSE.
7. ASSURER UNE ÉTANCHÉITÉ ENTRE LA CROSSE ET LA COQUE. FOURNIR DES ÉCROUS LIBRES À TOUT LES LIEUX DE PÉNÉTRATION DES CÂBLES AU NIVEAU DU BORDÉ DE QUILLE.
8. AFIN DE MAINTENIR L’ÉTANCHÉITÉ, INSTALLER DES ÉCROUS LIBRES AUX HILOIRES LORSQU’IL EST NÉCESSAIRE DE COUPER LE BORDÉ DE QUILLE À LA HAUTEUR DU TRACKLINK 1500 DU TRANSDUCTEUR.



POUR LE PROFILEUR DE COURANT À EFFET DOPPLER (PCED):

9. FIXER SOLIDEMENT LE BOUCHON DES PUIITS AVEC DES BOULONS, ÉCROUS (NYLOK), ET RONDELLES ÉQUIDISTANTS EN ACIER INOXYDABLE.
10. FIXER SOLIDEMENT LA FENÊTRE ACOUSTIQUE ET L’ANNEAU DE RETENUE AVEC DES VIS À MÉTAUX À TÊTE PLATE ÉQUIDISTANTES EN ACIER INOXYDABLE. ASSURER QUE LA TÊTE DES VIS SOIENT À PLAT AVEC LE TALON DE CROSSE.
11. FIXER SOLIDEMENT LE PCED À LA PLAQUE DE MONTAGE DU PCED AVEC DES BOULONS, ÉCROUS (NYLOK), ET RONDELLES ÉQUIDISTANTS EN ACIER INOXYDABLE.
12. FIXER LA PLAQUE DE MONTAGE DU PCED AU PUIITS DU TRANSDUCTEUR AVEC DES VIS À MÉTAUX À TÊTE PLATE ÉQUIDISTANTES EN ACIER INOXYDABLE.
13. FOURNIR UN MATÉRIAU D’ISOLATION ACOUSTIQUE DE 10mm, NÉOPRÈNE OU ÉQUIVALENT, SUR TOUTES LES SURFACES EN ACIER INTERNES DU PUIITS SITUÉES SOUS LA PLAQUE DE MONTAGE DU PCED.
14. FOURNIR DES JOINTS D’ÉTANCHÉITÉ AMOVIBLES EN CAOUTCHOUC–SILICIUM OU DE TYPE TORIQUE ENTRE LE BOUCHON DU PUIITS, LA FENÊTRE ACOUSTIQUE, ET LE PUIITS DU TRANSDUCTEUR. LES JOINTS DOIVENT ÊTRE ADAPTÉS AUX CONDITIONS ATMOSPHÉRIQUES DU NAVIRES.
15. FOURNIR DES JOINTS D’ÉTANCHÉITÉ AMOVIBLES EN CAOUTCHOUC–SILICIUM POUR L’ISOLATION ÉLECTRONIQUE ENTRE LE PCED ET LE PUIITS.
16. REMPLIR LES ESPACES D’UN MASTIC DE SCELLEMENT AFIN D’OBTENIR UNE SURFACE INTÉRIEURE LISSE.
17. FOURNIR UN ÉCROU LIBRE ÉTANCHE SUR LE PUIITS DU PCED ADAPTÉ AUX CONDITIONS ATMOSPHÉRIQUES DU NAVIRE.
18. FOURNIR DES PRISES D’AIR ET DES TUYAUX DE REMPLISSAGE AVEC VANNES DANS LE LABORATOIRE SEC PRENANT FIN AU MOINS 2 MÈTRES AU–DESSUS DE LA LIGNE DE FLOTTAISON. CONSULTER LE PLAN: 70500 FILL, VENT AND SOUNDING.
19. REMPLIR LE PUIITS DU TRANSDUCTEUR D’UNE SOLUTION EAU DOUCE/GLYCOL D’APRÈS LES RECOMMANDATIONS DU FABRICANT.

TRANSDUCERS/ TRANSDUCTEURS

LABEL/ ÉTIQUETTE	MANUFACTURER/ FABRICANT	MODEL/ MODÈLE	FREQUENCY/ FRÉQUENCE
SH90	Simrad	SH90	116 kHz
120kHz	Simrad	ES120–7C	120 kHz
TL	LinkQuest Inc.	TrackLink 1500 HA	31–42.3 kHz
38kHz	Simrad	38–7	38 kHz
WASSP	Electronic Navigation Ltd	WASSP	160 kHz
ADCP	RD Instruments	Ocean Surveyor	150 kHz
200kHz	Simrad	ES200–7	200kHz
H4	Marport	H4 B30X50	38.9–46.3 kHz

CE PLAN EST BASÉ SUR LE PLAN NO. 209–028. IL A ÉTÉ DÉVELOPPÉ UNIQUEMENT PAR MERIDIEN MARITIME À DES FINS DE PRODUCTION AVEC LA PERMISSION ÉCRITE DE ROBERT ALLAN LTÉE. ROBERT ALLAN LTÉE N’ASSUME AUCUNE RESPONSABILITÉ QUELLE QU’ELLE SOIT POUR CE PLAN MODIFIÉ. LA PROPRIÉTÉ INTELLECTUELLE DU PLAN CI–DÉCRIT APPARTIENT UNIQUEMENT À ROBERT ALLAN LTÉE ET AU CANADA. IL EST DÉFENDU DE REPRODUIRE LES PLANS ET LES DEVIS, CI–INCLUS, EN ENTIER OU EN PARTIE, OU DE LES PARTAGER AVEC UN TIERS SANS LA PERMISSION ÉCRITE DES PROPRIÉTAIRES.

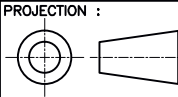
6	AS CONSTRUCTED	MM	JAN 2012
5	Appendices amendment for hydrophone Marport	MV	FEB 2011
4	<u>Transducer displacement</u> –Arrangement conflicts between SH90 and stairway –H4 moved due to have a better scan	AT	DEC 2010
REV.	REVISIONS	BY	DATE
	Garde côtière canadienne Canadian Coast Guard		
NAVIRE 25M VESSEL COQUE # / HULL # 008	PROJECT TITLE : Navire semi–hauturier de recherche halieutique Near Shore Fisheries Research Vessels		
PROJECT # : MR09–1113	DRAWING FILE : ISV25–21260RMM6.DWG	DATE : 31/01/2012	
DRAWN BY :	DRAWING # : 21260	REV : 	SHEET : 1 OF 11



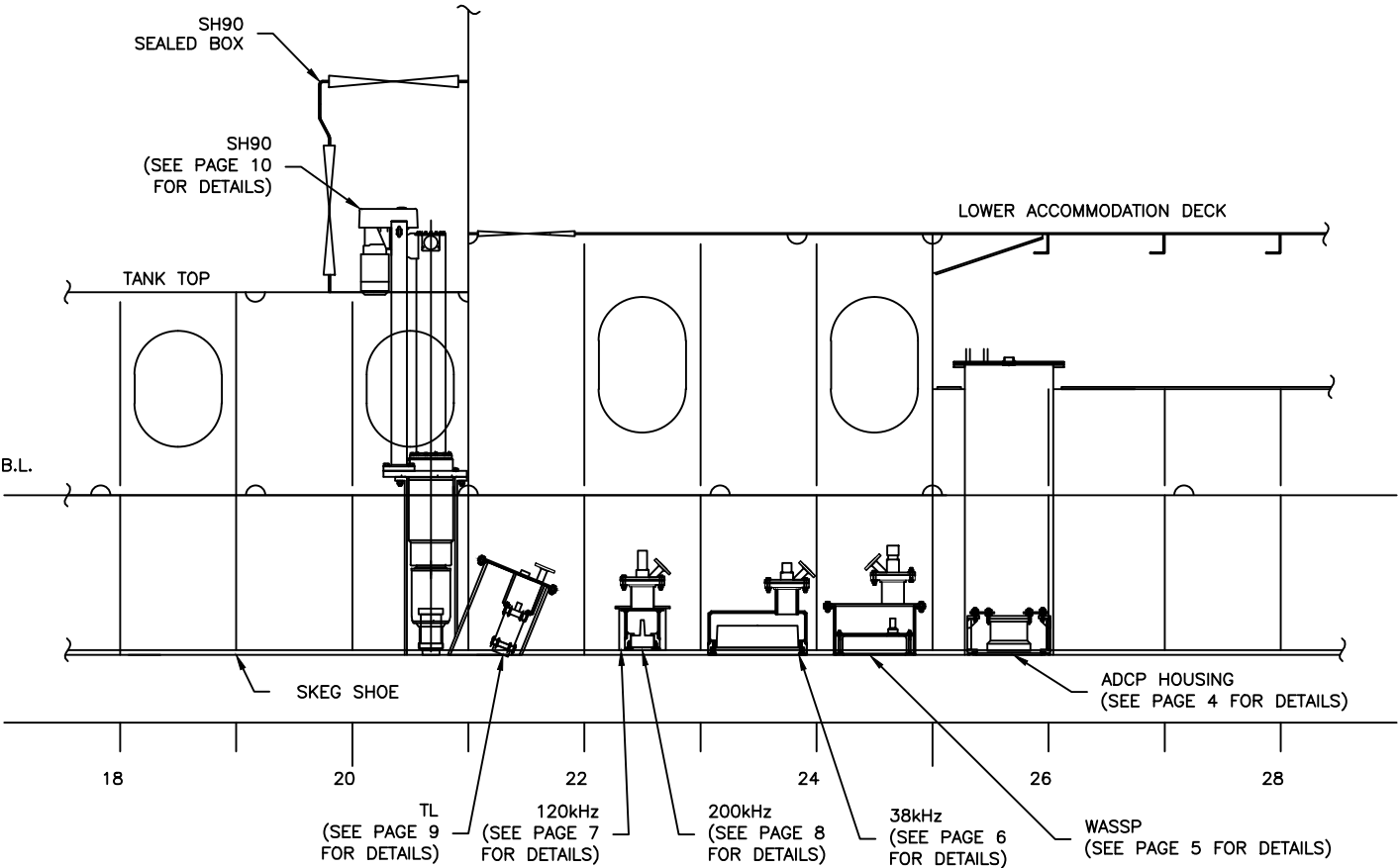
COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
TRANSDUCER HOUSING – 25M

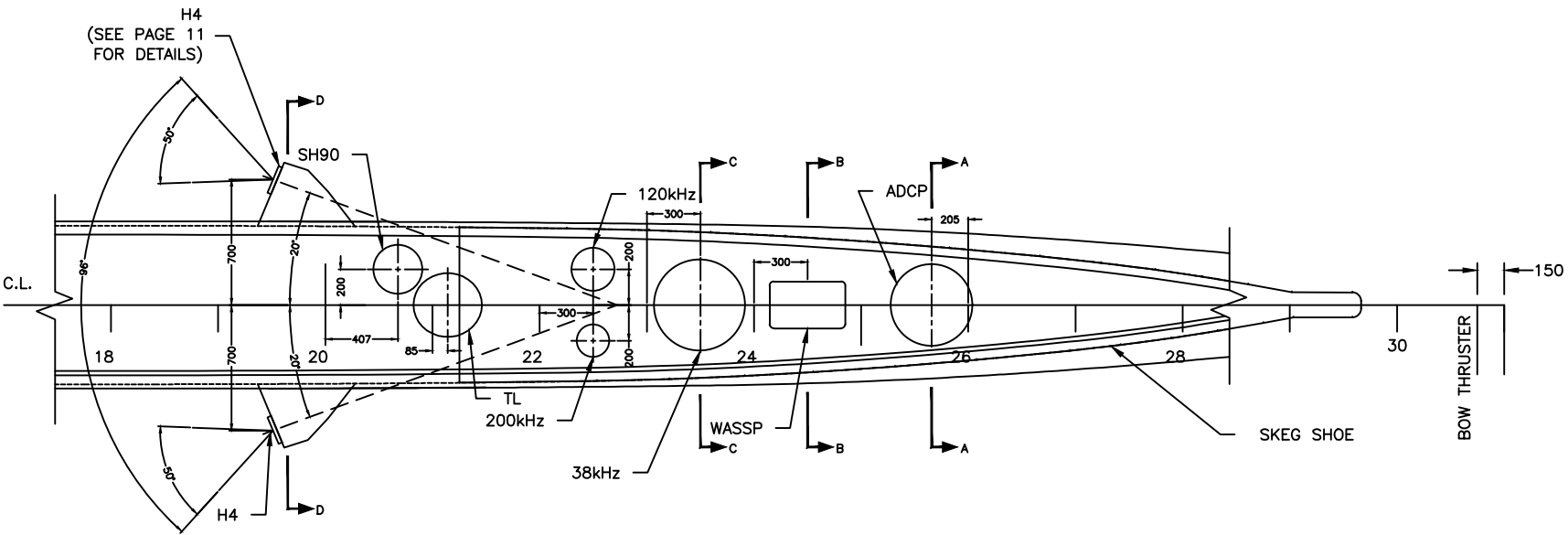
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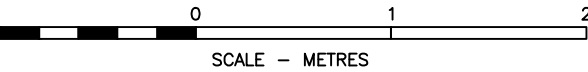
LOCATION OF TRANSDUCERS



PROFILE VIEW
INBOARD, LOOKING PORT



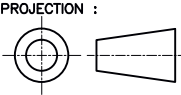
PLAN VIEW
LOOKING DOWN



COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
TRANSDUCER HOUSING - 25M

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Garde côtière canadienne
Canadian Coast Guard

NAVIRE 25M VESSEL
COQUE # / HULL #
008

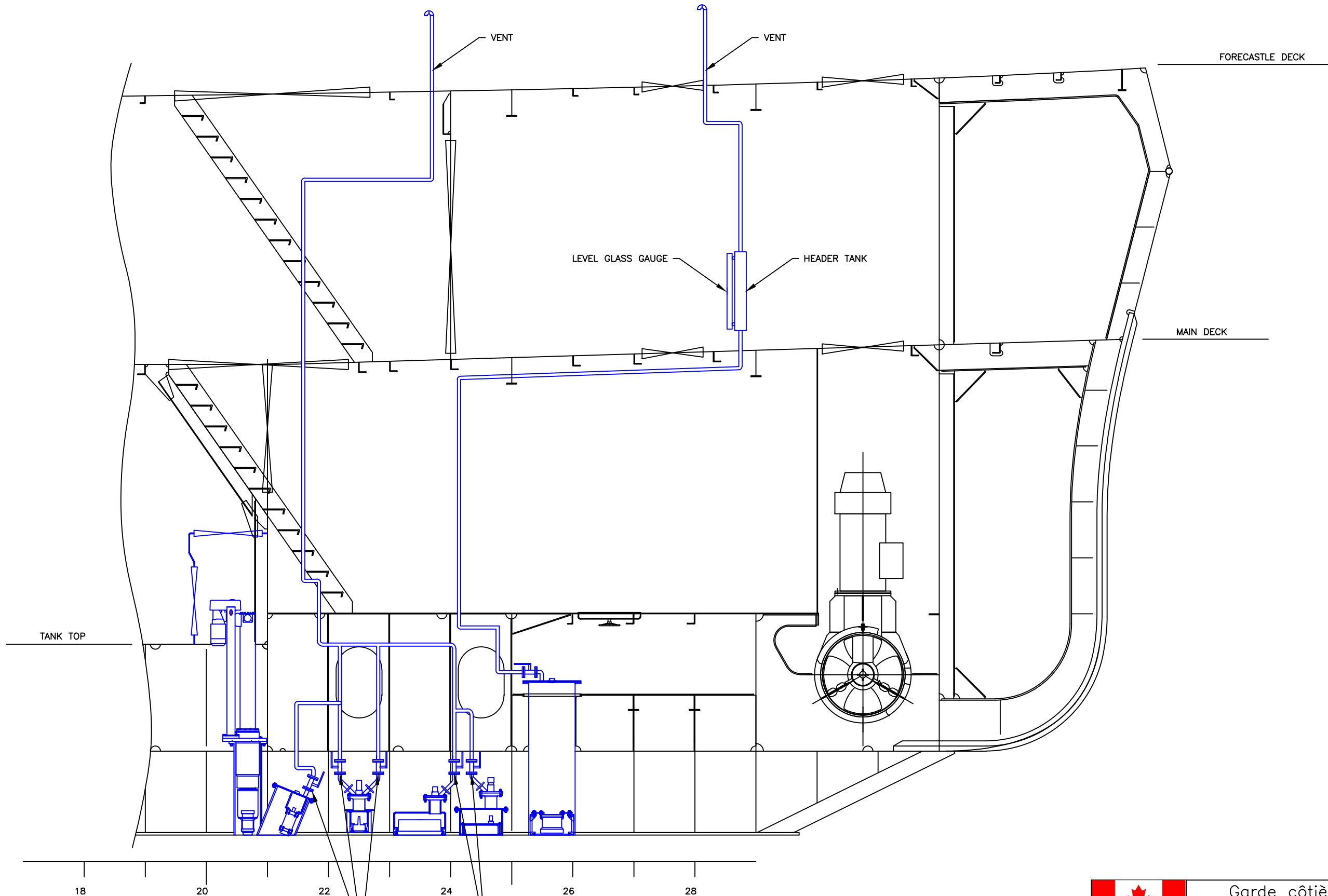
PROJECT TITLE :
Navire semi-hauturier de recherche halieutique
Near Shore Fisheries Research Vessels

PROJECT # :
MR09-1113
DRAWN BY :

DRAWING FILE :
ISV25-21260RMM6.DWG
DRAWING # :
21260


REV :
6

DATE :
31/01/2012
SHEET :
2 OF 11



0 1 2
SCALE - METRES

BRONZE 150 PSI
GLOBE VALVE FLANGED
(5x)

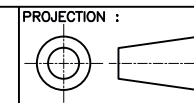
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NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV25-21260RMM6.DWG	DATE : 31/01/2012	SHEET : 3 OF 11
DRAWN BY :	DRAWING # : 21260	REV : 6	



COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

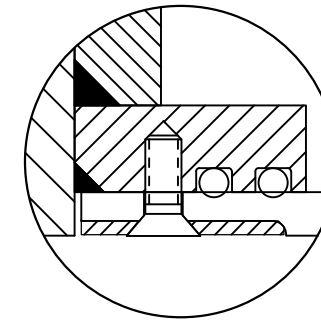
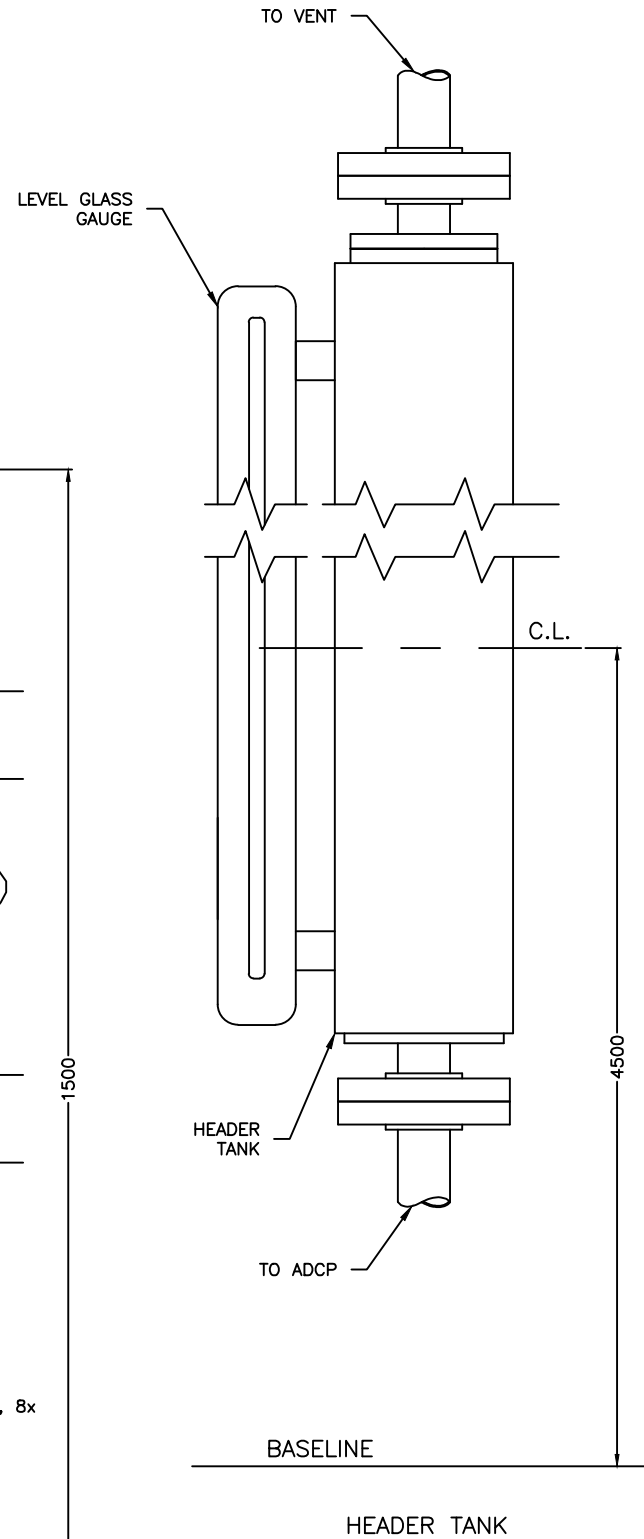
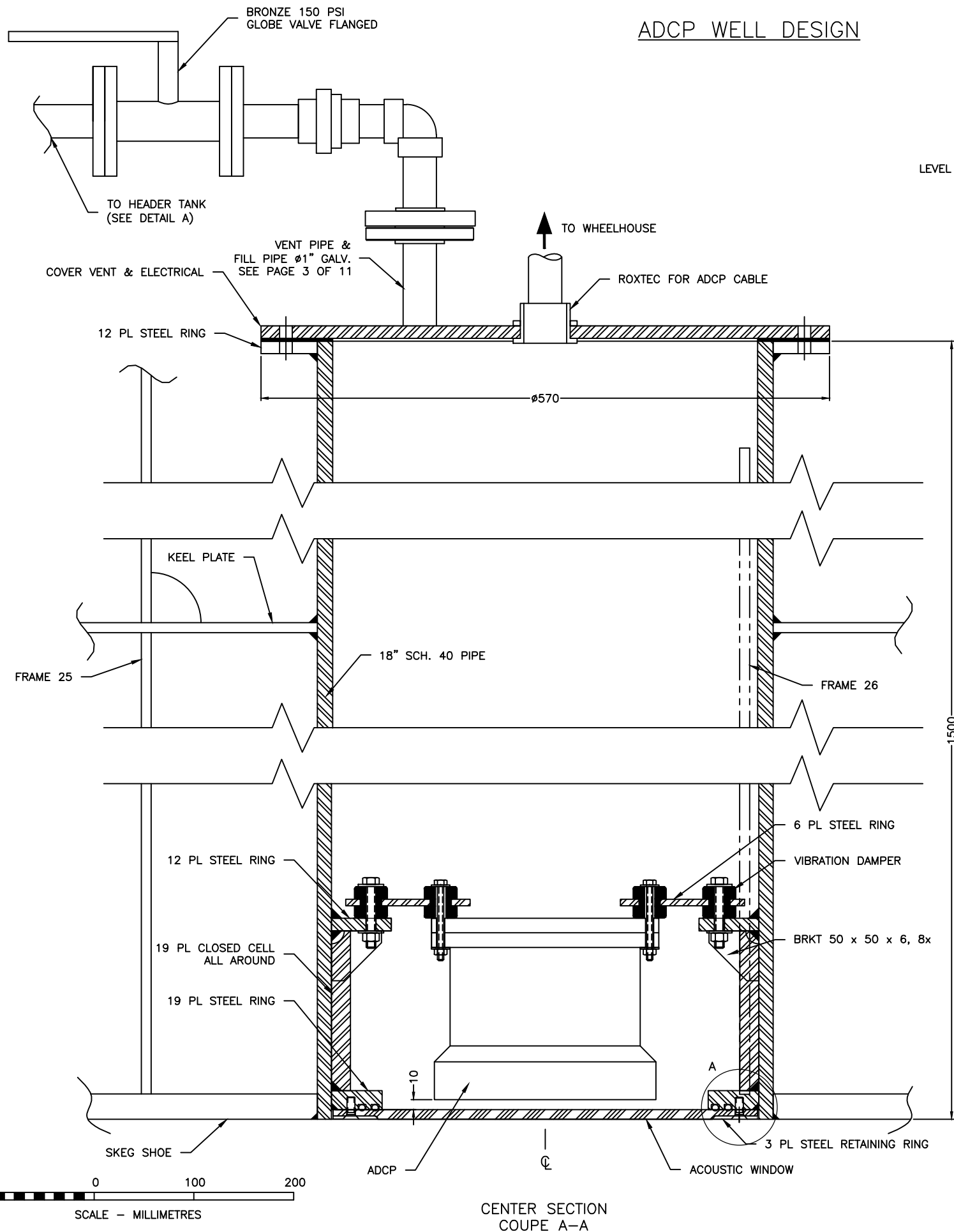
TITLE :
TRANSDUCER HOUSING - 25M

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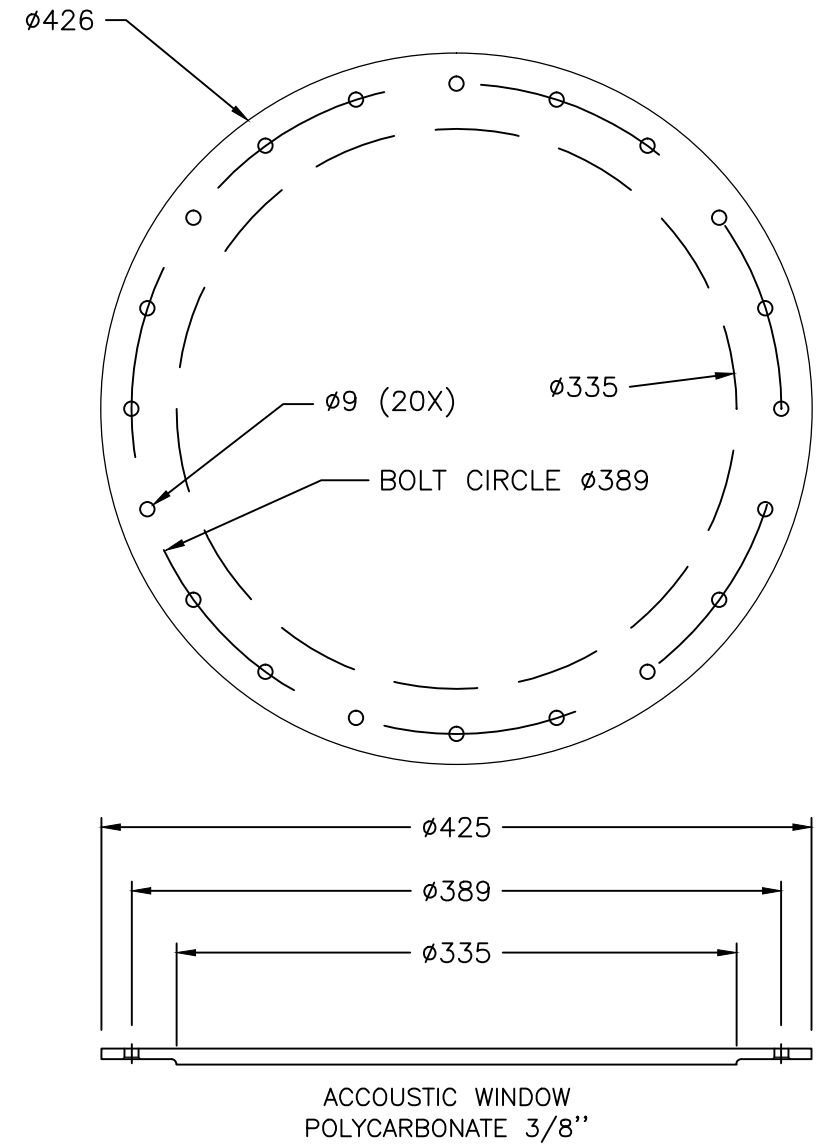


PROJECTION :

ADCP WELL DESIGN



DETAIL "A"

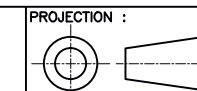


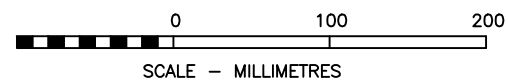
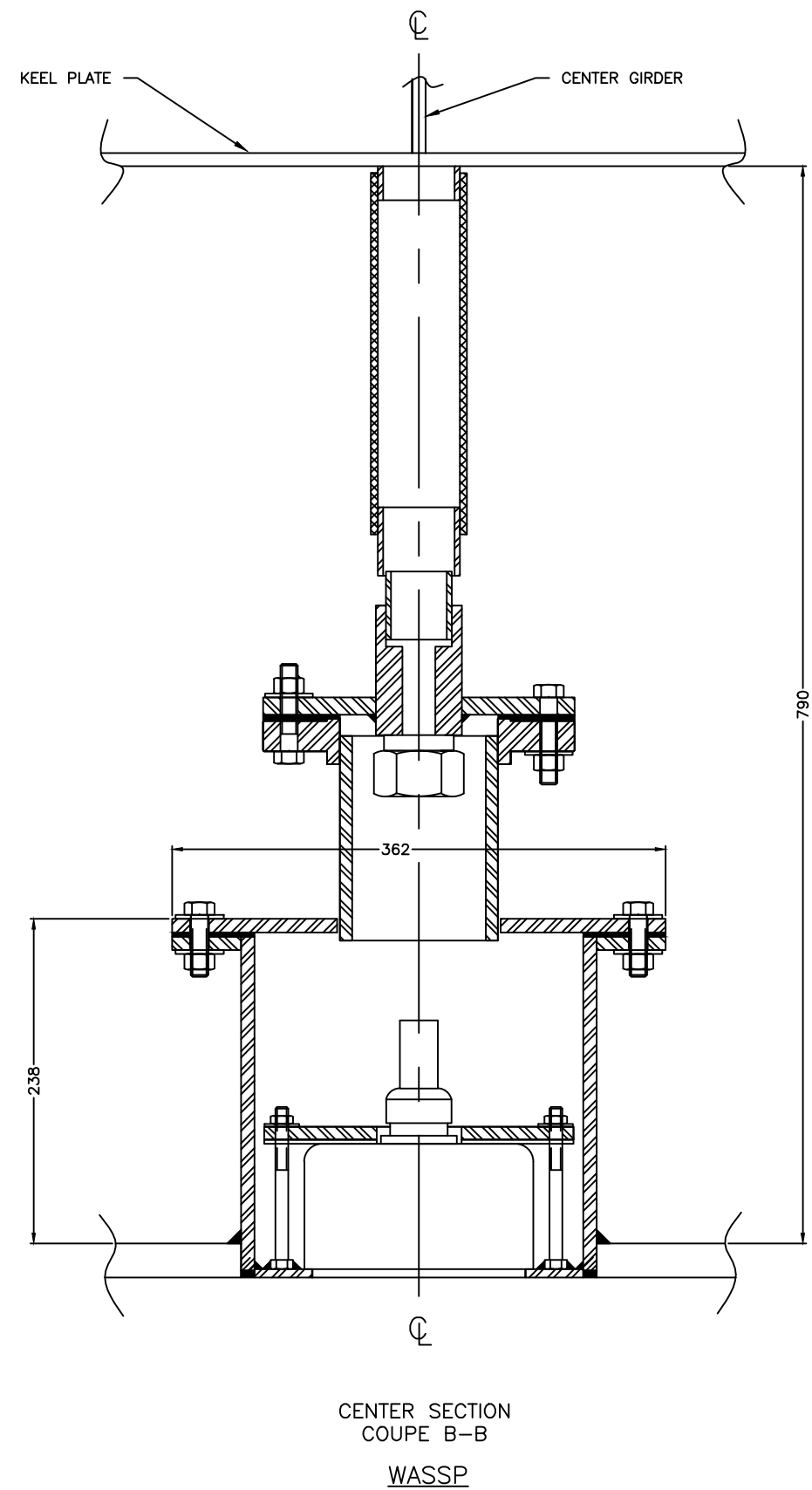
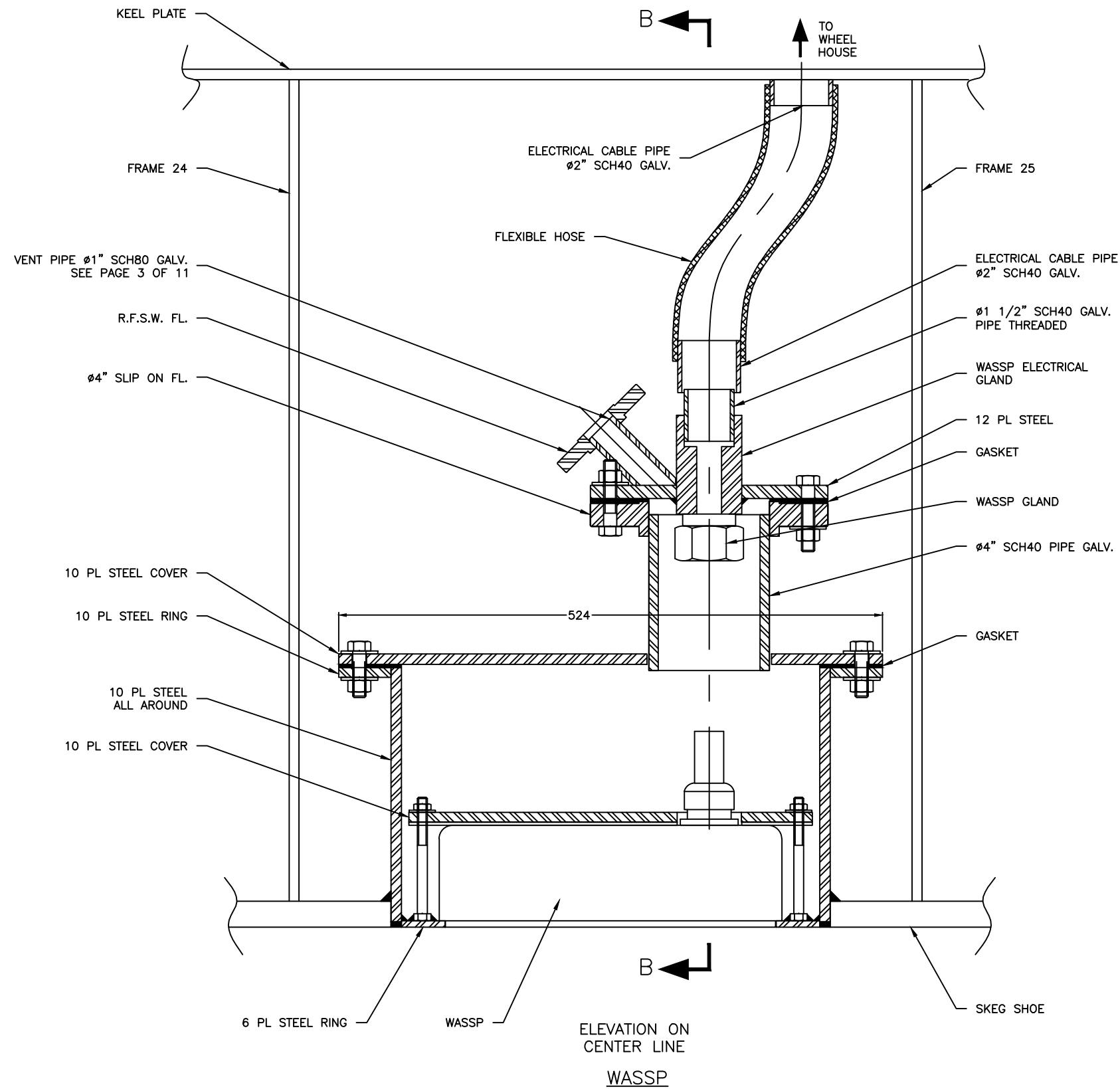
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NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # :	MRO9-1113	DRAWING FILE :	ISV25-21260RMM6.DWG
DRAWN BY :		DRAWING # :	21260
DATE :	31/01/2012	REV :	6
SHEET :	4 OF 11		

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COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
TRANSDUCER HOUSING - 25M

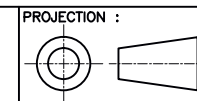




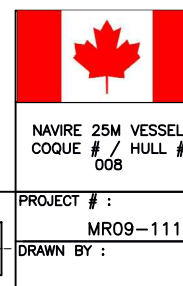
COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
TRANSDUCER HOUSING - 25M

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PROJECTION :



Garde côtière canadienne
Canadian Coast Guard

NAVIRE 25M VESSEL
COQUE # / HULL #
008

PROJECT TITLE :
Navire semi-hauturier de recherche halieutique
Near Shore Fisheries Research Vessels

PROJECT # :
MR09-1113

DRAWING FILE :
ISV25-21260RMM6.DWG

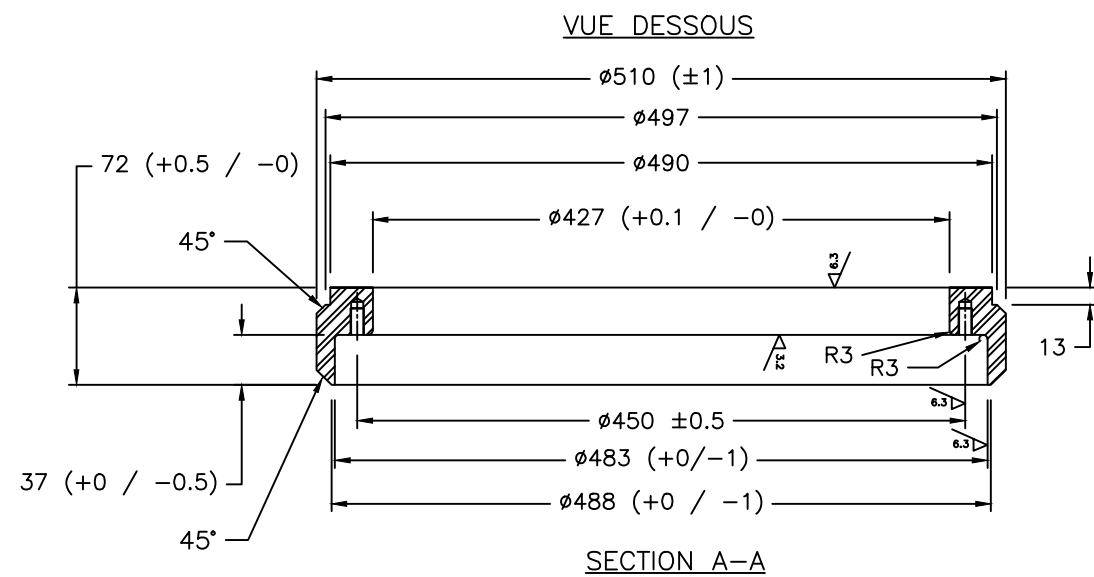
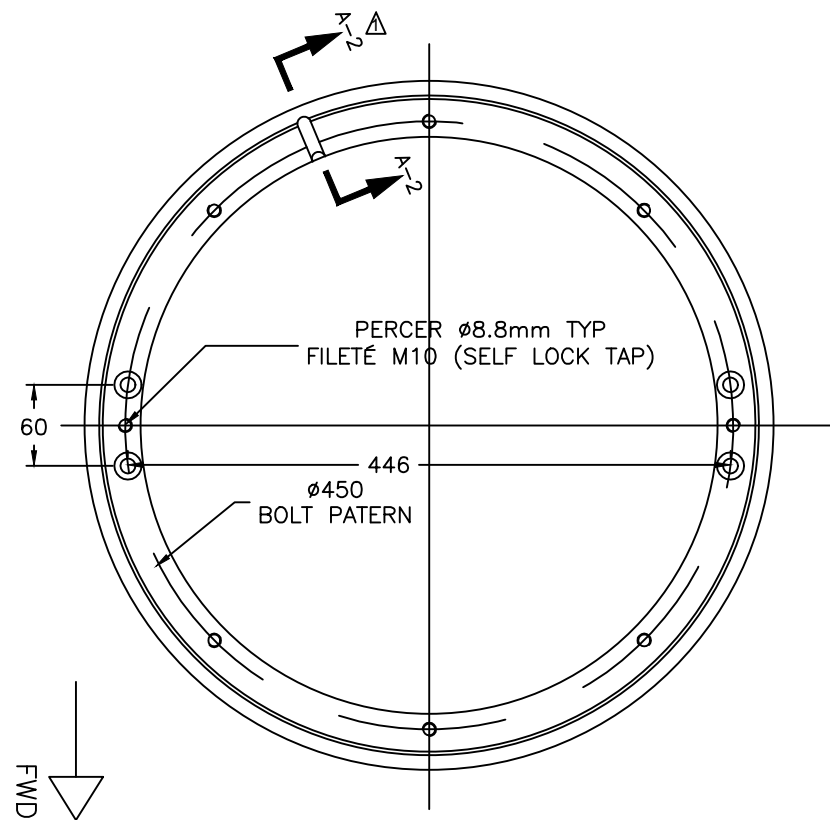
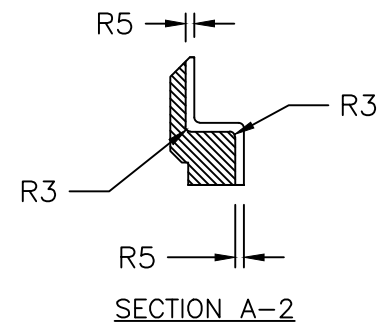
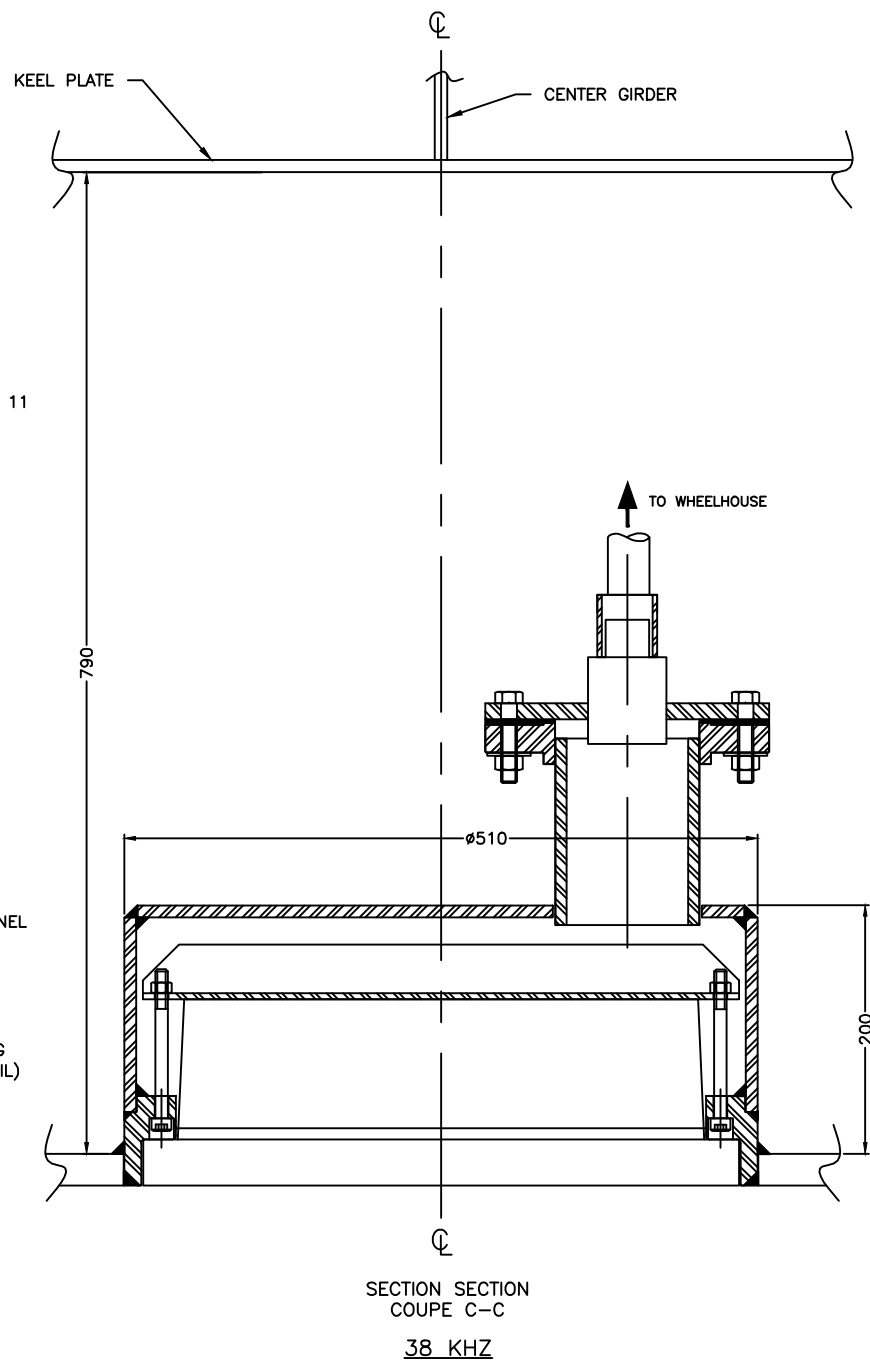
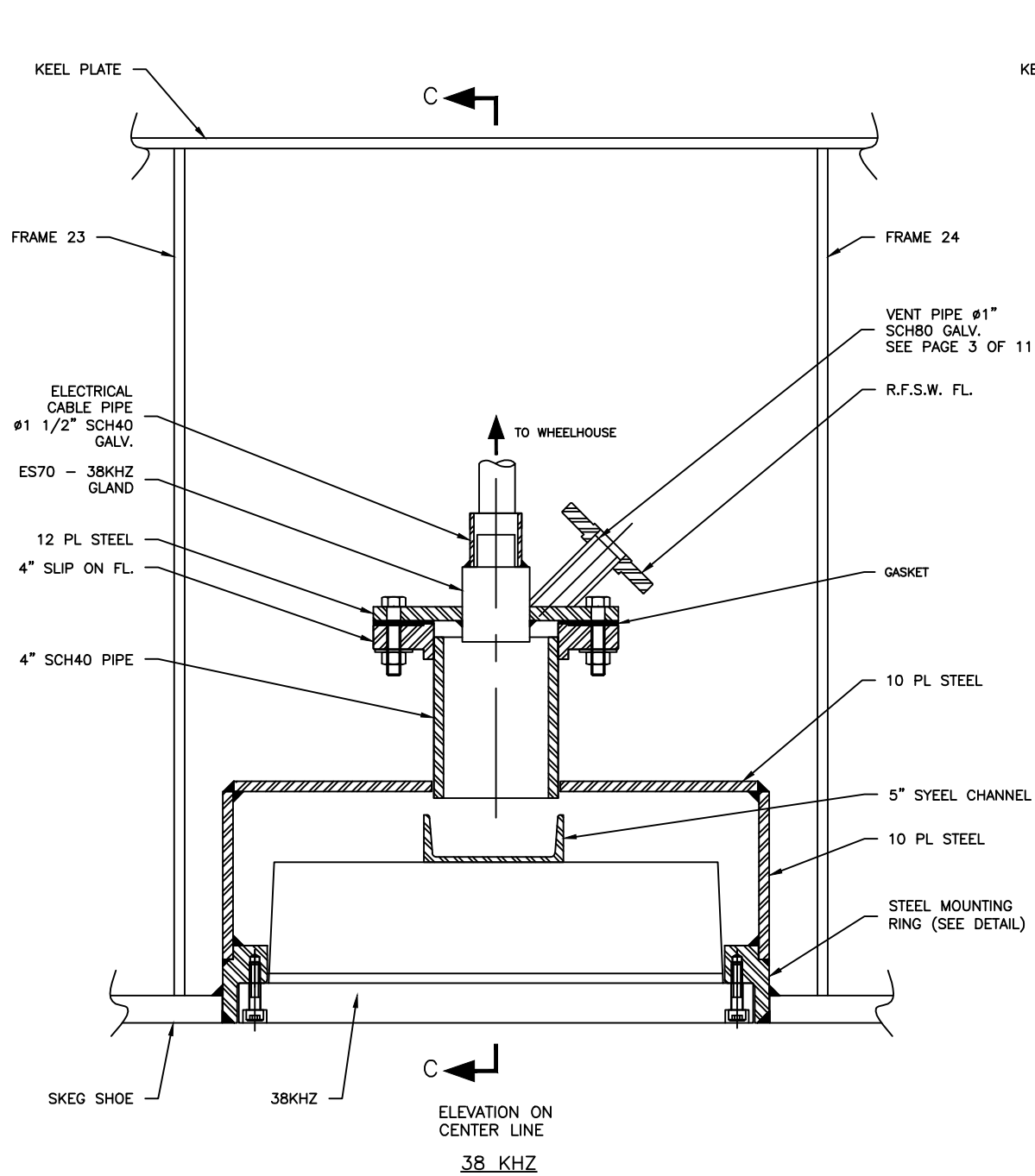
DRAWN BY :

