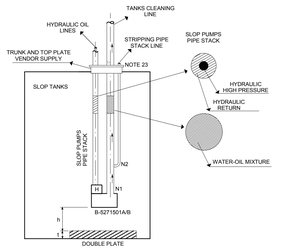
TYPICAL DETAIL I



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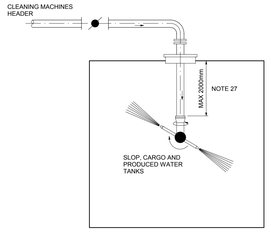

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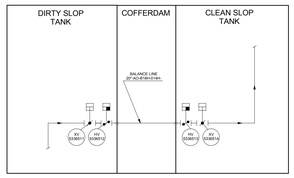


REFERENCE DOCUMENTS

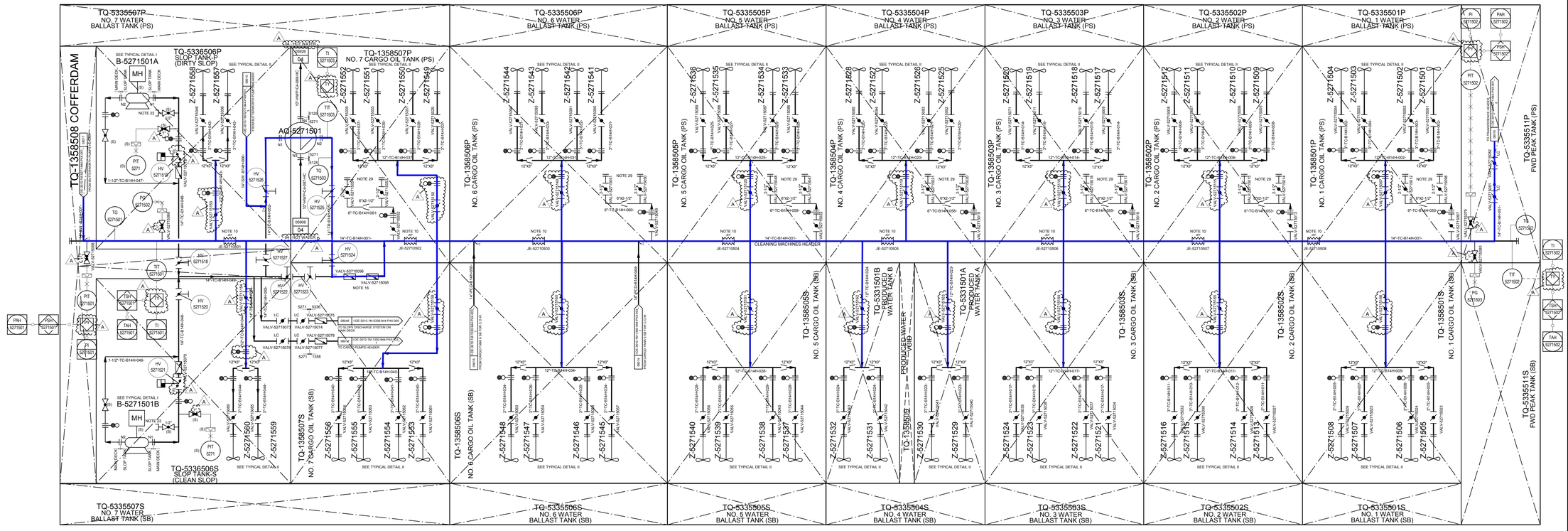
- I-MD-3010.1M-1200-940-P4X-017 - DESCRIPTIVE MEMORANDUM - GENERAL
- I-DE-3010.1M-1200-944-P4X-001 - PIPING INSTRUMENT DIAGRAM - GENERAL NOTES
- I-ET-3010.1M-1200-200-P4X-002 - PIPING SPECIFICATION FOR HULL
- I-ET-3000.00-0000-940-P4X-002 - SYMBOLS FOR PRODUCTION UNITS DESIGN
- I-ET-3000.00-1200-940-P4X-001 - TAGGING PROCEDURE FOR PRODUCTION UNITS DESIGN
- I-DE-3010.1M-1350-960-P4X-002 - CAPACITIES PLAN
- I-MC-3010.1M-5271-941-P4X-001 - TANKS CLEANING AND RECIRCULATION SYSTEM
- I-DE-3010.1M-5271-944-P4X-001_2 - TANKS CLEANING AND RECIRCULATION SYSTEM (TRANSFERENCE)
- I-DE-3010.1M-5271-944-P4X-001_3 - TANKS CLEANING AND RECIRCULATION SYSTEM (BUTTERWORTH PUMPS)
- I-DE-3010.1M-1350-944-P4X-003_1 - CARGO SYSTEM (CARGO PUMPS)
- I-DE-3010.1M-5336-944-P4X-005 - SLOP DISCHARGE SYSTEM
- I-DE-3010.1M-5125-944-P4X-007 - HOT WATER DISTRIBUTION NETWORK

