

SYSTEM OPERATION INTENT

EACH ENGINE IS PROVIDED WITH INDEPENDENT COOLING CIRCUITS, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

SYMBOLS LIST

SYMBOL	DESCRIPTION
—	PIPE
	BUTTERFLY VALVE
	BALL VALVE
	BALL VALVE WITH THREADED PLUG
	REDUCER
	FLEXIBLE CONNECTION
	THERMOMETER
	FLOW DIRECTION ARROW
	FLOW SWITCH
	LEVEL SWITCH

GENERAL MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	TAKEDOWN JOINTS			VALVES		FITTINGS	FLEXIBLE CONNECTIONS	COMMENTS
			MATERIAL	GASKETS	BOLTING	BODY	TRIM			
FW COOLING MAWP: 20 PSIG MAX TEMP: 200°F	1 1/2" & ABOVE	CARBON STEEL ASTM A53 OR A106, GRADE B SEAMLESS ANSI B36.10 SCH 40	FLANGE CARBON STEEL ASTM A105 ANSI B16.5 150# SLIP-ON OR WELD NECK	GARLOCK STYLE IFG 5500 OR EQUAL	BOLTS: CARBON STEEL ASTM A307 GRADE B ANSI B18.2.1 NUTS: CARBON STEEL ASTM A563 GRADE A ANSI B18.2.2	BUTTERFLY: DUCTILE IRON, ASTM A395, MSS-SP-67 150#, LUG TYPE	BUTTERFLY: SS DISC BUNA-M SEATS	CARBON STEEL ASTM A234, GR WPB ANSI B16.9 SCH 40 BUTT WELD	SEE B.O.M.	SEE NOTE 6
	UNDER 1-1/2"	SCH 80 SHALL BE USED AT HULL PENETRATIONS	UNION CARBON STEEL ASTM A105 ANSI B16.11 SOCKET WELD	-	-	BALL: CARBON STEEL ASTM A216 GR WCB THREADED 1500 PSI	BALL: CHROME PLATED CARBON STEEL BALL RPTFE SEATS	CARBON STEEL ASTM A105 ANSI B16.11 3000# SOCKET WELD	SEE B.O.M.	

EQUIPMENT LIST

ITEM #	QTY	SERVICE	TYPE	MODEL	CAPACITY	DRIVE	NOTES
1	2	MAIN ENGINE SCAC & GEARBOX OIL COOLER KEEL COOLER	KEEL COOLER	FERNSTRUM D8135U-Z	4541 BTU/MIN 50-58 GPM (0 KNOTS)	-	SEE NOTE 10
2	2	MAIN ENGINE J/W KEEL COOLER	KEEL COOLER	FERNSTRUM D10123-Z	10,758 BTU/MIN 53-77 GPM (0 KNOTS)	-	SEE NOTE 10

GENERAL NOTES

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1. MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.	9. TDH OF PUMPS FOR REQUIRED FLOW IS APPROXIMATE. THE CONTRACTOR SHALL PROVIDE PUMPS MEETING THE REQUIRED FLOW WITH THE INSTALLED PIPING SYSTEM. PUMP MOTORS SHALL BE SELECTED TO PREVENT MOTOR OVERLOAD OVER THE ENTIRE PUMP OPERATING RANGE.
2. THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. EQUIPMENT LAYOUT IN A GIVEN AREA IS APPROXIMATE. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED FROM THE SHIP AND MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.	10. CONTRACTOR TO SIZE, LOCATE AND INSTALL EXPANSION TANKS IN ACCORDANCE WITH ENGINE MANUFACTURER'S RECOMMENDATIONS. PROVIDE A 1" VALVED DRAIN WITH PLUG AT THE LOWEST POINT OF EACH COOLING CIRCUIT.
3. PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF PIPING, VALVES, FITTINGS, AND EQUIPMENT.	11. CONNECT SWITCHES TO SHIP'S ALARM AND MONITORING SYSTEM AND PROVIDE LOW COOLANT LEVEL ALARMS FOR EACH ENGINE.
4. AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.	12. WHERE PRACTICABLE, ROUTE KEEL COOLER PIPING WITHOUT HIGH SPOTS THAT COULD TRAP AIR. A VENT SHALL BE PROVIDED AT EACH HIGH SPOT CAPABLE OF TRAPPING AIR IN THE SYSTEM.
5. THE PIPING SYSTEM SHALL BE PRESSURE TESTED, CLEANED, AND FLUSHED PRIOR TO BEING PLACED IN SERVICE. PER MANUFACTURER'S RECOMMENDATIONS KEEL COOLERS MAY BE PRESSURE TESTED TO 20 PSI.	13. MOUNT REDUCTION GEAR COOLER AS CLOSE AS POSSIBLE TO REDUCTION GEAR. OIL FLOW MUST BE OPPOSITE OF WATER FLOW IN OIL COOLER.
6. PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.	
7. KEEL COOLER INLET AND OUTLET VALVES SHALL BE LOCATED CLEAR OF OBSTRUCTIONS, AND WITHIN EASY REACH FOR OPERATION. ALL VALVES SHALL BE PROVIDED WITH VISUAL POSITION INDICATION.	
8. THE CONTRACTOR SHALL VERIFY ENGINE REQUIREMENTS AND KEEL COOLER SELECTION PRIOR TO ORDERING KEEL COOLERS.	