DRAWING # :
21260

REV :
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DATE :
31/01/2012

SHEET :
5 OF 11



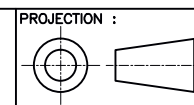
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NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV25-21260RMM6.DWG	DATE : 31/01/2012	
DRAWN BY :	DRAWING # : 21260	REV : 6	SHEET : 6 OF 11

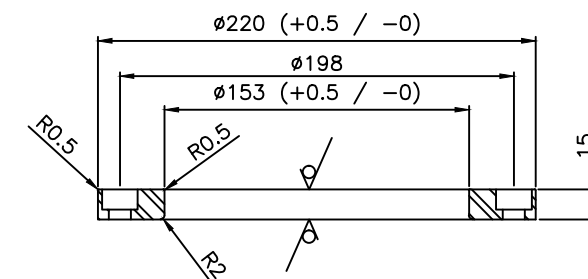
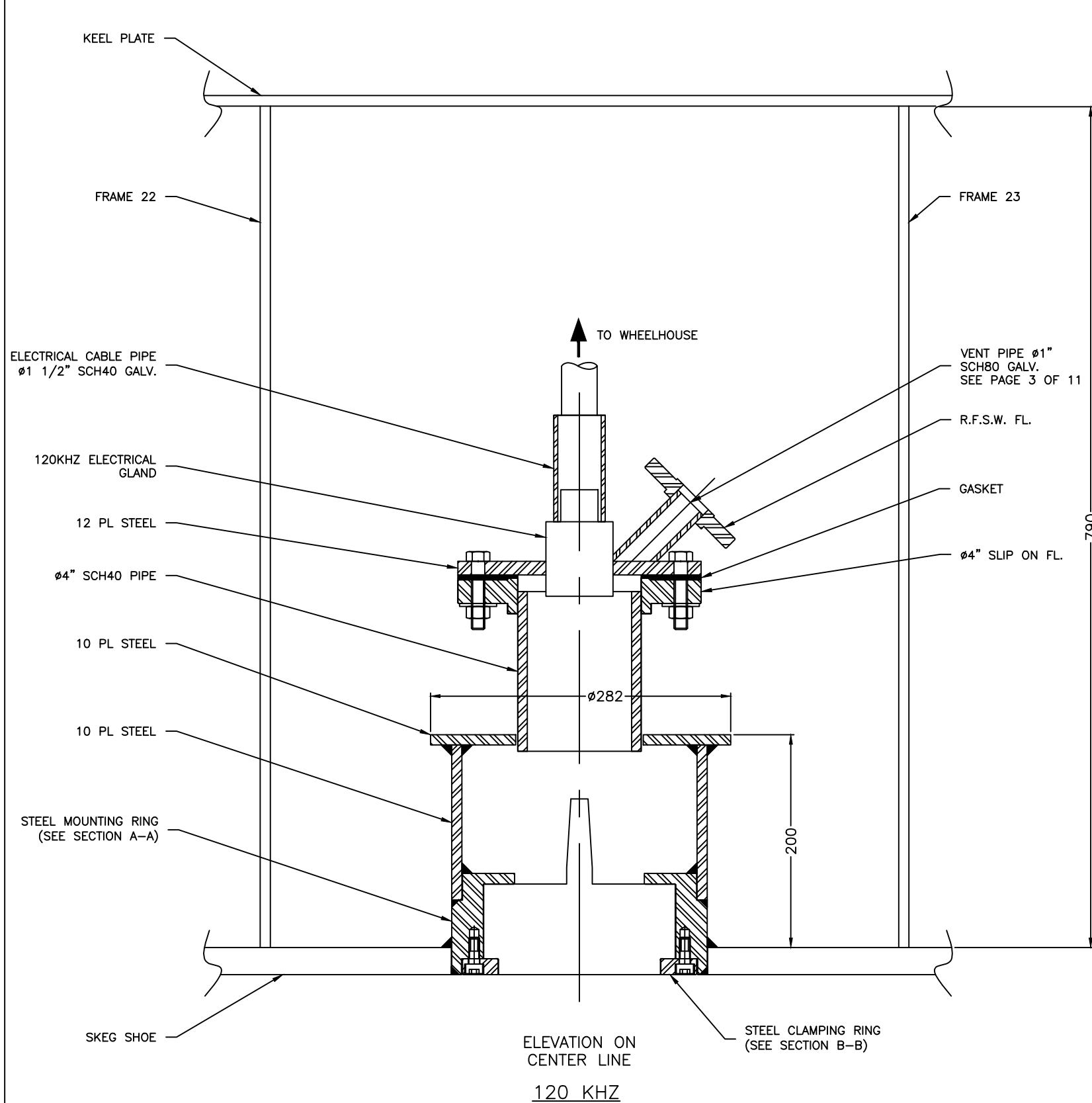


COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

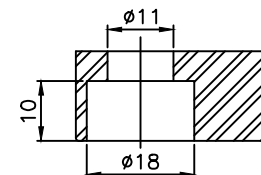
TITLE :
TRANSDUCER HOUSING - 25M

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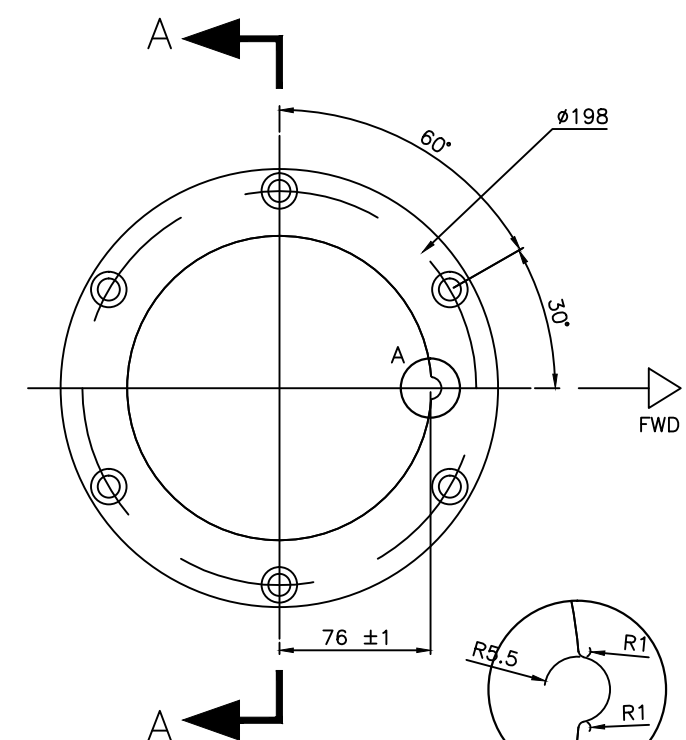




SECTION A-A

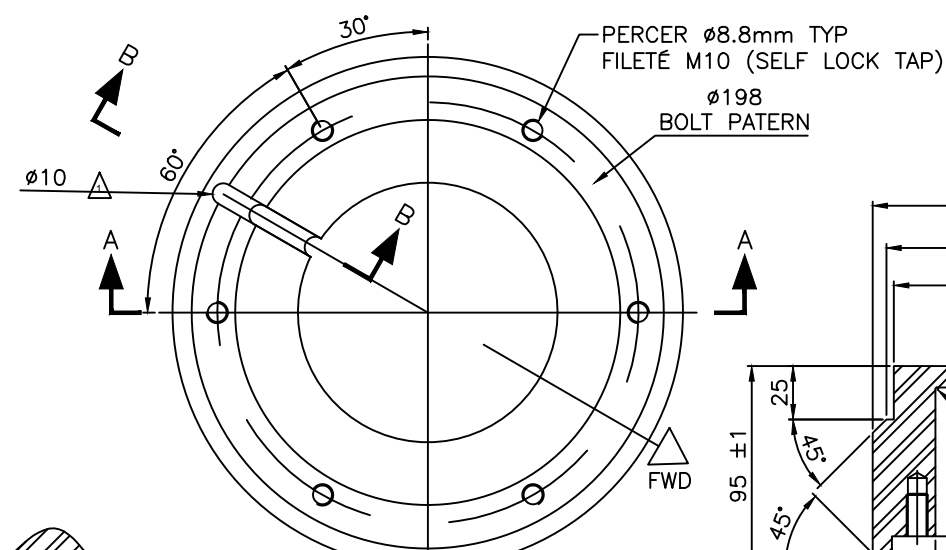


DETAIL CHAMBRAGE

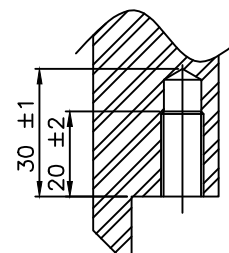


STEEL CLAMPING RING
120 KHZ

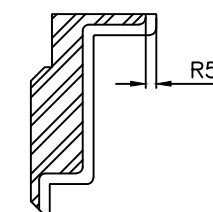
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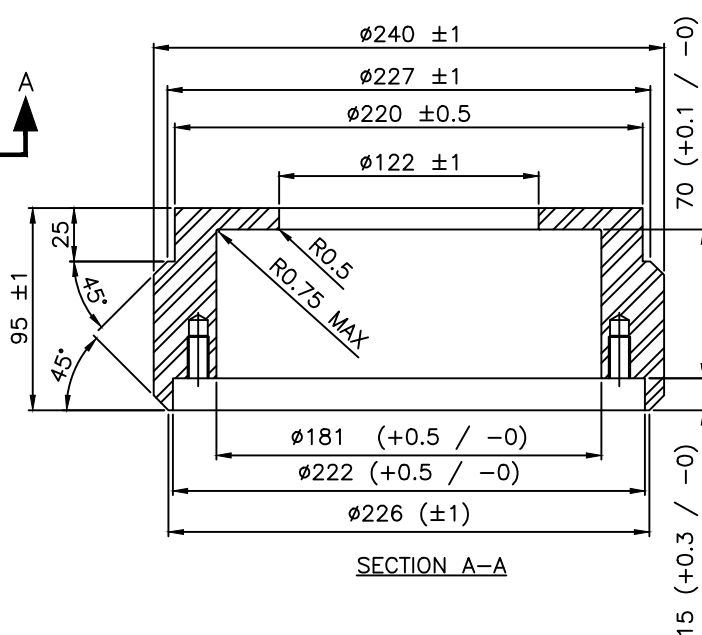
VUE DU DESSOUS



DÉTAIL PERCAGE-FILAGE

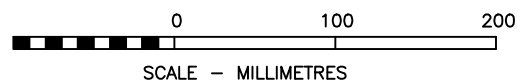


SECTION B-B



SECTION A-A

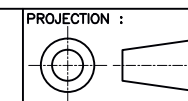
STEEL MOUNTING RING
120 KHZ



COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
TRANSDUCER HOUSING - 25M

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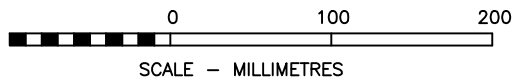
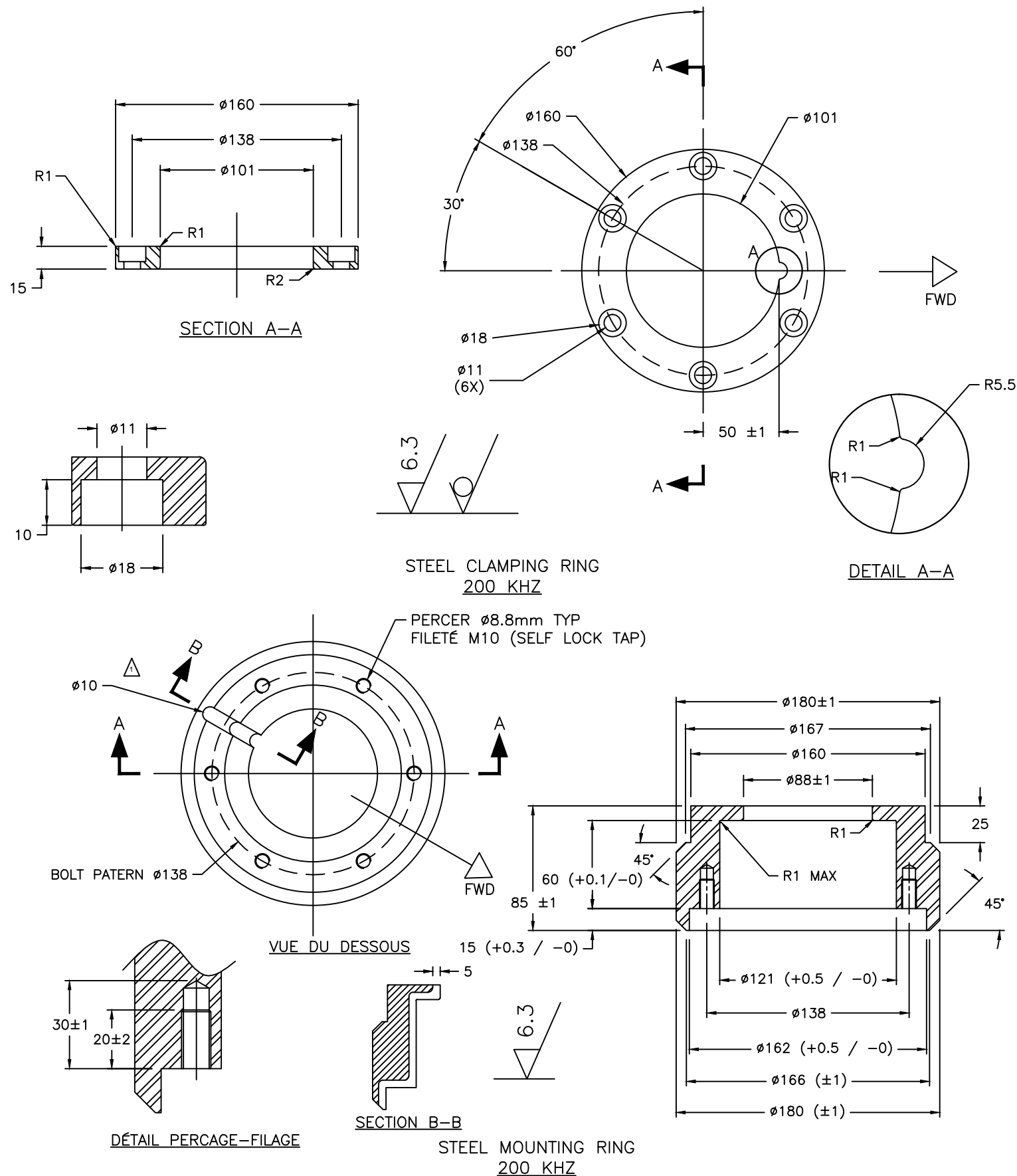
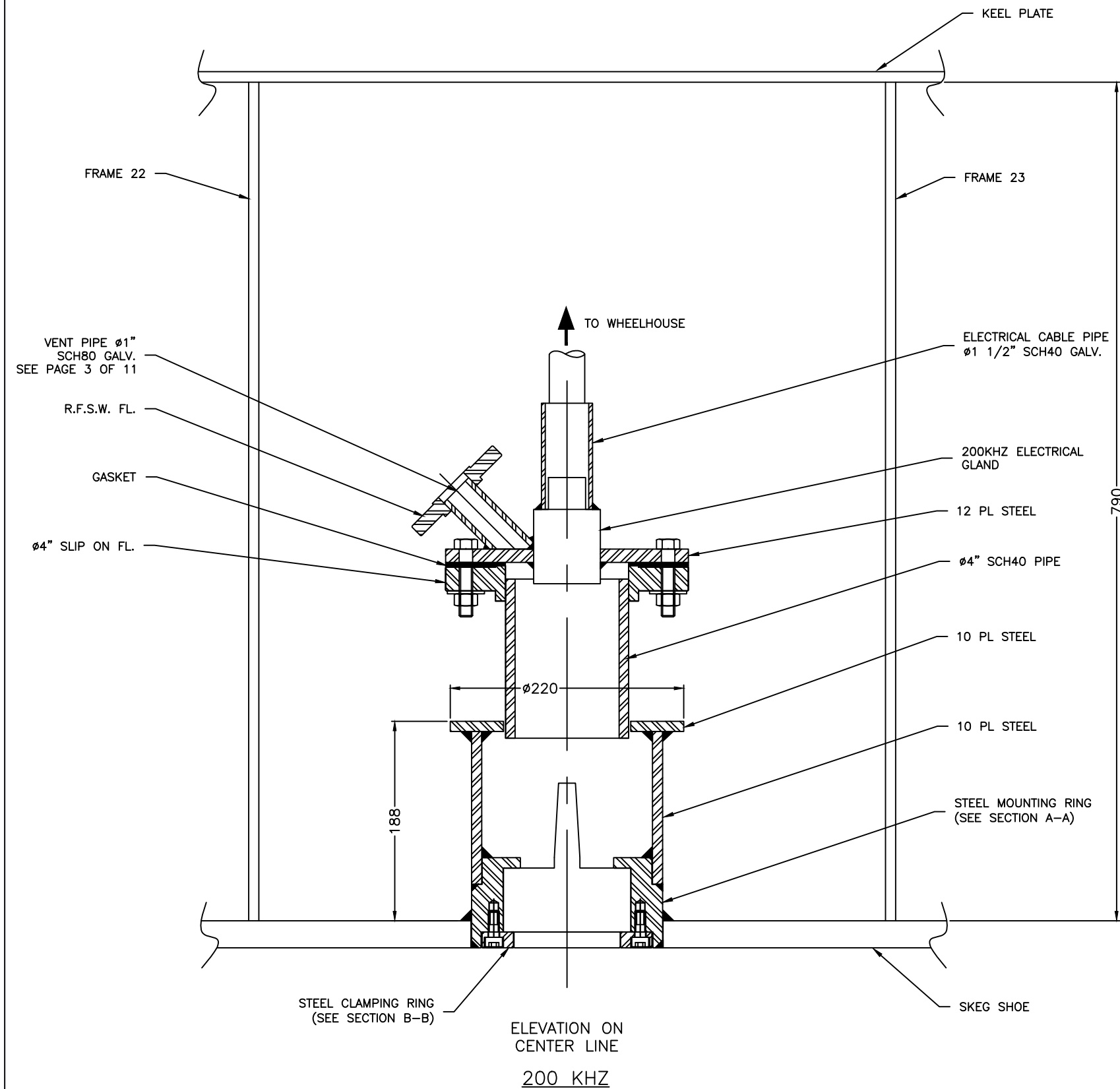


PROJECTION :

PROJECT # :
MR09-1113
DRAWN BY :

PROJECT TITLE :
Navire semi-hauturier de recherche halieutique
Near Shore Fisheries Research Vessels
DRAWING FILE :
ISV25-21260RMM6.DWG
REV :
6
SHEET :
7 OF 11

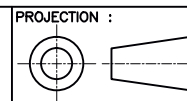
DATE :
31/01/2012



COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
TRANSDUCER HOUSING - 25M

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PROJECTION :

NAVIRE 25M VESSEL
COQUE # / HULL #
008

PROJECT # :
MR09-1113

DRAWN BY :

Garde côtière canadienne
Canadian Coast Guard

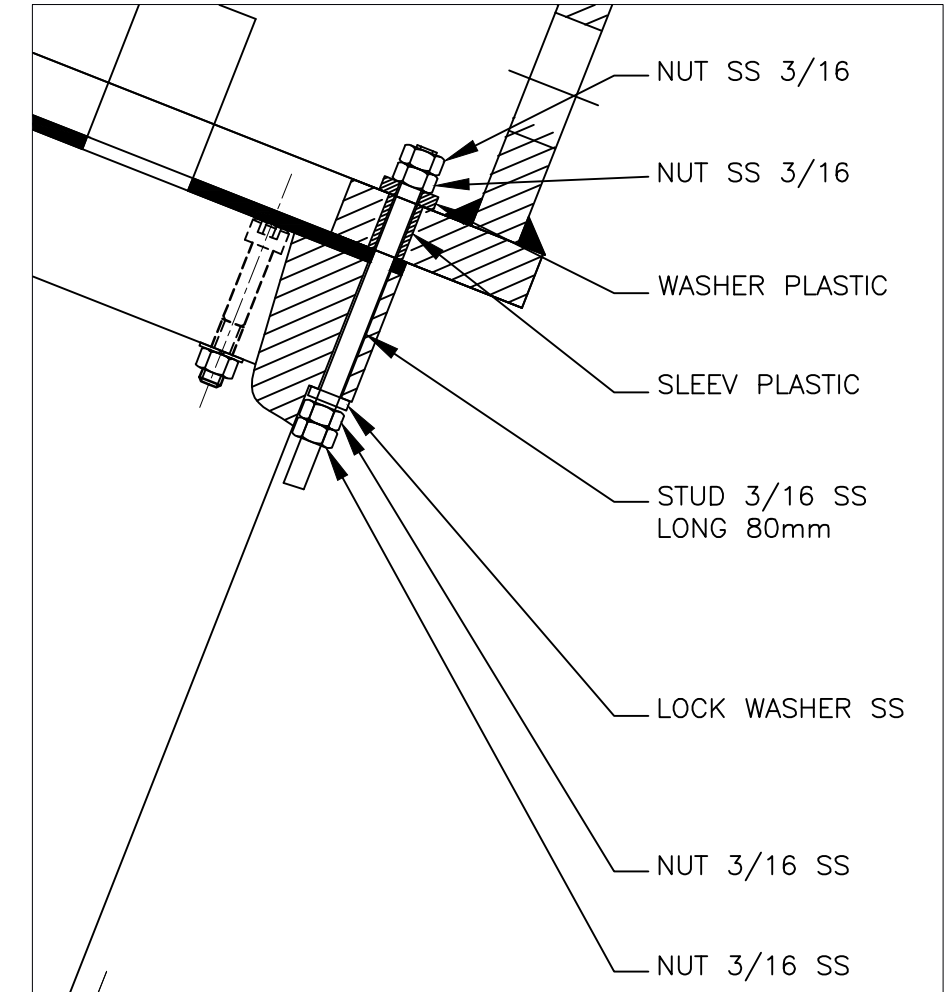
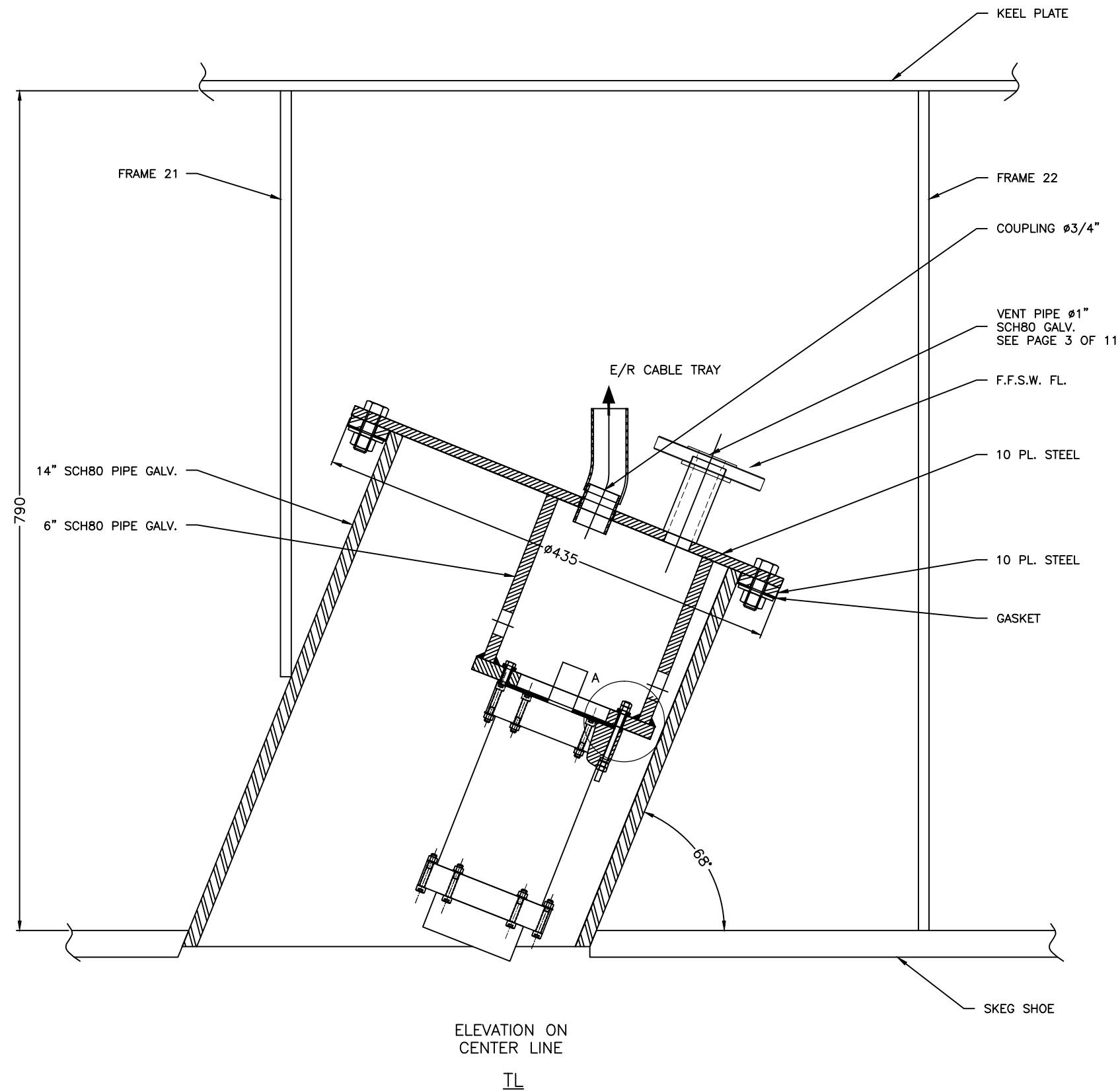
PROJECT TITLE :
Navire semi-hauturier de recherche halieutique
Near Shore Fisheries Research Vessels

DRAWING FILE :
ISV25-21260RMM6.DWG

REV :
6

SHEET :
8 OF 11


DATE :
31/01/2012



DÉTAIL A
TL FIXATION



ELEVATION ON
CENTER LINE
TL

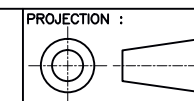
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NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # :	DRAWING FILE :	DATE :	
MRO9-1113	ISV25-21260RMM6.DWG	31/01/2012	
DRAWN BY :	DRAWING # :	REV :	SHEET :
	21260	6	9 OF 11



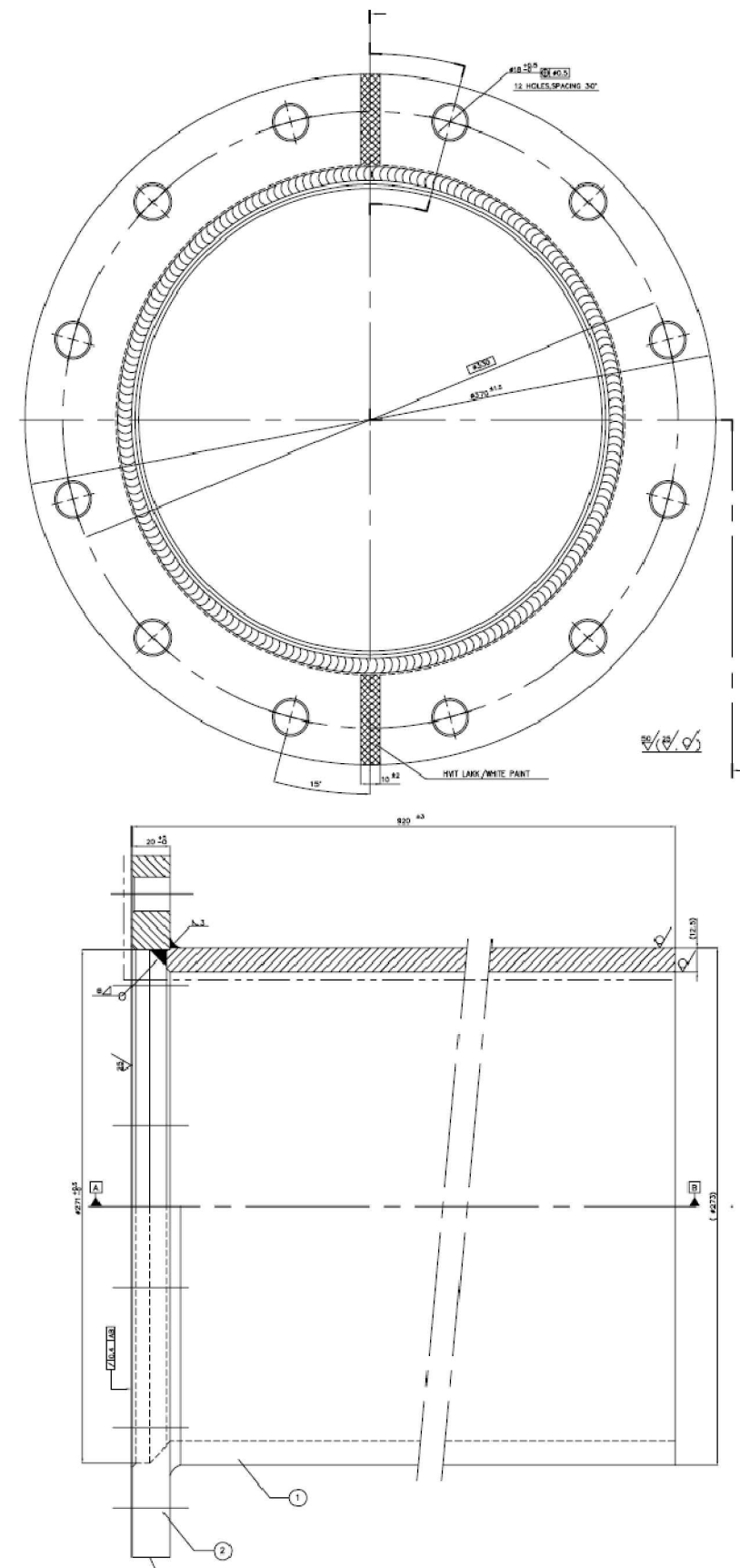
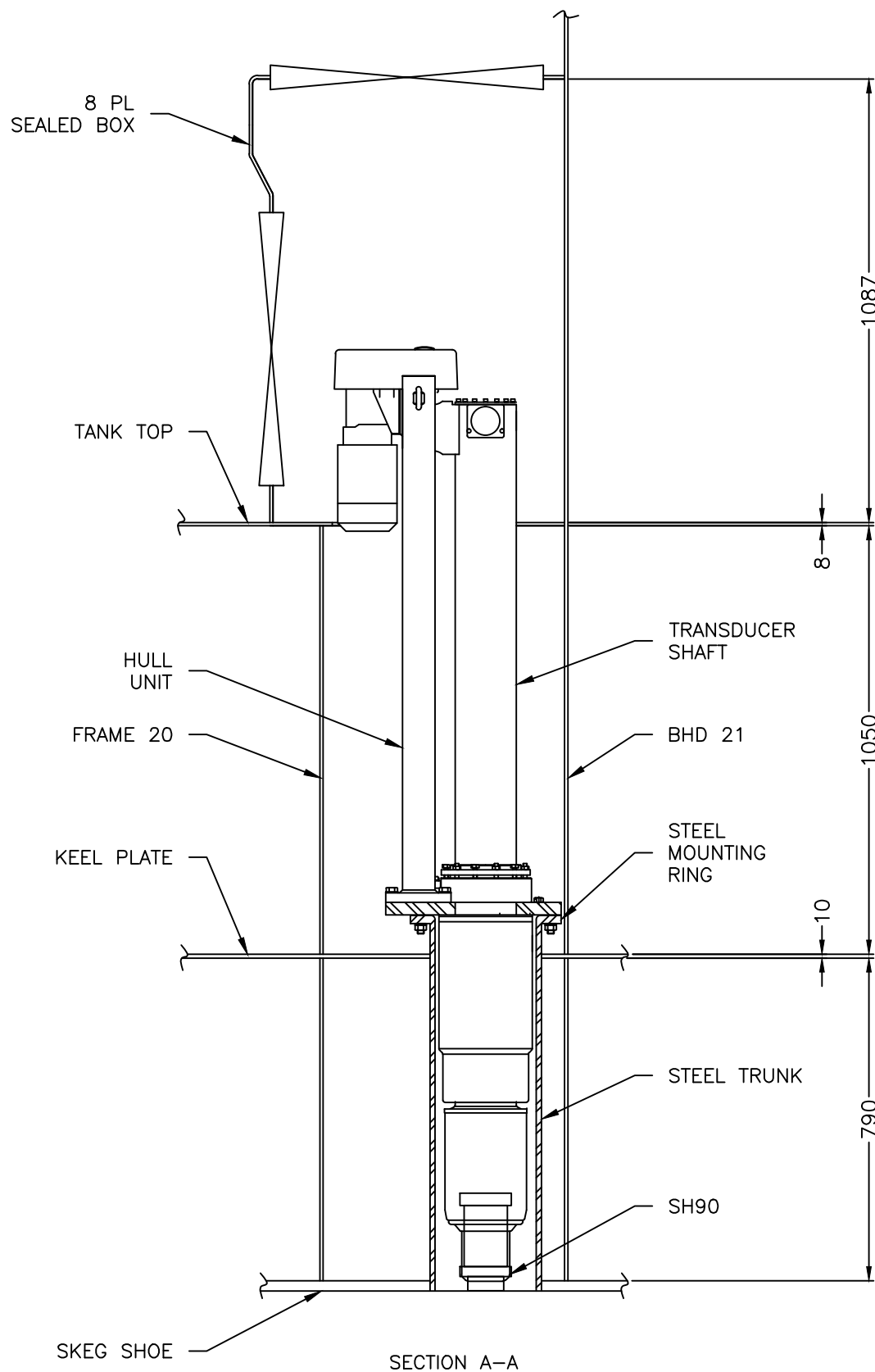
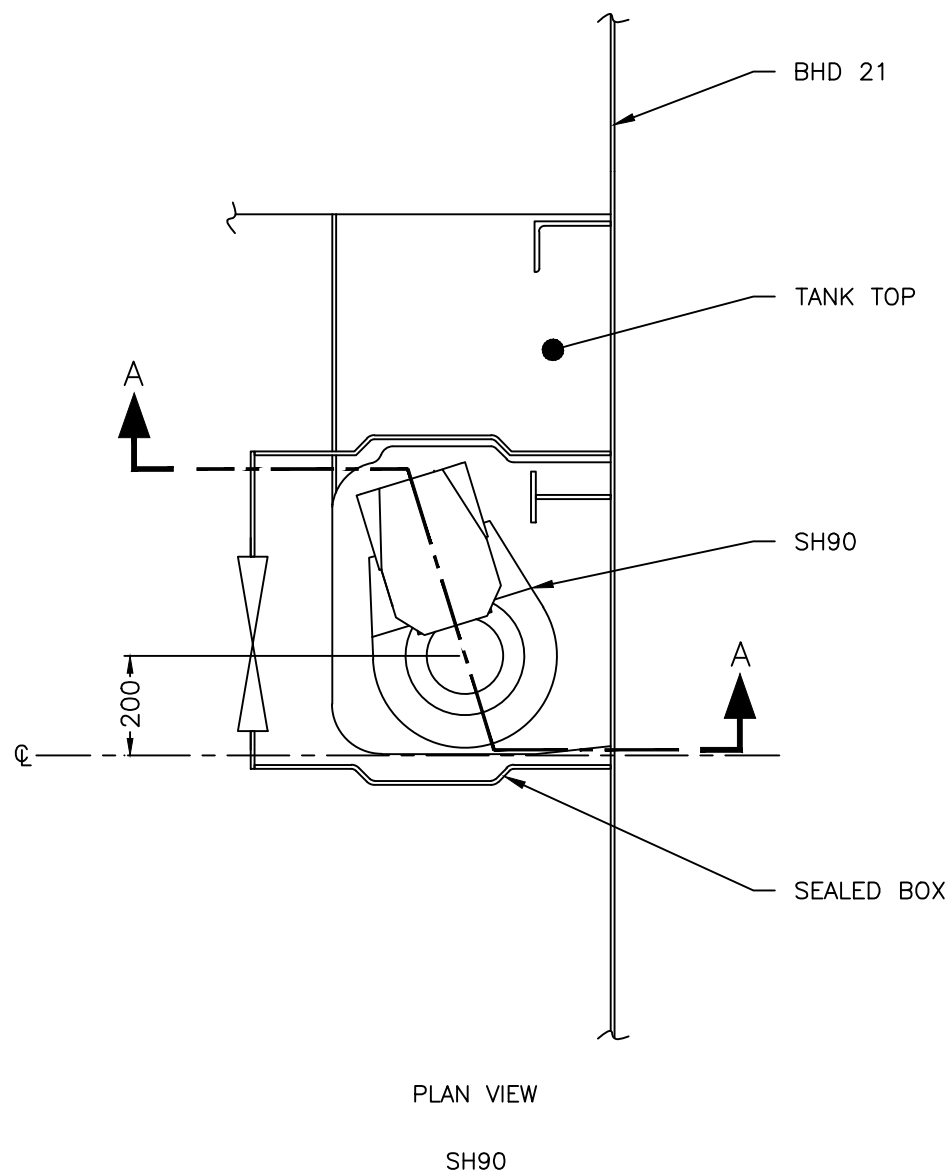
COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
TRANSDUCER HOUSING - 25M

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PROJECTION :

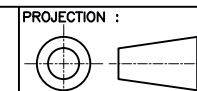


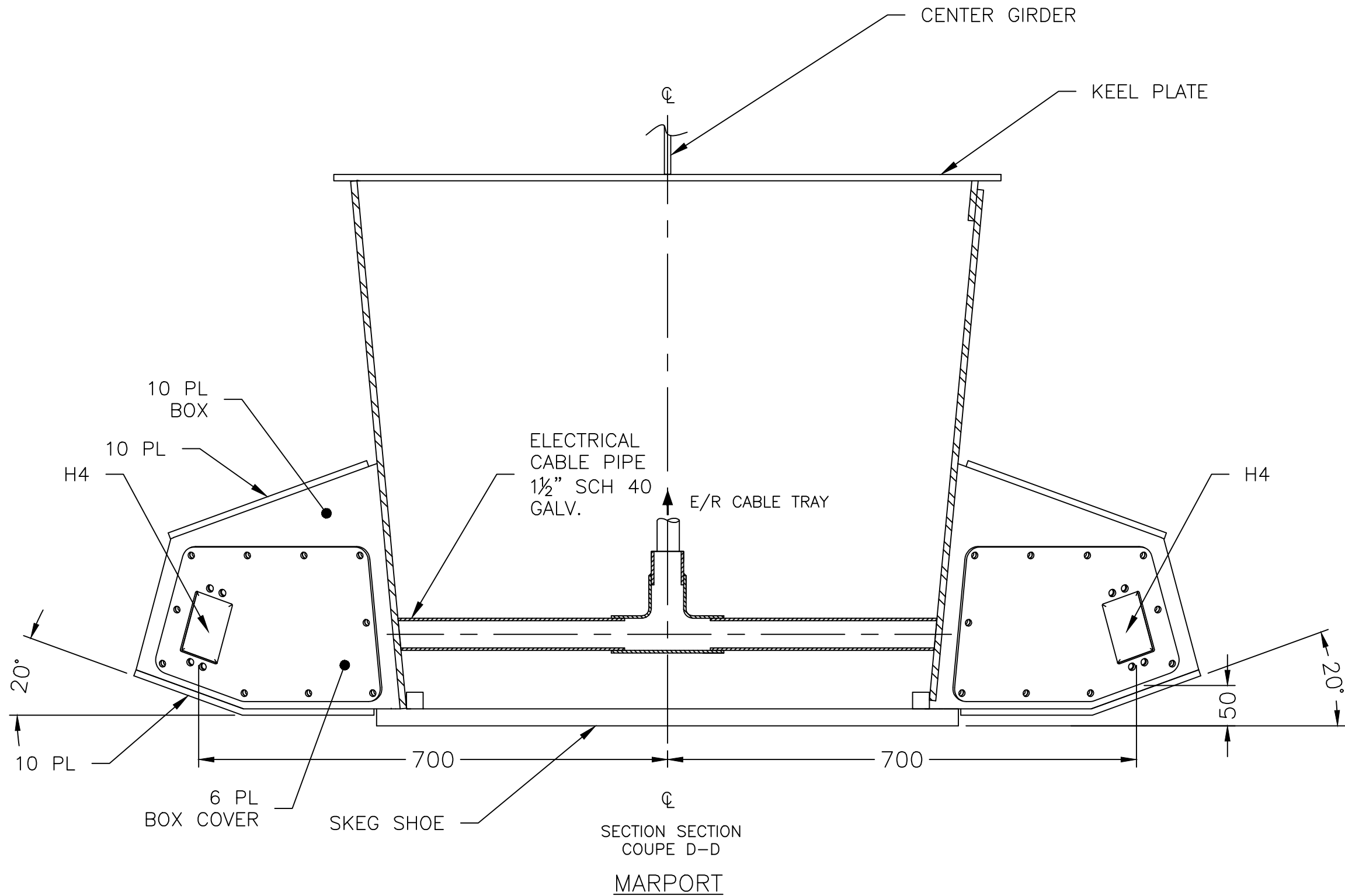
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NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # :	MR09-1113	DRAWING FILE :	ISV25-21260RMM6.DWG
DRAWN BY :		DRAWING # :	21260
DATE :	31/01/2012	REV :	6
SHEET :	10 OF 11		

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COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
 TRANSDUCER HOUSING — 25M





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SCALE - MILLIMETRES

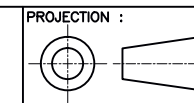
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NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV25-21260RMM6.DWG	DATE : 31/01/2012	
DRAWN BY :	DRAWING # : 21260	REV : 6	SHEET : 11 OF 11



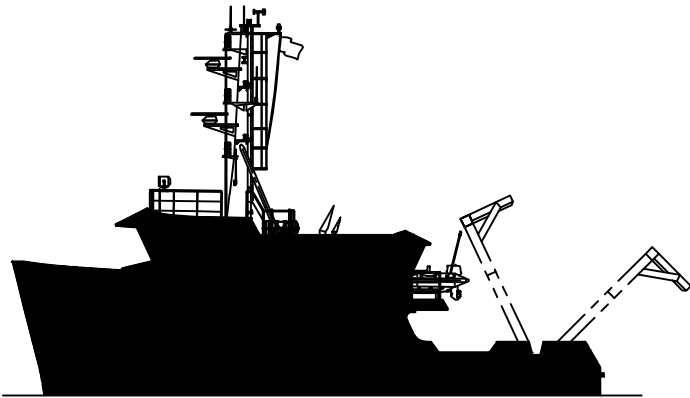
COMPANY :
MÉRIDIEN MARITIME
RÉPARATION



TITLE :
TRANSDUCER HOUSING - 25M

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PROJECTION :



9	AS CONSTRUCTED	MM	JAN 2012
REV.	REVISIONS	BY	DATE
	Garde côtière canadienne Canadian Coast Guard		
NAVIRE 25M VESSEL COQUE # / HULL # 008	PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels		
PROJECT # : MR09-1113	DRAWING FILE : ISV25-30000RMM9.DWG	DATE : 31/01/2012	
DRAWN BY :	DRAWING # : 30000	REV : 	SHEET : 1 OF 6

CE PLAN EST BASÉ SUR LE PLAN NO. 209-028. IL A ÉTÉ DÉVELOPPÉ UNIQUEMENT PAR MERIDIEN MARITIME À DES FINS DE PRODUCTION AVEC LA PERMISSION ÉCRITE DE ROBERT ALLAN LTÉE. ROBERT ALLAN LTÉE N'ASSUME AUCUNE RESPONSABILITÉ QUELLE QU'ELLE SOIT POUR CE PLAN MODIFIÉ. LA PROPRIÉTÉ INTELLECTUELLE DU PLAN CI-DÉCRIT APPARTIENT UNIQUEMENT À ROBERT ALLAN LTÉE ET AU CANADA. IL EST DÉFENDU DE REPRODUIRE LES PLANS ET LES DEVIS, CI-INCLUS, EN ENTIER OU EN PARTIE, OU DE LES PARTAGER AVEC UN TIERS SANS LA PERMISSION ÉCRITE DES PROPRIÉTAIRES.