EQUIPMENT

TAG	DESCRIPTION	TYPE	CAPACITY
B-5271501A/B (2 x 100%)	SLOP PUMP	VERTICAL SUBMERGED	
AQ-5271501 (1 x 100%)	BUTTERWORTH HEATER	SHELL AND TUBE	-
Z-5271501/560 ( )	TANK CLEANING MACHINE, TANK TOP	NON PROGRAMABLE	

GENERAL NOTES

1. NO VALVES OF THE TANKS CLEANING AND RECIRCULATION SYSTEM SHALL HAVE ANY KIND OF AUTOMATIC ACTUATION.
2. THE TANKS CLEANING AND RECIRCULATION SYSTEM REMOTE ACTUATED VALVES SHALL BE ACTUATED AND SHALL HAVE THEIR STATUS MONITORED IN THE SOS-HMI.
3. THE TANKS CLEANING AND RECIRCULATION SYSTEM MANUAL HV VALVES SHALL HAVE THEIR STATUS MONITORED IN THE SOS-HMI.
4. DOUBLE PLATES SHALL BE WELDED TO THE HULL IN THE REGION OF ALL DISCHARGES AND SUCTIONS INSIDE THE CARGO, SLOP AND PRODUCED WATER TANKS. THESES DOUBLE PLATES SHALL HAVE AT LEAST THE SAME THICKNESS OF THE HULL IN THE REGIONS WHERE THEY WILL BE INSTALED AND THEY SHALL BE COATED WITH THE LOCAL COATING SCHEME PLUS A LAST LAYER OF ANTIFRICTION COATING.
5. THE TANKS CLEANING AND RECIRCULATION SYSTEM LONGITUDINAL HEADERS ON MAIN DECK ARE THE CLEANING MACHINES HEADER (I-DE-3010.1M-5271-944-P4X-001), THE TRANSFERENCE HEADER (I-DE-3010.1M-5271-944-P4X-001_2) AND THE BUTTERWORTH PUMPS HEADER (I-DE-3010.1M-5271-944-P4X-001_3).
6. THE TANKS CLEANING AND RECIRCULATION SYSTEM LONGITUDINAL HEADERS ON MAIN DECK SHALL BE LOCATED IN HULL SYSTEMS PIPE-RACK ON MAIN DECK.
7. THE TANKS CLEANING AND RECIRCULATION SYSTEM PIPING ON MAIN DECK (CARGO AREA AND FORWARD DECK) AND ON POOP DECK SHALL HAVE ANTI-FRICTION PTFE PAD ON THE HORIZONTAL SUPPORTS TO AVOID PIPING WEARING.
8. THE TANKS CLEANING AND RECIRCULATION SYSTEM PIPING ON MAIN DECK SHALL HAVE ELECTRICAL CONTINUITY AND SHALL BE GROUNDED ACCORDING CLASSIFICATION SOCIETY RULES.
9. THE TANKS CLEANING AND RECIRCULATION SYSTEM PIPING ON MAIN DECK BOLTS, SCREWS, NUTS AND JUMPERS DEDICATED TO MAINTAIN THE CONTINUITY AND TO THE GROUNDING PROCEDURE SHALL BE CONSTRUCTED IN STAINLESS STEEL AISI 316 OR SIMILAR.
10. THE TANKS CLEANING AND RECIRCULATION SYSTEM LONGITUDINAL HEADERS ON MAIN DECK SHALL HAVE THE EXPANSION PERFORMED ONLY BY DRESSER JOINTS. THE NUMBER AND LOCATION OF THE EXPANSION JOINTS SHALL BE DEFINED IN THE DETAILED ENGINEERING DESIGN PHASE FINAL PIPING FLEXIBILITY CALCULATION.
11. THE TANKS CLEANING AND RECIRCULATION SYSTEM SPECTACLE FLANGES ON MAIN DECK SHALL BE MADE WITH STAINLESS STEEL AISI 316 OR SIMILAR MATERIAL.