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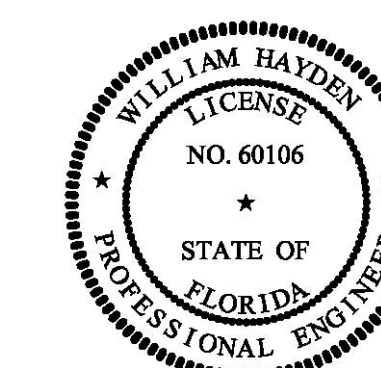
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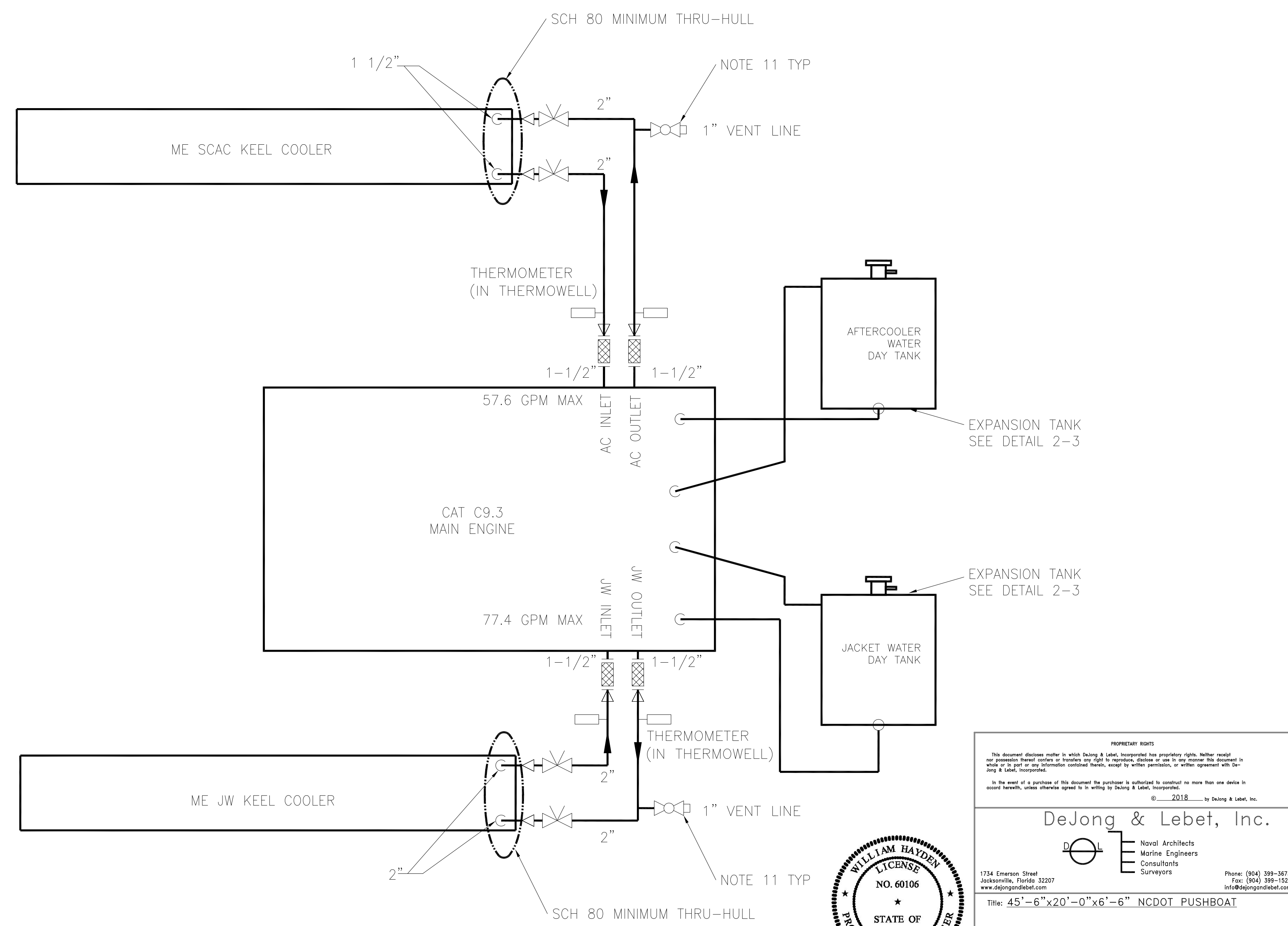
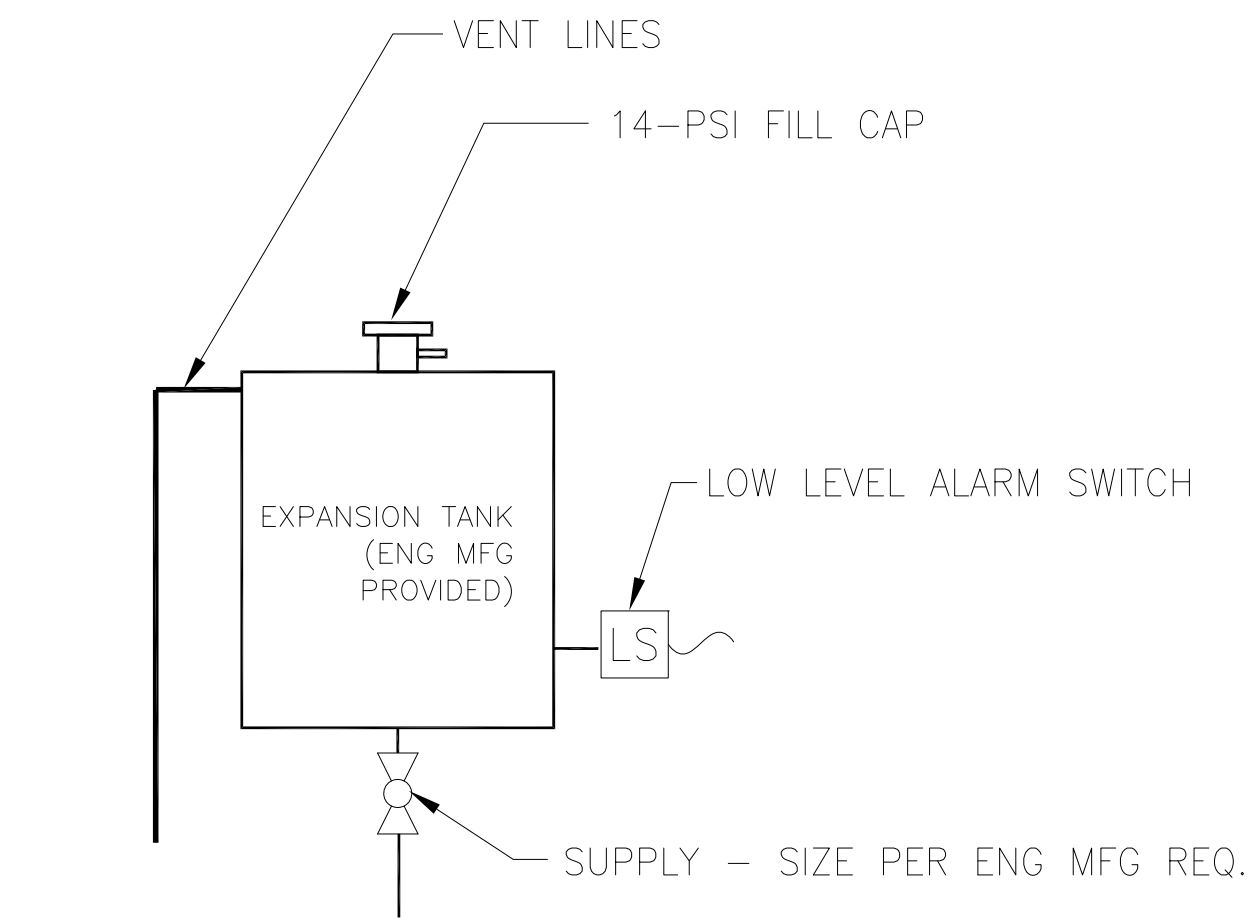
