LIST OF SYMBOLS	LIST OF SYMBOLS
STRAINER	OBSERVATION GLASS
SUCTION BOX (STRUM BO.)	NON-RETURN VALVE ; STRAIGHT
GLOBE VALVE	VENDOR SUPPLIED EQUIPMENT
GLOBE VALVE. SCREW DOWN NON RETURN	THREE WAY COCK, L-PORT
MEMBRANE	FLOW METER
GLOBE VALVE, ANGLE	AUTOMATIC AIR VENT
BUTTERFLY VALVE LRS APPROVED TYPE	ORIFICE PLATE
COCK	HAND PUMP
FLOAT VALVE	TWO WAY WATER REGULATING VALVE
PRESSURE GAUGE	THREE WAY WATER REGULATING VALVE
COMPOUND GAUGE	BLANK FLANGE
THERMOMETER	
GATE VALVE	
TEMPERATURE TRANSDUCER	
TEMPERATURE ALARM HIGH	
PRESSURE SWITCH	
PRESSURE TRANSDUCER	
PRESSURE ALARM LOW	
FLOW SWITCH	
LIMIT SWITCH	
VACUUM ALARM HIGH	
VACUUM TRANSDUCER	
LOW LEVEL ALARM	
LEVEL INDICATOR	
FLEXIBLE CONNECTION ; L.R.S. APPROVED TYPE	
SHIPYARD CONNECTION	
VENDOR SUPPLIED EQUIPMENT	
FILTER	
CATHODIC PROTECTION	

MATERIAL SPECIFICATION

PIPES

SYSTEM	WORK/TEST PRESSURE		SIZE	MATERIAL	TEST OR CERT.	FLANGE OR CONNECTION	GASKET
- CENTRAL COOLING SEA WATER - FRESH WATER GEN'R SEA WATER - AUXILIARY GEN'R SEA WATER - STERNTUBE COOLING	2.5/5.0		ALL	COPPER/NICKEL 90/10		150# ASA	NEOPRENE OR EQUAL
- CENTRAL COOLING FRESH WATER			ALL	E.R.W. STEEL ASTM-A-53 GR-B STD BLACK		150# ASA FORGED STEEL FLANGE	
- SEA SUCTION & SEA BAY TAIL PIPES - AIR PIPES DOWNSTREAM OF VALVES			ALL	E.R.W. STEEL ASTM-A-53 GR-B SCH. XS PRE-GALVANIZED			
- FIRE MAIN PRESSURIZING LINE WC SUPPLY LINE				E.R.W. STEEL ASTM-A-53 GR-B SCH. STD GALVANIZED		150# ASA FORGED STEEL FLANGE	

VALVES

SYSTEM	TYPE	SIZE	BODY MATERIAL	TRIM MATERIAL	BONNET TYPE	CONN'N
- SEA SUCTION & DISCHARGE	ALL	ALL	CAST STEEL	STAINLESS STEEL	BOLTED	FLANGED 150# ASA OR OTHER
- CENTRAL COOLING SEA WATER AND FRESH WATER - FRESH WATER GENERATORS SEA WATER - AUXILIARY GEN'R SEA WATER - STERNTUBE COOLING	BUTTERFLY	≥50	CAST STEEL	-		LUG TYPE
	GLOBE AND GATE	≤32	BRONZE	BRONZE		SCREWED
		≥40	BRONZE	BRONZE		FLG'D 150# ASA

PUMPS DATA

Nº OFF	SERVICE	TYPE	CAPACITY	HEAD
2	MAIN S.W.	VERTICAL CENTRIFUGAL	260 M³/HR	2.3 BAR
1	MAIN S.W.	VERTICAL CENTRIFUGAL	260/160 M³/HR	2.3/0.9 BAR
1	F.W. GENERATOR S.W.	VERTICAL CENTRIFUGAL	36 M³/HR	3.8 BAR
2	AUX. MACHINERY F.W. COOLING	VERTICAL CENTRIFUGAL	47 M³/HR	2.5 BAR
2	ELECT. MACHINERY F.W. COOLING	VERTICAL CENTRIFUGAL	105 M³/HR	2.5 BAR
2	S.W. STERTUBE COOLING	HORIZONTAL TURBINE	10 M³/HR	3.5 BAR
1	DISTILLED WATER PUMP	— " — — " —	2.7 M³/H	0.9 BAR