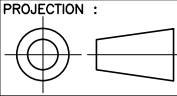
COMPANY :

MÉRIDIEN MARITIME
RÉPARATION

TITLE :

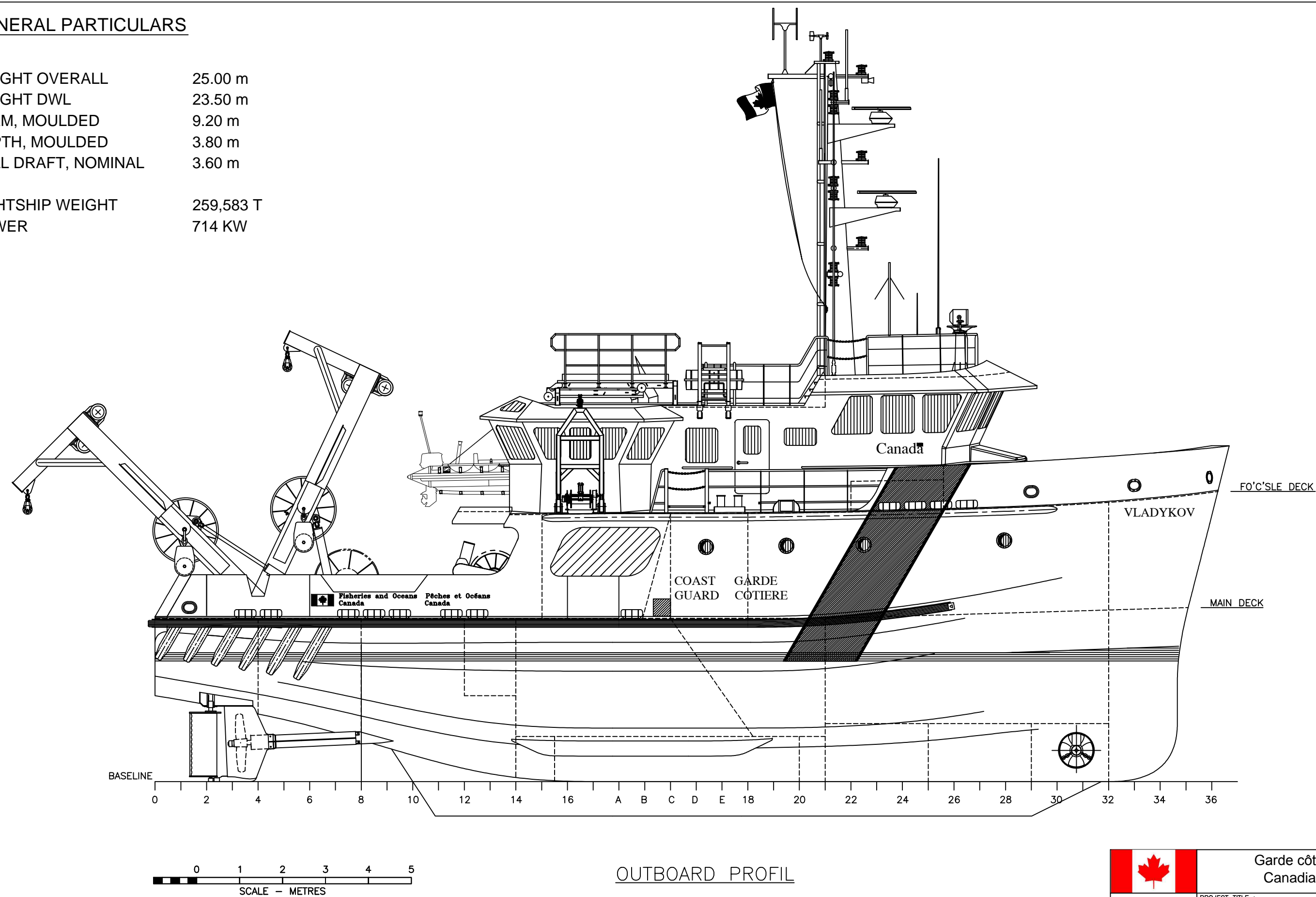
GENERAL ARRANGEMENT
25M


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GENERAL PARTICULARS

LENGHT OVERALL	25.00 m
LENGHT DWL	23.50 m
BEAM, MOULDED	9.20 m
DEPTH, MOULDED	3.80 m
HULL DRAFT, NOMINAL	3.60 m
LIGHTSHIP WEIGHT	259,583 T
POWER	714 KW



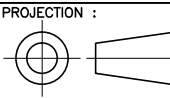
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NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV25-30000RMM9.DWG	DATE : 31/01/2012	
DRAWN BY :	DRAWING # : 30000	REV : 9	SHEET : 2 OF 6



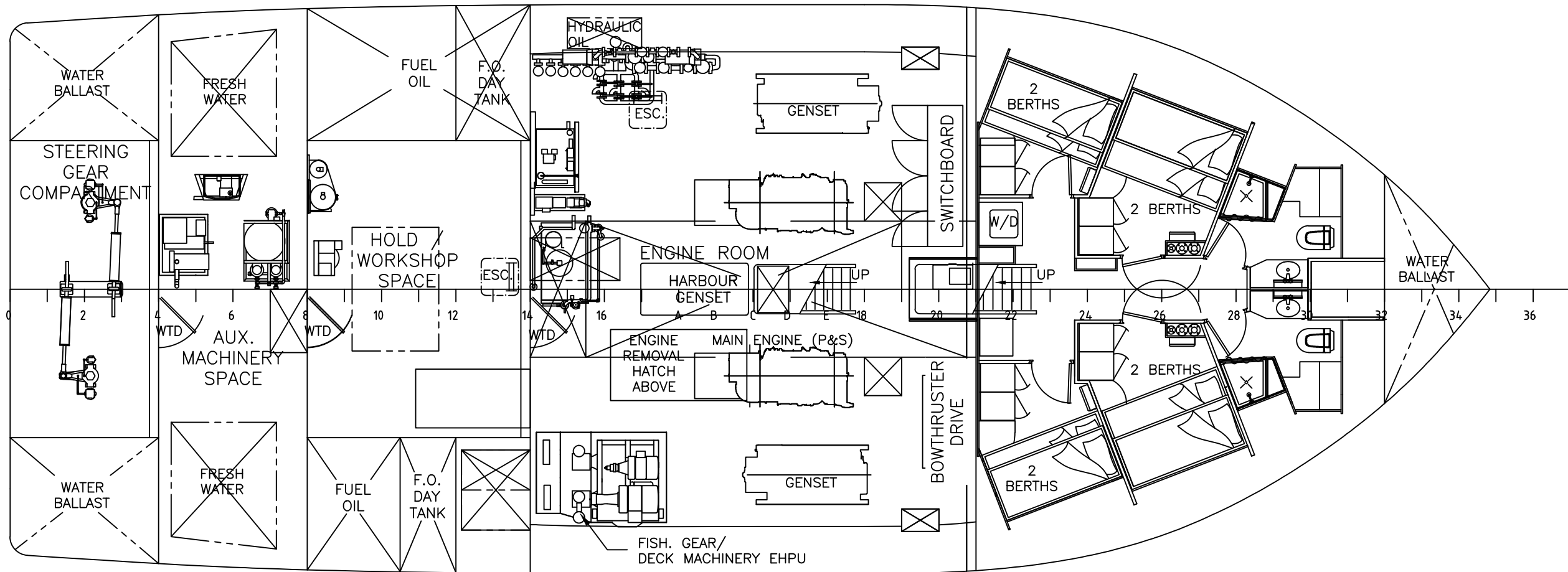
COMPANY :
**MRIDIEEN MARITIME
RPARATION**

TITLE :
**GENERAL ARRANGEMENT
25M**

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PROJECTION :
FIRST ANGLE



LOWER ACCOMMODATION

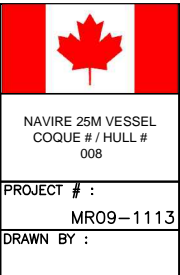
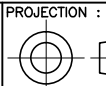
CE PLAN EST BASÉ SUR LE PLAN NO. 209-028. IL A ÉTÉ DÉVELOPPÉ UNIQUEMENT PAR MERIDIEN MARITIME À DES FINS DE PRODUCTION AVEC LA PERMISSION ÉCRITE DE ROBERT ALLAN LTÉE. ROBERT ALLAN LTÉE N'ASSUME AUCUNE RESPONSABILITÉ QUELLE QU'ELLE SOIT POUR CE PLAN MODIFIÉ. LA PROPRIÉTÉ INTELLECTUELLE DU PLAN CI-DESCRIT APPARTIENT UNIQUEMENT À ROBERT ALLAN LTÉE ET AU CANADA. IL EST DÉFENDU DE REPRODUIRE LES PLANS ET LES DEVIS, CI-INCLUS, EN ENTIER OU EN PARTIE, OU DE LES PARTAGER AVEC UN TIERS SANS LA PERMISSION ÉCRITE DES PROPRIÉTAIRES.



COMPANY : **MÉRIDIEN MARITIME**
RÉPARATION

TITLE : **GENERAL ARRANGEMENT**
25M

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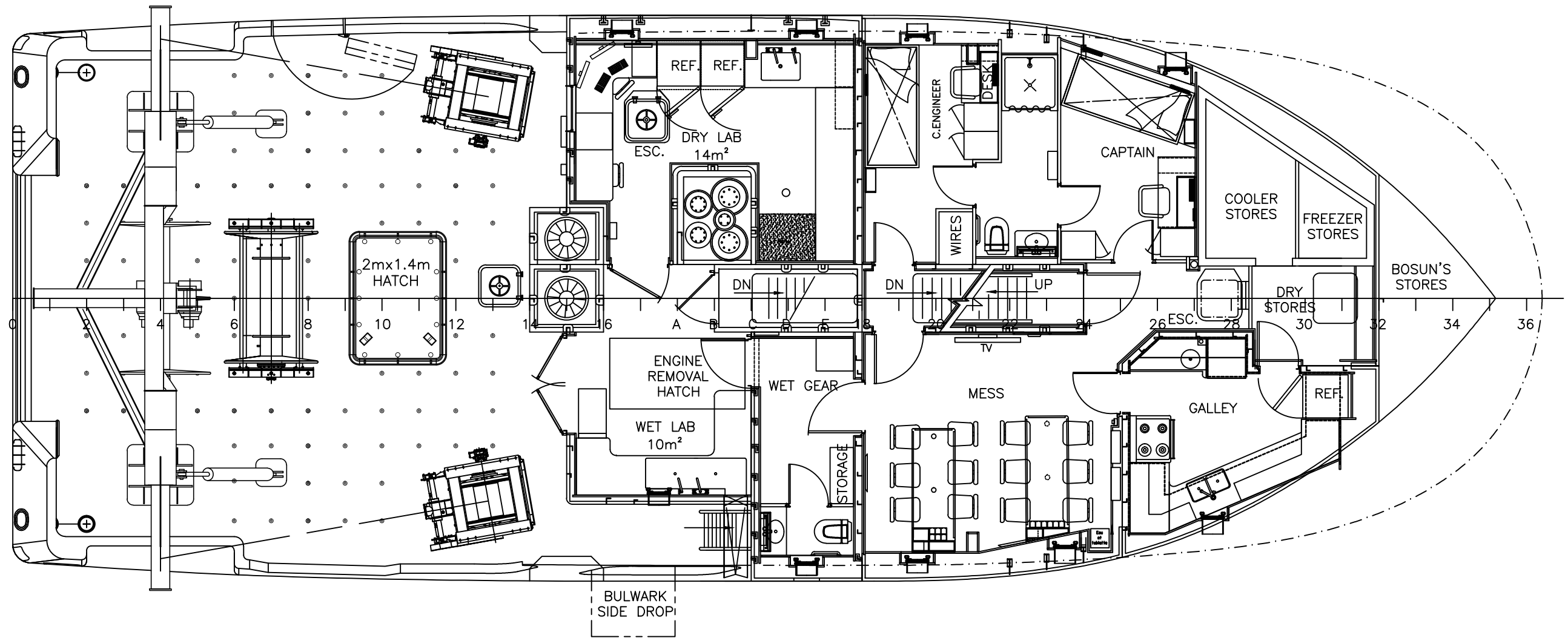


Garde côtière canadienne
Canadian Coast Guard


PROJECT TITLE :
Navire semi-hauturier de recherche halieutique
Near Shore Fisheries Research Vessels

PROJECT # :
MR09-1113
DRAWN BY :

DRAWING FILE :
ISV25-30000RMM9.DWG
DRAWING # :
30000
REV :
9
DATE :
31/01/2012
SHEET :
3 OF 6



MAIN DECK PLAN

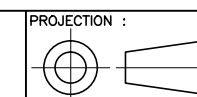
		Garde côtière canadienne Canadian Coast Guard	
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV25-30000RMM9.DWG	DATE : 31/01/2012	SHEET : 4 OF 6
DRAWN BY :	DRAWING # : 30000	REV : 9	



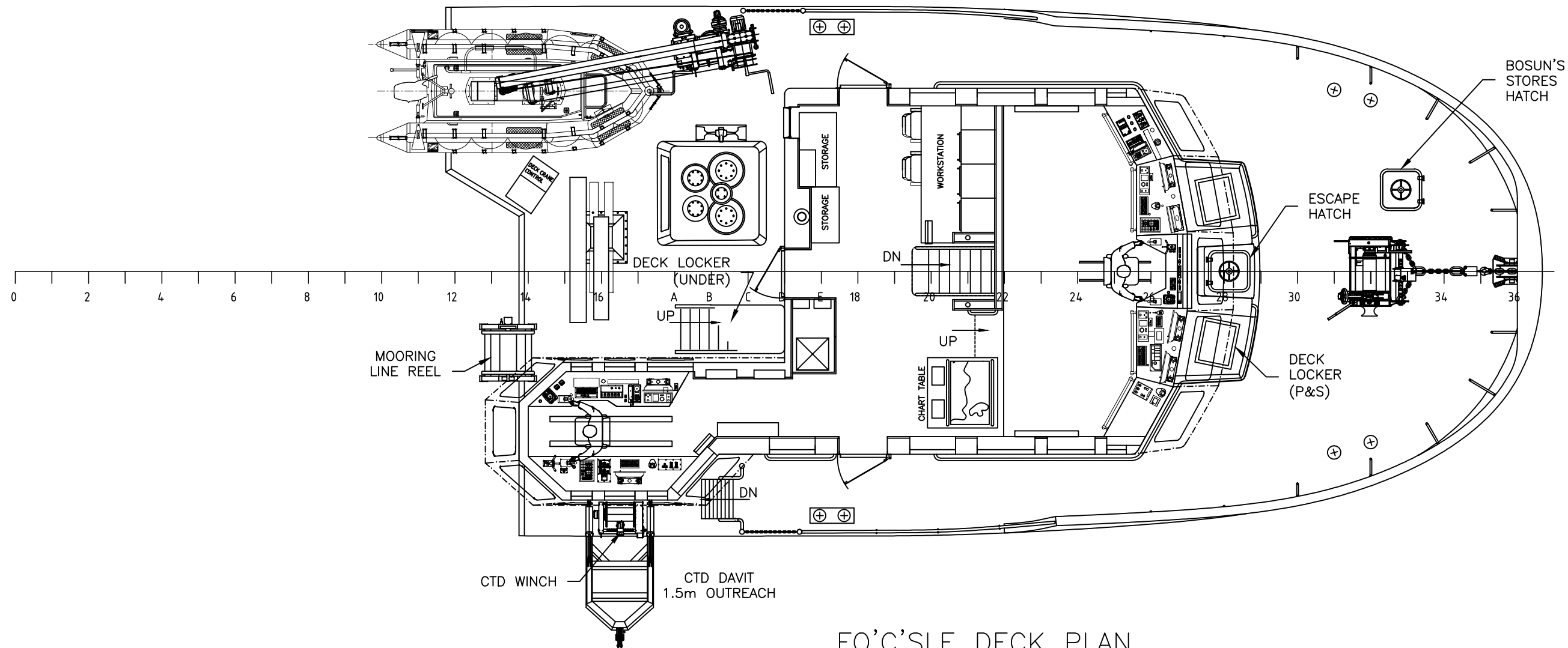
COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
GENERAL ARRANGEMENT
25M

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PROJECTION :



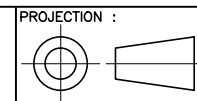
FO'C'SLE DECK PLAN



COMPANY :
**MÉRIDIEN MARITIME
RÉPARATION**

TITLE :
**GENERAL ARRANGEMENT
25M**

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PROJECTION :



**Garde côtière canadienne
Canadian Coast Guard**

NAVIRE 25M VESSEL
COQUE # / HULL #
008

PROJECT TITLE :
Navire semi-hauturier de recherche halieutique
Near Shore Fisheries Research Vessels

PROJECT # :
MR09-1113

DRAWING FILE :
ISV25-30000RMM9.DWG

DATE :
31/01/2012

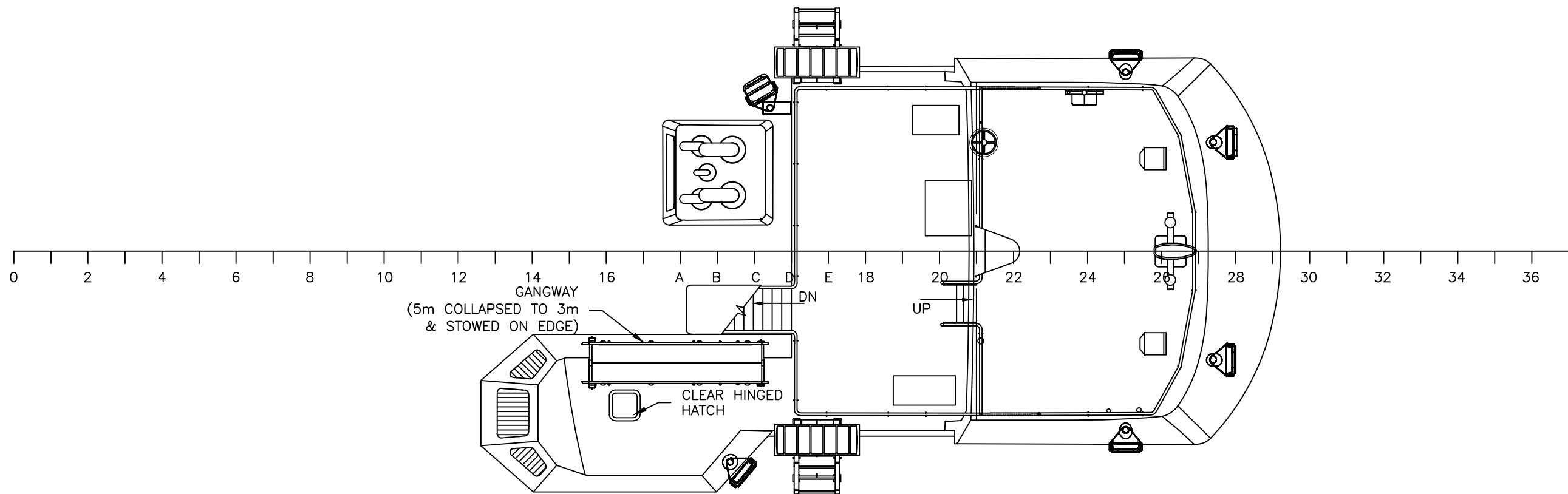
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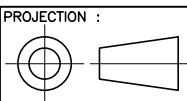
30000

REV :
9

SHEET :
5 OF 6



WHEELHOUSE TOP PLAN



GENERAL PARTICULARS/ CARACTÉRISTIQUES GÉNÉRALES

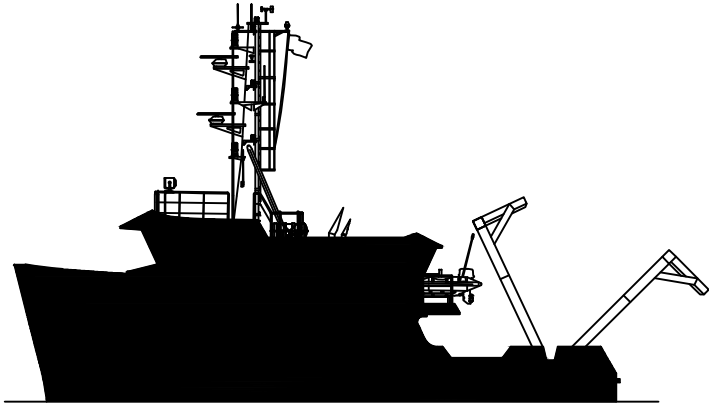
LENGTH OVERALL/ LONGUEUR HORS TOUT	25.00 m
LENGTH, WATERLINE/ LONGUEUR À LA LIGNE DE FLOTTAISON	23.80 m
BEAM, MOULDED/ LARGEUR HORS-MEMBRE	9.20 m
DEPTH, MOULDED/ CREUX SUR QUILLE	3.80 m
DRAFT, NAVIGATIONAL/ TIRANT D'EAU DE NAVIGATION	3.60 m
INSTALLED POWER/ PUISSANCE INSTALLÉE	714 kW
COMPLEMENT/ ÉQUIPAGE	15
CLASSIFICATIONS	
– BV 1 PHULL •MACH, SPECIAL SERVICE/RESEARCH VESSEL, COASTAL AREA.	
BV 1 PHULL •MACH, NAVIRE DE RECHERCHE/SERVICE SPÉCIFIQUE, ZONE CÔTIÈRE.	
– TRANSPORT CANADA CERTIFIED VESSEL FOR NEAR COAST VOYAGES CLASS 1	
– TRANSPORTS CANADA, NAVIRE CERTIFIÉ POUR LES VOYAGES À PROXIMITÉ DU LITTORAL, CLASSE 1	

NOTES:



1. ALL FIRE SAFETY EQUIPMENT AND ARRANGEMENT TO BE IN COMPLIANCE WITH IMO FSS CODE, BV, VESSEL CONTRACT SPECIFICATION, TRANSPORT CANADA AND ANY OTHER APPLICABLE REGULATIONS.
2. THE MAINTENANCE PLAN FOR FIRE–FIGHTING/PROTECTION EQUIPMENT AND SYSTEMS, AND A CREW MUSTER LIST SHALL BE PROVIDED ONBOARD THE VESSEL.
3. TRAINING MANUALS FOR FIRE–FIGHTING/PROTECTION SHALL BE PROVIDED IN CREW MESS ROOM AND WATCH ROOM OR IN EACH CREW CABIN.
4. SPARE CHARGES SHALL BE PROVIDED FOR 100% OF THE FIRST TEN EXTINGUISHERS INDICATED IN THIS DRAWING AND 50% OF THE REMAINING FIRE EXTINGUISHERS CAPABLE OF BEING RECHARGED ONBOARD. FOR FIRE EXTINGUISHERS WHICH CANNOT BE RECHARGED ONBOARD, ADDITIONAL PORTABLE FIRE EXTINGUISHERS OF THE SAME QUANTITY, TYPE, CAPACITY AND NUMBER SHALL BE PROVIDED IN LIEU OF SPARE CHARGES.

NOTES:

1. LES PIÈCES D'ÉQUIPEMENT DE SÉCURITÉ–INCENDIE ET LEUR DISPOSITIONS SUR LE NAVIRE DOIVENT SE CONFORMER AU CODE FSS DE L'IMO, BUREAU VÉRITAS, LES SPÉCIFICATIONS DU NAVIRE, TRANSPORTS CANADA ET TOUTES AUTRES RÉGLEMENTATIONS APPLICABLES.
2. LE PLAN D'ENTRETIEN D'ÉQUIPEMENT ET SYSTÈMES DE LUTTE ET PROTECTION CONTRE LES INCENDIES, AINSI QU'UN RÔLE D'APPEL DOIVENT ÊTRE SAUVEGARDÉS SUR LE NAVIRE.
3. LES MANUELS DE FORMATION DE L'ÉQUIPEMENT ET DES SYSTÈMES DE LUTTE ET PROTECTION CONTRE LES INCENDIES DOIVENT ÊTRE SAUVEGARDÉS DANS LES SALLES DE REPOS DE L'ÉQUIPAGE, LES POSTES DE CONTRÔLE, OU DANS LES CABINES INDIVIDUELLES DE L'ÉQUIPAGE.
4. FOURNIR DES CHARGES DE RÉSERVE POUR 100% DES PREMIERS 10 EXTINCTEURS INDIQUÉS SUR LE PLAN, ET 50% DES EXTINCTEURS RESTANTS CAPABLES D'ÊTRE RECHARGÉS À BORD. DES EXTINCTEURS ADDITIONNELS DE RÉSERVE DEVRONT ÊTRE FOURNIS POUR TOUT EXTINCTEUR INCAPABLE D'ÊTRE RECHARGÉ À BORD. CES EXTINCTEURS DE RÉSERVES DEVRONT ÊTRE DE LA MÊME QUANTITÉ, CAPACITÉ ET TYPE QUE LES EXTINCTEURS INDIQUÉS DANS LE PLAN.



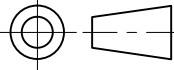
7	AS CONSTRUCTED	MM	MAY 2012
6	FIRE DAMPER	MM	APRIL 2012
5.2	MOVE LOCATION OF MESS FIRE STATION REMOVE NOVEC 1230 SYMBOL IN GALLEY REVISE CLASS OF DIVISION AROUND BOW THRUSTER UPDATE QUANTITY OF NOVEC RELEASE STATION RELOCATE REMOTE CONTROL FOR FUEL OIL VALVE UPDATE LOCATION/QTY VENTILATION DAMPER UPDATE QTY OF VENTILATION CLOSING APPLIANCE UPDATE QTY OF SMOKE DETECTOR	ACD	MARCH 2011
5.1	UPDATE LOCATION OF CONTROL STATION IN LEGEND	SF	NOV 2010
5	LAYOUT OF DOORS REVISED	SB	AUG 2010
REV.	REVISIONS	BY	DATE

















































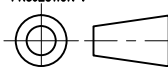
	Garde côtière canadienne Canadian Coast Guard		
NAVIRE 25M VESSEL COQUE # / HULL # 008	PROJECT TITLE : Navire semi–hauturier de recherche halieutique Near Shore Fisheries Research Vessels		
PROJECT # : MR09–1113	DRAWING FILE : ISV22–36000RMM7.DWG	DATE : MAY 2012	
DRAWN BY :	DRAWING # : 36000	REV : 	SHEET : 1 OF 5

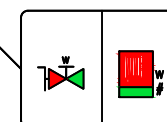
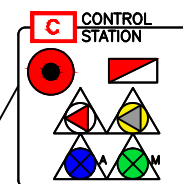
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PROJECTION :



DESCRIPTION		LOCATION & QUANTITY/ EMBLACEMENT ET QUANTITÉ					COMMENTS/ COMMENTAIRES	DESCRIPTION		LOCATION & QUANTITY/ EMBLACEMENT ET QUANTITÉ					COMMENTS/ COMMENTAIRES		
		TOTAL	FOCS'LE DECK/ GAILLARD	MAIN DECK/ PONT PRINCIPAL	LOWER ACCOM./ ACCOM. INFÉ.	HOLD-ER/ CALLE-SALLE DES MOTEURS				TOTAL	FOCS'LE DECK/ GAILLARD	MAIN DECK/ PONT PRINCIPAL	LOWER ACCOM./ ACCOM. INFÉ.	HOLD-ER/ CALLE-SALLE DES MOTEURS			
PUMPS, VALVES AND CONNECTIONS/ POMPES, SOUPAPES ET CONNEXIONS								FIXED FIRE-FIGHTING EQUIPMENT/ ÉQUIPEMENTS FIXES DE CONTRÔLE DES INCENDIES									
	FIRE PUMP/ POMPE À INCENDIE	2				2			STOWED BOTTLES/ BOUTEILLE D'AMARRAGE	1				1			
	FIRE HYDRANT/ PRISE D'EAU D'INCENDIE	5	1	2		2			RELEASE STATION/ STATION DE DÉCHARGE	2	1	1					
	FIRE MAIN SECTION VALVE/ SOUPAPE D'ISOLATION DU RÉSEAU COLLECTEUR D'INCENDIE	1		1					SPACE PROTECTED BY NOVEC1230/ ESPACE PROTÉGÉ PAR NOVEC1230	1				1			
	FIRE HOSE AND NOZZLE. # DENOTES HOSE LENGTH. / TUYAU ET TUYÈRE D'INCENDIE. # INDIQUE LA LONGUEUR DU TUYAU	5	1	2		2		MISCELLANEOUS/ DIVERS									
	INTERNATIONAL SHORE CONNECTION/ RACCORD INTERNATIONAL DE JONCTION AVEC LA TERRE	1		1					CONTROL STATION/ STATION DE CONTRÔLE	1	1						
LOCATION OF REMOTE CONTROLS/ COMMANDES À DISTANCE									FIRE STATION/ STATION D'INCENDIE						N/A		
	REMOTE CONTROL FOR FIRE PUMP(S)/ COMMANDE À DISTANCE DE LA POMPE À INCENDIE	1	1				MARCHE/ARRÊT LUMIÈRE VERTE/ROUGE		LOCKER WITH FIREFIGHTING OUTFIT. # DENOTES NUMBER OF OUTFITS. CASIER AVEC COMPLET DE POMPIER. # INDIQUE NOMBRE DE COMPLETS	2		2			AN OUTFIT SHALL CONSIST OF A SET OF PERSONAL EQUIPMENT AS PER SOLAS/ UN COMPLET COMPREND L'EQUIPEMENT TEL QUE PRESCRIT PAR SOLAS		
	FUEL OIL PUMP REMOTE SHUT-OFF/ ARRÊT À DISTANCE DE LA POMPE À CARBURANT	1	1				ARRÊT D'URGENCE AVEC ÉPAULEMENT "SHROUD"		FIRE PLAN IN WEATHERTIGHT ENCLOSURE/ PLAN DE FEUX DANS UN ENCADREMENT ÉTANCHE AUX INTÉMPÉRIES.	2		2					
	REMOTE CONTROL FOR FUEL OIL VALVE/ COMMANDE À DISTANCE DE LA SOUPAPE À CARBURANT	1		1			MARCHE/ARRÊT LUMIÈRE VERTE/ROUGE		FIRE AXE/ HACHETTE D'INCENDIE	2		2					
	ACCOMMODATION SPACES VENTILATION REMOTE SHUT-OFF/ ARRÊT À DISTANCE DE LA VENTILATION AUX ACCOMMODATIONS.	1	1				ARRÊT D'URGENCE AVEC ÉPAULEMENT "SHROUD"		CLOSING DEVICE FOR EXTERIOR VENTILATION TO ACCOMMODATION SPACES./ FERMETURE POUR LA VENTILATION EXTERIEURE AUX ACCOMMODATIONS.	1							
	MACHINERY SPACES VENTILATION REMOTE SHUT-OFF/ ARRÊT À DISTANCE DE LA VENTILATION AUX SALLES DES MACHINES	1	1				ARRÊT D'URGENCE AVEC ÉPAULEMENT "SHROUD"		FIRE DAMPER – ACCOMMODATION SPACES/ REGISTRE D'AIR AUX ACCOMMODATIONS	3		3					
DETECTORS, INDICATORS AND ALARM DEVICES/ DÉTECTEURS, INDICATEURS ET ALARMES									CLOSING DEVICE FOR EXTERIOR VENTILATION TO MACHINERY SPACES/ FERMETURE POUR LA VENTILATION EXTERIEURE AUX SALLES DES MACHINES	3	1	2					
	FIRE ALARM PUSH BUTTON/ BOUTON-POUSOIR D'ACTIVATION POUR L'ALARME D'INCENDIE	13	3	4	1	5			FIRE DAMPER – MACHINERY SPACES/ REGISTRE D'AIR AUX SALLES DES MACHINES								
	SPACE(S) MONITORED BY SMOKE DETECTOR/ ESPACES SURVEILLÉ D'UN DÉTECTEUR DE FUMÉE.	26	2	11	7	6			MEDICAL LOCKER/ TROUSSE DE PREMIERS SOINS	1		1					
	SPACE(S) MONITORED BY HEAT DETECTOR/ ESPACES SURVEILLÉ D'UN DÉTECTEUR DE CHALEUR	9		4		5			EMERGENCY SOURCE OF ELECTRICAL POWER/ SOURCE D'URGENCE DE POUVOIR ÉLECTRIQUE	1	1						
	FIRE ALARM PANEL/ PANNEAU D'ALARMES D'INCENDIE	1	1						EMERGENCY SWITCHBOARD/ TABLEAU DE CONTRÔLE D'URGENCE	1	1						
	FIRE ALARM BELL/ CLOCHE DE L'ALARME D'INCENDIE	10	1	4	1	4			MUSTER STATION – WITH STATION LETTER/ POSTE DE RASSEMBLEMENT AVEC LETTRE DU POSTE	1	1						
	GENERAL ALARM PUSH BUTTON/ BOUTON-POUSOIR D'ACTIVATION DE L'ALARME GÉNÉRALE	1	1					STRUCTURAL FIRE PROTECTION/ PROTECTION STRUCTURAL CONTRE LES INCENDIES									
	NOVEC1230 DISCHARGE HORN, SIGN AND LIGHT/ KLAXON, AFFICHE ET LUMIÈRE DE DÉCHARGE DE NOVEC1230	2		1		1			A-0 OR A-60 DIVISION AS INDICATED/ DIVISION A-0 OU A-60 TEL QU'INDIQUÉ		A-CLASS HINGED SELF-CLOSING FIRE DOOR/ PORTE COUPE-FEU À FERMETURE AUTOMATIQUE, À CHARNIÈRES, CLASSE-A			A-CLASS SELF CLOSING SLIDING FIRE DOOR/ PORTE COUPE-FEU À FERMETURE AUTOMATIQUE, COULISSANTE, CLASSE-A			
	HORN & STROBE/ SYRÈNE & STROBOSCOPE	1				1			B-0 CLASS DIVISION/ DIVISION CLASSE B-0		B-CLASS HINGED SELF-CLOSING FIRE DOOR/ PORTE COUPE-FEU À FERMETURE AUTOMATIQUE, À CHARNIÈRES, CLASSE-B			B-CLASS SELF CLOSING SLIDING FIRE DOOR/ PORTE COUPE-FEU À FERMETURE AUTOMATIQUE, COULISSANTE, CLASSE-B			
FIRE EXTINGUISHERS/ EXTINCTEURS DE FEUX									MAIN VERTICAL FIRE BOUNDARY/ LIMITE COUPE-FEU VERTICALE PRINCIPALE		A-CLASS HINGED FIRE DOOR/ PORTE COUPE-FEU À CHARNIÈRES CLASSE-A			A-CLASS SLIDING FIRE DOOR/ PORTE COUPE-FEU COULISSANTE CLASSE-A			PRIMARY ESCAPE ROUTE/ VOIE PRIMAIRE D'ÉVACUATION D'URGENCE
	CO2 PORTABLE FIRE EXTINGUISHER. # DENOTES kg./ EXTINCTEUR PORTABLE CO2. # INDIQUE kg.	2	1			1			B-CLASS HINGED FIRE DOOR/ PORTE COUPE-FEU À CHARNIÈRES CLASSE-B		B-CLASS SLIDING FIRE DOOR/ PORTE COUPE-FEU COULISSANTE CLASSE-B		B-CLASS SLIDING FIRE DOOR/ PORTE COUPE-FEU COULISSANTE CLASSE-B				
	DRY POWDER PORTABLE FIRE EXTINGUISHER. # DENOTES kg./ EXTINCTEUR PORTABLE À POUDRE SÈCHE. # INDIQUE LITRES.	2				2		<div><div>Garde côtière canadienne Canadian Coast Guard</div></div>									
	FOAM PORTABLE FIRE EXTINGUISHER. # DENOTES LITRES. EXTINCTEUR PORTABLE À MOUSSE. # INDIQUE LITRES.	6		2	1	3											
COMPANY : MÉRIDIEN MARITIME RÉPARATION		TITLE : FIRE SAFETY PLAN 25M			© THIS DRAWING IS BASED ON ROBERT ALLAN Ltd. DESIGN NO. 209-028 AND HAS BEEN DEVELOPED BY MERIDIEN MARITIME FOR PRODUCTION PURPOSES ONLY, WITH THE WRITTEN CONSENT OF ROBERT ALLAN LTD. ROBERT ALLAN LTD ASSUME NO RESPONSIBILITY WHATSOEVER FOR THIS ALTERED DRAWING. THE INTELLECTUAL PROPERTY RIGHTS TO THE DESIGN DESCRIBED HEREIN BELONG EXCLUSIVELY TO ROBERT ALLAN LTD. AND CANADA. THE DRAWINGS AND SPECIFICATIONS CONTAINED HEREIN SHALL NOT BE REPRODUCED IN WHOLE OR IN PART, NOR SHALL THEY BE GIVEN TO ANY THIRD PARTIES WITHOUT WRITTEN PERMISSION FROM THE OWNERS					PROJECTION : 		PROJECT # : MR09-1113		DRAWING FILE : ISV22-36000RMM7.DWG		DATE : 31/01/2012	
												DRAWN BY :		DRAWING # : 36000		SHEET : 2 OF 5	



Garde côtière canadienne
Canadian Coast Guard

NAVIRE 25M VESSE
COQUE # / HULL
008

PROJECT TITLE :	Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels
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PROJECT # :	MR09-111
DRAWN BY :	

3	DRAWING FILE : ISV22-36000RMM7.DWG		DATE : 31/01/2012
	DRAWING # : 36000	REV : 7	SHEET : 3 OF 5

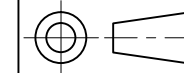


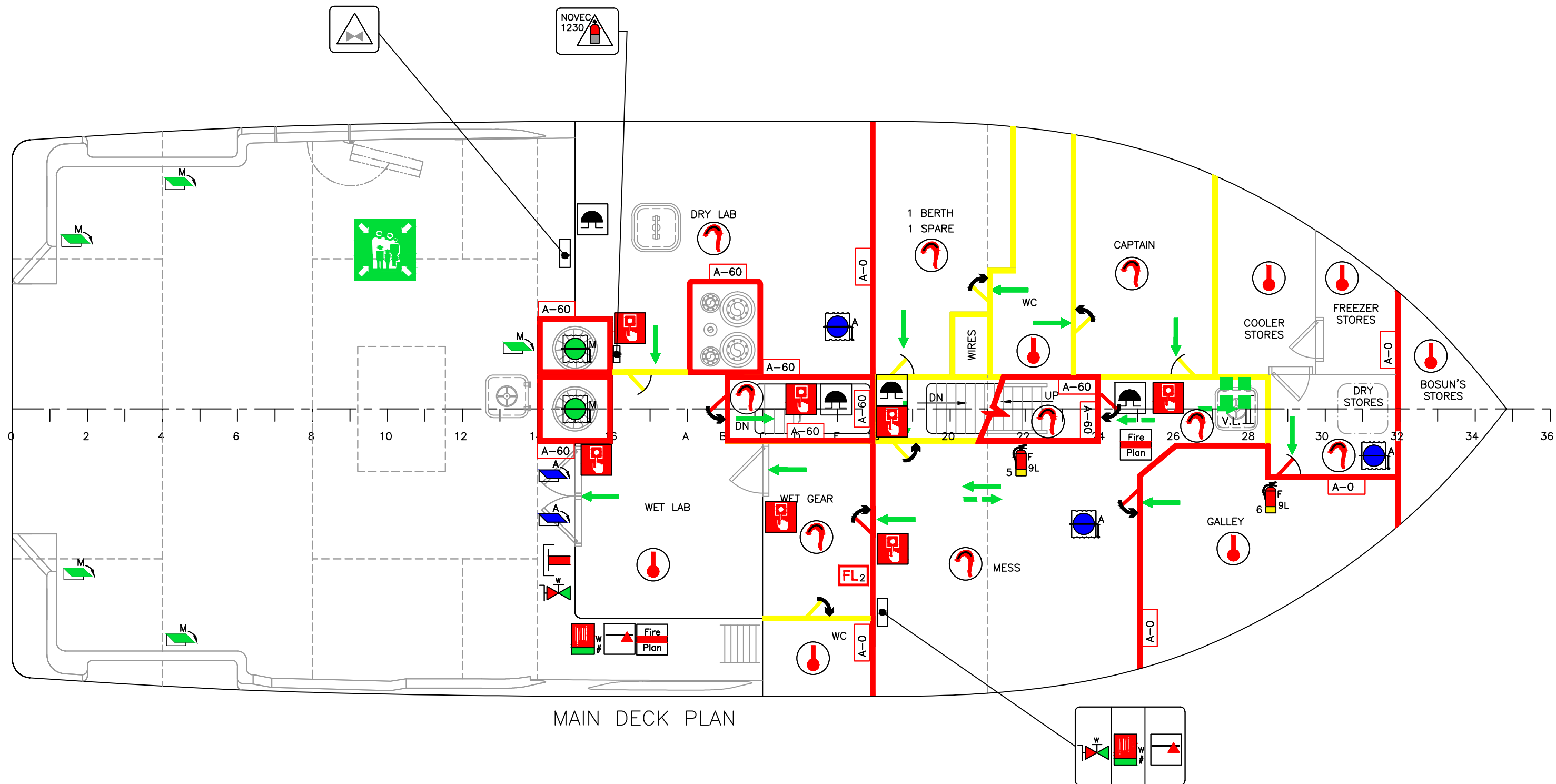
COMPANY : **MÉRIDIEN MARITIME
RÉPARATION**

TITLE :	FIRE SAFETY PLAN 25M
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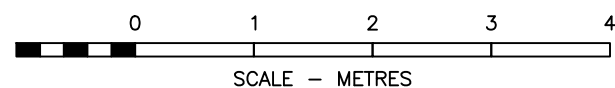
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PROJECTION :





MAIN DECK PLAN



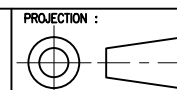
		Garde côtière canadienne Canadian Coast Guard	
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113		DRAWING FILE : ISV22-36000RMM7.DWG	
DRAWN BY :		REV : 36000	
DATE : 31/01/2012		SHEET : 4 OF 5	



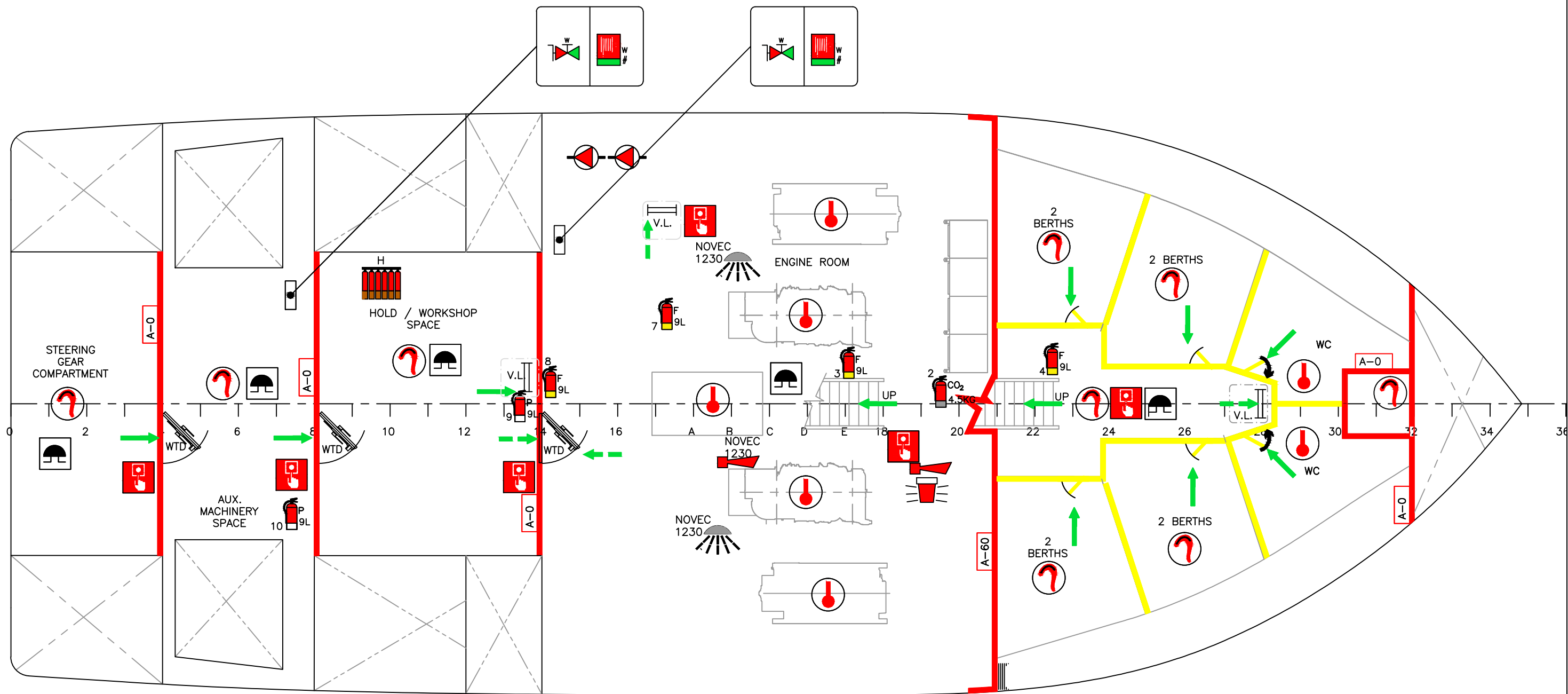
COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
FIRE SAFETY PLAN
25M

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PROJECTION :



HOLD PLAN

NOTES:

1. HULL CATHODIC PROTECTION REQUIREMENT ASSUMES HIGH QUALITY MARINE PAINT SYSTEM ON HULL.
2. USE CLASS GRADE-A MILD STEEL PLATING FOR DOUBLER PLATES.
3. USE WELDING PROCEDURE, MATERIALS, AND WORKMANSHIP IN ACCORDANCE WITH CLASSIFICATION SOCIETY RULES & REGULATIONS.
4. QUANTITIES ARE FOR HULL PROTECTION ONLY. ADDITIONAL ANODES WILL BE REQUIRED FOR NOZZLES, RUDDERS, ETC. AS PER SPECIFICATIONS AND VENDOR REQUIREMENTS.