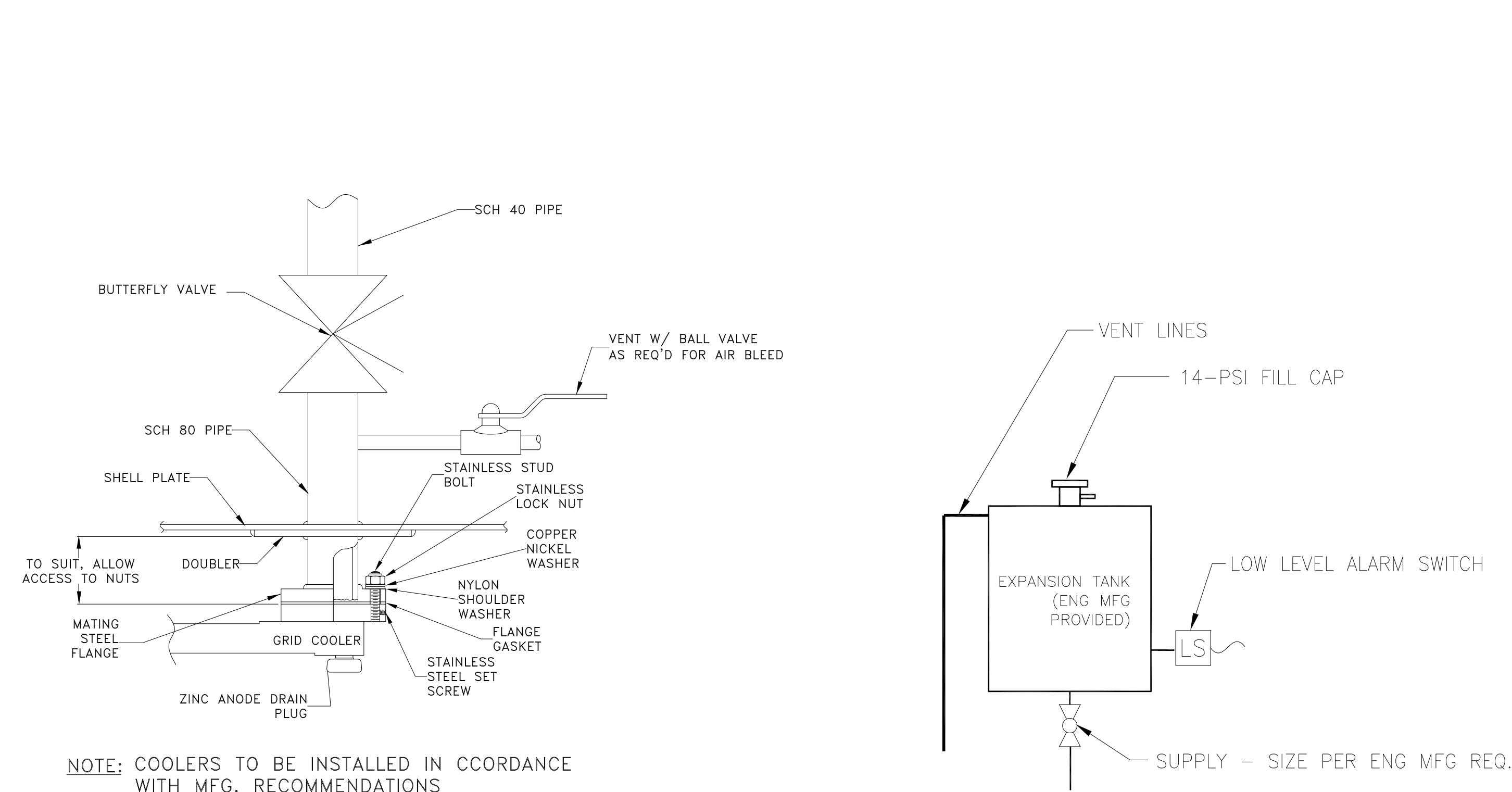
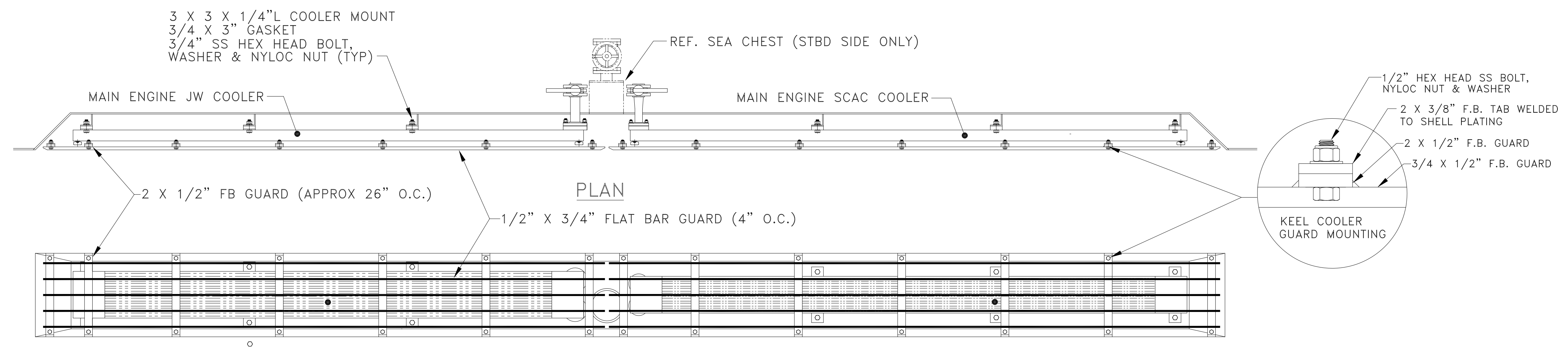
Title: 45'-6"x20'-0"x6'-6" NCDOT PUSHBOAT