ADDITIONAL REQUIREMENTS

1- BRASS PLUGS TO BE FITTED AT LOWEST POINTS IN PIPE LINE FOR DRAINING PURPOSES AND HIGHEST POINTS FOR BLEEDING
2- STEAM INJECTION CONNECTIONS TO BE FITTED TO SHIPSIDE VALVES OR TO DISTANCE PIECE BETWEEN THE VALVE AND SHELL
3- SEA WATER SUCTION PIPES IN SEA BAY TO BE AT MID-WAY BETWEEN TOP AND BOTTOM OF THE SEA BAY
4- SEA BAY TO BE FITTED WITH MANHOLES FOR CLEANING OUT PURPOPES
5- SENSORS FOR MONITORING AND ALARM ON THE EQUIPMENT TO BE PROVIDED BY SUPPLIERS IN ACCORDANCE WITH SHIP SPECIFICATIONS
6- ALL GATE VALVES TO BE LOCKED AFTER COOLING SYSTEM ADJUSTEMENT
7- THERMOSTATIC 10" 3-WAY VALVES TO BE FITTED WITH A MANUAL OVERRIDE
8- OIL DETECTORS SUPPLIED BY M.I.L. (REQ. 450/1-468-2-18) TO BE FITTED ON F.W. PIPING OF "BOMBARDIER" DIESEL ENGINES.
9- NUMBERS INDICATED IN RECTANGLES ☐ REFER TO CHANNEL CUSTOMIZING LIST PREPARED BY ELECTRICAL DEPT.

IMPUTATION DES COUTS/COST CHARGES

GR	IT	DESCRIPTION

REFERENCES

NO	TITRE/TITLE	DESSIN/DWG	F/SH
1	DOM. FRESH	450-233-02	
2	STEAM SYSTEM DIAGRAM	450-465-03	
3	COMPRESSED AIR SYSTEM DIAGRAM	450-465-09	
4	CONDENSATE AND FEED SYSTEM DIAGRAM	450-465-04	
5	BILGE AND BALLAST SYSTEM DIAGRAM	450-232-01	
6	AIR VENT AND SOUNDING SYSTEM DIAGRAM	450-232-03	
7	FIRE SYSTEM DIAGRAM	450-234-01	
8	CATHODIC PROTECTION	450-247-01	
9	FOAM SYSTEM	450-234-04	

POUR MATERIEL VOIR/FOR MATERIAL REFER TO:

NOTES:

REVISIONS

NO	ZN	CODE	DESCRIPTION	PAR/BY	DATE
9			AS FITTED UP TO 450	A.L	86-07-1
8			ORIFICE PLT SIZE INCREASED FOR FIRE MAIN PRESSURIZING LINE. ORIFICE PLT ON COOLING LINES TO GENERATOR & PROP. MOTOR DELETED. F.W COOLING TO CONDENSATE COOLER ADDED. DRESSER COUPLING ADDED ON F.W INLET & OUTLET PIPE OF ACC. AIR COND COMPR. FW PRESS CONT. VALVE ARRGT FOR REVERSE OSMOSIS MODIFIED. OILY BILGE PUMP PRIMING LINE MODIFIED. SEPARATE O.B.D. VALVE FOR DISTILLING PLANT & REVERSE OSMOSIS DESALINATOR. TEMP PROBE FOR CENTRAL F.W. COOLING TEMP CONT VALVE, THERMOMETER, TEMP ALARM HIGH ETC, RELOCATED.	A.L	86-07-1
7			PILOT CONTROLLER BALANCING LINE ADDED. STEAM & AIR SUPPLY LINE TO SEA CHEST MODIFIED. EMCY SANY CONN. REVISED. STERNTUBE FILTRATION UNIT INLET & OUTLET PIPE SIZE NOW 50. MAIN S.W PP CHANNEL NUMBER DELETED & MONITORING IDENTIFICATION ADDED. FW COOLING PUMPS PRESSURE SWITCH REVISED & MONITORING IDENTIFICATION ADDED. REGULATING VALVES FOR DOM REFN UNIT AND AIR COND CONTROL ROOM & RADIO ROOM ADDED. MONITORING IDENTIFICATION ADDED FOR LIMIT SWITCH AUX GENERATOR.	A.L	86,02,24
6			- EMERGENCY COOLING SYSTEM FOR DOMESTIC REFRIGERATION MACHINERY ADDED - DRAIN COOLER - SUPPLY REVISED - IDENTIFICATION OF MONITORING CHANNELS ADDED - CATHODIC PROTECTION DELETED IN DISTILLERS SEA CHEST - OIL DETECTOR ADDED ON GENERATORS DIESEL ENGINES COOLING SYSTEM - NUMBER OF S.W. PUMPS FOR F.W. GENERATOR REVISED - HYDROPHORE TANK - SYSTEM REARRANGED, SUPPLY REVISED - FILTRATION UNIT - SUPPLY REVISED - HAND PUMP ADDED TO F.W. MAKE-UP LINE TO EXPANSION TK - ORIFICE PLATES RELOCATED, SIZES CHANGED	N.P.	85/7/29
5			VALVES ON STRAINERS ADDED. AUX GENERATOR V̇, Q̇ REVISED. DRAIN COOLER ΔP; Q̇; V̇ REVISED. A/C UNITS ACCOMODATION, GENERATORS PIPE DIA REVISED. AUTOMATIC VENTS, FLOW METERS ADDED. CHECK VALVE ADDED ON AUX GEN. DISCHARGE LINE. TWO VT ON SUCTION OF SEA PUMPS - DELETED. DIESEL ENGINES VENTS AND EXPANSION LINE - REVISED. DIESEL ENGINE - GATE VALVE ON THE INLET SIDE DELETED. A/C UNITS, RADIO AND CONTROL ROOM - ΔP REVISED. DOMESTIC REFRG. UNITS - V̇ & ΔP REVISED. R.O. DESALINATOR'S CONNS REVISED. OILY BILGE PUMP PRIMING CONN ADDED. MAIN GENERATORS DIESEL - COOLING SYSTEM DELETED. DISTILLED WATER PUMP ADDED.	A.B.	84/8/21
4			GENERAL REVISION	MN	84/4/26
3	—	—	- STERNTUBE S.W. COOLING SYSTEM ADDED - EMERG'Y SEA SUCTION FOR AUXILIARY GENERATOR ADDED - PIPE SIZES ADDED - REVERSE OSMOSIS DESALINATOR ADDED - FRESH WATER GENERATOR DELETED - WATER VELOCITY ADDED	N P	18/1/84
2			GENERALLY REDRAWN	N.P.	1/12/83
1			GENERAL REVISION	N.P	

APPROBATIONS/APPROVALS

	SOU/SUB	APP	REV 5	REV 6	REV	REV	REV
CLASS'N (LRS)	84/1/19	84/2/23					
GCC/CCG	84/1/19	84/2/27					
PROP/OWN	84/1/27	84/3/14	85/2/13	85/10/24			
BOMBARDIER	83/9/8	83/9/14	84/8/23				
ALFA-LAVAL							
HAMWORTHY							

MARINE INDUSTRIE LIMITEE
SOREL, P.Q., CANADA

CENTRAL COOLING WATER SYSTEM DIAGRAM

PAR/BY	APPR	CONT NO	DESSIN DWG	REV
N P	[signature]	450 / 451	465-01	9
VER/CK	ECH/SC —			F/SH
[initials]	DATE 1/12/83			1

FORMAT ISO-A0/15