CALCULATIONS:

1. CALCULATION QUANTITY FOR HULL ONLY, DOES NOT INCLUDE ANODES FOR BALLAST TANKS OR SEA CHESTS.

CATHODIC PROTECTION - APPROXIMATE QUANTITY SACRIFICIAL ANODES

Vessel Particulars:

Length25 Metres

Displacement305 tonnes

Underwater surface area

284sq. metres

Current Density:

Newly painted ships5-10 mA/sq.m

Typical for in service20 mA/sq.m

General RAL design value for new ships60 mA/sq.m

Select40mA/sq.m

Current Required:11.4 Amps

Consumption Rate:

Zinc alloy US Mil.-A-18001K, Ref. 112 kg/Amp. year

Select12kg/Amp. year

Yearly consumption:136 kg/yr

Required Years of Protection:1years

Total required mass of anodes136 kg

Selected Anodes:

Type	Weight lbs	Weight kg	Quantity	Length	Width	Depth
Z22	23	10.4	14	14"	6 1/2"	1 1/2"

Notes:

1. Dimensions are typical only - As they can vary between manufacturers, check if size critical.

Ref.:

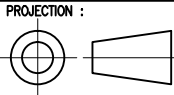
Recommended practice for the protection and painting of ships.


The British ship research Association

Chamber of shipping of the United Kingdom, 1973.

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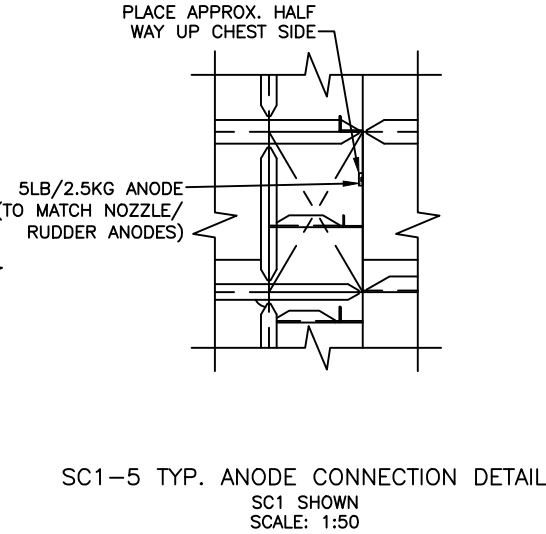
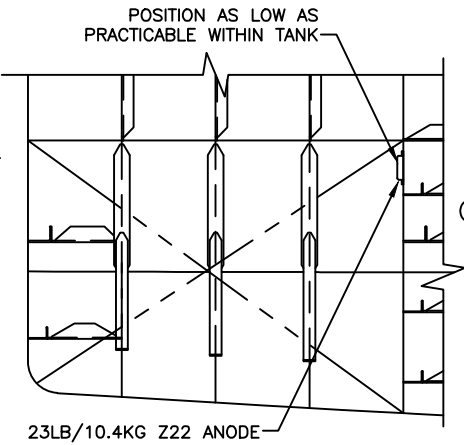
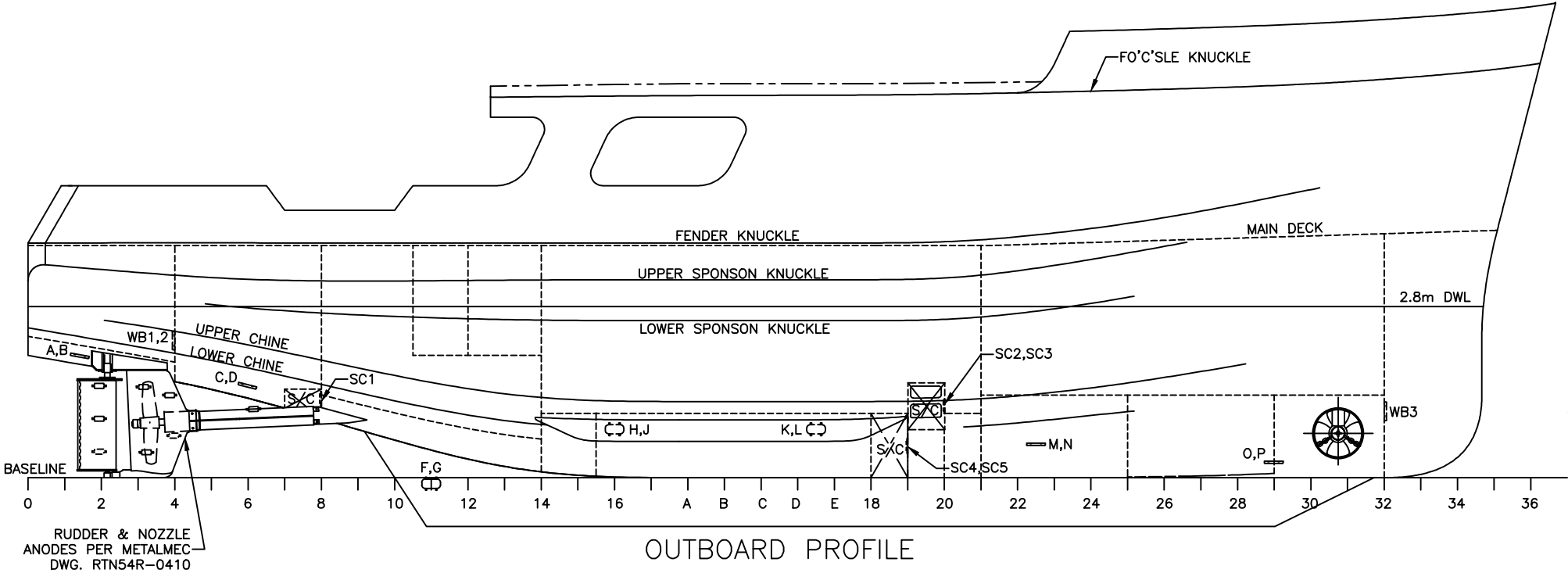
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3	AS CONSTRUCTED	MM	MAY 2012
2	CATHODIC PROTECTION ON ROPE GUARD	MM	MARCH 2012
REV.	REVISIONS	BY	DATE
	Garde côtière canadienne Canadian Coast Guard		
NAVIRE 25M VESSEL COQUE # / HULL # 008	PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels		
PROJECT # : MRO9-1113	DRAWING FILE : ISV25-38400RMM3.DWG	DATE : 31/01/2012	
DRAWN BY :	DRAWING # : 38400	REV : 3	SHEET : 1 OF 2

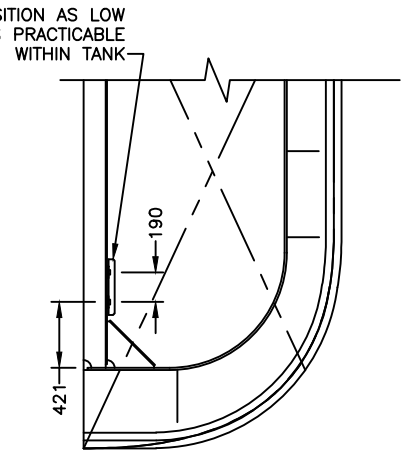
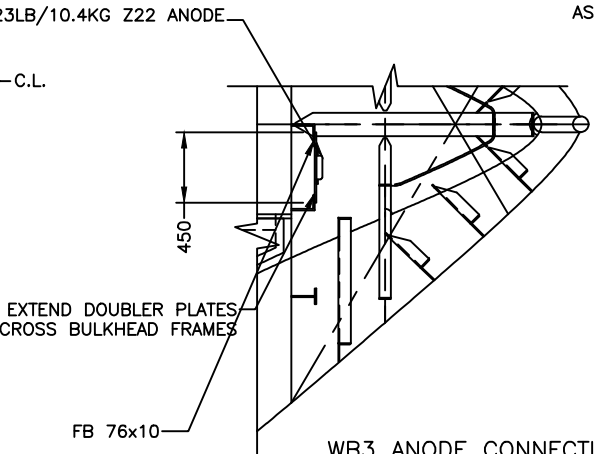
HULL PROTECTION

ANODE	ANODE LOCATION	DIST. TO CL (mm)
A,B	FR.1 1/2	1900
C,D	FR.6	2150
F,G	FR.11 SKEG	CENTRE ON SKEG
H,J	FR.16 BILGE KEEL	CENTRE ON BILGE KEEL
K,L	BTWN FR. D,E BILGE KEEL	CENTRE ON BILGE KEEL
M,N	SKEG/FR.22	2000
O,P	SKEG/FR.22	750
SC1	SEA CHEST	SEE DETAIL
SC2,SC3	SEA CHEST	SEE DETAIL
SC4,SC5	SEA CHEST	SEE DETAIL
WB1,WB2	BALLAST TANK 12P, 12S	SEE DETAIL
WB3	BALLAST TANK 1 (CENTRE)	SEE DETAIL

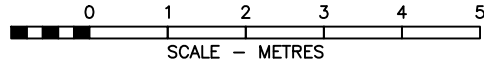
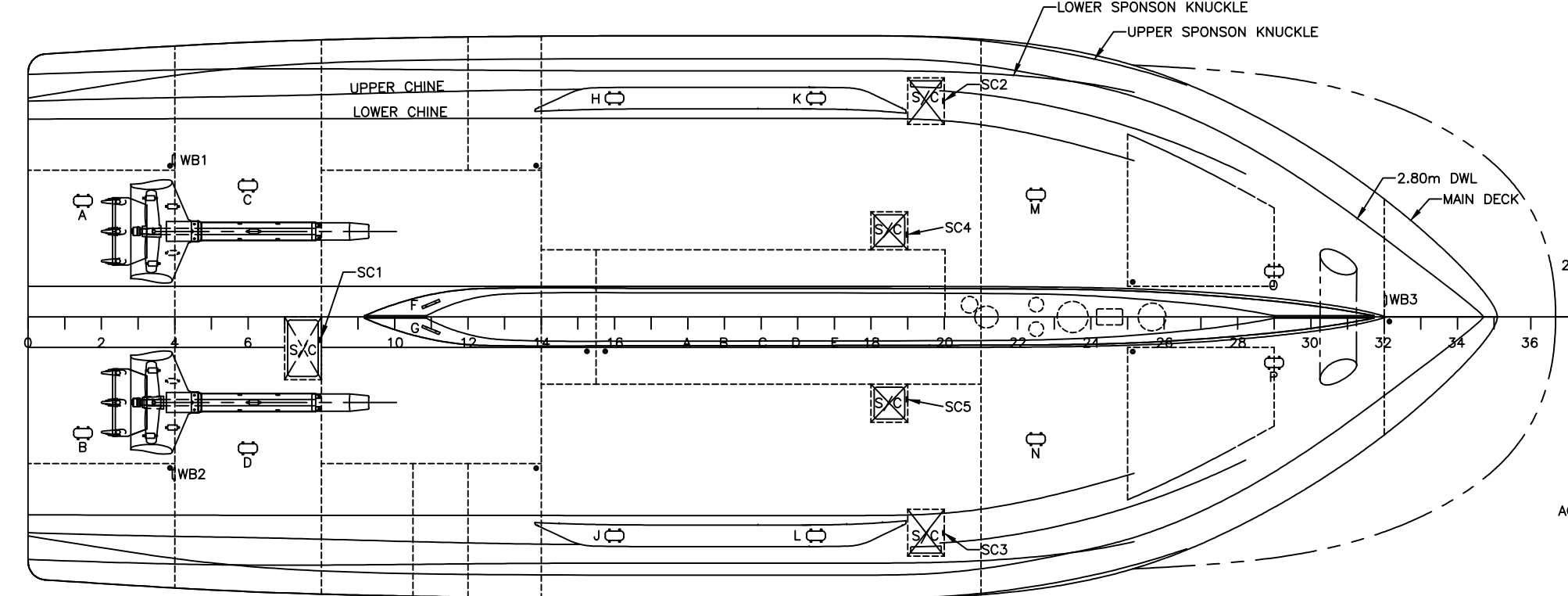



WB1,2 ANODE CONNECTION DETAIL
WB2 SHOWN
SCALE: 1:50

SC1-5 TYP. ANODE CONNECTION DETAIL
SC1 SHOWN
SCALE: 1:50



WB3 ANODE CONNECTION DETAIL
SCALE: 1:50

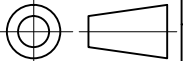


		Garde côtière canadienne Canadian Coast Guard	
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV25-38400RMM3.DWG	DATE : 31/01/2012	SHEET : 2 OF 2
DRAWN BY :	DRAWING # : 38400	REV : 3	

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COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
CATHODIC PROTECTION PLAN
25M

PROJECTION :


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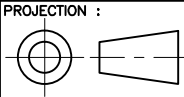


COMPANY :
**MÉRIDIEN MARITIME
RÉPARATION**


TITLE :

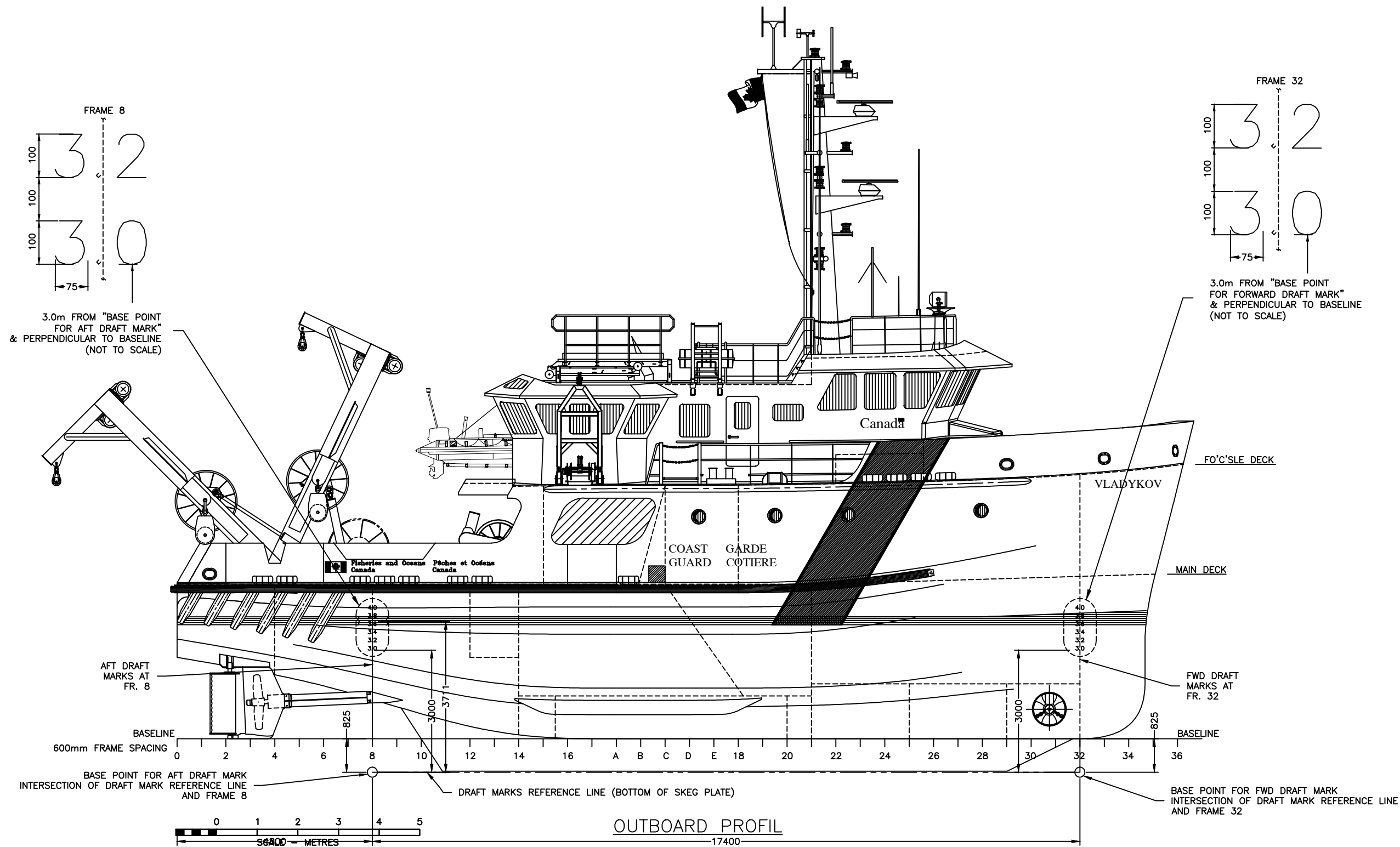
DRAFT MARKS
25M


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PROJECT # :	DRAWING FILE :	DATE :
MRO9-1113	ISV25-38541RMM4.DWG	31/01/2012
DRAWN BY :	DRAWING # :	SHEET :
	38541	1 OF 2

4	AS CONSTRUCTED	MM	JAN 2012
3	ADD 3.0/3.2/3.4 DRAFT MARKS	MM	JAN 2011
REV.	REVISIONS	BY	DATE
	Garde côtière canadienne Canadian Coast Guard		
NAVIRE 25M VESSEL COQUE # / HULL # 008	PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels		



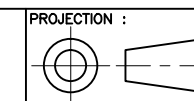
		Garde côtière canadienne Canadian Coast Guard	
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV25-38541RMM4.DWG	DATE : 31/01/2012	SHEET : 2 OF 2
DRAWN BY :	DRAWING # : 38541	REV : 4	



COMPANY :
**MÉRIDIEN MARITIME
RÉPARATION**

TITLE :
**DRAFT MARKS
25M**

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PROJECTION :

- NOTES:

1. SEE ALSO DRAWING 22210 "BULWARK STRUCTURE", 23430 "WINCH SEATINGS", AND 21010 "STRUCTURAL ARRANGEMENT"

2. PROVIDE DEVIL'S CLAW FITTINGS OF EQUAL OR GREATER STRENGTH THAN ANCHOR RODE.

3. FINALIZE ANCHOR POCKET POSITION, GEOMETRY AND CONSTRUCTION DETAILS WITH FINAL LOFTED HULL FORM.

4. REFER TO DRAWING 21010 "STRUCTURAL ARRANGEMENT" FOR FORWARD AND AFT MOORING BITTS DETAIL.
- NOTES:

1. SE REPORTER ÉGALEMENT AUX PLANS SUIVANTS:

– 22210 "BULWARK STRUCTURE",

– 23430 "WINCH SEATINGS", ET

– 21010 "STRUCTURAL ARRANGEMENT"

2. FOURNIR DES GRIFFES DE BOSSAGE DE RÉSISTANCE ÉGALE OU SUPÉRIEURE À LA CHAÎNE DE L'ANCRE.

3. LA POSITION DÉFINITIVE DU LOGEMENT DE L'ANCRE, AINSI QUE SA GÉOMÉTRIE ET SES DÉTAILS DE CONSTRUCTION DOIVENT ÊTRE DÉTERMINÉS D'APRÈS LE TRAÇAGE FINAL DE LA COQUE.

4. CONSULTER LE PLAN "21010 – STRUCTURAL ARRANGEMENT" POUR LES DÉTAILS DES BITTES D'AMARRAGE AVANTS ET ARRIÈRES.

ANCHOR AND CABLE RULES/ RÈGLEMENTS PORTANT SUR L'ANCRE ET SON CÂBLE		
	BUREAU VERITAS	TRANSPORT(S) CANADA
RULES/ RÈGLEMENT	CLASSIFICATION OF STEEL SHIPS – COASTAL NAVIGATION/ CLASSIFICATION DE NAVIRE EN ACIER – ZONE CÔTIÈRE	LARGE FISHING VESSEL/ GRAND BATEAU DE PÊCHE
MAIN ANCHOR/ ANCRE PRINCIPALE	360 kg	184 kg
SPARE ANCHOR*/ ANCRE DE RÉSERVE*	360 kg	123 kg
CHAIN DIAMETER (GRADE 2)/ DIAMÈTRE DE LA CHAÎNE (GRADE 2)	19 mm	19 mm
WIRE DIAMETER/ DIAMÈTRE DU CÂBLE	19 mm	19 mm
WIRE LENGTH*/ LONGUEUR DU CÂBLE	412.5 m	137.5 m

*

DENOTES ITEMS FOR WHICH THE VESSEL COMPLIES WITH TRANSPORT CANADA LARGE FISHING VESSEL INSPECTION REGULATIONS. INDIQUE UN ITEM QUI SE CONFORME AUX NORMES D'INSPECTION POUR LES GRANDS BATEAUX DE PÊCHE DE TRANSPORTS CANADA.

SELECTED ANCHOR EQUIPMENT/ ÉQUIPEMENT D'ANCRAGE SÉLECTIONNÉ		
MAIN ANCHOR/ ANCRE PRINCIPALE		
TYPE	AC–14	
WEIGHT/ POIDS	360	kg
SPARE ANCHOR/ ANCRE DE RÉSERVE		
TYPE	AC–14	
WEIGHT/ POIDS	150	kg
WINCH SHOWN/ TREUIL INDIQUÉ		
MANUFACTURER/ FABRICANT	HAWBOLDT INDUSTRIES	
MODEL/ MODÈLE	HSF–2226	
CABLE DIAMETER/ DIAMÈTRE DU CÂBLE	19	mm
CABLE LENGTH/ LONGUEUR DU CÂBLE	155	m
CHAIN LENGTH/ LONGUEUR DE LA CHAÎNE	10	m
CHAIN DIAMETER/ DIAMÈTRE DE LA CHAÎNE	19	mm

CE PLAN EST BASÉ SUR LE PLAN NO. 209–028. IL A ÉTÉ DÉVELOPPÉ UNIQUEMENT PAR MERIDIEN MARITIME À DES FINS DE PRODUCTION AVEC LA PERMISSION ÉCRITE DE ROBERT ALLAN LTÉE. ROBERT ALLAN LTÉE N'ASSUME AUCUNE RESPONSABILITÉ QUELLE QU'ELLE SOIT POUR CE PLAN MODIFIÉ. LA PROPRIÉTÉ INTELLECTUELLE DU PLAN CI-DÉCRIT APPARTIENT UNIQUEMENT À ROBERT ALLAN LTÉE ET AU CANADA. IL EST DÉFENDU DE REPRODUIRE LES PLANS ET LES DEVIS, CI-INCLUS, EN ENTIER OU EN PARTIE, OU DE LES PARTAGER AVEC UN TIERS SANS LA PERMISSION ÉCRITE DES PROPRIÉTAIRES.

10" DOUBLE BITT (P&S)
SEE DRAWING 21010 "STRUCTURAL
ARRANGEMENT" FOR DETAILS
18" height above Main Deck (MM)

6" DOUBLE BITT (P&S)
SEE PAGE 4 FOR DETAILS

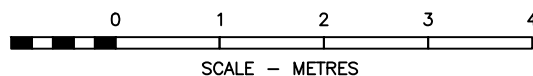
SPARE ANCHOR
PROVIDE SECURING MEANS

10" DOUBLE BITT (P&S) FINAL ORIENTATION
TO BE DECIDED AT SHIP IN CONSULTATION WITH
OWNER'S REPRESENTATIVE. SEE DRAWING 21010
"STRUCTURAL ARRANGEMENT" FOR DETAILS
(MM) : 24" Height Above Main Deck

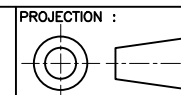
FOR EMERGENCY
TOWING PURPOSES


FOR EMERGENCY
TOWING PURPOSES

MOORING POINTS



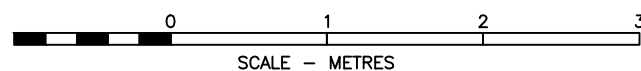
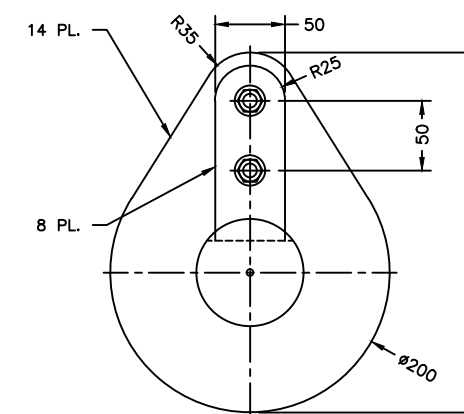
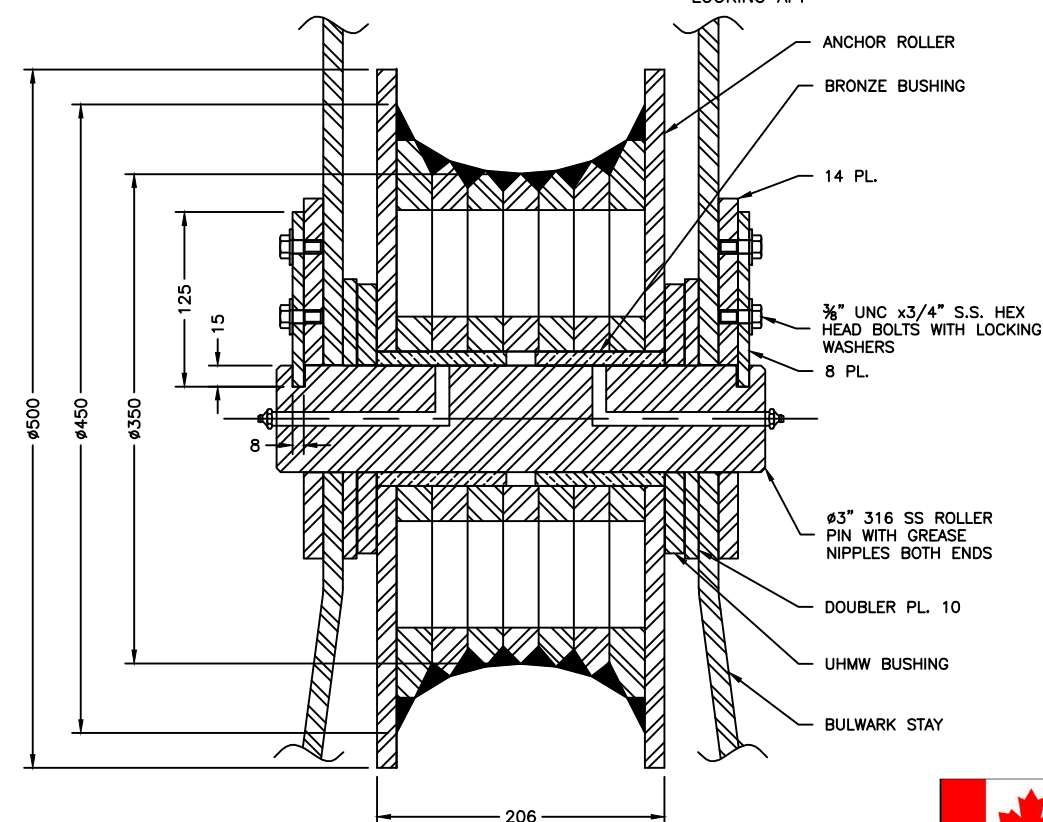
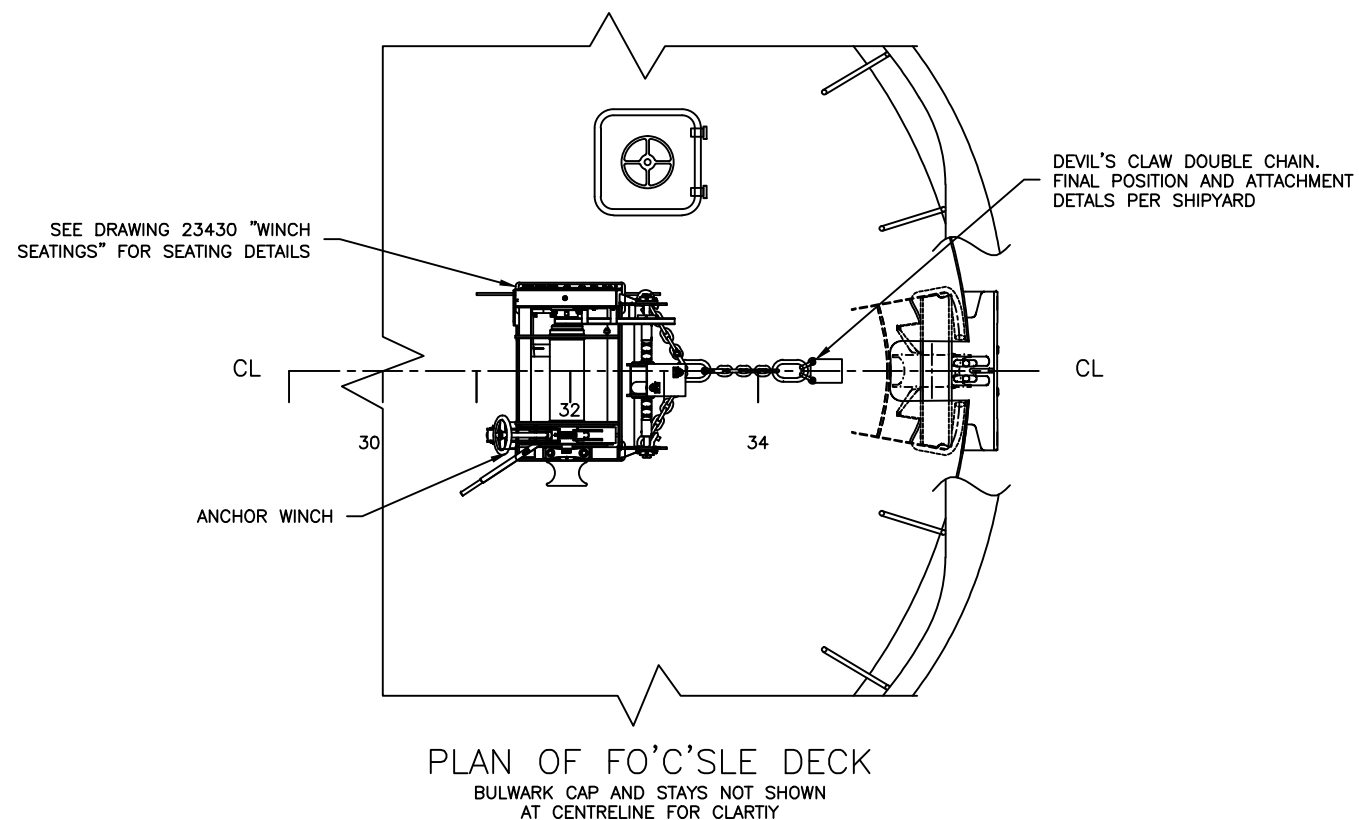
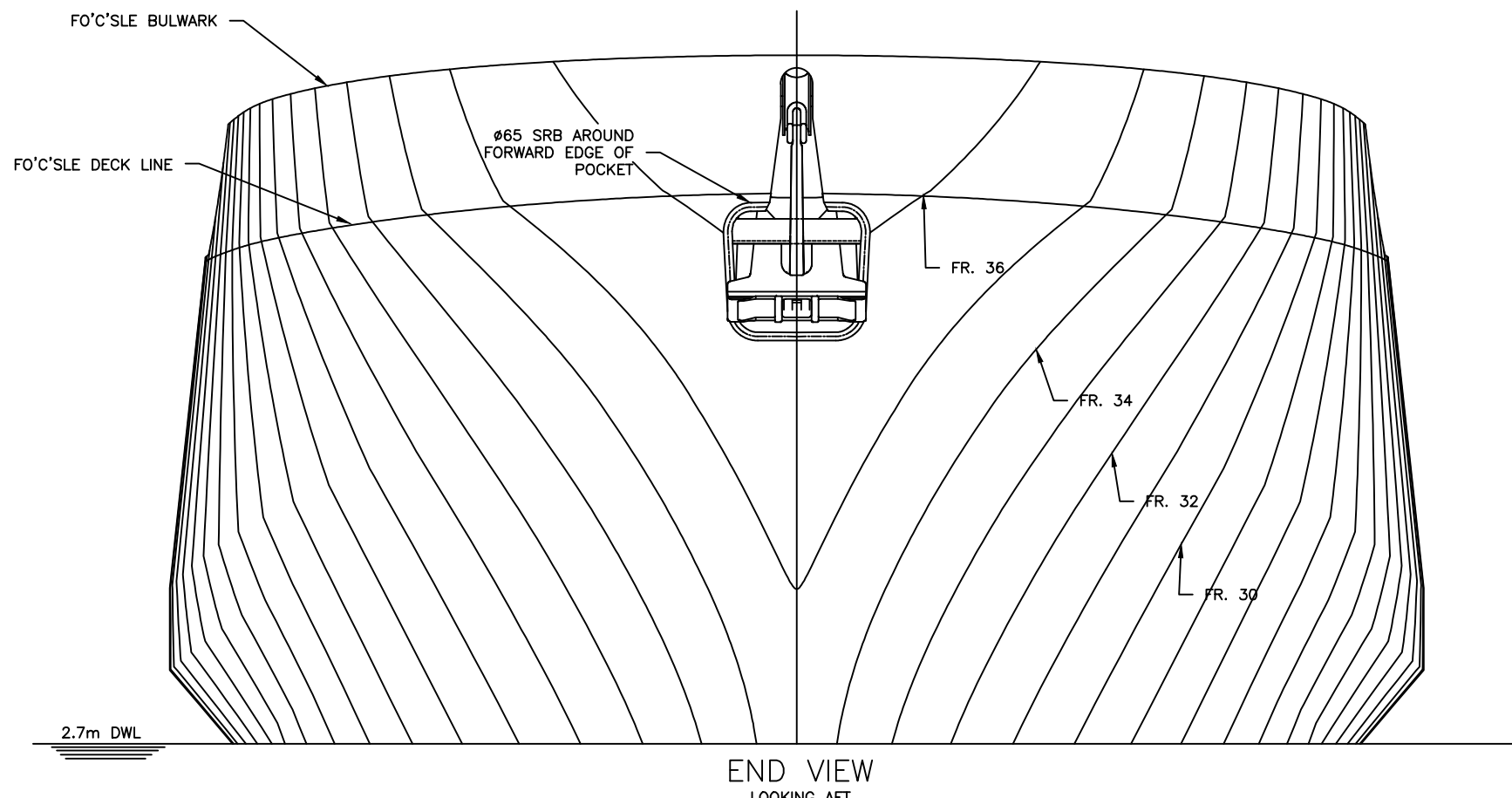
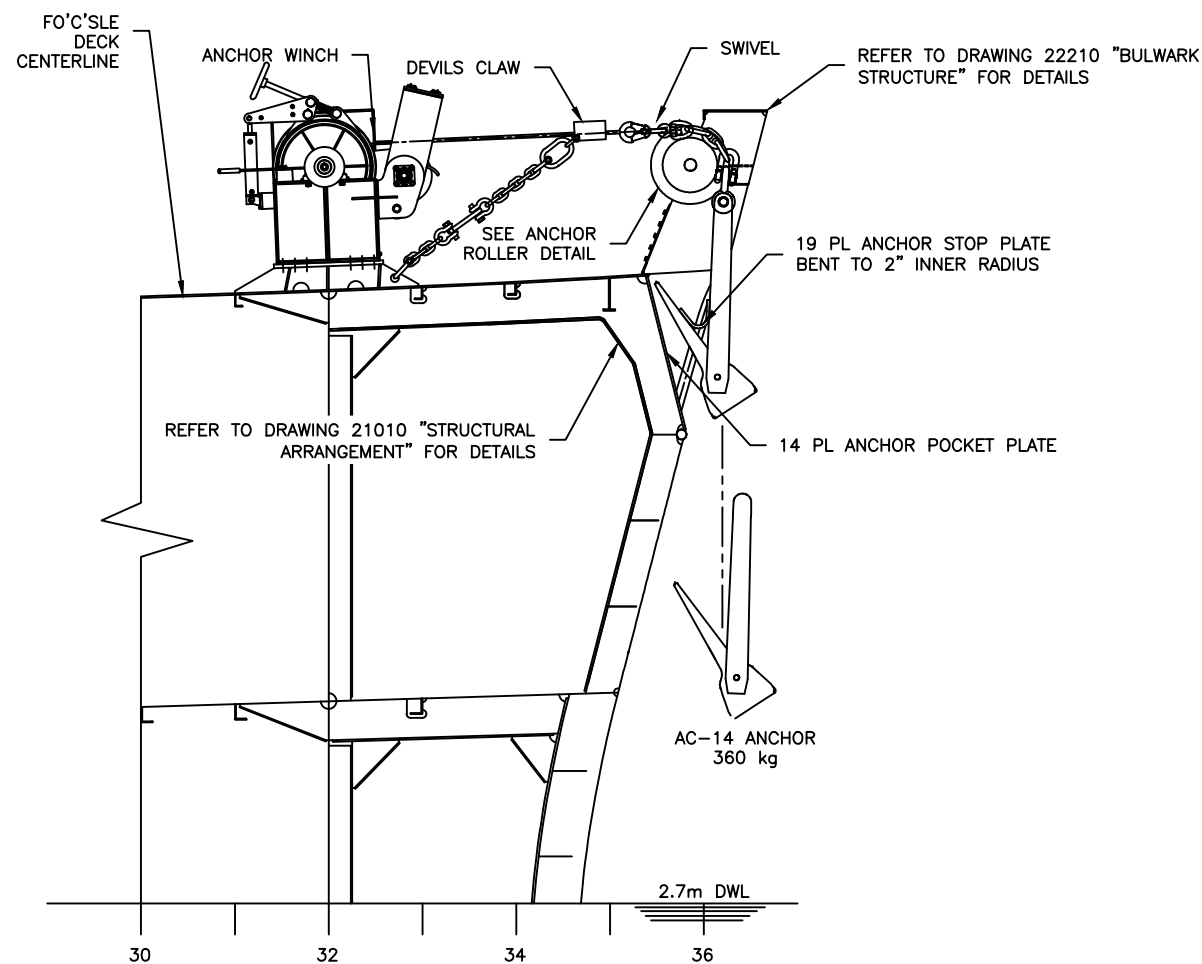
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		Garde côtière canadienne Canadian Coast Guard	
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV22-40500RMM6.DWG	DATE : 31/01/2012	SHEET : 2 OF 4
DRAWN BY :	DRAWING # : 40500	REV : 6	

COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

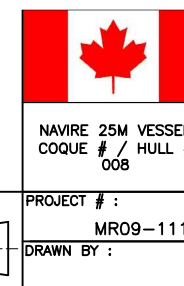
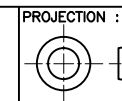
TITLE :
ANCHOR & MOORING ARRANGEMENT
25M



COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

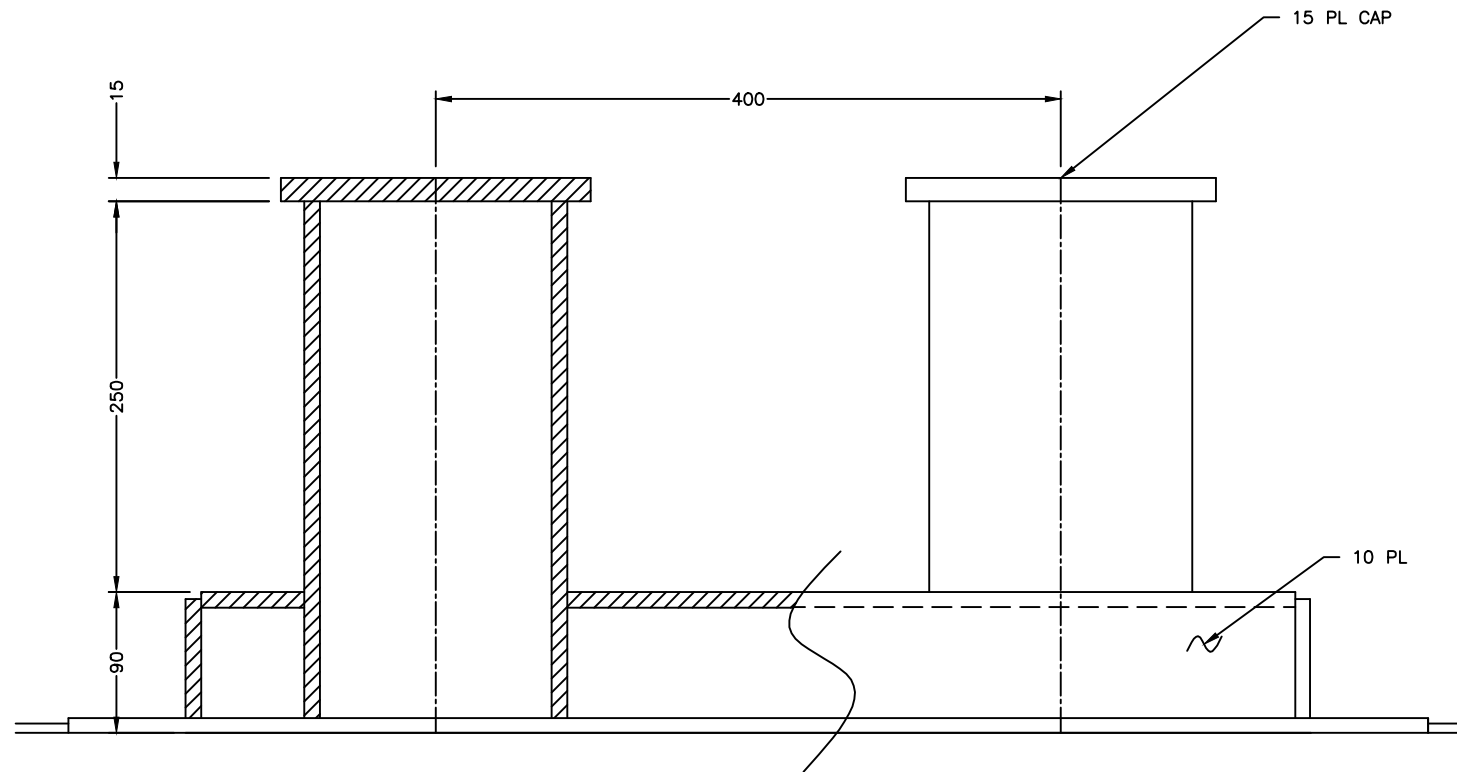
TITLE :
ANCHOR & MOORING ARRANGEMENT
25M

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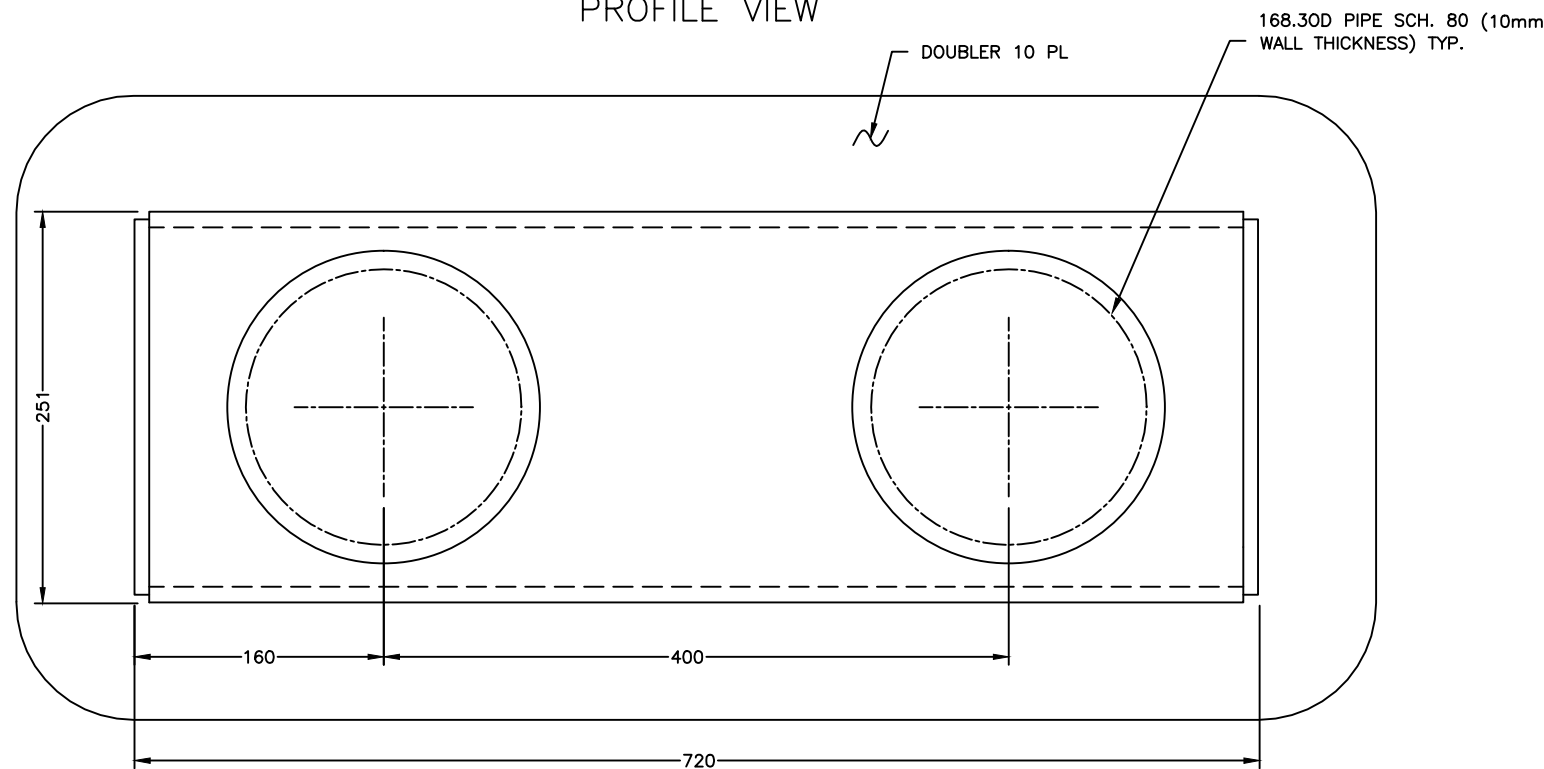
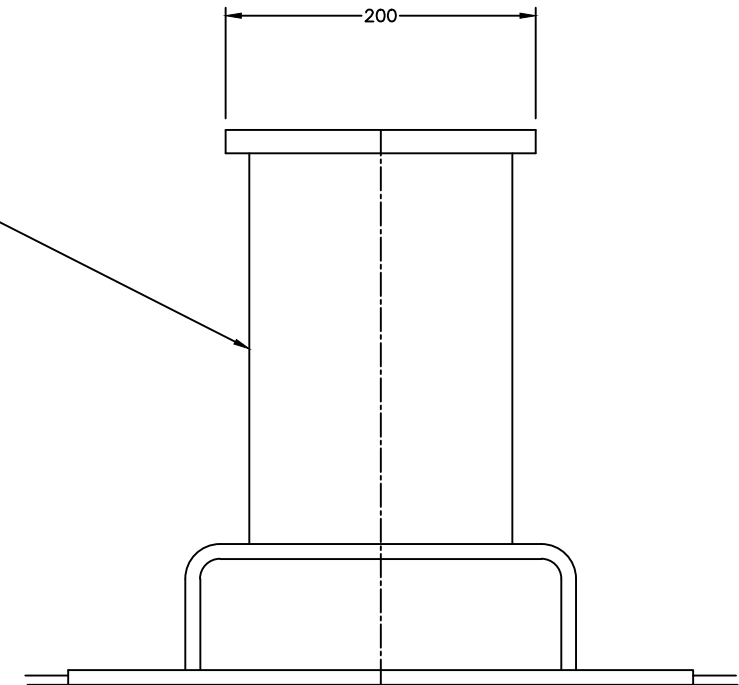


Garde côtière canadienne
Canadian Coast Guard

NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV22-40500RMM6.DWG	DATE : 31/01/2012	
DRAWN BY :	DRAWING # : 40500	REV : 6	SHEET : 3 OF 4

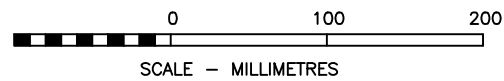


168.30D PIPE SCH. 80 (10mm
WALL THICKNESS) TYP.