MAIN ENGINE COOLING

Dwg. No. 17-1393-255 Alt. No. 0
 Sh. 1 of 1

Drawn By: JAH Date: OCTOBER 25, 2018
 Checked By: Date:
 App'd By: Scale: NONE
 ABS App'l: USCG App'l:





-- GENERAL NOTES --		-- GENERAL NOTES --	
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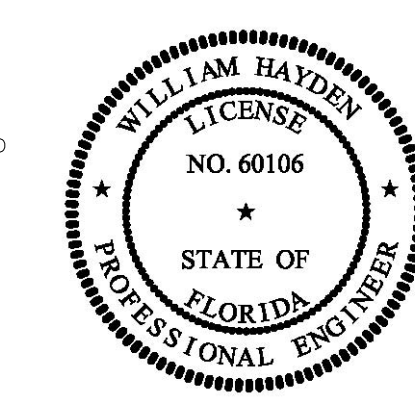
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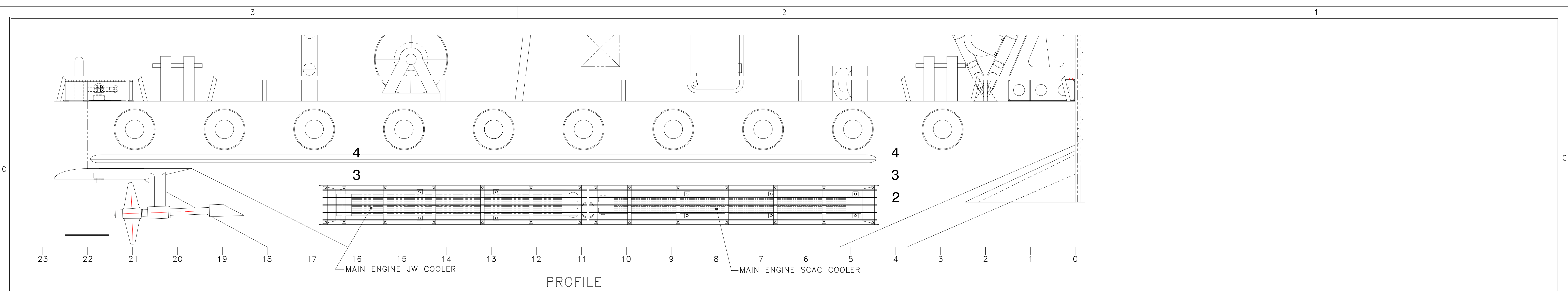
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MAIN ENGINE COOLING