MOORING BITT DETAIL

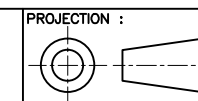
FOR FORWARD AND AFT MOORING BITTS
DETAIL, REFER TO DRAWING 21010
"STRUCTURAL ARRANGEMENT"



COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
ANCHOR & MOORING ARRANGEMENT
25M

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PROJECTION :

		Garde côtière canadienne Canadian Coast Guard		
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels		
PROJECT # : MR09-1113	DRAWING FILE : ISV22-40500RMM6.DWG	DATE : 31/01/2012		
DRAWN BY :	DRAWING # : 40500	REV : 6	SHEET : 4 OF 4	

NOTES:

1. VERIFY ALL EQUIPMENT WITH MANUFACTURERS CERTIFIED DRAWINGS. ARRANGEMENT BASED ON EQUIPMENT SHOWN. UPDATE TO SUIT SELECTED EQUIPMENT.
2. PROVIDE AND INSTALL ALL EQUIPMENT, SHAFTS, COUPLINGS, ETC. IN ACCORDANCE WITH MANUFACTURER AND CLASS REQUIREMENTS, TO THE SATISFACTION OF THE MANUFACTURER AND ATTENDING SURVEYOR.
3. INSTALL ALL MACHINERY AND EQUIPMENT WITH ADEQUATE ACCESS FOR SERVICE AND MAINTENANCE. PROVIDE SUFFICIENT ALLOWANCE FOR COMPONENT WITHDRAWAL, INCLUDING APPROPRIATE LIFTING GEAR.
4. PROVIDE GUARDS IN WAY OF HOT OR ROTATING MACHINERY TO PROTECT PERSONNEL FROM INJURY.
5. STERN TUBE AND BEARING BOSS MATERIAL TO MATCH HULL.
6. SEE RAL SPEC SECTION 380: PAINTING AND PROTECTION, FOR PAINTING REQUIREMENTS.

NOTES:

1. VÉRIFIER L'ÉQUIPEMENT D'APRÈS LES PLANS CERTIFIÉS DES FABRICANTS. L'AMÉNAGEMENT EST BASÉ SUR L'ÉQUIPEMENT INDIQUÉ. MODIFIER LE PLAN SELON L'ÉQUIPEMENT SÉLECTIONNÉ.
2. FOURNIR ET INSTALLER L'ÉQUIPEMENT (ARBRES, COUPLAGE, ETC.) CONFORMÉMENT AUX EXIGENCES DU FABRICANT ET AUX NORMES DE CLASSIFICATION. INSTALLER L'ÉQUIPEMENT À LA SATISFACTION DU FABRICANT ET DE L'INSPECTEUR PRÉSENT.
3. INSTALLER LA MACHINERIE ET LES PIÈCES D'ÉQUIPEMENT DE FAÇON À PERMETTRE LEUR ACCÈS ET ENTRETIEN, AINSI QUE LE MONTAGE ET DÉMONTAGE DE LEUR COMPOSANTS.
4. INSTALLER DES RAMBARDES AUTOUR DE LA MACHINERIE EN ROTATION ET À TEMPÉRATURE ÉLEVÉE AFIN D'ÉVITER DE BLESSER LE PERSONNEL.
5. LE MATÉRIEL DU TUBE D'ÉTAMBOT ET DU BOSSAGE DE PALIER DOIT CORRESPONDRE À CELUI DE LA COQUE.
6. CONSULTER LA SECTION 380 DES SPÉCIFICATIONS DU NAVIRE POUR LES DÉTAILS ET EXIGENCES DE PEINTURE.

CALCULATIONS:

REF: BUREAU VERITAS RULES AND REGULATIONS FOR THE CLASSIFICATION OF SHIPS, APRIL 2007
PART D, CHAPTER 21, SEC 3, ARTICLE 7

7.2.2 SHAFT LINERS

$$e = (d+230) / 32$$

where:

d =

ACTUAL DIAMETER OF THE PROPELLER SHAFT,
IN mm.

=

102

mm

e =

REQUIRED SHAFT LINER THICKNESS

=

10.4

mm

7.2.3 STERN BEARING a) WATER LUBRICATION

$$L = 2 \times d$$

d =

RULE DIAMETER OF THE PROPELLER SHAFT

=

102

mm

L =

REQUIRED STERN BEARING LENGTH

=

204

mm

=

0

PART B, CHAPTER 10, SEC 3, ARTICLE 1
1.2.3 SCANTLINGS OF PROPELLER SHAFT BOSSING

$$t \geq 0.33 dp$$

dp =

PROPELLER SHAFT DIAMETER

=

102

mm

t =

REQUIRED SHAFT BOSSING THICKNESS

=

33.66

mm


CHOSEN SHAFT BOSSING THICKNESS

=

34

mm

CE PLAN EST BASÉ SUR LE PLAN NO. 209-028. IL A ÉTÉ DÉVELOPPÉ UNIQUEMENT PAR MERIDIEN MARITIME À DES FINS DE PRODUCTION AVEC LA PERMISSION ÉCRITE DE ROBERT ALLAN LTÉE. ROBERT ALLAN LTÉE N'ASSUME AUCUNE RESPONSABILITÉ QUELLE QU'ELLE SOIT POUR CE PLAN MODIFIÉ. LA PROPRIÉTÉ INTELLECTUELLE DU PLAN CI-DÉCRIT APPARTIENT UNIQUEMENT À ROBERT ALLAN LTÉE ET AU CANADA. IL EST DÉFENDU DE REPRODUIRE LES PLANS ET LES DEVIS, CI-INCLUS, EN ENTIER OU EN PARTIE, OU DE LES PARTAGER AVEC UN TIERS SANS LA PERMISSION ÉCRITE DES PROPRIÉTAIRES.

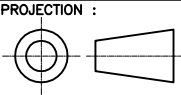
4	AS CONSTRUCTED	MM	MAY 2012
3	ROPE GUARD	MM	APRIL 2012
REV.	REVISIONS	BY	DATE
		Garde côtière canadienne Canadian Coast Guard	
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # :	DRAWING FILE :	DATE :	
MR09-1113	ISV22-52600RMM4.DWG	MAY 2012	
DRAWN BY :	DRAWING # :	REV :	SHEET :
	52600	4	1 OF 4



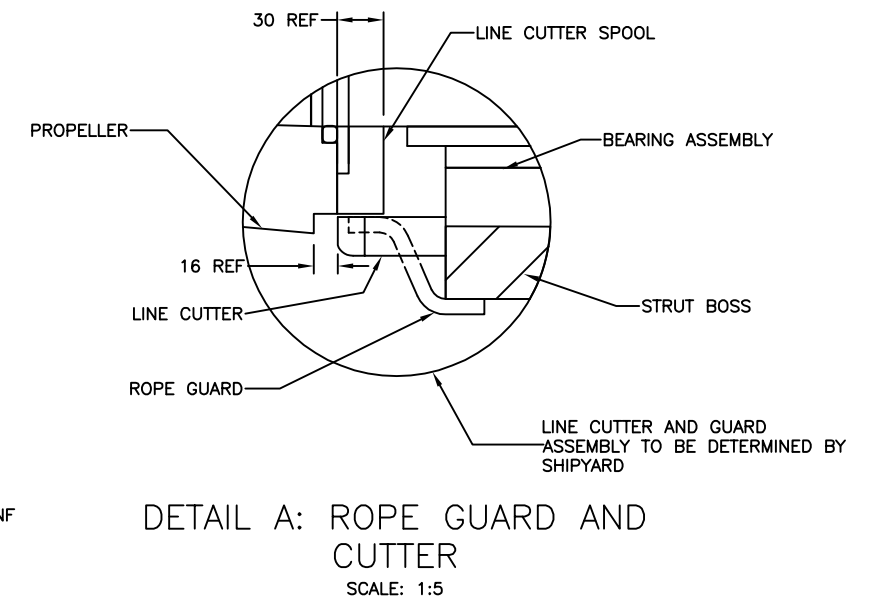
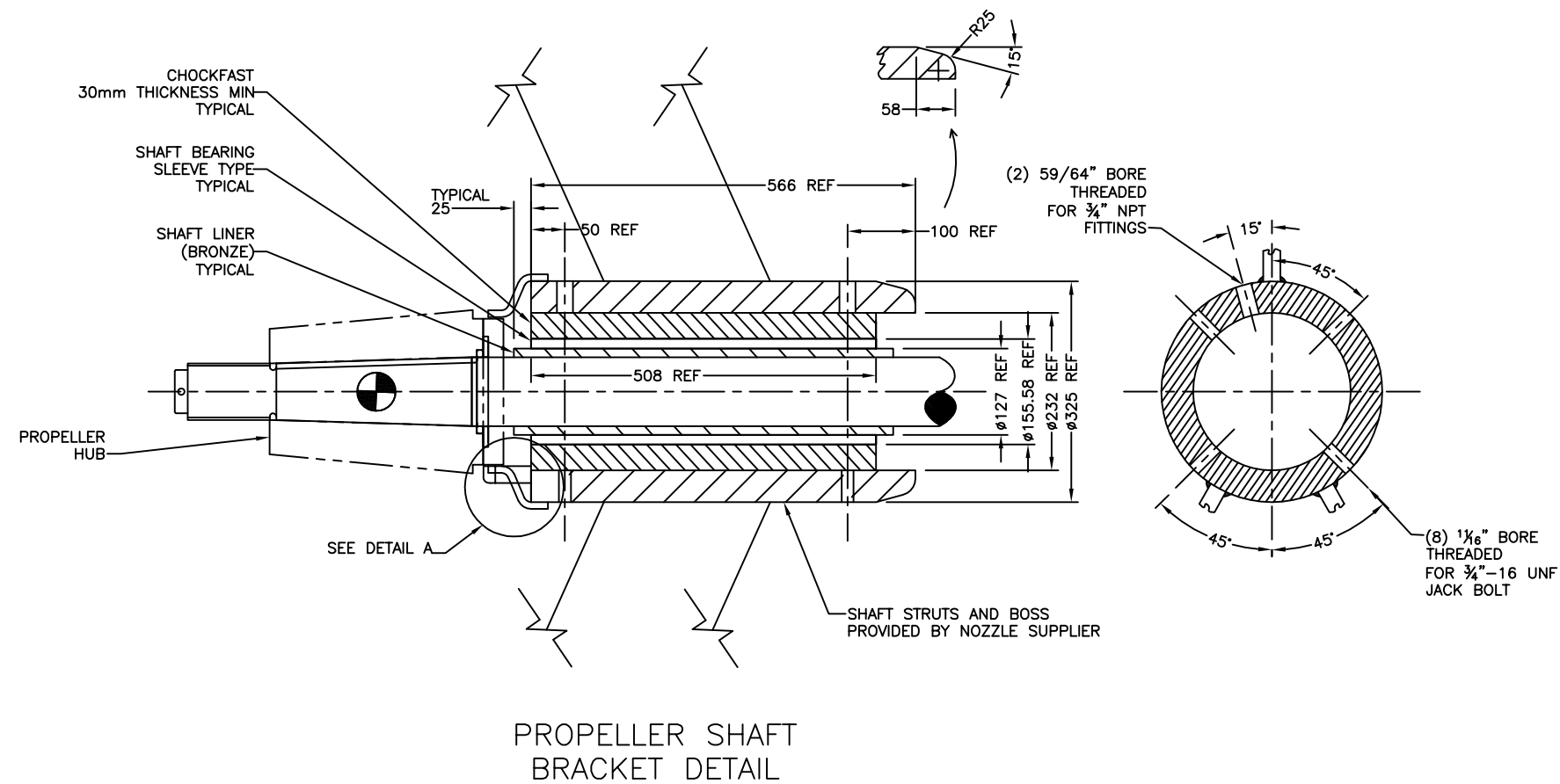
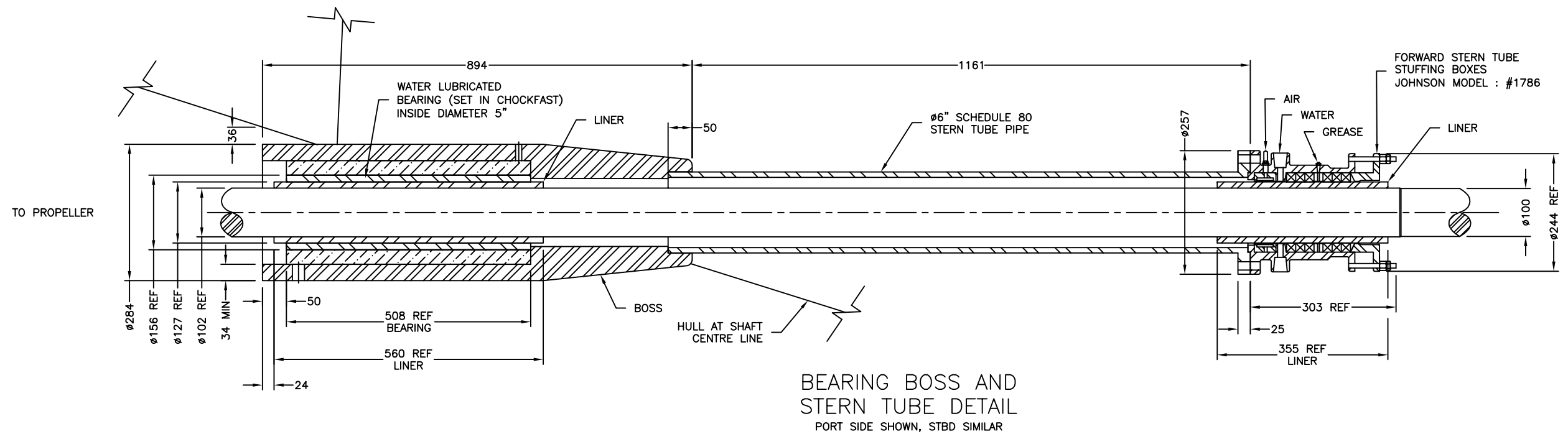
COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
STERN TUBE & SHAFT BRACKET
ARRANGEMENT – 25M


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PROJECTION :



0 200 400
SCALE - MILLIMETRES

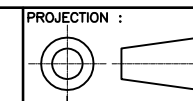
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NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV22-52600RMM4.DWG	DATE : MAY 2012	
DRAWN BY :	DRAWING # : 52600	REV : 4	SHEET : 2 OF 4



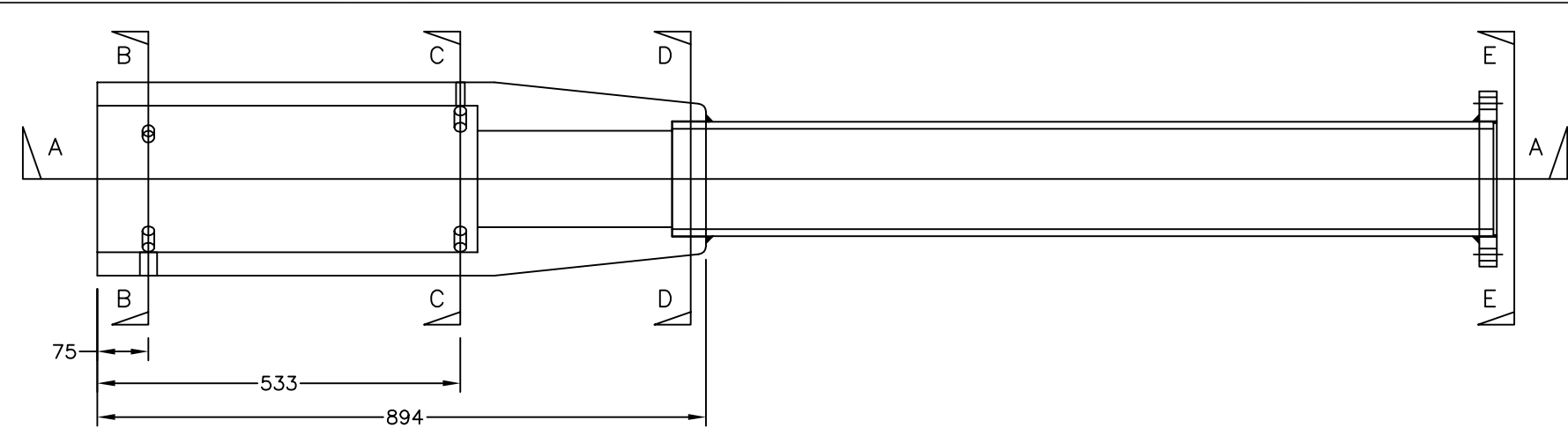
COMPANY :
MRIDIENT MARITIME
RPARATION

TITLE :
**STERN TUBE & SHAFT BRACKET
ARRANGEMENT - 25M**

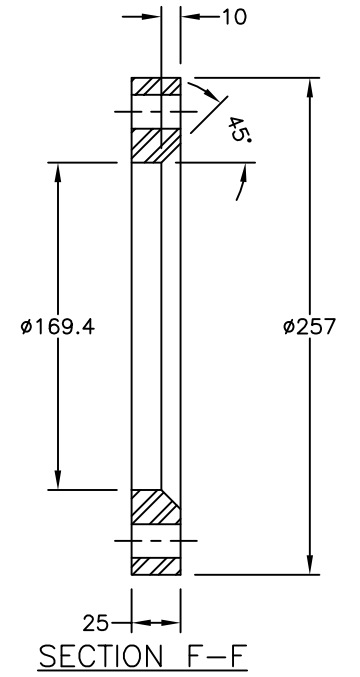
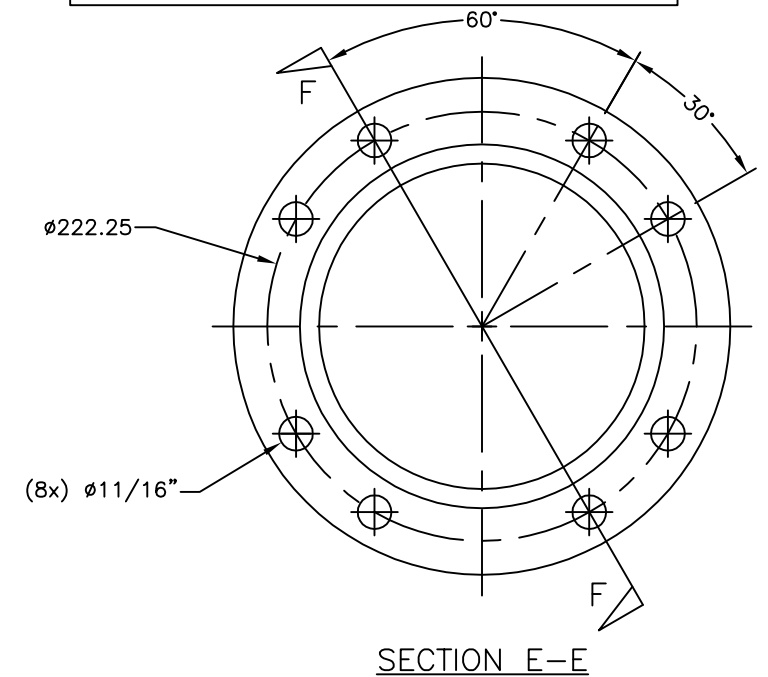
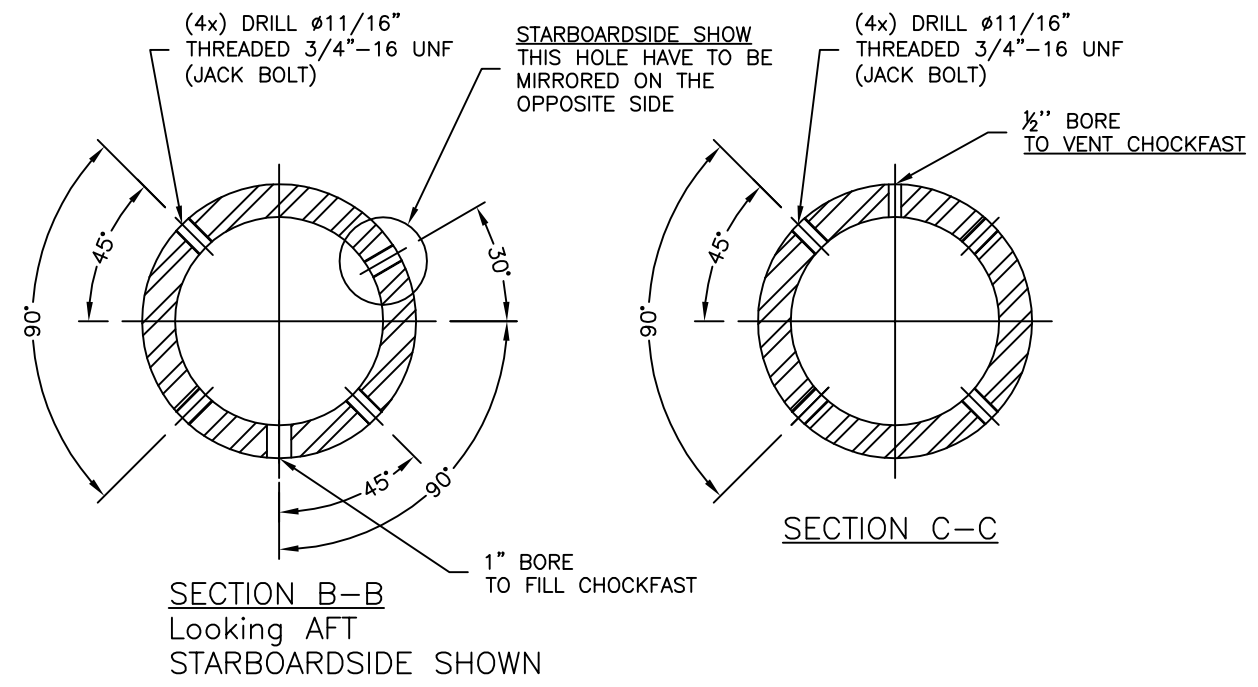
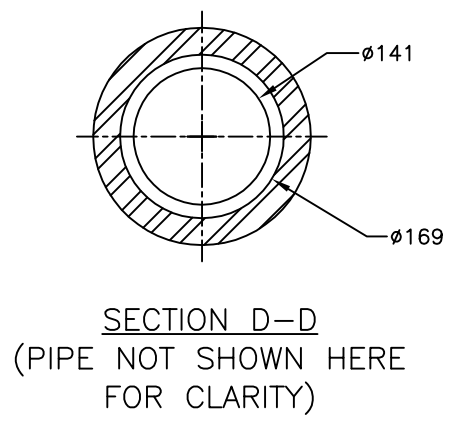
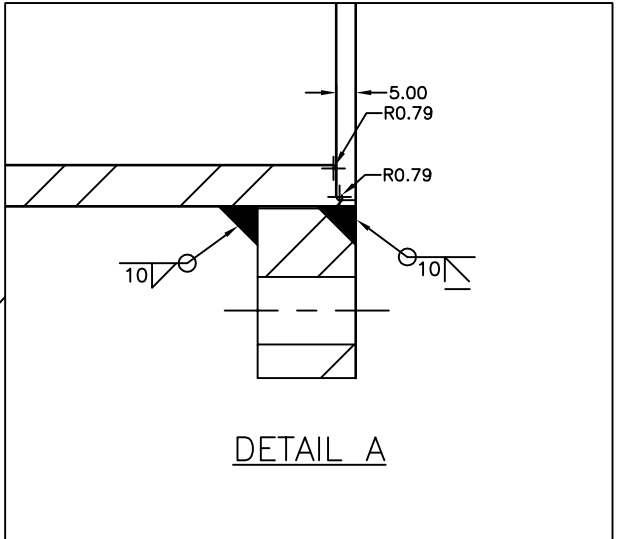
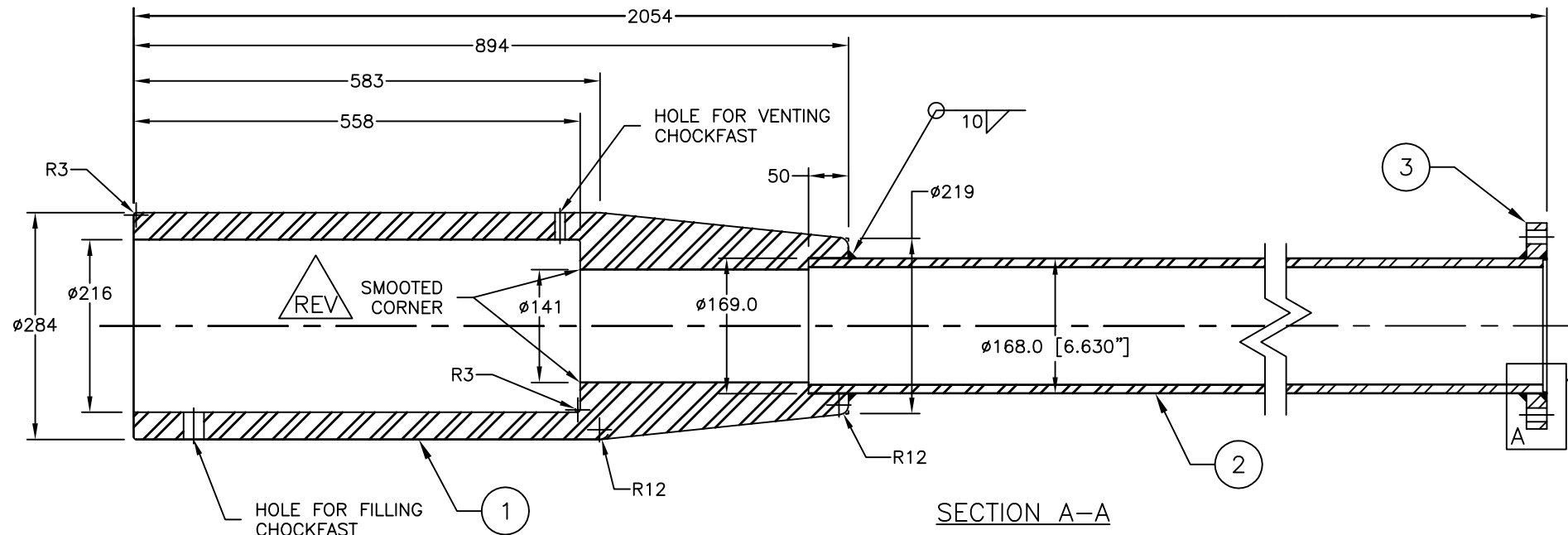
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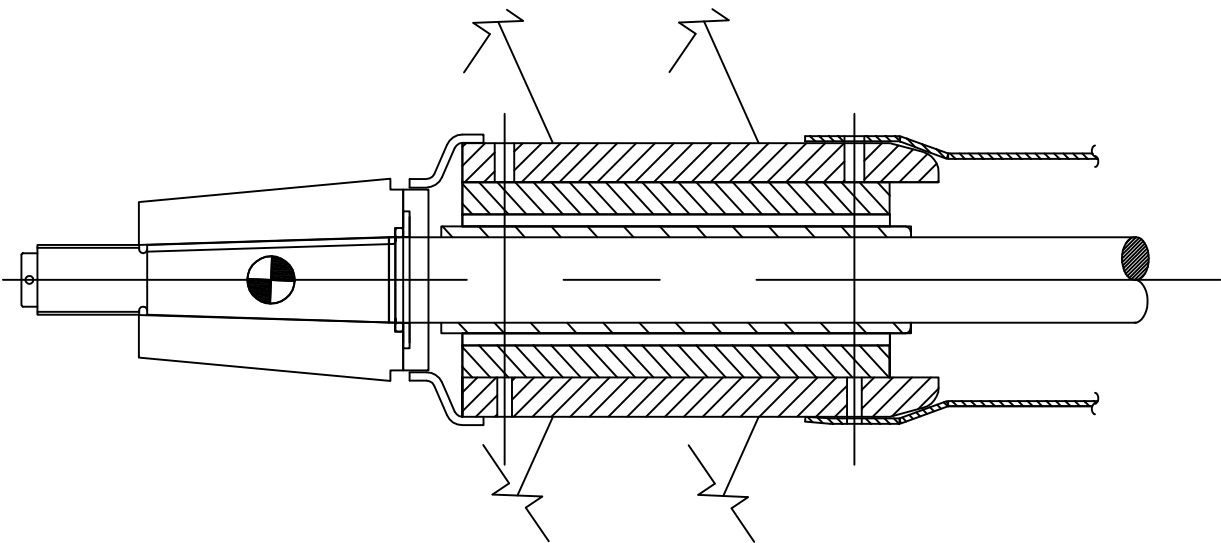
PROJECTION :



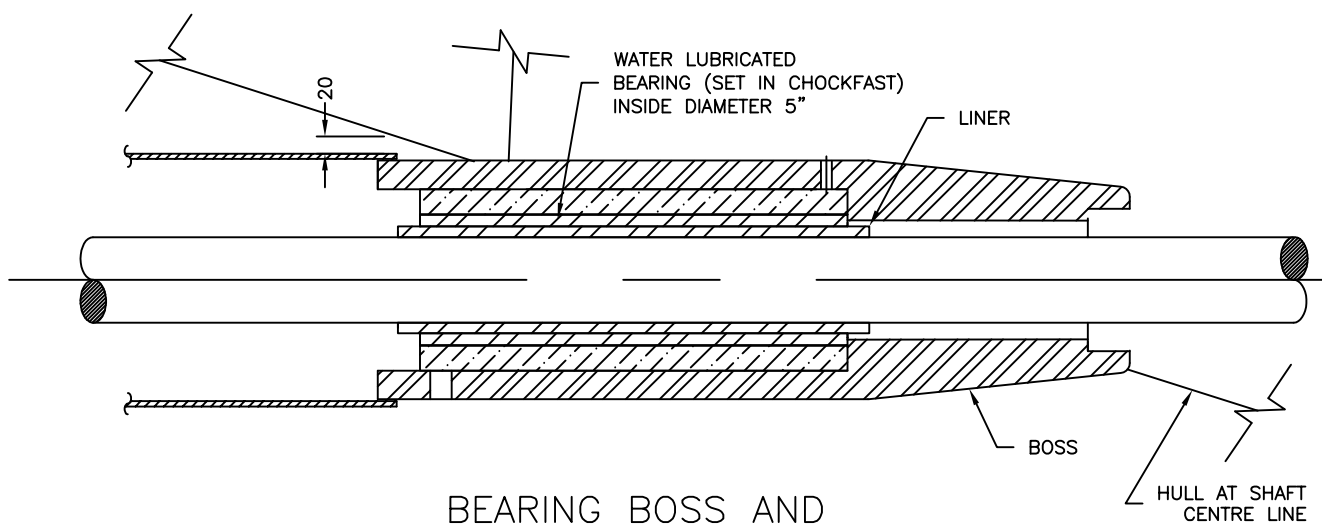
BILL OF MATERIAL			
ITEM	QTY	DESCRIPTION	MATERIAL
①	1	BOSS	STEEL ASTM 1018
②	1	PIPE 1211mm LENGTH	TUBING 6" SCH 80 Grade ASTM A-106
③	1	FLANGE	STEEL GRADE ABS A-36



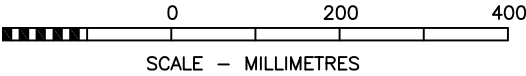
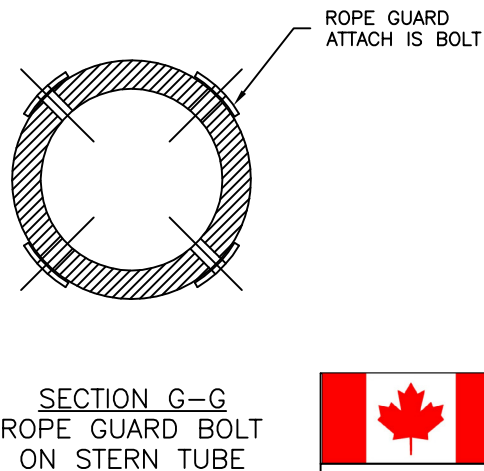
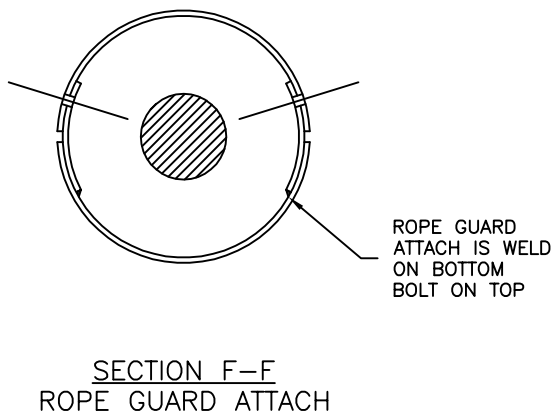
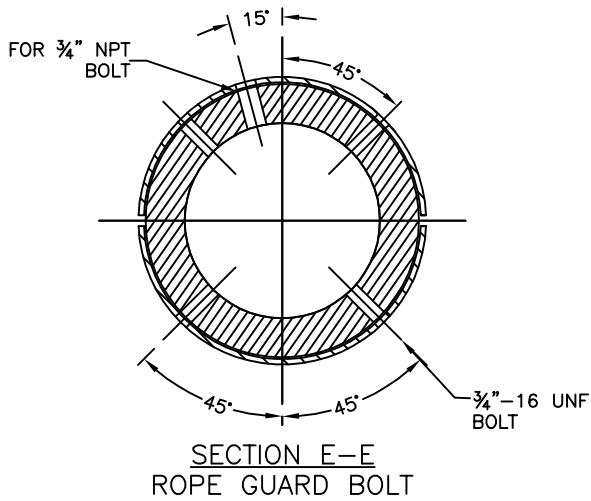
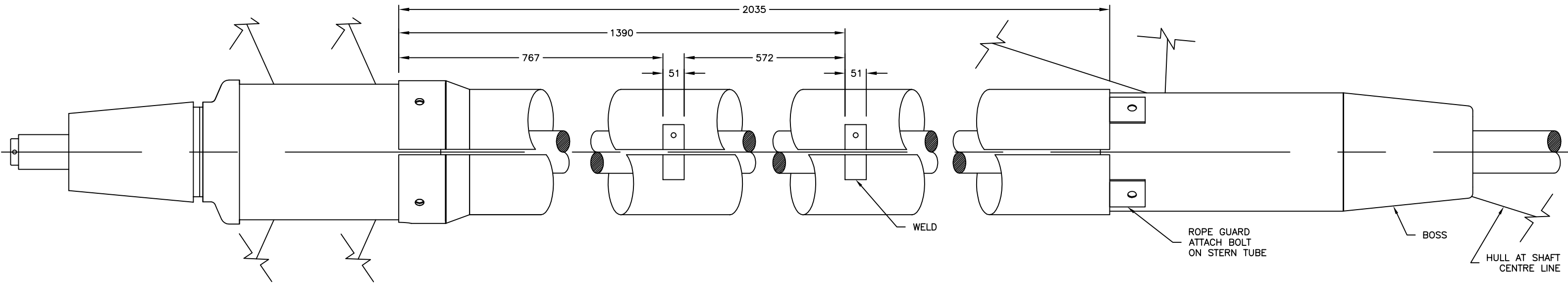
	Garde ctire canadienne Canadian Coast Guard		
	NAVIRE 25M VESSEL COQUE # / HULL # 008	PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV22-52600RMM4.DWG	DATE : MAY 2012	
DRAWN BY :	DRAWING # : 52600	REV : 4	SHEET : 3 OF 4



PROPELLER SHAFT
WITH ROPE GUARD



BEARING BOSS AND
STERN TUBE WITH
ROPE GUARD DETAIL
PORT SIDE SHOWN, STBD SIMILAR



Garde côtière canadienne
Canadian Coast Guard

PROJECT TITLE :
Navire semi-hauturier de recherche halieutique
Near Shore Fisheries Research Vessels

NAVIRE 25M VESSEL
COQUE # / HULL #
008

PROJECT # :
MR09-1113

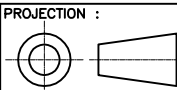
DRAWING FILE :
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DATE :
MAY 2012

DRAWN BY :

DRAWING # :
52600

SHEET :
4 OF 4



PROJECTION :

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TITLE :
STERN TUBE & SHAFT BRACKET
ARRANGEMENT - 25M

COMPANY :
MÉRIDIEN MARITIME
RÉPARATION



MATERIALS

SERVICE: MACHINERY COOLING					CLASS 150			MATERIAL: CARBON STEEL GALVANIZED AFTER FABRICATION IN CONTACT WITH SEAWATER						
RATED TEMPERATURE	300°F (149°C) MAX													
PRESSURE	CLASS 150 – MAXIMUM WORKING PRESSURE 230psi (16 bar) AT RATED TEMPERATURE													
SIZE	½”	¾”	1”	1 ¼”	1 ½”	2”	2 ½”	3”	4”	5”	6”	8”	10”	
	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100	DN125	DN150	DN200	DN250	
PIPE	SCH. 80				SCH. 40									
	ASTM A–53 GR. B SMLS OR ASTM A–106 GR. B SMLS													
FITTINGS	ASTM A105, ASME B16.11				ASTM A234 WPB SMLS, ASME B16.9									
	SW OR THD				BUTT WELDED, BORE TO MATCH PIPE									
FLANGE	ASTM A105, ASME B16.5				ASTM A105, ASME B16.5									
	CL 150 RF SW				CL 150 RF SO OR WN, BORE TO MATCH PIPE									

SERVICE: MACHINERY COOLING (REF: ASTM F 1155 – 98)					CLASS 200			MATERIAL: COPPER NICKEL, CuNi 90–10						
RATED TEMPERATURE	200°F (93°C) MAX													
	PRESSURE	CLASS 200 – MAXIMUM WORKING PRESSURE 216psi (18 bar) AT RATED TEMPERATURE												
SIZE		½"	¾"	1"	1 ¼"	1 ½"	2"	2 ½"	3"	4"	5"	6"	8"	10"
PIPE	ASME SB466, SEAMLESS CuNi 90–10													
	FITTINGS	FLANGED: ASME SB61, ANSI B16.24 BUTTWELD: ASME SB466, NAVSEA 810–1385880												
FLANGE		ASME SB62, ANSI B16.24												
	BOLTING	BOLTS: ASTM A 307 GR B, ANSI B18.2.1, NUTS: ASTM A 563 GR A, ANSI B18.2.2												
VALVES		BUTTERFLY: DUCTILE IRON – ASTM A 395, CARBON STEEL – ASTM A 216/A 216M GR WCB, MSS–SP–67												
	GATE:													
	GLOBE–SDNR: FLANGED: DUCTILE IRON – ASTM A 395, CARBON STEEL – ASTM A 216/A 216M GR WCB, ANSI B16.34													
	CHECK													

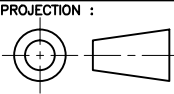
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COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
COOLING WATER SYSTEM DIAGRAM

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PROJECTION :

PROJECT # :
MRO9–1113
DRAWN BY :
MV

DRAWING FILE :
ISV25–73500RMM12.DWG
DRAWING # :
73500

DATE :
JAN 2012
SHEET :
1 OF 4























Garde côtière canadienne
Canadian Coast Guard

NAVIRE 25M VESSEL
COQUE # / HULL #
008

PROJECT TITLE :
Navire semi–hauturier de recherche halieutique
Near Shore Fisheries Research Vessels

REV :
12

SYMBOLS LEGEND/LÉGENDE DE SYMBOLES		
	GLOBE VALVE	ROBINET À SOUPAPE
	BUTTERFLY VALVE	VANNE À PAPILLON
	SDNR (GLOBE CHECK) VALVE	ROBINET À SOUPAPE ANTIRETOUR
	DISC CHECK VALVE	SOUPAPE À CLAPET BATTANT
	SIMPLEX BASKET STRAINER	CRÉPINE À PANIER SIMPLEX
	CONCENTRIC REDUCER	RACCORD–RÉDUCTION CONCENTRIQUE
	CENTRIFUGAL PUMP	POMPE CENTRIFUGE
	OVERBOARD DISCHARGE	CONDUITE D'ÉVACUATION VERS L'EXTÉRIEUR
	PRESSURE GAUGE, LOCAL	MANOMÈTRE LOCAL
	VACUUM/PRESSURE GAUGE, LOCAL	MANOMÈTRE À VIDE LOCAL
	BALL VALVE	ROBINET À TOURNANT SPHÉRIQUE
	FLANGE	BRIDE
	TEMPERATURE GAUGE IN THERMOWELL	INDICATEUR DE TEMPÉRATURE DANS UN PUIT THERMOMÉTRIQUE
	LOW LEVEL ALARM	AVERTISSEUR DE NIVEAU BAS
	SHELL & TUBE HEAT EXCHANGER	ÉCHANGEUR DE CHALEUR À CALANDRE
	SIGHTGLASS	VOYANT LIQUIDE
	FLEXIBLE CONNECTION	RACCORD FLEXIBLE
	PLATE HEAT EXCHANGER	ÉCHANGEUR À PLAQUE
	CARBON STEEL PIPE	TUYAU EN ACIER AU CARBONE
	COPPER NICKEL PIPE	TUYAU EN NICKÉLINE

NOTES

1. PROVIDE A MACHINERY COOLING SYSTEM IN ACCORDANCE WITH CLASSIFICATION SOCIETY REQUIREMENTS, INSTALL PIPING AND EQUIPMENT TO THE SATISFACTION OF THE ATTENDING SURVEYOR.
2. AFTER INSTALLATION, CLEAN AND FLUSH SYSTEM IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
3. CARRY ONBOARD ONE SPARE OF EACH TYPE OF MAIN ENGINE COOLING PUMP (PROPULSION MACHINERY SEAWATER, JACKET WATER, AND AFTERCOOLER WATER PUMPS). ENSURE ALL NECESSARY MEANS ARE ONBOARD TO FACILITATE REPLACEMENT.
4. PROVIDE STRAINER MESH SIZES ACCORDING TO EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.
5. USE VALVES AND FLEXIBLE HOSE CONNECTIONS COMPLYING TO CLASS REQUIREMENTS.
6. VERIFY PRESSURE DROP IN COOLING SYSTEM MEETS EQUIPMENT MANUFACTURER'S REQUIREMENTS PRIOR TO CONSTRUCTION.
7. KEEP SHUT–OFF VALVES ASSOCIATED WITH THE SEAWATER INLET TO THE SEAWATER MAIN PERMANENTLY OPEN AND PROVIDE NOTICE "VALVE ALWAYS TO BE KEPT OPEN!"
8. DOSE FRESH WATER SYSTEMS WITH CORROSION INHIBITOR AND/OR ANTIFREEZE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
9. USE GLOBE VALVES ON DISCHARGE SIDE OF HEAT EXCHANGERS TO ALLOW FOR SYSTEM BALANCING.
10. LOCATE EMERGENCY BILGE SUCTION AT LOW LEVEL AND INSTALL VALVE WITH HANDWHEEL NOT LESS THAN 18" (460 mm) ABOVE FLOORPLATES. FIT VALVE WITH NOTICE "FOR EMERGENCY USE ONLY".
11. PROVIDE REDUCED PRESSURE CONNECTION FOR SEA CHEST BLOWDOWN FROM COMPRESSED AIR SYSTEM. VENT SAFETY RELIEF VALVES TO MAIN DECK.
12. ARRANGE OVERBOARD DISCHARGE IN A LOCATION SUCH THAT THE DISCHARGE OF WATER AT ANY DRAUGHT WILL NOT BE OBSTRUCTED BY ICE. ALL DISCHARGES ARE TO BE LOCATED ON THE PORT SIDE.

NOTES

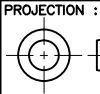
1. FOURNIR UN SYSTÈME DE REFROIDISSEMENT DE LA MACHINERIE CONFORMÉMENT AUX NORMES DE CLASSIFICATION. INSTALLER L'ÉQUIPEMENT ET LA TUYAUTERIE À LA SATISFACTION DE L'INSPECTEUR PRÉSENT.
2. APRÈS L'INSTALLATION, NETTOYER ET RINCER LE SYSTÈME CONFORMÉMENT AUX EXIGENCES DU FABRICANT.
3. SAUVEGARDER À BORD DU NAVIRE UNE POMPE DE RÉSERVE POUR CHAQUE TYPE DE POMPE COMPRISE DANS LE SYSTÈME DE REFROIDISSEMENT DES MOTEURS PRINCIPAUX (POMPE À EAU BRUTE DE LA MACHINERIE DE PROPULSION, POMPE À EAU DE REFROIDISSEMENT, ET POMPE À EAU DU POSTREFROIDISSEUR). ASSURER QUE LE REMPLACEMENT DES PIÈCES PUISSE S'EFFECTUER À BORD DU NAVIRE.
4. LES MAILLES DE CRÉPINES DOIVENT SE CONFORMER AUX RECOMMANDATIONS DU FABRICANT.
5. FOURNIR LES SOUPAPES ET LES RACCORDS FLEXIBLES CONFORMÉMENT AUX NORMES DE CLASSIFICATION.
6. AVANT LA CONSTRUCTION, VÉRIFIER QUE LA PERTE DE CHARGE DU SYSTÈME DE REFROIDISSEMENT SE CONFORME AUX EXIGENCES DU FABRICANT.
7. MAINTENIR OUVERTE LES SOUPAPES ASSOCIÉES À L'ENTRÉE D'EAU AU COLLECTEUR D'EAU DE MER ET Y AFFIXER L'AVIS: "VALVE ALWAYS TO BE KEPT OPEN!"
8. INTRODUIRE AU SYSTÈME D'EAU DOUCE UN INHIBITEUR DE CORROSION ET/OU UN ANTIGEL CONFORMÉMENT AUX RECOMMANDATIONS DU FABRICANT.
9. PLACER DES SOUPAPES GLOBULAIRES DU CÔTÉ DE REFOULEMENT DES ÉCHANGEURS DE CHALEUR AFIN DE PERMETTRE AU SYSTÈME DE S'ÉQUILIBRER.
10. SITUER L'ASPIRATION D'URGENCE DE CALE À BAS NIVEAU ET Y INSTALLER UNE SOUPAPE AVEC VOLANT DE COMMANDE PLACÉ AU MOINS 18" (460mm) AU–DESSUS DES TÔLES VARANGUES. AFFIXER L'AVIS: "FOR EMERGENCY USE ONLY".
11. FOURNIR UN RACCORD DE PRESSION DÉTENDUE AU COFFRE DE BORD, AFIN DE PERMETTRE LA PURGE SOUS PRESSION À PARTIR DU SYSTÈME D'AIR COMPRIMÉ. METTRE À L'AIR AU PONT PRINCIPAL LE ROBINET DE SURETÉ ET DE DÉCHARGE.
12. PLACER L'ÉVACUATION VERS L'EXTÉRIEUR DE FAÇON À CE QU'ELLE NE SOIT JAMAIS OBSTRUÉE PAR LA GLACE, PEU IMPORTE LE TIRANT D'EAU. LES ÉVACUATIONS DOIVENT TOUS ÊTRE SITUÉES DU CÔTÉ BÂBORD.



COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
COOLING WATER SYSTEM DIAGRAM

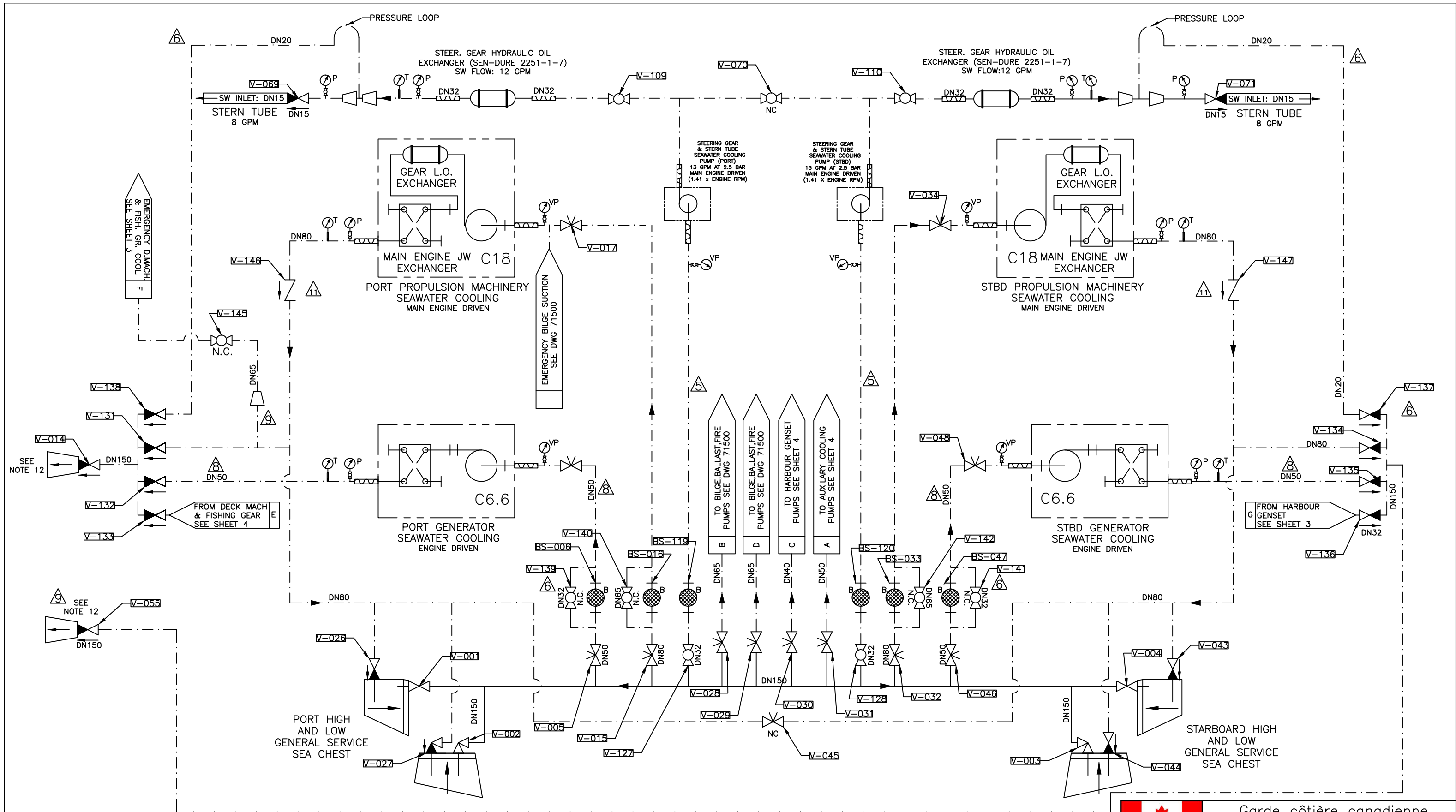
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PROJECT # :
MR09–1113
DRAWN BY :
MV

DRAWING FILE :
ISV25–73500RMM12.DWG
DRAWING # :
73500

DATE :
JAN 2012
SHEET :
2 OF 4



Garde côtière canadienne
Canadian Coast Guard

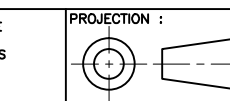
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PROJECT # : MR09-1113	DRAWING FILE : ISV25-73500RMM12.DWG	DATE : JAN 2012	SHEET : 3 OF 4
DRAWN BY : MV	DRAWING # : 73500	REV : 12	



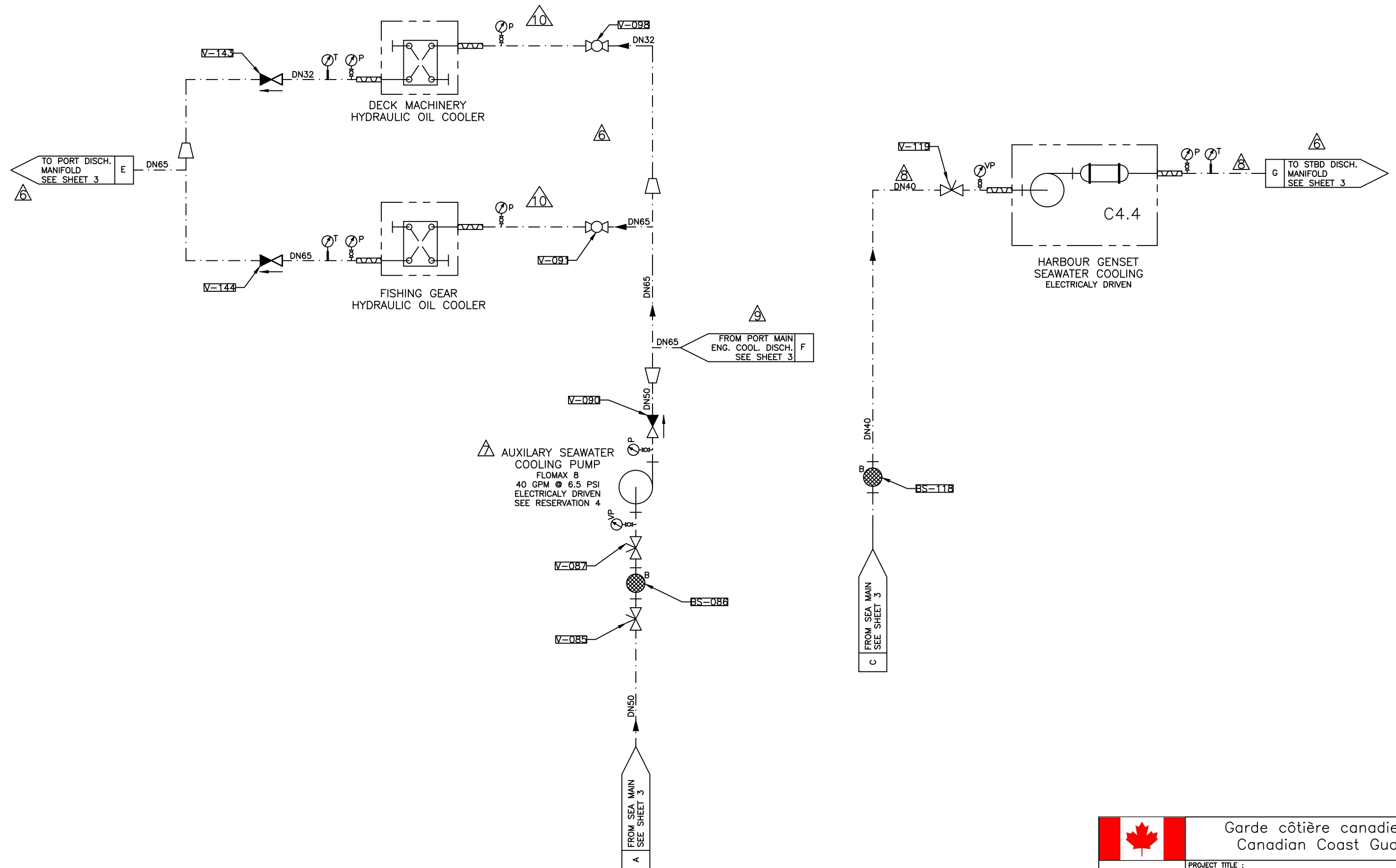
COMPANY :
MÉRIDIEM MARITIME
RÉPARATION

TITLE :
COOLING WATER SYSTEM DIAGRAM

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PROJECTION :
FIRST ANGLE



NOTES

1. PROVIDE A SLUDGE & OILY WATER SYSTEM IN ACCORDANCE WITH CLASS RULES & REGULATIONS, AND MARPOL REQUIREMENTS & GUIDELINES WHERE APPLICABLE. INSTALL PIPING AND EQUIPMENT TO THE SATISFACTION OF THE ATTENDING SURVEYOR.
2. PROVIDE HOSE REELS COMPLETE WITH NON COLLAPSIBLE TYPE SUCTION HOSE, APPROXIMATELY 2 METER LONG DETACHABLE PIPE WANDS, AND ADAPTERS TO SUIT CONNECTION TO SUCTION PIPES. MINIMUM HOSE LENGTH IS 10 METERS. LOCATE HOSE REELS NEAR SHIPS CENTERLINE IN THE POSITIONS INDICATED.
3. COMBINE SPILL COAMINGS WHERE POSSIBLE. SLOPE PIPING TO ENSURE EFFECTIVE DRAINAGE. WHERE DRIP TRAYS ARE LOCATED BELOW DRAINS, FILTERS OR DRAW-OFF, LEAVE SPACE FOR PORTABLE CONTAINER ABOVE THE TRAY.
4. PROVIDE MARPOL AND/OR TRANSPORT CANADA APPROVED OILY WATER SEPARATOR.
5. PIPE DRIP TRAYS TO GRAVITY DRAIN TO THE OILY WATER TANK.

NOTES

1. FOURNIR UN SYSTÈME DE BOUES ET D’EAU HUILEUSE D’APRÈS LES NORMES DE CLASSIFICATION DU NAVIRE, ET LES EXIGENCES DE MARPOL. POSER LA TUYAUTERIE ET LES APPAREILS DU SYSTÈME DE FAÇON À SATISFAIRE AUX DEMANDES DE L’INSPECTEUR PRÉSENT.
2. FOURNIR DES DÉVIDOIRS AVEC TUYAU SOUPLE D’ASPIRATION DE TYPE SEMI-RIGIDE. MUNI D’UN TUBE-RALLONGE AMOVIBLE DE 2m AVEC ADAPTEUR CONVENABLE AU TUYAU D’ASPIRATION. LA LONGUEUR MINIMALE DU TUYAU SOUPLE EST DE 10m. INSTALLER LES DÉVIDOIRS À PROXIMITÉ DE LA LIGNE CENTRALE DU NAVIRE TEL QU’INDIQUÉ.
3. COMBINER AUTANT QUE POSSIBLE LES HILOIRES DE DÉBORDEMENT. INTRODUIRE UNE PENTE À LA TUYAUTERIE AFIN DE PERMETTRE UN DRAINAGE EFFICACE. LORSQUE DES PLATEAUX D’ÉGOUTTAGE SONT PLACÉS DESSOUS LES DRAINS OU LES FILTRES, LAISSER UN ESPACE AFIN DE POUVOIR PLACER UN CONTENANT AMOVIBLE AU-DESSUS DU PLATEAU.
4. FOURNIR UN SÉPARATEUR D’EAU HUILEUSE DE TYPE APPROUVÉ D’APRÈS MARPOL ET/OU TRANSPORTS CANADA.
5. LES PLATEAUX D’ÉGOUTTAGE DOIVENT S’ÉGOUTTER PAR GRAVITÉ AU RÉSERVOIR D’EAU HUILEUSE.

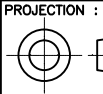
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
COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
SLUDGE – OILY WATER DIAGRAM

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PROJECTION :

5	AS CONSTRUCTED	MM	JAN 2012
4	PIPING IWO OILY WATER SEPARATOR REVISED TO MATCH EQUIPEMENT REQUIREMENT	AD	AUG. 2010
REV.	REVISIONS	BY	DATE
		Garde côtière canadienne Canadian Coast Guard	
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MRO9-1113		DRAWING FILE : ISV25-75000RMM5.DWG	
DRAWN BY : MV		DATE : 23/10/11	
		DRAWING # : 75000	
		REV : 	
		SHEET : 1 OF 3	










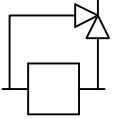











MATERIALS

SERVICE: SLUDGE/OILY WATER					CLASS 150			MATERIAL: CARBON STEEL						
RATED TEMPERATURE	100°F (38°C) MAX													
PRESSURE	CLASS 150 – MAXIMUM WORKING PRESSURE 275psi (20 bar) AT RATED TEMPERATURE													
SIZE	½"	¾"	1"	1 ¼"	1 ½"	2"	2 ½"	3"	4"	5"	6"			
	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100	DN125	DN150			
PIPE	SCH. 80				SCH. 40									
	ASTM A-106 GR. B SMLS													
FITTINGS	ASTM A105, ASME B16.11				ASTM A234 WPB SMLS, ASME B16.9									
	SW OR THD				BUTT WELDED, BORE TO MATCH PIPE									
FLANGE	ASTM A105, ASME B16.5				ASTM A105, ASME B16.5									
	CL 150 RF SW				CL 150 RF SO OR WN, BORE TO MATCH PIPE									
VALVE	STEEL													

CALCULATIONS

CALCULATIONS:				
GENERAL REFERENCE: MARPOL – INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS				
SLUDGE TANK CAPACITY		REF: UNIFIED INTERPRETATIONS OF ANNEX I – 15 – CAPACITY OF SLUDGE TANKS		
8.1 CAPACITY OF SLUDGE TANKS		$V_1 = K_1 C D$		
WHERE:	$K_1 =$.005		* FOR SHIPS USING DIESEL OIL
	$C =$	2.3	m ³	* DAILY FUEL OIL CONSUMPTION
	$D =$	14	DAYS	* MAXIMUM TIME BETWEEN PORTS WHERE SLUDGE CAN BE DISCHARGED
	$V_1 =$	0.16	m ³	* MINIMUM SLUDGE TANK CAPACITY
		SLUDGE TANK CAPACITY PROVIDED = 0.6 m ³		
OILY WATER TANK (BILGE HOLDING TK)		REF: IMO MARINE ENVIRONMENTAL PROTECTION COMMITTEE/CIRCULAR 235 – APPENDIX – GUIDELINES FOR SYSTEMS FOR HANDLING OILY WASTE IN MACHINERY SPACES OF SHIPS		
8.5 CAPACITY OF BILGE HOLDING TANKS				
WHERE:	$P =$	750	kW	* MAIN ENGINE RATING
	$V =$	1.5	m ³	* MINIMUM OILY WATER TANK (BILGE HOLDING TANK) CAPACITY
		OILY WATER TANK CAPACITY PROVIDED = 1.71 m ³		
SLUDGE PUMP CAPACITY		REF: IMO MARINE ENVIRONMENTAL PROTECTION COMMITTEE/CIRCULAR 235 – APPENDIX – GUIDELINES FOR SYSTEMS FOR HANDLING OILY WASTE IN MACHINERY SPACES OF SHIPS		
10.1.6 PUMP AND PRESSURE LINES		$Q = V/t$		
WHERE:	$V_1 =$	0.16	m ³	* CALCULATED SLUDGE TANK CAPACITY
	$t =$	4	HOURS	* TIME TO DRAIN TANK
	$Q =$	0.04	m ³ /HR	* AS PER IMO CIRCULAR.235 GUIDELINE, MINIMUM PUMP CAPACITY: 2.0 m ³ /HR

SYMBOLS LEGEND/LÉGENDE DE SYMBOLES

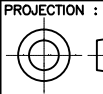
	BALL VALVE	ROBINET À TOURNANT SPHÉRIQUE
	3-WAY CONTROL VALVE	SOUPAPE DE CONTRÔLE À 3 VOIES
	3 WAY BALL VALVE "T" PORTED	ROBINET À TOURNANT SPHÉRIQUE À 3 VOIES EN "T"
	SWING CHECK VALVE	SOUPAPE À CLAPET BATTANT
	SDNR (GLOBE CHECK) VALVE	ROBINET À SOUPAPE ANTIRETOUR
	PRESSURE GAUGE, LOCAL	MANOMÈTRE LOCAL
	VACUUM/PRESSURE GAUGE, LOCAL	MANOMÈTRE (PRESSION ET VIDE) LOCAL
	DIAPHRAGM WATER PRESSURE REGULATOR	RÉGULATEUR DE PRESSION À DIAPHRAGME
	EXTENDED MANUAL ACTUATOR	ACTIONNEUR MANUEL RALONGÉ
	POSITIVE DISPLACEMENT PUMP WITH RELIEF VALVE	POMPE À DÉPLACEMENT DIRECT AVEC SOUPAPE DE SÛRETÉ
	SIMPLEX BASKET STRAINER	CRÉPINE À PANIER SIMPLEX
	OIL CONTENT MONITEUR	MONITEUR DE CONTENU D'HUILE
	OVERBOARD DISCHARGE	CONDUITE D'ÉVACUATION VERS L'EXTÉRIEUR
	BULKHEAD OR DECK PENETRATION	PASSAGE DE BORDÉS DE PONTS OU CLOISONS
	BELLMOUTH TAILPIPE	TUYAU-QUEUE ÉVASÉ
	FUNNEL WITH COVER & SCREEN	ENTONNOIR AVEC COUVERCLE ET GRILLAGE
	OPEN FUNNEL	ENTONNOIR OUVERT
	WEIGHTED LEVER CLOSING ACTUATOR	ACTIONNEUR À LEVIER LESTÉ
	CAPPED HOSE CONNECTION	RACCORD DE TUYAU MUNI D'UN BOUCHON
	HOSE REEL	DÉVIDOIR
	SOLENOID VALVE	VALVE SOLENOIDE



COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
SLUDGE – OILY WATER DIAGRAM

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PROJECTION :
PROJECT # :
MRO9-1113
DRAWN BY :
MV

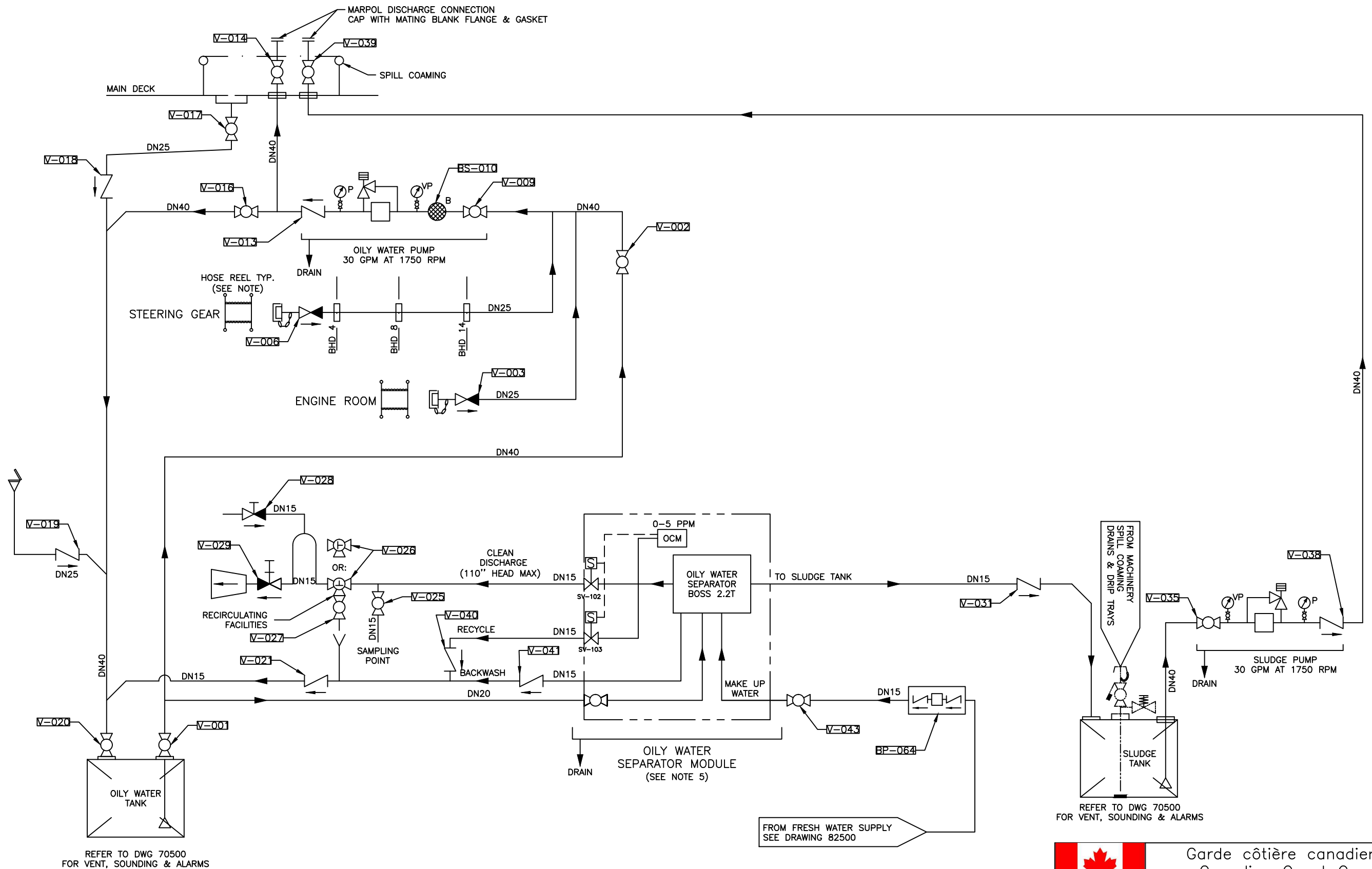
DRAWING FILE :
ISV25-75000RMM5.DWG
DRAWING # :
75000

DATE :
JAN 2012
SHEET :
2 OF 3



Garde côtière canadienne
Canadian Coast Guard

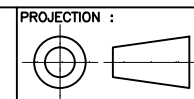
NAVIRE 25M VESSEL
COQUE # / HULL #
008
PROJECT TITLE :
Navire semi-hauturier de recherche halieutique
Near Shore Fisheries Research Vessels



COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
SLUDGE - OILY WATER DIAGRAM

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PROJECTION :

NAVIRE 25M VESSEL
COQUE # / HULL #
008

PROJECT # :
MRO9-1113

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PROJECT TITLE :
Navire semi-hauturier de recherche halieutique
Near Shore Fisheries Research Vessels

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75000

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SHEET :
3 OF 3

















Garde côtière canadienne
Canadian Coast Guard

NOTES

1. PROVIDE A SYSTEM IN ACCORDANCE WITH CLASSIFICATION SOCIETY REQUIREMENTS, INSTALL PIPING AND EQUIPMENT TO THE SATISFACTION OF THE ATTENDING SURVEYOR.
2. AFTER INSTALLATION, CLEAN AND FLUSH SYSTEM IN ACCORDANCE WITH MANUFACTURER’S REQUIREMENTS.
3. PROVIDE STRAINER MESH SIZES ACCORDING TO EQUIPMENT MANUFACTURER’S RECOMMENDATIONS.
4. USE VALVES AND FLEXIBLE HOSE CONNECTIONS COMPLYING TO CLASS REQUIREMENTS.
5. ARRANGE OVERBOARD DISCHARGE IN A LOCATION SUCH THAT THE DISCHARGE OF WATER AT ANY DRAUGHT WILL NOT BE OBSTRUCTED BY ICE. ALL DISCHARGES ARE TO BE LOCATED ON THE PORT SIDE.

NOTES

1. FOURNIR UN SYSTÈME CONFORMÉMENT AUX NORMES DE CLASSIFICATION. INSTALLER L’ÉQUIPEMENT ET LA TUYAUTERIE À LA SATISFACTION DE L’INSPECTEUR PRÉSENT.
2. APRÈS L’INSTALLATION, NETTOYER ET RINCER LE SYSTÈME CONFORMÉMENT AUX EXIGENCES DU FABRICANT.
3. LES MAILLES DE CRÉPINES DOIVENT SE CONFORMER AUX RECOMMANDATIONS DU MANUFACTURIER.
4. FOURNIR LES VANNES ET LES RACCORDS FLEXIBLES CONFORMÉMENT AUX NORMES DE CLASSIFICATION.
5. PLACER L’ÉVACUATION VERS L’EXTÉRIEUR DE FAÇON À CE QU’ELLE NE SOIT JAMAIS OBSTRUÉE PAR LA GLACE, PEU IMPORTE LE TIRANT D’EAU. LES ÉVACUATIONS DOIVENT TOUS ÊTRE SITUÉES DU CÔTÉ BABORD.

SYMBOLS LEGEND/LÉGENDE DE SYMBOLES		
	BALL VALVE	ROBINET À TOURNANT SPHÉRIQUE
	SDNR (GLOBE CHECK) VALVE	ROBINET À SOUPAPE ANTIRETOUR
	SWING CHECK VALVE	SOUPAPE À CLAPET BATTANT
	SIMPLEX BASKET STRAINER	CRÉPINE À PANIER SIMPLEX
	PRESSURE GAUGE, LOCAL	MANOMÈTRE LOCAL
	TEMPERATURE GAUGE, LOCAL	INDICATEUR DE TEMPÉRATURE LOCAL
	VACUUM/PRESSURE GAUGE, LOCAL	MANOMÈTRE À VIDE LOCAL
	CAPPED HOSE CONNECTION	RACCORD DE TUYAU MUNI D’UN BOUCHON
	CENTRIFUGAL PUMP	POMPE CENTRIFUGE
	PRESSURE TANK	HYDROPHORE
	PRESSURE SWITCH	PRESSOSTAT
	OVERBOARD DISCHARGE	EVACUATION PAR DESSUS BORD
	REGULATING VALVE	VALVE REGULATRICE
	FLOW SWITCH	INTERRUPTEUR DE DÉBIT

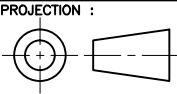
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COMPANY :
MÉRIDIEN MARITIME
RÉPARATION


TITLE :
CHILLED SEAWATER WATER
SYSTEM DIAGRAM

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PROJECT # : MRO9–1113	DRAWING FILE : ISV25–82000RMM7.DWG	DATE : JAN 2012
DRAWN BY : MV	DRAWING # : 82000	REV : 7 SHEET : 1 OF 3

7	AS CONSTRUCTED	MM	JAN 2012
6	BRINE DISCHARGE FROM POTABLE WATER SYSTEM	AD	DEC 2011
5	VALVE ARRANGEMENT AT PUMPS DISCHARGE	AD	APR 2011
4	ADD SEA CHEST SUCTION, PUMP AND PRESSURE SET	AD	FEB 2011
3	ADD SUPPLY FAUCET IN WET LAB	AD	FEB 2011
2	CHILLERS CONDENSER SEAWATER COOLED	AD	JAN 2011
REV.	REVISIONS	BY	DATE

	Garde côtière canadienne Canadian Coast Guard
NAVIRE 25M VESSEL COQUE # / HULL # 008	PROJECT TITLE : Navire semi–hauturier de recherche halieutique Near Shore Fisheries Research Vessels

MATERIALS:

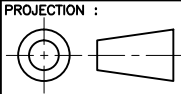
SERVICE: CHILLED SEA WATER				CLASS 150				MATERIAL: CARBON STEEL GALVANIZED AFTER FABRICATION							
RATED TEMPERATURE	300°F (149°C) MAX														
PRESSURE	CLASS 150 – MAXIMUM WORKING PRESSURE 230psi (16 bar) AT RATED TEMPERATURE														
SIZE	½"	¾"	1"	1 ¼"	1 ½"	2"									
	DN15	DN20	DN25	DN32	DN40	DN50									
PIPE	SCH. 80														
	ASTM A-53 GR. B SMLS OR ASTM A-106 GR. B SMLS														
FITTINGS	ASTM A105, ASME B16.11					ASTM A234 WPB SMLS, ASME B16.9									
	SW OR THD					BUTT WELDED, BORE TO MATCH PIPE									
FLANGE	ASTM A105, ASME B16.5					ASTM A105, ASME B16.5									
	CL 150 RF SW					CL 150 RF SO OR WN, BORE TO MATCH PIPE									





COMPANY :
MÉRIDIEN MARITIME
RÉPARATION

TITLE :
CHILLED SEAWATER WATER
SYSTEM DIAGRAM

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
		Garde côtière canadienne Canadian Coast Guard			
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels			
PROJECT # : MRO9–1113	DRAWING FILE : ISV25–82000RMM7.DWG		DATE : JAN 2012		
DRAWN BY : MV	DRAWING # : 82000	REV : 	SHEET : 2 OF 3		

NOTES:

1. DRAWING ITEMS AND DIMENSIONS ARE DISPLAYED FOR REFERENCE ONLY. MODIFY ARRANGEMENT TO SUIT EQUIPMENT SUPPLIED.
2. ALL EQUIPMENT AND INSTALLATION TO BE IN ACCORDANCE WITH SELECTED MANUFACTURER AND CLASS REQUIREMENTS.
3. VENDOR TO SUPPLY CLASS APPROVED RUDDERS, NOZZLE, HEADBOX AND STEERING GEAR ASSEMBLIES.

NOTES:

1. TRAITER LES DÉTAILS ET LES DIMENSIONS DU PRÉSENT PLAN EN TANT QUE RÉFÉRENCE UNIQUEMENT. METTRE LE PLAN À JOUR LORS DE LA CONSTRUCTION.
2. INSTALLER L'ÉQUIPEMENT D'APRÈS LES RECOMMANDATIONS ET LES INSTRUCTIONS DU FABRICANT, ET LES EXIGENCES DES NORMES DE CLASSIFICATION.
3. LE VENDEUR DEVRA S'ASSURER DE FOURNIR LES GOUVERNAILS DE DIRECTION, LES TUYÈRES, LES CAISSES DE TÊTE, ET LES APPAREILS À GOUVERNER APPROUVÉS D'APRÈS LES NORMES DE CLASSIFICATION.

4	AS CONSTRUCTED	MM	JAN 2012
REV.	REVISIONS	BY	DATE
	Garde côtière canadienne Canadian Coast Guard		
NAVIRE 25M VESSEL COQUE # / HULL # 008	PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels		
PROJECT # : MR09-1113	DRAWING FILE : ISV25-90520RMM4.DWG	DATE : 08/12/11	
DRAWN BY :	DRAWING # : 90520	REV : 	SHEET : 1 OF 2

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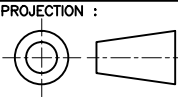
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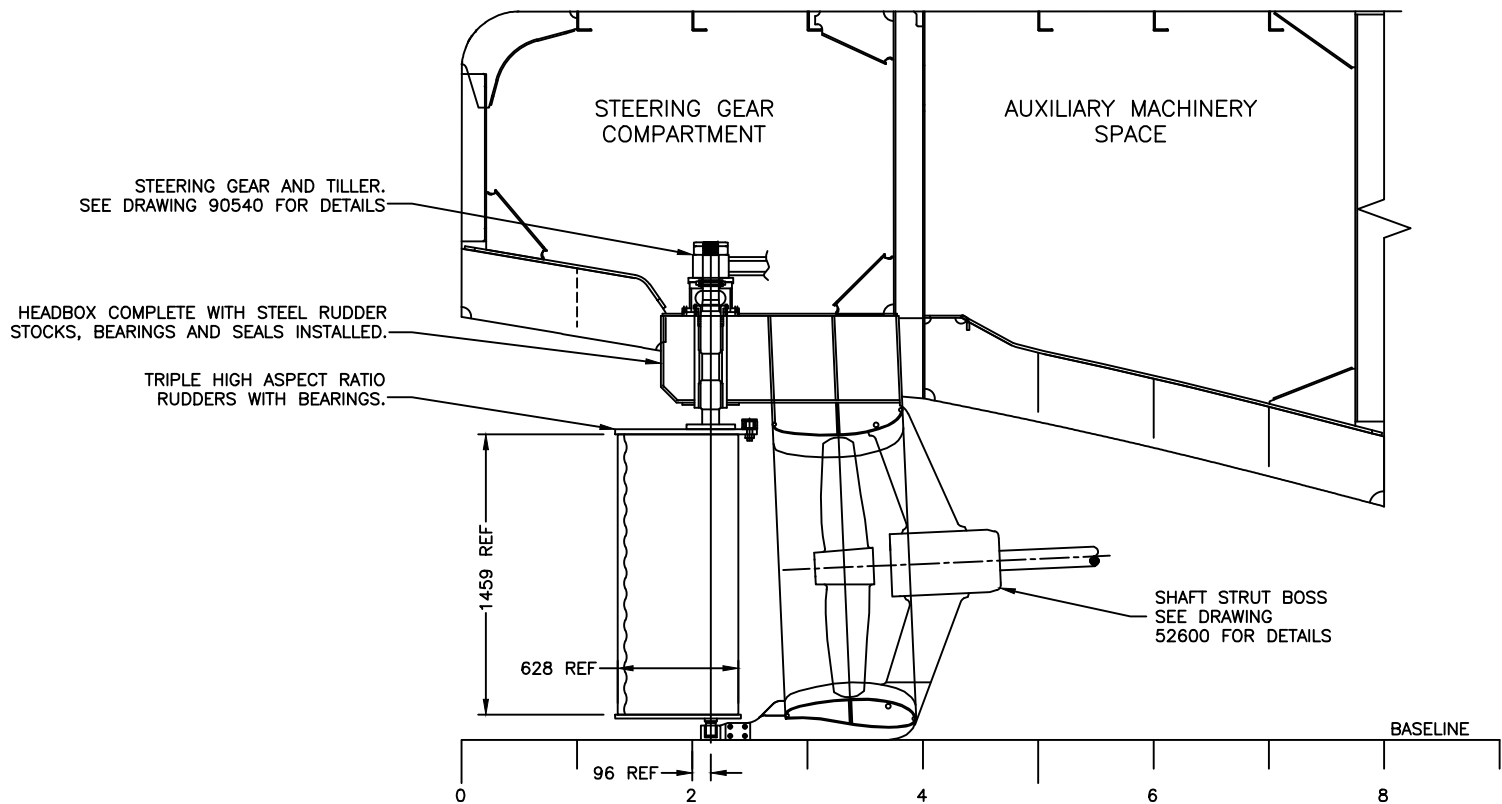
MÉRIDIEN MARITIME
RÉPARATION

TITLE :