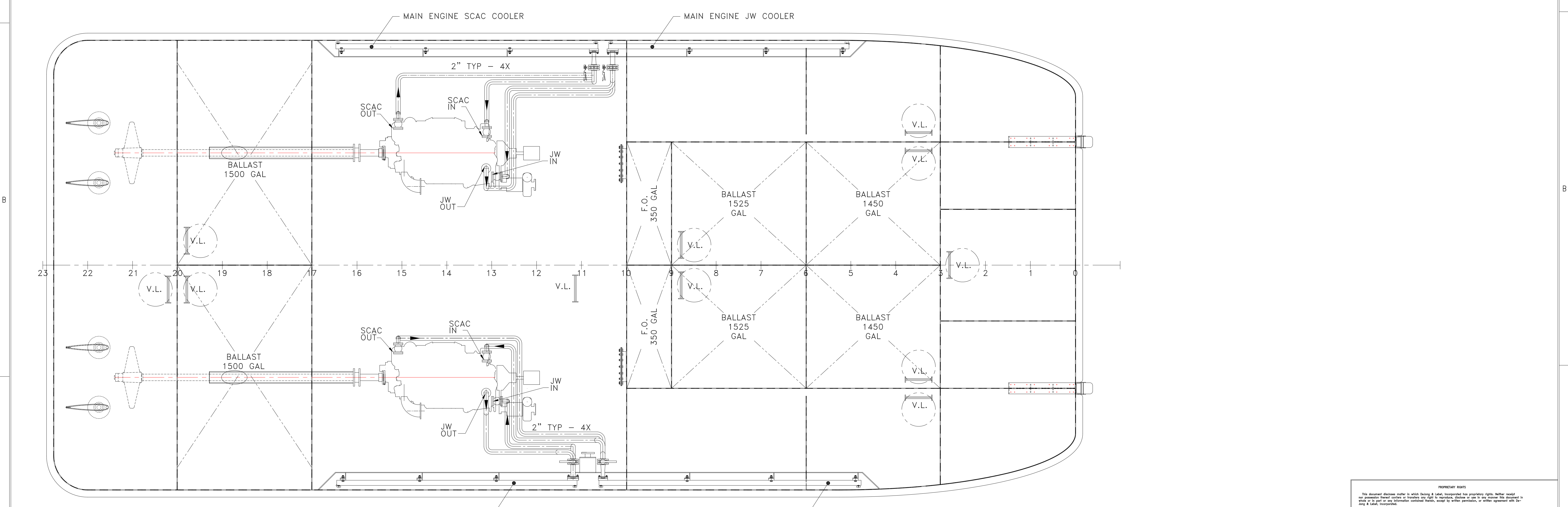
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Sh: 2 of 3

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Checked By: Date: None
App'd By: Scale: None
ABS App'l: USCG App'l:





PROFILE



HOLD PLAN

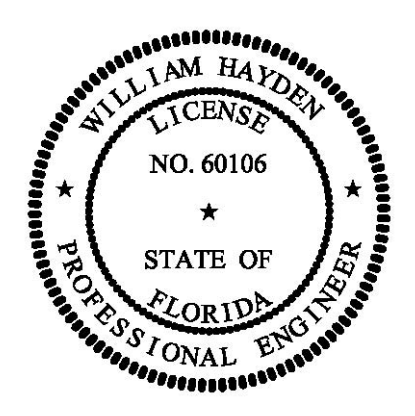
MAIN ENGINE COOLING ARRANGEMENT

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