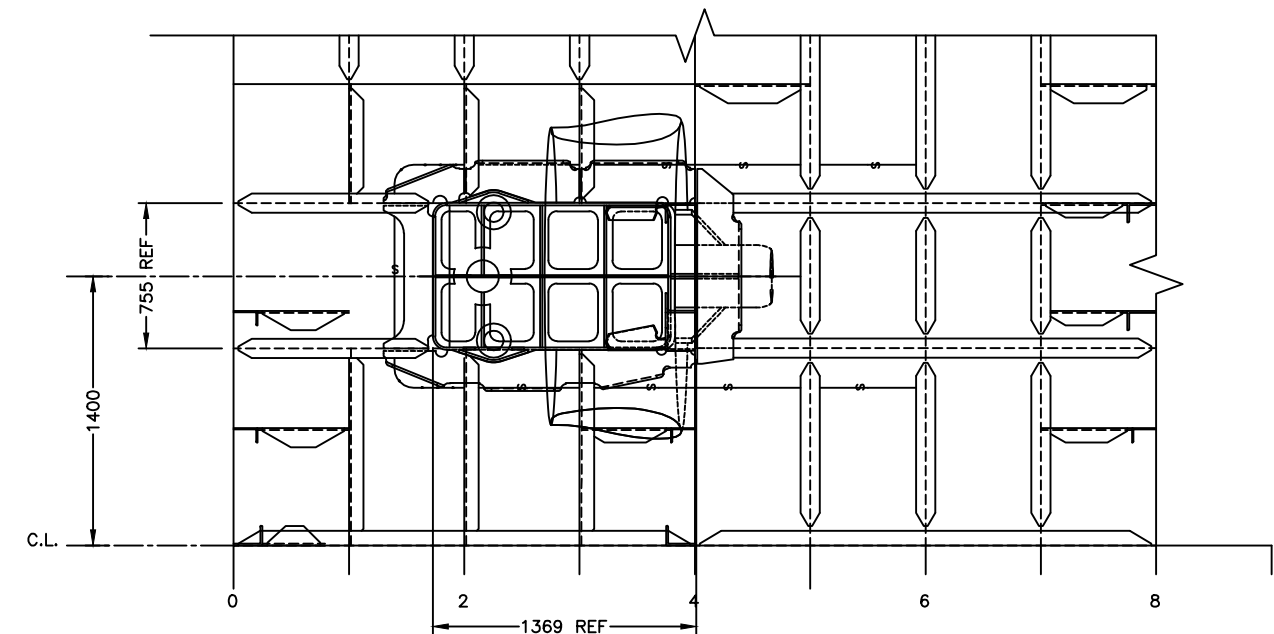
25 m
Rudder and Nozzle Arrangement

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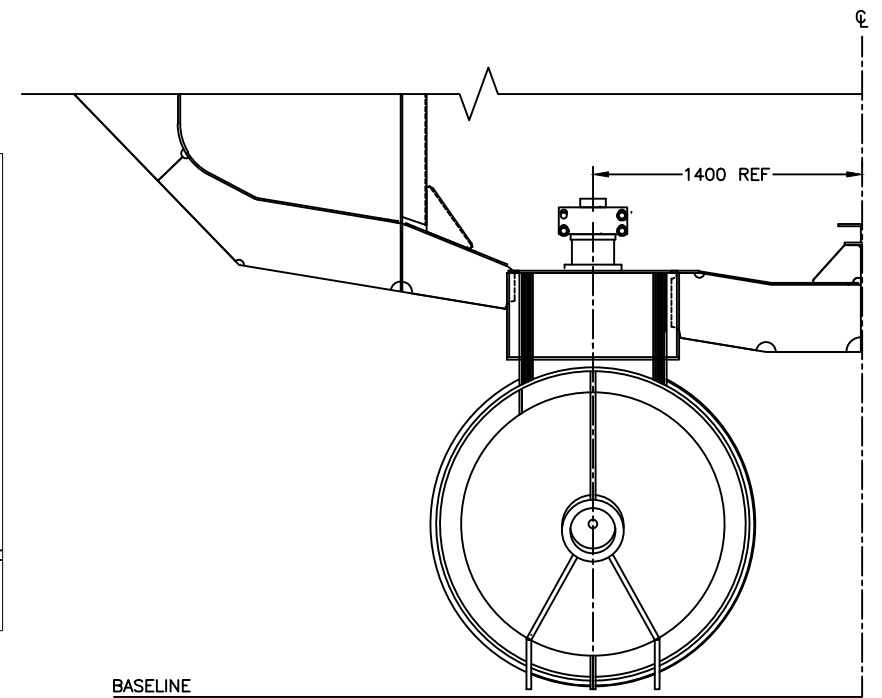
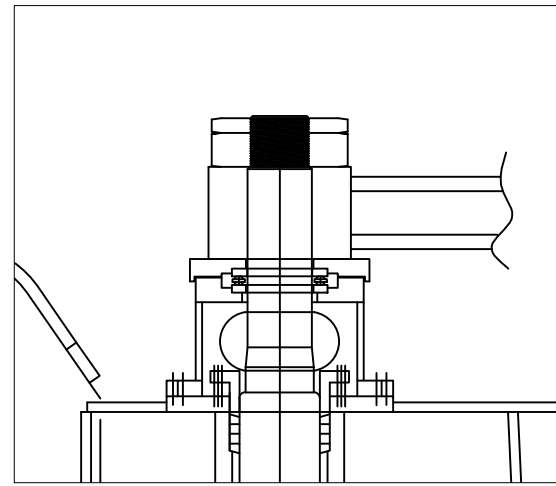
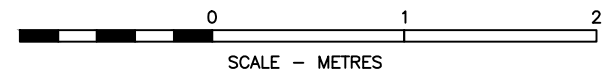




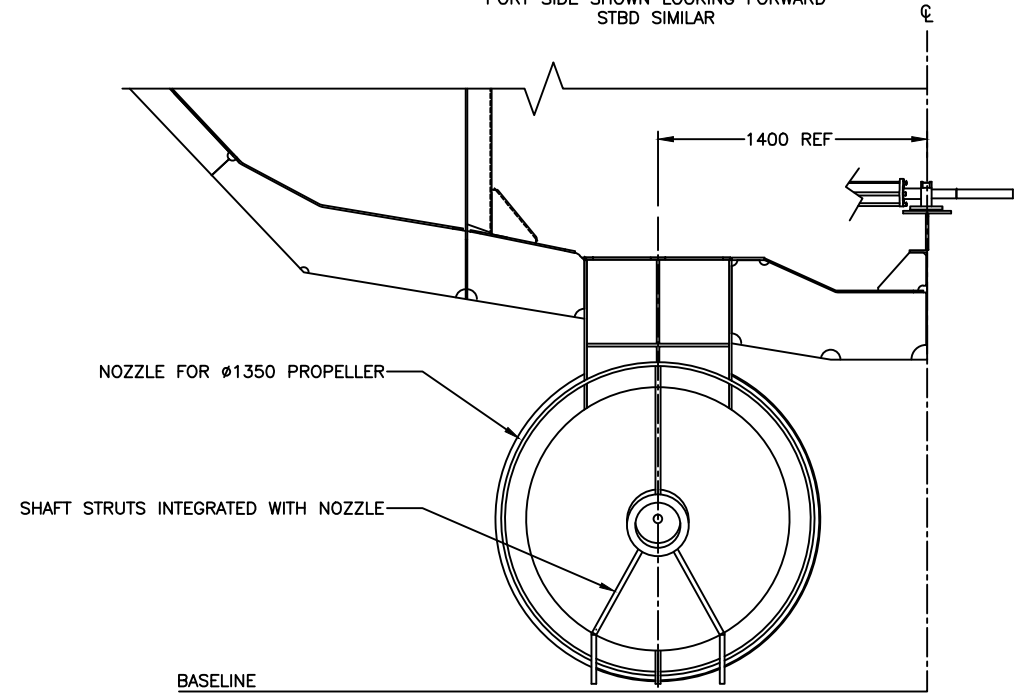
PROFILE VIEW
PORT SIDE AT SHAFT CENTRE LINE
OUTBOARD GIRDER SHOWN
STBD SIMILAR



PLAN VIEW
PORT SIDE SHOWN
STBD SIMILAR



FR.2
PORT SIDE SHOWN LOOKING FORWARD
STBD SIMILAR



FR.3
PORT SIDE SHOWN LOOKING FORWARD
STBD SIMILAR

		Garde côtière canadienne Canadian Coast Guard	
NAVIRE 25M VESSEL COQUE # / HULL # 008		PROJECT TITLE : Navire semi-hauturier de recherche halieutique Near Shore Fisheries Research Vessels	
PROJECT # : MR09-1113	DRAWING FILE : ISV25-90520RMM4.DWG	DATE : 08/12/11	SHEET : 2 OF 2
DRAWN BY :	DRAWING # : 90520	REV : 4	

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E-mail : info.peinturelaurentide@generalpaint.com

MATCHLESS

713

Red Oxide Alkyd Primer

Type:	Red Oxide Alkyd Primer	Drying time:	Touch: 4-6 hours ¹ 2 nd coat: 6-8 hours ²
Gloss level:	<10% (60°)	Concentration of Solids:	Per volume: 52% Per weight: 66%
Viscosity:	80-82 K.U.	Size :	946ml & 3,78 litres
Color:	Red oxide	VOC :	<450 g/L
Coverage:	9 m ² / litre (100 ft ² /litre)		
Thinner / cleaner:	545-151, 545-153 ou 545-162		

Description :

Antirust primer formulated for steel and iron surfaces exposed to extreme weather conditions. Such as, structural steel, bridges, boats, tugboats, transportation ships and other ferrous structures. Perfect to prepare surfaces that are to be exposed to marine environment.

Application: Shake well and use a stirring stick in order to get the entire product mixed. Use a natural paintbrush or a 10 mm good quality anti-lint roller. Product is ready to use but do not thin more than 5% per volume to apply with brush or roller. If spray painting, use no more than 20% per volume of mineral spirits. Temperature must be between 10 °C and not over 32 °C. The humidity level must be lower than 50 % and the room well ventilated. Never paint under direct sunlight.

Storage: Store in a dry and well ventilated area. Temperature should be around 20° C.

Not recommended for:

- *Floors, ciment, alkali surfaces;
- *Surfaces under the waterline;
- *Areas exposed to chemical fumes.

Do not modify the color of this product.

Do not topcoat with an epoxy-type paint.

Topcoat with:

- * Matchless marine paints from the 300 or 700 series.

¹ Drying time could be longer when it's cold and humid.

² Completely cured : 14-18 heures

Keep out of the reach of children. Consult with your municipality for proper disposal of used paint.

Warning: Combustible
Keep away from open flames and sparks

Prior the use of this product, read the Material Safety Data Sheet for use of proper protective equipment (section 8) for preventives measures (section 7), first-aid and emergency procedures (section 4).

The information given above is provided by the Laurentide Paint Inc. for information purposes only and in no way does it constitute a representation, promise or guarantee in regards to the usage, durability or quality of the product. The products identified above must be used in strict compliance with the specifications mentioned above and all other instructions, warnings or guidelines issued by the Laurentide Paint Inc. This publication supersedes any previous one.



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MATCHLESS

Surface Preparation: Surface preparation is crucial and the successful outcome of your project depends on it. All surfaces must be free from contaminants, mildew or peeling paint. Glossy surfaces should be sanded to assure a better adhesion of the primer or the new paint. Wash all painted surfaces to be painted with TSP (Trisodium Phosphate) and rinse well. Scrape and wire brush all loose rust particles and clean with metal conditioner.

Steel and iron: Remove all peeling rust with a steel wire brush. The antirust preparation paint can be applied directly on the surface. It penetrates and stops the progression of rust.

Aluminum and non-ferrous metals: For better adherence, the surface should be sandblasted.

- **Previously painted surfaces:** Apply as is.
- **Ferrous or non ferrous metals:** Clean with a laquer thinner 545-105, let dry and repeat the operation until all traces of the galvalume (oily film on the entire metal surface) has been eliminated because this oily film will prevent the primer or preparation paint to adhere. Apply as is.

- **Aged ferrous or non ferrous metals:** Clean with a laquer thinner 545-105 and let dry. If surface has rusted, scrape and brush the rust off as much as possible and make all the necessary repairs before applying the primer as is.

Note: The properties of antirust preparation paint are effective only in direct contact with rust and porous metals.

Do not use to paint floors.

For more information and ideas, please contact our Customer Service or visit our stores / retailers. You can also visit our Website at www.laurentidepaint.com or write us at info.peinturelaurentide@generalpaint.com.

Keep out of the reach of children. Consult with your municipality for proper disposal of used paint.

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Material Safety Data Sheet

MATCHLESS, Marine paint alkyd (anti-corrosive primer)

1. Product and company identification

Product name : MATCHLESS, Marine paint alkyd (anti-corrosive primer)
Manufactured/supplied : Laurentide Industriel
4660 12e Avenue
Qc, Shawinigan-sud
G9N 6T5
Trade name : Alkyde paint
Code : 000713
Validation date : 2014-01-24.
Validated by: : Whims Departement
In case of Emergency : CANUTEC (613) 996-6666
Product type : Liquid.

2. Hazards identification

Physical state : Liquid.
Odor : Solvent odeur
OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview : DANGER!
FLAMMABLE LIQUID AND VAPOR. COMBUSTIBLE. MAY BE FATAL IF SWALLOWED. CAUSES DIGESTIVE TRACT BURNS. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
Precautions : Keep away from heat, sparks and flame. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Avoid exposure during pregnancy. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effects
Inhalation : Irritating to respiratory system.
Ingestion : Very toxic if swallowed. Corrosive to the digestive tract. Causes burns.
Skin : Irritating to skin.
Eyes : Irritating to eyes.
Potential chronic health effects
Chronic effects : Contains material that may cause target organ damage, based on animal data.
Carcinogenicity : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.
Target organs : Contains material which may cause damage to the following organs: kidneys, lungs, upper respiratory tract, skin, eyes, central nervous system (CNS).

Over-exposure signs/symptoms

2. Hazards identification

- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
- Ingestion** : Adverse symptoms may include the following:
stomach pains
- Skin** : Adverse symptoms may include the following:
irritation
redness
- Eyes** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Medical conditions aggravated by over-exposure** : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

3. Composition/information on ingredients

Name	CAS number	%
Stoddard solvent	8052-41-3	10-30
Solvent naphtha (petroleum), medium aliph.	64742-88-7	10-30
Iron oxide (Fe ₂ O ₃)	1309-37-1	5-10
Nepheline syenite	37244-96-5	5-10
Carbonic acid calcium salt (1:1)	471-34-1	1-5
Solvent naphtha (petroleum), light arom.	64742-95-6	1-5
Benzene, dimethyl-	1330-20-7	0.1-1
Tremolite	14567-73-8	0.1-1
ethylbenzene	100-41-4	0.1-1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention if irritation occurs.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if irritation occurs.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Call medical doctor or poison control center immediately. If potentially dangerous quantities of this material have been swallowed, call a physician immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4. First aid measures

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product : Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

Extinguishing media

Suitable : Use dry chemical, CO₂, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Flash point : Closed cup: 48 to 53°C (118,4 to 127,4°F) [Setaflas h.]

Flammable limits : Not available.

Auto-ignition temperature : Not available.

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling

: Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage

: Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			Notations
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	
Stoddard solvent	US ACGIH 1/2008	100	525	-	-	-	-	-	-	-	
	AB 6/2008	100	572	-	-	-	-	-	-	-	
	BC 6/2008	-	290	-	-	580	-	-	-	-	
	ON 6/2008	-	525	-	-	-	-	-	-	-	
	QC 6/2008	100	525	-	-	-	-	-	-	-	
Iron oxide (Fe ₂ O ₃) Iron oxide (Fe ₂ O ₃), as Fe	US ACGIH 1/2008	-	5	-	-	-	-	-	-	-	[a]
	AB 6/2008	-	5	-	-	-	-	-	-	-	[b]
	BC 6/2008	-	10	-	-	-	-	-	-	-	[c] [d] [e] [f] [g] [h] [i]
		-	5	-	-	-	-	-	-	-	
		-	3	-	-	-	-	-	-	-	
Iron oxide (Fe ₂ O ₃) Iron oxide (Fe ₂ O ₃), as Fe Tremolite	ON 6/2008	-	10	-	-	-	-	-	-	-	
		-	5	-	-	-	-	-	-	-	
		-	10	-	-	-	-	-	-	-	
	QC 6/2008	-	5	-	-	-	-	-	-	-	
	US ACGIH 1/2008	-	-	0,1 f/cc	-	-	-	-	-	-	
Benzene, dimethyl- ethylbenzene	AB 6/2008	-	-	0,1 f/cc	-	-	-	-	-	-	
	BC 6/2008	-	-	0,1 f/cc	-	-	-	-	-	-	
	QC 6/2008	-	-	1 f/cc	-	-	5 f/cc	-	-	-	
	US ACGIH 1/2008	100	434	-	150	651	-	-	-	-	
	AB 6/2008	100	434	-	150	651	-	-	-	-	
Nepheline syenite Carbonic acid calcium salt (1:1)	BC 6/2008	100	-	-	150	-	-	-	-	-	
	ON 6/2008	100	435	-	150	650	-	-	-	-	
	QC 6/2008	100	434	-	150	651	-	-	-	-	
	US ACGIH 1/2009	100	-	-	125	-	-	-	-	-	
	AB 4/2009	100	434	-	125	543	-	-	-	-	
	BC 9/2009	100	-	-	125	-	-	-	-	-	
	ON 8/2008	100	435	-	125	540	-	-	-	-	
	QC 6/2008	100	434	-	125	543	-	-	-	-	
	ON 6/2008	-	10	-	-	-	-	-	-	-	[h]
	AB 6/2008	-	10	-	-	-	-	-	-	-	
	ON 6/2008	-	10	-	-	-	-	-	-	-	
	QC 6/2008	-	10	-	-	-	-	-	-	-	

8. Exposure controls/personal protection

Form: [a]Respirable fraction [b]Dust and fumes [c]Dust [d]Fume [e]Respirable dust [f]Total dust [g]The notation "respirable" following the name of an agent in this Schedule means that size fraction of the airborne particulate deposited in the gas-exchange region of the respiratory tract and collected during air sampling with a particle size-selective device that, (a) meets the American Conference of Governmental Industrial Hygienists (ACGIH) particle size-selective criteria; and (b) has the cut point of 4 microns at 50 per cent collective efficiency. [h]total dust [i]dust and fume [j]Total dust.

Consult local authorities for acceptable exposure limits.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
- Engineering measures** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

- Appearance (Physical state)** : Liquid.
- Flash point** : Closed cup: 48 to 53°C (118,4 to 127,4°F) [Setaflas h.]
- Flammable limits** : Not available.
- Color** : Red Oxide
- Odor** : Solvent odeur
- pH** : Not available.
- Boiling/condensation point** : Not available.
- Melting/freezing point** : Not available.
- Relative density** : 1,21
- Vapor density** : Not available.
- Volatility** : 52% (v/v)
- Odor threshold** : Not available.

9. Physical and chemical properties

Evaporation rate : Not available.
 VOC content : 400 g/l [Method 24]

10. Stability and reactivity

Chemical stability : The product is stable.
Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Avoid exposure - obtain special instructions before use.
Materials to avoid : Reactive or incompatible with the following materials:
 oxidizing materials
Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Solvent naphtha (petroleum), medium aliph.	LC50 Inhalation Vapor	Rat	>14,1 mg/L	4 hours
	LD50 Dermal	Rat	>3,108 mg/kg	-
	LD50 Oral	Rat	>6,216 mg/kg	-
Iron oxide (Fe ₂ O ₃)	LD50 Dermal	Rat	5500 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
Solvent naphtha (petroleum), light arom.	LD50 Dermal	Rabbit	14000 mg/kg	-
	LD50 Oral	Rat	8400 mg/kg	-
Benzene, dimethyl-	LC50 Inhalation Gas.	Rat	5000 ppm	4 hours
	LD50 Dermal	Rabbit	>1700 mg/kg	-
	LD50 Oral	Rat	4300 mg/kg	-
ethylbenzene	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-
Carbonic acid calcium salt (1:1)	LD50 Oral	Rat	6450 mg/kg	-

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Iron oxide (Fe ₂ O ₃)	A4	3	-	-	-	-
Tremolite	A1	1	-	-	Proven.	+
ethylbenzene	A3	2B	-	-	-	-

Mutagenicity

11. Toxicological information

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Benzene, dimethyl-ethylbenzene	Acute LC50 8500 ug/L Marine water	Crustaceans - Palaemonetes pugio	48 hours
	Acute LC50 3300 ug/L Fresh water	Fish - Oncorhynchus mykiss - 0,6 g	96 hours
	Acute EC50 2930 ug/L Fresh water	Daphnia - Daphnia magna - Neonate - <=24 hours	48 hours
	Acute LC50 >5200 ug/L Marine water	Crustaceans - Americamysis bahia - <24 hours	48 hours
	Acute LC50 4200 ug/L Fresh water	Fish - Oncorhynchus mykiss	96 hours
	Chronic NOEC 6800 ug/L Fresh water	Daphnia - Daphnia magna - <=24 hours	48 hours
Carbonic acid calcium salt (1:1)	Chronic NOEC 3300 ug/L Marine water	Fish - Menidia menidia	96 hours
	Acute LC50 >56000000 ug/L Fresh water	Fish - Gambusia affinis - Adult	96 hours

Conclusion/Summary : Not available.

Persistence/degradability

Conclusion/Summary : Not available.

Other adverse effects : No known significant effects or critical hazards.

13. Disposal considerations




Waste disposal : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1263	PAINTS	3	III		Remarks For containers of 450 litres or less, EXEMPTED from Transport of Dangerous Goods by Road according to exemption of article 1.33. 1.17 Exemption related to limited quantities 5 Litres
IMDG Class	UN1263	PAINTS	3	III		-
IATA-DGR Class	UN1263	PAINTS	3	III		-

PG* : Packing group

15. Regulatory information

Canada

WHMIS (Canada)

: Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
 Class D-2A: Material causing other toxic effects (Very toxic).
 Class D-2B: Material causing other toxic effects (Toxic).



Canadian lists

Canadian NPRI

The following components are listed: Stoddard solvent; Solvent naphtha medium aliphatic; Light aromatic solvent naphtha

CEPA Toxic substances

None of the components are listed.

Canada inventory

All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. Other information

Label requirements

: FLAMMABLE LIQUID AND VAPOR. COMBUSTIBLE. MAY BE FATAL IF SWALLOWED. CAUSES DIGESTIVE TRACT BURNS. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.

Hazardous Material Information System (U.S.A.)

:

Health

4

000713

8/9

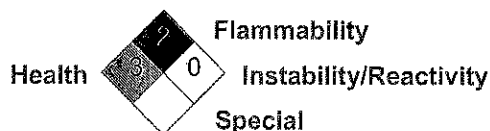
16. Other information

Flammability	2
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.) :



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Date of issue : 2014-01-24.
 Date of previous issue : No previous validation.
 Version : 0.02

☑ Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



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7XX Serie

Super Marine Alkyd Enamel

Solid	Coverage	Film thickness recommended
By weight: 52-64 % By volume: 41-47 %	63 m ² /gal (678 ft ² /gal) @ 1mil dry	1.0 to 1.5 mils dry (2 coats)

Drying time	T° of resistance	Attributes	Shell life	Sheen	Viscosity
Touch free: 6 hrs Recoating time: 14 to 18 hrs :	90° C, Continuous	Flexibility: Good Abrasion res.: Very good Weathering: Excellent	Minimum 1 years	High gloss	80-86 K.U.

Thinner/Cleaner	Format	Colors:
545-151, 545-153, 545-162	946 ml & 3,78l	

700	White	719	Dark Blue
702	Red	720	Orange
703	Aqua	724	Dark Grey
704	Green	732	Dory Buff
705	Light Grey	734	Red Deck
708	Black	605	Copper Bottom Red
717	Yellow		

Description:

A high gloss alkyd enamel designed for exterior and interior marine use. This is a 1-GP-61 Type, specially formulated with selected pigments and ingredients that provide excellent gloss retention, hardness, water resistance and adhesion.

Recommended uses:

Interior/exterior use on properly primed wood and metal exposure to marine environment.
Excellent for lawn furniture, porches, trims, wagon, breezeways, crafts.
Suitable as tractor and engine enamel.

Not recommended for:

Floors, concrete and alkaline surfaces.
Use in area exposed to chemical fumes.
Immersion service.

Surface preparation:

- Previously painted surfaces should be dry, free of dirt, oil, loose paint, etc
- Surfaces to be painted should be previously primed before applying the top finish coat.
- Wash off dirt, rust, oil, grease and wax using a cloth dampened with mineral spirit or T.S.P.
- Remove rust by scrapping, wire brushing or sanding.
- To improve adhesion of finish coat on glossy surfaces, sand to a dull finish.

Primers to use:

Wood: 709 Alkyd undercoater
Steel: Duro-Sol 545-062

Method of application:

Brush & roller, maximum dilution: 5% by volume.
Spray, maximum dilution: 20% by volume.

KEEP AWAY FROM FLAMES OR EXCESSIVE HEAT

KEEP OUT OF REACH OF CHILDREN AND ANIMALS

CONTACT YOUR MUNICIPALITY FOR DISPOSAL

Before using this product, read the material safety data sheet (MSDS) concerning the safety equipment to wear (section IX), for preventive measures (section VII), emergency and first aid treatments.

The information given above is provided by *Matchless Paint* for information purposes only and in no way does it constitute a representation, promise or guarantee in regards to the usage, durability or quality of the product. The products identified above must be used in strict compliance with the specifications mentioned above and all other instructions, warnings or guidelines issued by *Matchless Paint*

08-06-17

Material Safety Data Sheet

MATCHLESS, Marine paint high gloss alkyd enamel (white)

1. Product and company identification

Product name	: MATCHLESS, Marine paint high gloss alkyd enamel (white)
Manufactured/supplied	: Societe Laurentide 4660 12e Avenue Qc, Shawinigan-sud G9N 6T5
Trade name	: Alkyde paint
Code	: 000700
Validation date	: 2011-03-08.
Validated by:	: Whims Departement
<u>In case of Emergency</u>	: CANUTEC (613) 996-6666
Product type	: Liquid.

2. Hazards identification

Physical state	: Liquid.
Odor	: Solvent odeur
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview	: DANGER! FLAMMABLE LIQUID AND VAPOR. COMBUSTIBLE. MAY BE FATAL IF SWALLOWED. CAUSES DIGESTIVE TRACT BURNS. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
Precautions	: Keep away from heat, sparks and flame. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Avoid exposure during pregnancy. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
<u>Potential acute health effects</u>	
<u>Inhalation</u>	: Irritating to respiratory system.
<u>Ingestion</u>	: Very toxic if swallowed. Corrosive to the digestive tract. Causes burns.
<u>Skin</u>	: Irritating to skin.
<u>Eyes</u>	: Irritating to eyes.
<u>Potential chronic health effects</u>	
<u>Chronic effects</u>	: Contains material that may cause target organ damage, based on animal data.
<u>Carcinogenicity</u>	: Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
<u>Mutagenicity</u>	: No known significant effects or critical hazards.
<u>Teratogenicity</u>	: No known significant effects or critical hazards.
<u>Developmental effects</u>	: No known significant effects or critical hazards.
<u>Fertility effects</u>	: No known significant effects or critical hazards.
<u>Target organs</u>	: Contains material which may cause damage to the following organs: kidneys, lungs, upper respiratory tract, skin, eyes, central nervous system (CNS), stomach.
<u>Over-exposure signs/symptoms</u>	

2. Hazards identification

- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
- Ingestion** : Adverse symptoms may include the following:
stomach pains
- Skin** : Adverse symptoms may include the following:
irritation
redness
- Eyes** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Medical conditions aggravated by over-exposure** : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

3. Composition/information on ingredients

Name	CAS number	%
Stoddard solvent	8052-41-3	10-30
titanium dioxide	13463-67-7	10-30
Solvent naphtha (petroleum), medium aliph.	64742-88-7	10-30
Kaolin	1332-58-7	1-5
Silica gel, pptd., cryst.-free	112926-00-8	1-5
Benzene, dimethyl-	1330-20-7	0.1-1
ethylbenzene	100-41-4	0.1-1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention if irritation occurs.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if irritation occurs.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Call medical doctor or poison control center immediately. If potentially dangerous quantities of this material have been swallowed, call a physician immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

- Flammability of the product** : Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.
- Extinguishing media**
- Suitable** : Use dry chemical, CO₂, water spray (fog) or foam.
- Not suitable** : Do not use water jet.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
metal oxide/oxides
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Flash point** : Closed cup: 48 to 53°C (118,4 to 127,4°F) [Setaflas h.]
- Flammable limits** : Not available.
- Auto-ignition temperature** : Not available.

6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling

- Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage

- Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			Notations
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	
Stoddard solvent	US ACGIH 1/2008	100	525	-	-	-	-	-	-	-	
	AB 6/2008	100	572	-	-	-	-	-	-	-	
	BC 6/2008	-	290	-	-	580	-	-	-	-	
	ON 6/2008	-	525	-	-	-	-	-	-	-	
	QC 6/2008	100	525	-	-	-	-	-	-	-	
titanium dioxide	US ACGIH 1/2009	-	10	-	-	-	-	-	-	-	[3] [a] [b] [c] [d]
	AB 4/2009	-	10	-	-	-	-	-	-	-	
	BC 9/2009	-	3	-	-	-	-	-	-	-	
	ON 8/2008	-	10	-	-	-	-	-	-	-	
	QC 6/2008	-	10	-	-	-	-	-	-	-	
Benzene, dimethyl-	US ACGIH 1/2008	100	434	-	150	651	-	-	-	-	
	AB 6/2008	100	434	-	150	651	-	-	-	-	
	BC 6/2008	100	-	-	150	-	-	-	-	-	
	ON 6/2008	100	435	-	150	650	-	-	-	-	
	QC 6/2008	100	434	-	150	651	-	-	-	-	
ethylbenzene	US ACGIH 1/2009	100	-	-	125	-	-	-	-	-	
	AB 4/2009	100	434	-	125	543	-	-	-	-	
	BC 9/2009	100	-	-	125	-	-	-	-	-	
	ON 8/2008	100	435	-	125	540	-	-	-	-	
	QC 6/2008	100	434	-	125	543	-	-	-	-	
Kaolin	US ACGIH 1/2008	-	2	-	-	-	-	-	-	-	[e] [f] [g] [h] [i]
	AB 6/2008	-	2	-	-	-	-	-	-	-	
	BC 6/2008	-	2	-	-	-	-	-	-	-	
	ON 6/2008	-	2	-	-	-	-	-	-	-	
	QC 6/2008	-	5	-	-	-	-	-	-	-	
Silica gel, pptd., cryst.-free	AB 6/2008	-	10	-	-	-	-	-	-	-	[g] [i]
	BC 6/2008	-	1,5	-	-	-	-	-	-	-	
	ON 6/2008	-	4	-	-	-	-	-	-	-	
	QC 6/2008	-	10	-	-	-	-	-	-	-	
	QC 6/2008	-	6	-	-	-	-	-	-	-	

8. Exposure controls/personal protection

[3]Skin sensitization

Form: [a]Respirable dust [b]Total dust [c]total dust [d]Total dust. [e]Respirable fraction [f]Respirable particulate [g]Respirable [h]The notation “respirable” following the name of an agent in this Schedule means that size fraction of the airborne particulate deposited in the gas-exchange region of the respiratory tract and collected during air sampling with a particle size-selective device that, (a) meets the American Conference of Governmental Industrial Hygienists (ACGIH) particle size-selective criteria; and (b) has the cut point of 4 microns at 50 per cent collective efficiency. [i]Respirable dust.

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Appearance (Physical state) : Liquid.

Flash point : Closed cup: 48 to 53°C (118,4 to 127,4°F) [Setaflas h.]

Flammable limits : Not available.

Color : White.

Odor : Solvent odeur

pH : Not available.

Boiling/condensation point : Not available.

Melting/freezing point : Not available.

Relative density : 1,13

Vapor density : Not available.

Volatility : 55% (v/v)

9. Physical and chemical properties

Odor threshold	: Not available.
Evaporation rate	: Not available.
VOC content	: 430 g/l [Method 24]

10. Stability and reactivity

Chemical stability	: The product is stable.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Avoid exposure - obtain special instructions before use.
Materials to avoid	: Reactive or incompatible with the following materials: oxidizing materials
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Solvent naphtha (petroleum), medium aliph.	LC50 Inhalation Vapor	Rat	>14,1 mg/L	4 hours
Benzene, dimethyl-ethylbenzene	LD50 Dermal	Rat	>3,108 mg/kg	-
	LD50 Oral	Rat	>6,216 mg/kg	-
	LC50 Inhalation Gas.	Rat	5000 ppm	4 hours
	LD50 Dermal	Rabbit	>1700 mg/kg	-
	LD50 Oral	Rat	4300 mg/kg	-
ethylbenzene	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
titanium dioxide	A4	2B	-	-	-	-
Kaolin	A4	-	-	-	-	-
Silica gel, pptd., cryst.-free	-	3	-	-	-	-
ethylbenzene	A3	2B	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

11. Toxicological information

Reproductive toxicity

Conclusion/Summary : Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
titanium dioxide	Acute LC50 5,5 ppm Fresh water	Daphnia - Daphnia magna - Juvenile (Fledgling, Hatchling, Weanling) - <24 hours	48 hours
	Acute LC50 >1000000 ug/L Marine water	Fish - Fundulus heteroclitus	96 hours
	Chronic NOEC 1 ppm Fresh water	Daphnia - Daphnia magna - Juvenile (Fledgling, Hatchling, Weanling) - <24 hours	48 hours
Benzene, dimethyl-	Acute LC50 8500 ug/L Marine water	Crustaceans - Palaemonetes pugio	48 hours
	Acute LC50 3300 ug/L Fresh water	Fish - Oncorhynchus mykiss - 0,6 g	96 hours
ethylbenzene	Acute EC50 2930 ug/L Fresh water	Daphnia - Daphnia magna - Neonate - <=24 hours	48 hours
	Acute LC50 >5200 ug/L Marine water	Crustaceans - Americamysis bahia - <24 hours	48 hours
	Acute LC50 4200 ug/L Fresh water	Fish - Oncorhynchus mykiss	96 hours
	Chronic NOEC 6800 ug/L Fresh water	Daphnia - Daphnia magna - <=24 hours	48 hours
	Chronic NOEC 3300 ug/L Marine water	Fish - Menidia menidia	96 hours

Conclusion/Summary : Not available.

Persistence/degradability

Conclusion/Summary : Not available.

Other adverse effects : No known significant effects or critical hazards.


13. Disposal considerations

Waste disposal : Please recycle this product. To find the points of deposits in your municipality Please consult the www.peinture.ca

Disposal should be in accordance with applicable regional, national and local laws and regulations.



Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	1263	PAINT	3	III		Remarks For containers of 450 litres or less, EXEMPTED from Transport of Dangerous Goods by Road according to exemption of article 1.33.

MATCHLESS, Marine paint high gloss alkyd enamel (white)

14. Transport information

IMDG Class	1263	PAINTS (Stoddard solvent)	3	III		-
IATA-DGR Class	1263	PAINTS (Stoddard solvent)	3	III		-

PG* : Packing group

15. Regulatory information

Canada

WHMIS (Canada)

- : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
- Class D-2A: Material causing other toxic effects (Very toxic).
- Class D-2B: Material causing other toxic effects (Toxic).



Canadian lists

Canadian NPRI

The following components are listed: Stoddard solvent; Solvent naphtha medium aliphatic

CEPA Toxic substances

None of the components are listed.

Canada inventory

All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. Other information

Label requirements

- : FLAMMABLE LIQUID AND VAPOR. COMBUSTIBLE. MAY BE FATAL IF SWALLOWED. CAUSES DIGESTIVE TRACT BURNS. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.

Hazardous Material Information System (U.S.A.)

:

Health	4
Flammability	2
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

:

16. Other information



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

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Version : 0.03

📌 Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Megger
Testing
CCG Ship
Valadykov

March 21

2014

Testing

Performed By : Ryan Wicks

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MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

GENERATOR SECTION

460V MAIN SWITCHBOARD

CIRCUIT #	AMPS	DESIGNATION	PHASE	MEGOHM			
				L FRAME	L1-L2	L2-L3	L3-L1
SHS-001/P	100	SHORE SUPPLY CONNECTION BOX	A	∞	∞	∞	∞
	100		B	∞			
	100		C	∞			
SHS-001/P-A	100	TRANSFO / SHORE SUPPLY	A	∞			
	100		B	∞			
	100		C	∞			
GEN1-01/P		GENERATOR #1	A	∞	∞	∞	∞
			B	∞			
			C	∞			
GEN1-02/P		GENERATOR #1	A	∞	∞	∞	∞
			B	∞			
			C	∞			
GEN2-01/P		GENERATOR #2	A	∞	∞	∞	∞
			B	∞			
			C	∞			
GEN2-02/P		GENERATOR #2	A	∞	∞	∞	∞
			B	∞			
			C	∞			
HGEN-01/P		HARBOURG GENERATOR	A	∞	∞	∞	∞
			B	∞			
			C	∞			



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

PORT DISTRIBUTION SECTION

460V MAIN SWITCHBOARD

CIRCUIT #	AMPS	DESIGNATION	PHASE	MEGOHM			
				L FRAME	L1-L2	L2-L3	L3-L1
P401P	100	460V MACHINERY SPACE PANEL #1 P401P	A	∞	∞	∞	∞
	100		B	∞			
	100		C	∞			
P402P	70	TRANSFO 460V/240V ; P200P	A	∞	∞	∞	∞
	70		B	∞			
	70		C	∞			
P403P	100	SPARE	A				
	100		B				
	100		C				
P404P	150	FISHING EQUIPMENT EHPU PUMP #1 STARTER	A	∞	∞	∞	∞
	150		B	∞			
	150		C	∞			
P405P	40	RESCUT BOAT DAVIT	A	∞	∞	∞	∞
	40		B	∞			
	40		C	∞			
P406P	100	SPARE	A				
	100		B				
	100		C				
P407P	70	TRANSFO 460V/120V ; P100	A	∞	∞	∞	∞
	70		B	∞			
	70		C	∞			
P408P	225	VFD BOW THRUSTER	A	∞	∞	∞	∞
	225		B	∞			
	225		C	∞			
		INTERRUPTEUR ATACHE	A	∞	∞	∞	∞
			B	∞			
			C	∞			



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

STBD DISTRIBUTION SECTION

460V MAIN SWITCHBOARD

CIRCUIT #	AMPS	DESIGNATION	PHASE	MEGOHM			
				L FRAME	L1-L2	L2-L3	L3-L1
P401S	225	VFD BOW THRUSTER	A	∞	∞	∞	∞
	225		B	∞			
	225		C	∞			
P402S	70	TRANSFO 460V/120V ; P100	A	∞	∞	∞	∞
	70		B	∞			
	70		C	∞			
P403S	100	460V MACHINERY SPACE PANEL #2 P403S	A	∞	∞	∞	∞
	100		B	∞			
	100		C	∞			
P404S	100	460V HOLD WORKSHOP & AUXILIARY SPACE PANEL P404S	A	∞	∞	∞	∞
	100		B	∞			
	100		C	∞			
P405S	100	SPARE	A				
	100		B				
	100		C				
P406S	150	FISHING EQUIPMENT EHPU PUMP #2 STARTER	A	∞	∞	∞	∞
	150		B	∞			
	150		C	∞			
P407S	60	DECK MACHINERY EHPU PUMP #1, / DECK MACHINERY EHPU PUMP #2	A	∞	∞	∞	∞
	60		B	∞			
	60		C	∞			
P408S	100	SPARE	A				
	100		B				
	100		C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P401P

ENGINE ROOM, 460V/3PH MAIN SWITCHBOARD PORT
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
1	P401P-1	15	ENGINE ROOM SUPPLY FAN #1	A	∞	∞	∞	∞
3		15		B	∞			
5		15		C	∞			
7	P401P-3	15	EHPU HEATER CONTROL BOX	A	∞	∞	∞	∞
9		15		B	∞			
11		15		C	∞			
13	P401P-5	15	OILY WATER SEPARATOR	A	∞	∞	∞	∞
15		15		B	∞			
17		15		C	∞			
21	P401P-7	15	FUEL OIL TRANSFER PUMP #1	A	∞	∞	∞	∞
23		15		B	∞			
25		15		C	∞			
27	P401P-9	15	ENGINE ROOM SUSPENDED UNIT #1 & ENGINE ROOM SUSPENDED UNIT HEATER #3	A	∞	∞	∞	∞
29		15		B	∞			
31		15		C	∞			
33	P401P-11	60	AFT WORKING DECK WT. RCPT.CCT.	A	∞	∞	∞	∞
35		60		B	∞			
37		60		C	∞			
39	P401P-13	15	SPARE	A				
41		15		B				
43		15		C				
45	FREE		BLANK	A				
47	FREE		BLANK	B				
49	FREE		BLANK	C				
51	FREE		BLANK	A				
53	FREE		BLANK	B				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P401P

ENGINE ROOM, 460V/3PH MAINSWITCHBOARD PORT
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
2	P401P-2	15	BILGE/BALLAST PUMP & BACK-UP FIRE PUMP	A	∞	∞	∞	∞
4		15		B	∞			
6		15		C	∞			
8	P401P-4	15	AUX. COOLING PUMP	A	∞	∞	∞	∞
10		15		B	∞			
12		15		C	∞			
14	P401P-6	15	DIRTY OIL TRANSFER PUMP	A	∞	∞	∞	∞
16		15		B	∞			
18		15		C	∞			
22	P401P-8	15	SPARE	A				
24		15		B				
26		15		C				
28	P401P-10	15	BOW THRUSTER SUSPENDED UNIT HEATER #1 & #2	A	∞	∞	∞	∞
30		15		B	∞			
32		15		C	∞			
34	P401P-12	50	MUAH ELECTRIC DUCT HEATER	A	∞	∞	∞	∞
36		50		B	∞			
38		50		C	∞			
40	FREE		BLANK	A				
42	FREE		BLANK	B				
44	FREE		BLANK	C				
46	FREE		BLANK	A				
48	FREE		BLANK	B				
50	FREE		BLANK	C				
52	FREE		BLANK	A				
54	FREE		BLANK	B				



MEGGER TEST
CCG SHIP VALADYKOV
BY POWERLITE ELECTRIC LTD.

P401P

ENGINE ROOM, 460V MAIN SWITCHBOARD PORT

MOTEUR		AMPERE MOTEUR						RESISTAN CE		RPM
		EN CHARGE			A VIDE					
		L 1	L2	L3	L1	L2	L3	OHM	MEGOH M	
P401P-1	ENGINE ROOM SUPPLY FAN #1								∞	
P401P-2	BILGE/BALLAST PUMP & BACK UP FIRE PUMP								∞	
P401P-4	AUXILIARY COOLING PUMP								∞	
P401P-6	DIRTY OIL TRANSFER PUMP								∞	
P401P-7	FUEL OIL TRANSFER PUMP #1								∞	



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P403S

ENGINE ROOM, 460V/3PH MAIN SWITCHBOARD STBD
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
1	P403S-1	15	ENGINE ROOM SUPPLY FAN #2	A	∞	∞	∞	∞
3		15		B	∞			
5		15		C	∞			
7	P403S-3	15	SPARE	A				
9		15		B				
11		15		C				
13	P403S-5	15	SPARE	A				
15		15		B				
17		15		C				
21	P403S-7	15	FUEL OIL TRANSFER PUMP #2	A	∞	∞	∞	∞
23		15		B	∞			
25		15		C	∞			
27	P403S-9	15	SCIENTIFIC SONAR HULL UNIT	A	∞	∞	∞	∞
29		15		B	∞			
31		15		C	∞			
33	P403S-11	15	MUAH ELECTRIC DUCT HEATER	A	∞	∞	∞	∞
35		15		B	∞			
37		15		C	∞			
39	P403S-13	60	AFT WORKING DECK WT. RCPT. CCT.	A	∞	∞	∞	∞
41		60		B	∞			
43		60		C	∞			
45	P403S-15	15	SPARE	A				
47		15		B				
49		15		C				
51	FREE		BLANK	A				
53	FREE		BLANK	B				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P403S

ENGINE ROOM, 460V/3PH MAINSWITCHBOARD STBD
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
2	P403S-2	15	FIRE/GENERAL SERVICE PUMP	A	∞	∞	∞	∞
4		15		B	∞			
6		15		C	∞			
8	P403S-4	15	OILY WATER PUMP	A	∞	∞	∞	∞
10		15		B	∞			
12		15		C	∞			
14	P403S-6	15	SLUDGE PUMP	A	∞	∞	∞	∞
16		15		B	∞			
18		15		C	∞			
22	P403S-8	15	SPARE	A				
24		15		B				
26		15		C				
28	P403S-10	15	ENGINE ROOM SUSPENDED UNIT HEATER #2 & #4	A	∞	∞	∞	∞
30		15		B	∞			
32		15		C	∞			
34		20	MARINE TYPE DRYER RCPT	A	∞	∞	∞	
36	P403S-12	20		B	∞			
38		20		C	∞			
42	P403S-14	15	SPARE	A				
44		15		B				
46		15		C				
48	FREE		BLANK	A				
50	FREE		BLANK	B				
52	FREE		BLANK	C				
54	FREE		BLANK	A				



MEGGER TEST
CCG SHIP VALADYKOV
BY POWERLITE ELECTRIC LTD.

P403S

ENGINE ROOM, 460V MAIN SWITCHBOARD STBD

MOTEUR		AMPERE MOTEUR						RESISTANC E		RPM
		EN CHARGE			A VIDE					
		L1	L2	L3	L1	L2	L3	OHM	MEGOHM	
P403S-1	ENGINE ROOM SUPPLY FAN #2								∞	
P403S-2	FIRE/GENERAL SERVICE PUMP								∞	
P403S-4	OILY WATER PUMP								∞	
P403S-6	SLUDGE PUMP								∞	
P403S-7	FUEL OIL TRANSFER PUMP #2								∞	



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P404S

HOLD WORKSHOP & AUXILIARY SPACE, 460V/3PH MAIN SWITCHBOARD STBD
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
1	P404S-1	15	FRESH WATER PUMP #1	A	∞	∞	∞	∞
3		15		B	∞			
5		15		C	∞			
7	P404S-3	15	AUX. MACH. SPACE SUSPENDED UNIT HEATER #1 & #2	A	∞	∞	∞	∞
9		15		B	∞			
11		15		C	∞			
13	P404S-5	15	SEA WATER CHILLER (LIVE CATCH)	A	∞	∞	∞	∞
15		15		B	∞			
17		15		C	∞			
19	P404S-7	15	SPARE	A				
21		15		B				
23		15		C				
25	P404S-9	15	HOT WATER HEATER	A	∞	∞	∞	∞
27		15		B	∞			
29		15		C	∞			
31	P404S-11	15	SEA WATER CHILLER COOLING PUMP	A	∞	∞	∞	∞
33		15		B	∞			
35		15		C	∞			
37	P404S-13	15	SPARE	A				
39		15		B				
41		15		C				
43	P404S-15	30	SPARE	A				
45		30		B				
47		30		C				
49	FREE		BLANK	A				
51	FREE		BLANK	B				
53	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P404S

HOLD WORKSHOP & AUXILIARY SPACE, 460V/3PH MAINSWITCHBOARD STBD
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
2	P404S-2	15	FRESH WATER PUMP #2	A	∞	∞	∞	∞
4		15		B	∞			
6		15		C	∞			
8	P404S-4	15	AIR COMPRESSOR	A	∞	∞	∞	∞
10		15		B	∞			
12		15		C	∞			
14	P404S-6	20	HOLD WORKSHOP SUSPENDED UNIT HEATER #1 & #2 STEERING GEAR SUSPENDED UNIT HEATER #1 & #2	A	∞	∞	∞	∞
16		20		B	∞			
18		20		C	∞			
20	P404S-8	15	SPARE	A				
22		15		B				
24		15		C				
26	P404S-10	15	SPARE	A				
28		15		B				
30		15		C				
32	P404S-12	15	SEA WATER LIVE CATCH SUPPLY PUMP	A	∞	∞	∞	∞
34		15		B	∞			
36		15		C	∞			
38	P404S-14	15	REVERSE OSMOSIS WATER TREATMENT	A	∞	∞	∞	∞
40		15		B	∞			
42		15		C	∞			
44	FREE		BLANK	A				
46	FREE		BLANK	B				
48	FREE		BLANK	C				
50	FREE		BLANK	A				
52	FREE		BLANK	B				
54	FREE		BLANK	C				



MEGGER TEST
CCG SHIP VALADYKOV
BY POWERLITE ELECTRIC LTD.

P404S

HOLD WORKSHOP & AUXILIARY SPACE, 460V MAIN SWITCHBOARD STBD

MOTEUR		AMPERE MOTEUR						RESISTANC E		RPM
		EN CHARGE			A VIDE					
		L 1	L2	L3	L1	L2	L3	OHM	MEGOHM	
P404S-1	FRESH WATER PUMP #1								∞	
P404S-2	FRESH WATER PUMP #2								∞	
P404S-4	AIR COMPRESSOR								∞	
P404S-11	SEA WATER CHILLER COOLING PUMP								∞	
P404S-12	SEA WATER LIVE CATCH SUPPLY PUMP								∞	



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P200P ENGINE ROOM, 240V/3PH MAIN POWER DISTRIBUTION PORT
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHASE	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
	P200P		TRANSFO T3 460V/240V	A	∞	∞	∞	∞
				B	∞			
				C	∞			
1	P200P-1	15	SH90 SCIENTIFIC SONAR POWER SUPPLY & SH90 SCIENTIFIC SONAR TRANSCEIVER UNIT	A	∞	∞		
3		15		B	∞			
5	P200P-5	15	LOWER ACC. PORT WC. WALL HEATER & LOWER ACC. STBD WC. WALL HEATER	C	∞			∞
7		15		A	∞			
9	P200P-9	15	SPARE	B			∞	
11		15		C				
13	P200P-13	15	MAIN ENGINE #1 PRE-HEATER	A	∞	∞		
15		15		B	∞			
17	P200P-17	15	LOWER ACC. STBD. AFT CABIN BASEBOARD HEATER, LOWER ACC. PORT AFT CABIN BASEBOARD HEATER, LOWER ACC. PORT FWD. CABIN BASEBOARD HEATER, LOWER ACC. STBD. FWD. CABIN BASEBOARD HEATER	C	∞			∞
19		15		A	∞			
21	P200P-21	15	SPARE	B				
23		15		C				
25	P200P-25	15	CHIEF ENGINEER'S CABIN BASEBOARD HEATER, CAPTAIN'S CABIN BASEBOARD HEATER, CAPTAIN'S WC. BASEBOARD HEATER	A	∞	∞		
27		15		B	∞			
29	P200P-29	15	VACUUM SEWAGE PUMP #1	C	2			∞
31		15		A	2			
33	P200P-33	60	AFT WORKING DECK WT. RCPT.CCT. #1, 10KW	B	∞	∞	∞	∞
35		60		C	∞			
37		60		A	∞			
39	P200P-39	15	MAIN ENGINE #2 PRE-HEATER	B	∞		∞	
41		15		C	∞			
43	FREE		BLANK	A				
45	FREE		BLANK	B				
47	FREE		BLANK	C				
49	P200P-49	15	VACUUM SEWAGE PUMP BACK-UP	A	2	∞		
51		15		B	2			
53	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P200P

ENGINE ROOM, 240V/3PH MAIN POWER DISTRIBUTION PORT
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
2	P200P-2	15	WET LAB BASEBOARD HEATER	A	∞	∞		
4		15		B	∞			
6	P200P-6	15	SPARE	C				
8		15		A				
10	P200P-10	15	SPARE	B				
12		15		C				
14	P200P-14	30	AFT WORKING DECK WT.RCPT.CCT. 2KW	A	∞	∞		
16		30		B	∞			
18	P200P-18	20	DRY LAB WT. RCPT. #1 & DRY LAB WT. WT. RCPT. #2	C	∞			∞
20		20		A	∞			
22	P200P-22	15	SPARE	B				
24		15		C				
26	P200P-26	15	SPARE	A				
28		15		B				
30	P200P-30	60	AFT WORKING DECK WT.RCPT.CCT. #2, 10KW	C	∞	∞	∞	∞
32		60		A	∞			
34		60		B	∞			
36	P200P-36	15	WET GEAR BASEBOARD HEATER	C	∞			∞
38		15		A	∞			
40	P200P-40	100	P201P PANEL	B	∞	∞	∞	∞
42		100		C	∞			
44		100		A	∞			
46	FREE		BLANK	B				
48	FREE		BLANK	C				
50	FREE		BLANK	A				
52	FREE		BLANK	B				
54	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P201P

MESS, 240V/3PH SUB POWER DISTRIBUTION
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
1	P201P-1	15	COLD STORE CONDENSER	A	∞	∞		
3		15		B	∞			
5	P201P-5	15	DRY STORE WALL HEATER 1KW	C	∞			∞
7		15		A	∞			
9	P201P-9	40	TRANSFO 2KVA DISJONCTEUR 15A 3PH, & OVEN/RANGE RECEPTACLE	B	∞		∞	
11		40		C	∞			
13	P201P-13	15	WH CONVECTION & FAN HEATER #5 AFT CONSOLE & HEATER GALEY	A	∞	∞		
15		15		B	∞			
17	P201P-17	50	DISHWASHER	C	∞			∞
19		50		A	∞			
21	P201P-21	30	A/C CONDENSER WH. TOP	B	∞		∞	
23		30		C	∞			
25	P201P-25	15	WH CONVECTION & FAN HEATER #1 PORT W/H	A	∞	∞		
27		15		B	∞			
29	P201P-29	15	DRY LAB BASEBOARD HEATER	C	∞			∞
31		15		A	∞			
33	P201P-33	15	A/C UNIT WH. #1, A/C UNIT WH. #2, A/C UNIT DRY LAB	B	∞		∞	
35		15		C	∞			
37	FREE		BLANK	A				
39	FREE		BLANK	B				
41	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P201P

MESS, 240V/3PH SUB POWER DISTRIBUTION
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
2	P201P-2	15	FREEZER CONDENSER & FREEZER EVAPORATOR	A	∞	∞		
4		15		B	∞			
6	P201P-6	15	FWD. CONSOLE TB2; POWER SUPPLY #1, POWER SUPPLY #2, POWER SUPPLY #3	C	∞			∞
8		15		A	∞			
10	P201P-10	15	SPARE	B				
12		15		C				
14	P201P-14	20	WH. CONVECTION & FAN HEATER #3 AFT WH.	A	∞	∞		
16		20		B	∞			
18	P201P-18	15	SPARE	C				
20		15		A				
22	P201P-22	20	WINDOW WIPER IMS MODULE #9	B	∞			∞
24		20		C	∞			
26	P201P-26	15	WH. CONVECTION & FAN HEATER #2 STBD WH.	A	∞	∞		
28		15		B	∞			
30	P201P-30	15	SPARE	C				
32		15		A				
34	P201P-34	30	MUAH CONDENSER WH.TOP & MUAH BLOWER WET GEAR	B	∞		∞	
36		30		C	∞			
38	FREE		BLANK	A				
40	FREE		BLANK	B				
42	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P100 ENGINE ROOM, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POLE POS.	CCT #	AMPS	DESIGNATION	PHASE	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
	P100P		TRANSFO T1 460V/120V	A	∞	∞	∞	∞
				B	∞			
				C	∞			
	P100S		TRANSFO T2 460V/120V	A	∞	∞	∞	∞
				B	∞			
				C	∞			
1	P107	30	24VDC DC4 EMERGENCY SERVICE BATT. CHARGER	A	15	∞		
3		30		B	15			
5	P108	20	24VDC DC2 WHEELHOUSE BATT. CHARGER	C	5			∞
7		20		A	5			
9	P112	30	3KVA UPS	B	∞		∞	
11		30		C	∞			
13	FREE		BLANK	A				
15	FREE		BLANK	B				
17	FREE		BLANK	C				
19	FREE		BLANK	A				
21	FREE		BLANK	B				
23	FREE		BLANK	C				
25	FREE		BLANK	A				
27	FREE		BLANK	B				
29	FREE		BLANK	C				
31	FREE		BLANK	A				
33	FREE		BLANK	B				
35	FREE		BLANK	C				
37	FREE		BLANK	A				
39	FREE		BLANK	B				
41	FREE		BLANK	C				
43	FREE		BLANK	A				
45	FREE		BLANK	B				
47	FREE		BLANK	C				
49	FREE		BLANK	A				
51	FREE		BLANK	B				
53	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P100

ENGINE ROOM, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POLE POS.	CCT #	AMPS	DESIGNATION	PHASE	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
2	P110	15	NAVIGATION LIGHTS PANEL MAIN SUPPLY	A	∞	∞		
4		15		B	∞			
6	P111	70	SPARE	C				
8		70		A				
10	P109	15	SPARE	B				
12		15		C				
14	P113	15	SPARE	A				
16		15		B				
18	P101	100	120V MACHINERY SPACE PANEL NO.1 P101	C	∞	∞	∞	∞
20		100		A	∞			
22		100		B	∞			
24	P102	100	120V MACHINERY SPACE PANEL NO.2 P102	C	∞	∞	∞	∞
26		100		A	∞			
28		100		B	∞			
30	P103	100	120V FOCSE/MAIN DECK PANEL P103	C	∞	∞	∞	∞
32		100		A	∞			
34		100		B	∞			
36	P104	80	120V GALEY PANEL P104	C	∞	∞	∞	∞
38		80		A	∞			
40		80		B	∞			
42	P105	100	120V WHEELHOUSE PANEL P105	C	∞	∞	∞	∞
44		100		A	∞			
46		100		B	∞			
48	P106	50	120V PANEL P106	C	∞	∞	∞	∞
50		50		A	∞			
52		50		B	∞			
54	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P101

ENGINE ROOM, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POLE POS.	CCT #	AMPS	DESIGNATION	PHASE	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
1	P101-1	15	STEERING GEAR SPACE EXHAUST FAN	A	∞	∞		
3		15		B	∞			
5	P101-5	25	24VDC1 MACHINERY SPACE BAT. CHARGER	C	10			∞
7		25		A	10			
9	P101-9	15	UV STERILIZER	B	∞		∞	
11		15		C	∞			
13	P101-13	20	AFT WORKING DECK WT. RCPT.	A	∞	∞		
15		20		B	∞			
17	P101-17	15	AUX. MACHINERY SPACE EXHAUST FAN	C	∞			∞
19		15		A	∞			
21	P101-21	15	HOLD SPACE LIGHTING CCT.	B	∞		∞	
23		15		C	∞			
25	P101-25	15	SPARE	A				
27		15		B				
29	P101-29	15	SPARE	C				
31		15		A				
33	P101-33	15	GENSET #1 BLOCK HTR	B	∞		∞	
35		15		C	∞			
37	FREE		BLANK	A				
39	FREE		BLANK	B				
41	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P101

ENGINE ROOM, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POLE POS.	CCT #	AMPS	DESIGNATION	PHASE	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
2	P101-2	15	GENSET #1 HEATERSWITCH (SWITCHBOARD) & GENSET #1 ANTI-COND. HTR	A	∞	∞		
4		15		B	∞			
6	P101-6	15	ENGINE ROOM WT. RCPT. CCT.	C	∞			∞
8		15		A	∞			
10	P101-10	15	HOLD WORKSHOP SPACE WT. RCPT. CCT.	B	∞		∞	
12		15		C	∞			
14	P101-14	15	SPARE	A				
16		15		B				
18	P101-18	15	GENSET #1 START/CTRL. BAT. CHARGER	C	10			∞
20		15		A	10			
22	P101-22	15	MACHINERY SPACE LIGHTING CCT.	B	∞		∞	
24		15		C	∞			
26	P101-26	15	OILY WATER SEPARATOR CONTROL PANEL	A	∞	∞		
28		15		B	∞			
30	P101-30	15	SPARE	C				
32		15		A				
34	P101-34	15	SPARE	B				
36		15		C				
38	FREE		BLANK	A				
40	FREE		BLANK	B				
42	FREE		BLANK	C				



MEGGER TEST
CCG SHIP VALADYKOV
BY POWERLITE ELECTRIC LTD.

P101

ENGINE ROOM, 120V/3PH DISTRIBUTION

MOTEUR		AMPERE MOTEUR						RESISTANC E		RPM
		EN CHARGE			A VIDE					
		L1	L2	L3	L1	L2	L3	OHM	MEGOH M	
P101-1	STEERING GEAR SPACE EXHAUST FAN								∞	
P101-17	AUX MACHINERY SPACE EXHAUST FAN								∞	



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P102

ENGINE ROOM, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POL E POS	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
1	P102-1	15	HOLD WORKSHOP EXHAUST FAN	A	∞	∞		
3		15		B	∞			
5	P102-5	20	AFT WORKING DECK WT. RCPT.	C	∞			∞
7		20		A	∞			
9	P102-9	15	FRESH WATER & STEERING GEAR SPACE LIGHTING CCT.	B	∞		∞	
11		15		C	∞			
13	P102-13	15	MACHINERY SPACE LIGHTING CCT. #2	A	∞	∞		
15		15		B	∞			
17	P102-17	15	HG. START/CTRL BAT. CHARGER	C	∞			∞
19		15		A	∞			
21	P102-21	15	GENSET #2 HEATER SWITCH (SWITCHBOARD) & GENSET #2 ANTI-COND. HTR	B	∞		∞	
23		15		C	∞			
25	P102-25	15	WASHER	A	∞	∞		
27		15		B	∞			
29	P102-29	15	SPARE	C				
31		15		A				
33	FREE		BLANK	B				
35	FREE		BLANK	C				
37	FREE		BLANK	A				
39	FREE		BLANK	B				
41	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P102

ENGINE ROOM, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
2	P102-2	15	BOW THRUSTER SPACE EXHAUST FAN	A	∞	∞		
4		15		B	∞			
6	P102-6	15	UNDER VOLTAGE (RELAY CONTACT)	C	∞			∞
8		15	HOLD WORKSHOP EXHAUST FAN	A	∞			
10	P102-10	15	GENSET #2 START/CTRL BAT. CHARGER	B	2			∞
12		15		C	2			
14	P102-14	15	HG. GENSET BLOCK HEATER	A	∞	∞		
16		15		B	∞			
18	P102-18	15	GENSET #2 BLOCK HEATER	C	∞			∞
20		15		A	∞			
22	P102-22	15	HG.HEATERSWITCH (SWITCHBOARD) & HG. GENSET ANTI-COND. HTR	B	∞		∞	
24		15		C	∞			
26	P102-26	15	SPARE	A				
28		15		B				
30	FREE		BLANK	C				
32	FREE		BLANK	A				
34	FREE		BLANK	B				
36	FREE		BLANK	C				
38	FREE		BLANK	A				
40	FREE		BLANK	B				
42	FREE		BLANK	C				



MEGGER TEST
CCG SHIP VALADYKOV
BY POWERLITE ELECTRIC LTD.

P102

ENGINE ROOM, 120V/3PH DISTRIBUTION

MOTEUR		AMPERE MOTEUR						RESISTAN CE		RPM
		EN CHARGE			A VIDE					
		L 1	L2	L3	L1	L2	L3	OHM	MEGOH M	
P102-1	HOLD WORKSHOP EXHAUST FAN								∞	
P102-2	BOW THRUSTER SPACE EXHAUST FAN								∞	



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P103

MESS, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POLE POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
1	P103-1	15	MUAH TRANSFO POWER SUPPLY CONTROL PANEL	A	∞	∞		
3		15		B	∞			
5	P103-5	15	MAIN DK PORT & LOWER ACC. WC. EXHAUST FAN	C	∞			∞
7		15		A	∞			
9	P103-9	15	LOWER ACC.RCPT.CCT. #3	B	∞		∞	
11		15		C	∞			
13	P103-13	15	MAIN DK. ACC. LIGHTING & RCPT. CCT. #1	A	∞	∞		
15		15		B	∞			
17	P103-17	30	DRY LAB FREEZER #2	C	∞			∞
19		30		A	∞			
21	P103-21	15	WET GEAR RCPT. CCT. #1	B	∞		∞	
23		15		C	∞			
25	P103-25	15	CONSOLE RCPT. ACCOMODATION	A	∞	∞		
27		15		B	∞			
29	P103-29	15	HEATING CABLE	C	∞			∞
31		15		A	∞			
33	FREE		BLANK	B				
35	FREE		BLANK	C				
37	FREE		BLANK	A				
39	FREE		BLANK	B				
41	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P103

MESS, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POLE POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
2	P103-2	15	WET GEAR WC. STBD EXHAUST FAN	A	∞	∞		
4		15		B	∞			
6	P103-6	15	LOWER ACC. LIGHTING & RCPT. CCT. #1	C	∞			∞
8		15		A	∞			
10	P103-10	15	SPARE	B				
12		15		C				
14	P103-14	20	AFT WORKING DECK WT. RCPT. CCT.	A	∞	∞		
16		20		B	∞			
18	P103-18	15	DRY LAB RCPT. CCT.	C	∞			∞
20		15		A	∞			
22	P103-22	30	DRY LAB FREEZER #1	B	∞		∞	
24		30		C	∞			
26	P103-26	15	MAIN DECK ACC. LIGHTING & RCPT. CCT. #2	A	∞	∞		
28		15		B	∞			
30	P103-30	15	SPARE	C				
32		15		A				
34	FREE		BLANK	B				
36	FREE		BLANK	C				
38	FREE		BLANK	A				
40	FREE		BLANK	B				
42	FREE		BLANK	C				



MEGGER TEST
CCG SHIP VALADYKOV
BY POWERLITE ELECTRIC LTD.

P103
MESS, 120V/3PH DISTRIBUTION

MOTEUR		AMPERE MOTEUR						RESISTANC E		RPM
		EN CHARGE			A VIDE					
		L1	L2	L3	L1	L2	L3	OHM	MEGOHM	
P103-2	WET GEAR WC. STBD. EXHAUST FAN								∞	
P103-5	MAIN DK PORT & LOWER ACC. WC. EXHAUST FAN								∞	



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P104

MESS, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
1	P104-1	20	MICROWAVE OVEN	A	∞	∞		
3		20		B	∞			
5	P104-5	15	COFFEE MAKER	C	∞			∞
7		15		A	∞			
9	P104-9	15	WATER COOLER RCPT., TV. RCPT., SMALL FRIDGE RCPT.	B	∞		∞	
11		15		C	∞			
13	P104-13	15	COLD STORE EVAPORATOR	A	∞	∞		
15		15		B	∞			
17	P104-17	15	GALEY RCPT. CCT.	C	∞			∞
19		15		A	∞			
21	P104-21	15	GALEY EXHAUST FAN	B			∞	
23		15		C				
25	FREE		BLANK	A				
27	FREE		BLANK	B				
29	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P104

MESS, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
2	P104-2	15	SPARE	A				
4		15		B				
6	P104-6	15	REFRIGERATOR	C	∞			∞
8		15		A	∞			
10	P104-10	15	SPARE	B				
12		15		C				
14	P104-14	20	TOASTER	A	∞	∞		
16		20		B	∞			
18	P104-18	15	GALLEY REC.	C		∞		
20		15		A		∞		
22	P104-22	15	GALLEY REC.	B		∞		
24		15		C		∞		
26	FREE		BLANK	A				
28	FREE		BLANK	B				
30	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P105

WHEELHOUSE, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POLE POS.	CCT #	AMPS	DESIGNATION	PHASE	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
1	P105-1	15	WASSP ETHERNET SWITCH, RCPT. CCT. & SCIENTIFIC MULTIBEAM SONAR PC (WASSP), RCPT. CCT.	A	∞	∞		
3		15		B	∞			
5	P105-5	15	WHEELHOUSE LIGHTING & RCPT. CCT.	C	∞			∞
7		15		A	∞			
9	P105-9	20	SCIENTIFIC ACOUSTIC DOPPLER PROFILER (ADCP)	B	∞		∞	
11		20		C	∞			
13	P105-13	15	AFT FISHUT RECEPTACLE	A	∞	∞		
15		15		B	∞			
17	P105-17	15	RADAR SLAVE	C	∞			∞
19		15		A	∞			
21	P105-21	15	WH. TOP FWD. SEARCHLIGHT 2X300W	B	∞		∞	
23		15		C	∞			
25	P105-25	15	MAIN DECK LIGHT AFT + DOCKING LIGHT 11X60W	A	∞	∞		
27		15		B	∞			
29	P105-29	15	WH. TOP FWD. FLOODLIGHT 2X250W	C	∞			∞
31		15		A	∞			
33	P105-33	15	CELLULAR TELEPHONE (TELLULAR)	B	∞		∞	
35		15		C	∞			
37	P105-37	15	MARPORT TRANSCEIVER #1, MARPORT TRANSCEIVER #2, MARPORT PC (CONTROL STATION)	A	∞	∞		
39		15		B	∞			
41	P105-41	15	TRACKLINK PC RCPT. CCT.	C	∞			∞
43		15		A	∞			
45	P105-45	15	DECK LIGHT FWD. + DOCKING LIGHT FWD (9X60W)	B	120Mohms		120mohms	
47		15		C	∞			
49	P105-49	15	LIGHTING RELAY BOX SWITCH 1 TO 7 IN WH. & LIGHTING RELAY BOX RELAY K1 TO K7	A	∞	∞		
51		15		B	∞			
53	P105-53	15	SPARE	C				
55		15		A				
57	P105-57	15	SPARE	B				
59		15		C				
61	FREE		BLANK	A				
63	FREE		BLANK	B				
65	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P105

WHEELHOUSE, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POLE POS.	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
2	P105-2	15	SPARE	A				
4		15		B				
6	P105-6	15	FORECASTLE DECK FR.14 FLOODLIGHT (400W) (2X250W + 2X400W)	C	∞			∞
8		15		A	∞			
10	P105-10	15	SCIENTIFIC SONAR OPERATING PANEL POWER SUPPLY / PC SCIENTIFIC SONAR	B	∞		∞	
12		15		C	∞			
14	P105-14	20	TRUF FWD.	A	∞	∞		
16		20		B	∞			
18	P105-18	15	FLOODLIGHTS AFT	C	∞			∞
20		15		A	∞			
22	P105-22	15	AVOCENT USER STATION C19B RCPT. CCT., MONITOR WATTELAND C19B RCPT.CCT., AVOCENT USER STATION C10 RCPT.CCT., MULTIFONCTIONMONITOR DURAMON C10 RCPT. CCT.	B	∞		∞	
24		15		C	∞			
26	P105-26	15	PORTABLE VHF RADIO TELEPHONE RCPT.#1, & PORTABLE VHF RADIO TELEPHONE RCPT.#2	A	∞	∞		
28		15		B	∞			
30	P105-30	15	JB1, JB2,JB3; WHEELHOUSE DEMISTING FAN	C	∞			∞
32		15		A	∞			
34	P105-34	20	ZENITEL RACK TERMINAL XA	B	∞		∞	
36		20		C	∞			
38	P105-38	15	SPARE	A				
40		15		B				
42	P105-42	15	VHF-FM RADIO TELEPHONE POWER SUPPLY, & VHF-FM RADIO TELEPHONE	C	∞			∞
44		15		A	∞			
46	P105-46	15	SPARE	B				
48		15		C				
50	P105-50	15	IMS-06	A	∞	∞		
52		15		B	∞			
54	P105-54	15	WH. TOP FWD. FLOODLIGHT (2X400W)	C	∞			∞
56		15		A	∞			
58	P105-58	15	SPARE	B				
60		15		C				
62	FREE		BLANK	A				
64	FREE		BLANK	B				
66	FREE		BLANK	C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P106

WHEELHOUSE FWD. CONSOLE, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POL E PO S.	CCT #	AMPS	DESIGNATION	PHA SE	MEGOHM			
					L FRAM E	L1-L2	L2-L3	L3-L1
1	P106-1	1 5	NAVIGAT 2100 GYRO COMPAS MAINS	A	∞	∞		
3		1 5		B	∞			
5	P106-5	15	RADAR SET #1	C	∞			∞
7		15		A	∞			
9	P106-9	15	SCIENTIFIC ECHO SOUNDER, TRANSCEIVER #1 38Khz, TRANSCEIVER #2 120 Khz, TRANSCEIVER #3 200Khz	B	∞		∞	
11		15		C	∞			
13	P106-13	1 5	FIRE DETECTION SYSTEM	A	∞	∞		
15		1 5		B	∞			
17	P106-17	15	POWER BAR 6 OUTLETS WORKSTATION	C	∞			∞
19		15		A	∞			
21	P106-21	15	RADAR SET #2	B	∞		∞	
23		15		C	∞			
25	P106-25	1 5	OUTSIDE ANTI-INTRUSION HEATER	A	∞	∞		
27		1 5		B	∞			
29	P106-29	15	EMERGENCY STOP WHEELHOUSE CONSOLE; FUEL OIL & LUBE OIL	C	∞			∞
31		15		A	∞			
33	P106-33	15	SPARE	B				
35		15		C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

P106

WHEELHOUSE FWD. CONSOLE, 120V/3PH DISTRIBUTION
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POL E 4	CCT #	AMPS	DESIGNATION	PHAS E	MEGOHM			
					L FRAME	L1-L2	L2-L3	L3-L1
2	P106-2	15	DATA NETWORK (CISCO) SWITCH	A	∞	∞		
4		15		B	∞			
6	P106-6	20	FWD TRUF TB-1; IMS -01, IMS-02, IMS-04	C	∞			∞
8		20		A	∞			
10	P106-10	15	WHEELHOUSE CONSOLE FAN	B	∞		∞	
12		15		C	∞			
14	P106-14	15	BAT. CHARGER VHF-FM RADIO TELEPHONE, & VHF-FM BATTERIES	A	∞	∞		
16		15		B	∞			
18	P106-18	15	FWD TRUF TB-3; IMS-03, IMS-05	C	∞			∞
20		15		A	∞			
22	P106-22	15	AVOCENT SWITCHING HUB AMX-5000 RCPT/ MONIT. HATTELAND C19B RCPT/ MULTIF. MONIT. DURAMON B24 WH FWD RCPT/ AVOCENT USER STATION B19	B	∞		∞	
24		15	RCPT/MONIT. HATTELAND B19 RCPT/AVOCENT USER STATIONWS6 WORKSTATION RCPT/MULTIF. MONIT. DURAMON WS6 RCPT	C	∞			
26	P106-26	15	EMERGENCY STOP WHEELHOUSE CONSOLE ACCOMODATION VENTILLATION	A	∞	∞		
28		15		B	∞			
30	P106-30	15	POWER SUPPLY : WIND DIRECTION & SPEED DISPLAY	C				∞
32		15		A				
34	P106-34	15	SPARE	B				
36		15		C				



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

DC1

ENGINE ROOM, 24VDC DISTRIBUTION
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POLE POS.	CCT #	AMPS	DESIGNATION	POLARITY	MEGOHM	
					L FRAME	POS/NEG
	DC1-CHG	50	DC POWER SUPPLY/BATTERY CHARGER	+	∞	∞
		50		-	∞	
1	DC1-1	25	ME #1 CTRL BACKUP SUPPLY	+	∞	∞
3		25		-	∞	
5	DC1-5	25	ME #2 CTRL BACKUP SUPPLY	+	∞	∞
7		25		-	∞	
9	DC1-9	25	SPARE	+		
11		25		-		
13	DC1-13	16	DECK/FISHING CRANE HPU CTRL SOLENOID	+	∞	∞
15		16		-	∞	
17	DC1-17	16	GRAY WATER AUX. TRANSFER PUMP	+	∞	∞
19		16		-	∞	
21	DC1-21	30	AFT WORKING DECK 24VDC RCPT. CCT.	+	∞	∞
23		30		-	∞	



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

DC1

ENGINE ROOM, 24VDC DISTRIBUTION
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	POLARI TY	MEGOHM	
					L FRAME	POS/NE G
	DC1-BAT	60	2 BAT. 3ET-4B 120RC	+	∞	∞
		60		-	∞	
2	DC1-2	25	SPARE	+		
4		25		-		
6	DC1-6	25	SPARE	+		
8		25		-		
10	DC1-10	25	BOW THRUSTER CTRL	+	∞	∞
12		25		-	∞	
14	DC1-14	16	TMH-013 MAIN SWBD GEN #1 SECTION SOURCE 1	+	∞	∞
16		16		-	∞	
18	DC1-18	16	STEERING GEAR RUDDER ANGLE INDICATOR PS, &	+	∞	∞
20		16	STEERING GEAR RUDDER ANGLE INDICATORN SB	-	∞	
22	DC1-22	16	SPARE	+		
24		16		-		



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

DC2

WHEELHOUSE, 24VDC DISTRIBUTION
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POL E POS.	CCT #	AMPS	DESIGNATION	POLARI TY	MEGOHM	
					L FRAME	POS/NE G
	DC2-CHG	70	DC POWER SUPPLY/BATTERY CHARGER	+	∞	∞
		70		-	∞	
1	DC2-1	16	WEATHERFAX	+	∞	∞
3		16		-	∞	
5	DC2-5	16	ICAN CHART SYSTEM	+	∞	∞
7		16		-	∞	
9	DC2-9	16	SPARE	+		
11		16		-		
13	DC2-13	16	NAVIGAT 2100 GYROCOMPAS BACKUP / GYROCOMPAS RS422 DISTRIBUTION BOX #1 / GYROCOMPAS RS422 DISTRIBUTION BOX #2	+	∞	∞
15		16		-	∞	
17	DC2-17	16	SPARE	+		
19		16		-		
21	DC2-21	40	ALARM SYSTEM & CTRL- MAIN	+	∞	∞
23		40		-	∞	
25	DC2-25	16	ELECTRIC FOG HORN	+	∞	∞
27		16		-	∞	
29	DC2-29	16	VHF DIRECTION FINDER	+	∞	∞
31		16		-	∞	
33	DC2-33	16	PORT TRAWL WINCH DISPLAY / STBD TRAWL WINCH DISPLAY / CTD TRAWL WINCH DISPLAY	+	∞	∞
35		16		-	∞	
37	DC2-37	16	AUTO-PILOT COMNAV 2001	+	∞	∞
39		16		-	∞	
41	DC2-41	16	SPARE	+		
43		16		-		



MEGGER TEST

CCG SHIP VALADYKOV

BY POWERLITE ELECTRIC LTD.

DC2

WHEELHOUSE, 24VDC DISTRIBUTION
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POLE POS.	CCT #	AMPS	DESIGNATION	POLARITY	MEGOHM	
					L FRAME	POS/NEG
	DC2-BAT	80	2 BAT. 8D-115 380RC	+	∞	∞
		80		-	∞	
2	DC2-2	16	STEERING GEAR FFU PS / STEERING GEAR RUDDER INDICATOR	+	∞	∞
4		16		-	∞	
6	DC2-6	16	WASSP TRANSCEIVER (BTXR) /WASSP SSC 200 CONVERTER / WASSP NMEA INTERFACE	+	∞	∞
8		16		-	∞	
10	DC2-10	16	SPARE	+		
12		16		-		
14	DC2-14	20	WHEELHOUSE PORTSIDE 24VDC RCPT CCT / WHEELHOUSE STBD SIDE 24VDC RCPT CCT	+	∞	∞
16		20		-	∞	
18	DC2-18	16	SPARE	+		
20		16		-		
22	DC2-22	20	DRY LAB 24VDC RCPT CCT / ENGINE ROOM 24VDC RCPT CCT	+	∞	∞
24		20		-	∞	
26	DC2-26	16	DECK CRANE CTRL PANEL	+	∞	∞
28		16		-	∞	
30	DC2-30	16	STEERING GEAR FFU STBD / STEERING GEAR RUDDER INDICATOR SB	+	∞	∞
32		16		-	∞	
34	DC2-34	16	DIMMER-INSTR. LIGHTING WH. FWD CONSOLE / DIMMER-INSTR. LIGHTING WH. AFT. CONSOLE	+	∞	∞
36		16		-	∞	
38	DC2-38	16	SPARE	+		
40		16		-		
42	FREE		BLANK	+		
44	FREE			-		



MEGGER TEST
CCG SHIP VALADYKOV
BY POWERLITE ELECTRIC LTD.

DC4

WHEELHOUSE, 24VDC EMERGENCY SERVICES
DISTRIBUTION CIRCUITS (LEFT COLUMN)

POLE POS.	CCT #	AMPS	DESIGNATION	POLARIT Y	MEGOHM	
					L FRAME	POS/NEG
	DC4-CHG	100	POWER SUPPLY / BATT. CHARGER	+	∞	∞
		100		-	∞	
1	DC4-1	16	RELAY BOX; EMERGENCY LIGHTING; WH. TOP, FORECASTLE DECK, RESCUE BOAT / MAIN DECK / EMERGENCY CONTACTOR	+	∞	∞
3		16		-	∞	
5	DC4-5	16	RELAY BOX; EMERGENCY LIGHTING; ENGINE ROOM, HOLD WORKSHOP, STEERING GEAR COMP. / EMERGENCY CONTACTOR	+	∞	∞
7		16		-	∞	
9	DC4-9	16	RELAY BOX; EMERGENCY LIGHTING; WHEELHOUSE/DRY LAB / EMERGENCY CONTACTOR	+	∞	∞
11		16		-	∞	
13	DC4-13	16	INTERNAL TELEPHONE SYSTEM	+	∞	∞
15		16		-	∞	
17	DC4-17	16	EHPU CONTROL EQUIPMENT AFT CONSOLE C31 / RELAY BOX ENGINE ROOM / DECK & FISHING CRANE HPU CONTROL SOLENOIDE	+	∞	∞
19		16		-	∞	
21	DC4-21	16	DD20#1/DD20#2/DD20#3/DD20#4/DGPS-AIS NAVIGATION SENSOR/ DGPS-AIS TRANSPONDER/DGPS-AIS CTRL DISPLAY	+	∞	∞
23		16		-	∞	
25	DC4-25	16	NAVTEX	+	∞	∞
27		16		-	∞	
29	DC4-29	40	ALARM SYSTEM & CTRL BACKUP	+	∞	∞
31		40		-	∞	
33	DC4-33	16	SATELLITE RADIO TELEPHONE	+	∞	∞
35		16		-	∞	
37	DC4-37	16	SPARE	+		
39		16		-		
41	DC4-41	16	SPARE	+		
43		16		-		
45	DC4-45	16	SPARE	+		
47		16		-		
	DC4-1-1		JB; EMERGENCY FLOODLIGHT: WHEELHOUSE TOP / FORECASTLE / RESCUE BOAT	+	∞	∞
				-	∞	
	DC4-1-2		EMERGENCY LIGHT	+	∞	
				-	∞	
	DC4-5-1		EMERGENCY LIGHT	+	∞	
				-	∞	
	DC4-9-1		EMERGENCY LIGHT	+	∞	
				-	∞	



MEGGER TEST

CCG SHIP VALADYKOV

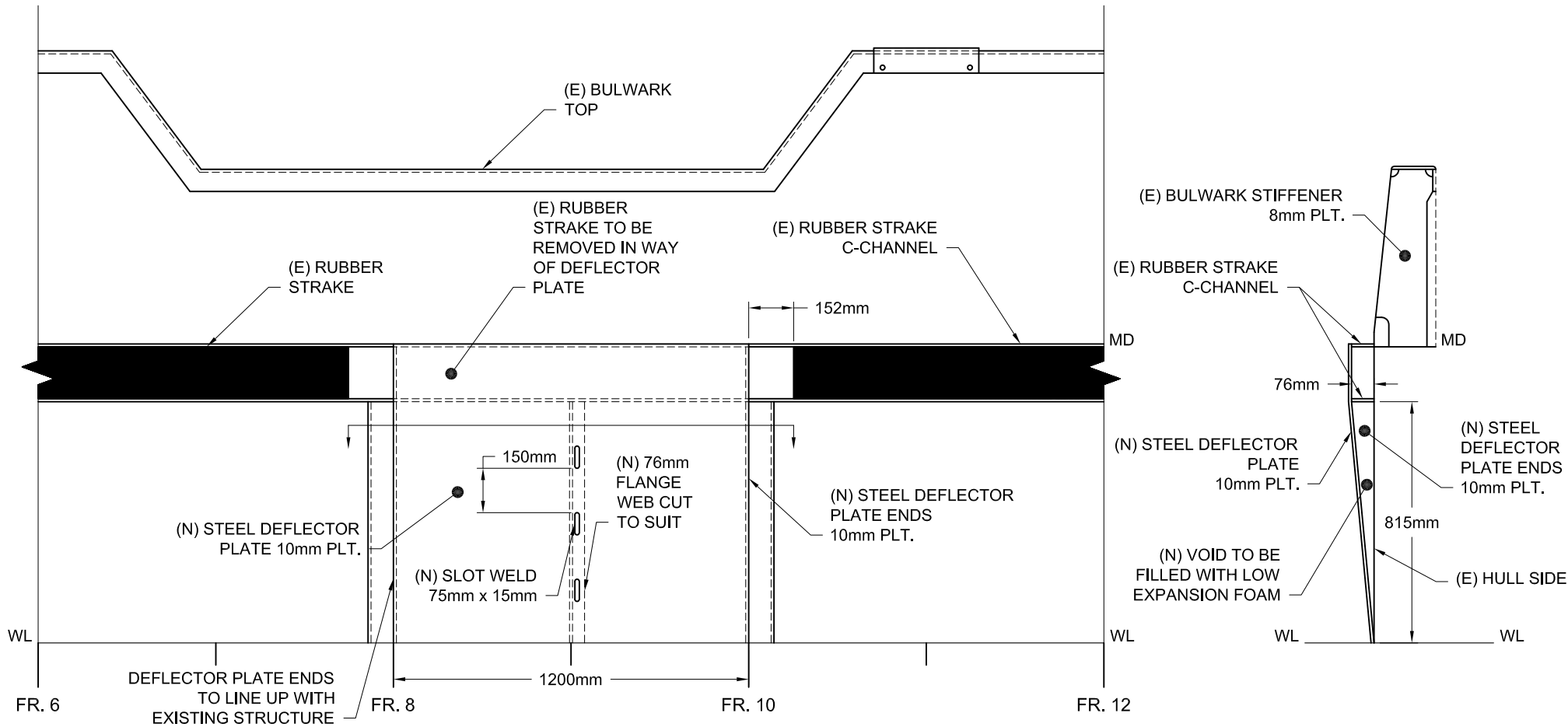
BY POWERLITE ELECTRIC LTD.

DC4

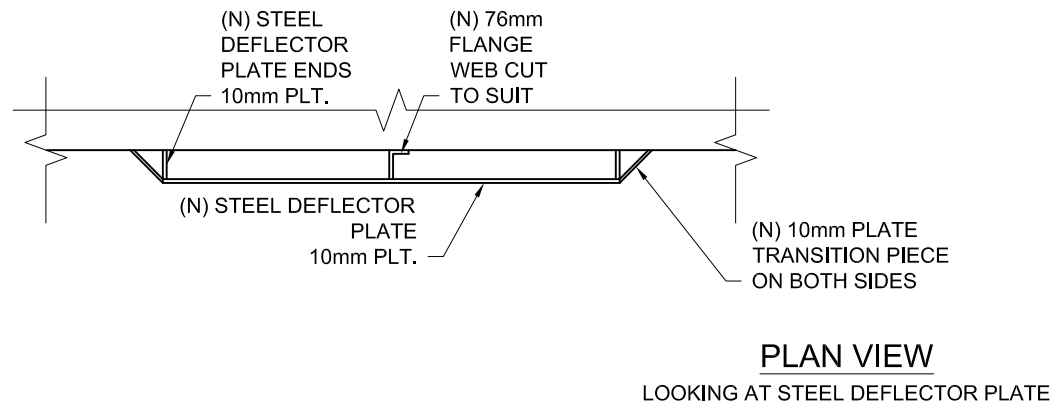
WHEELHOUSE, 24VDC EMERGENCY SERVICES
DISTRIBUTION CIRCUITS (RIGHT COLUMN)

POLE POS.	CCT #	AMPS	DESIGNATION	POLARITY	MEGOHM	
					L FRAME	POS/NEG
	DC4-BAT	100	2 BATT. 8D-115 RC380	+	∞	∞
		100		-	∞	
2	DC4-2	15	POWER SUPPLY / ICOM 422 VHF MARINE BAND	+	∞	∞
4		15		-	∞	
6	DC4-6	20	NAVIGATION LIGHT PANEL	+	∞	∞
8		20		-	∞	
10	DC4-10	15	TMH-013 MAIN SWBD GEN 1 SECTION SOURCE 2	+	∞	∞
12		15		-	∞	
14	DC4-14	63	ZENITEL RACK TERMINAL XB	+	∞	∞
16		63		-	∞	
18	DC4-18	15	CELLULAR TELEPHONE AMPLIFIER CONVERTER / CELLULAR TELEPHONE AMPLIFIER	+	∞	∞
20		15		-	∞	
22	DC4-22	15	SOUND POWER TELEPHONE	+	∞	∞
24		15		-	∞	
26	DC4-26	15	VHF-AM RADIO TELEPHONE	+	∞	∞
28		15		-	∞	
30	DC4-30	30	POWER SUPPLY / RADIO TELEPHONE JSB-196GM / DSC TERMINAL NCT-196	+	∞	∞
32		30		-	∞	
34	DC4-34	15	STEERING GEAR NFU POWER / STEERING GEAR WH RUDDER INDICATOR / STEERING GEAR WH SB RUDDER INDICATOR / STEERING GEAR 7173-TX-SPEC POWER	+	∞	∞
36		15		-	∞	
38	DC4-38	15	SPARE	+		
40		15		-		
42	DC4-42	15	SPARE	+		
44		15		-		
46			LOW VOLTAGE ALARM MONITORING	+		
48				-		
			EMERGENCY CONTACTOR	+		
				-		

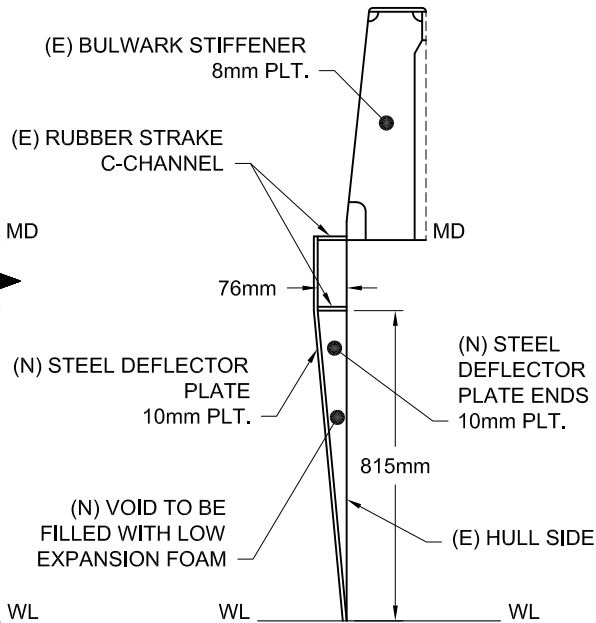
MEGGER TEST PERFORMED BY: RYAN WICKS



PROFILE
STARBOARD SIDE



PLAN VIEW
LOOKING AT STEEL DEFLECTOR PLATE



SECTION
BULWARK IN WAY OF CRAB HAULER

GENERAL NOTES:

1. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. ALL MATERIALS TO BE CLASS CERTIFIED MILD STEEL UNLESS OTHERWISE NOTED.
3. WELDING PROCEDURE, MATERIALS AND WORKMANSHIP TO BE IN ACCORDANCE WITH BV'S RULES AND REGULATIONS FOR THE CLASSIFICATION OF STEEL SHIPS, 2009, AND THE REQUIREMENTS OF TRANSPORT CANADA MARINE SAFETY. ALL WELDING TO BE COMPLETED BY CWB.
4. ALL WELDING TO BE CONTINUOUS FILLET WELDS, 6mm THROAT THICKNESS.
5. ALL STEEL WORK TO BE PREPPED, PRIMED AND PAINTED AS PER VESSEL PAINT SYSTEM.
6. ALL MEASUREMENTS TO BE VERIFIED ONSITE.
7. STEEL DEFLECTOR PLATE INSTALLED IN WAY OF CRAB HAULER TO LINE UP WITH EXISTING VESSEL STRUCTURE.
8. RUBBER STRAKE IN WAY OF STEEL DEFLECTOR PLATE TO BE REMOVED ON VESSEL'S STARBOARD SIDE.
9. SLOT WELDS FOR DEFLECTOR PLATE CONNECTION TO FLANGE TO BE CONTINUOUS WELD AROUND THE PERIMETER OF THE SLOT.