12. THE HYDRAULIC DRIVEN SUBMERSIBLE PUMPS AND OTHERS COMPONENTS INCLUDED IN THE HYDRAULIC DRIVEN SUBMERGED PUMPS PACKAGE SHALL BE IDENTIFIED IN THE P&IDS I-DE-3010.1M-5271-944-P4X-001, I-DE-3010.1M-5271-944-P4X-001_2 AND I-DE-3010.1M-5271-944-P4X-001_3 WITH "(S)".
13. IT IS NOT ALLOWED TO HAVE ANY PIPING OR VALVE INSIDE THE SLOP TANKS, EXCLUDING THE FOLLOWING ITEMS:
    - THE SLOP TANKS TRANSFERENCE DROPLINES
    - THE BALANCE LINE AND THEIR VALVES
    - THE PROCESS PLANT OPEN DRAIN (CLASSIFIED AREAS) DISCHARGE LINE IN THE SLOP TANKS
    - THE PROCESS PLANT OPEN DRAIN (NON CLASSIFIED AREAS) DISCHARGE LINE IN THE SLOP TANKS
    - THE MAIN DECK DRAINING SYSTEM DISCHARGE IN THE SLOP TANKS
    - THE ENGINE ROOM BILGE PUMPS AND SLUDGE PUMPS DISCHARGE IN THE SLOP TANKS
    - THE CHEMICAL PRODUCTS (BIOCIDE AND BIOSTATIC) INJECTION LINES IN THE SLOP TANKS
    - SLOP TANKS BOTTOM CLEANING MACHINES FEED PIPES, IF IT IS APPLICABLE
14. IT IS NOT ALLOWED TO HAVE ANY PIPING OR VALVE INSIDE THE CARGO TANKS, EXCLUDING THE CARGO TANKS TRANSFERENCE DROPLINES AND THE LOADING SYSTEM DROPLINES.
15. THE TANKS CLEANING AND RECIRCULATION SYSTEM PENETRATION PIECES ON MAIN DECK SHALL BE BUILT WITH INTERNALLY LINED STEEL PIPE SPEC B18H.
16. DISSIMILAR NON RETURN VALVES.
17. THE CLEANING MACHINES LONGITUDINAL HEADER ON MAIN DECK SHALL BE DIMENSIONED TO THE FLOWRATE OF ONE CARGO PUMP IN C.O.W. OPERATIONS.
18. THE SLOP PUMPS ARE INCLUDED IN THE HYDRAULIC DRIVEN SUBMERGED PUMPS PACKAGE.
19. THE SLOP PUMPS SHALL HAVE THEIR OWN PIPE STACK LOCATED INSIDE THE SLOP TANKS. FOR MORE INFORMATIONS SEE TYPICAL DETAIL I.
20. THE SLOP PUMPS PIPE STACKS MATERIAL SHALL BE DEFINED BY THE HYDRAULIC DRIVEN SUBMERGED PUMPS PACKAGE VENDOR.
21. THE SLOP PUMPS PIPE STACKS SHALL BE SPLIT IN PARTS TO ALLOW THEIR REMOVAL OR INSTALATION CONSIDERING A FREE HEIGHT EXISTING BETWEEN MAIN DECK PLATING AND THE PROCESS PLANT LOWER DECK.
22. CONNECTION FOR SLOP PUMPS PIPE STACKS PURGING WITH NITROGEN. FOR MORE INFORMATIONS SEE TYPICAL DETAIL I.
23. THE SLOP PUMPS TOP PLATE ON MAIN DECK SHALL HAVE ALL INTERFACE BETWEEN PIPE STACKS AND THE CARGO SYSTEM, THE STACKS NITROGEN PURGING SYSTEM AND CARGO PUMPS HYDRAULIC ACTUATION SYSTEM ON MAIN DECK. THESE TOP PLATES SHALL BE SUPPLIED BY HYDRAULIC DRIVEN SUBMERGED PUMPS PACKAGE VENDOR. FOR MORE INFORMATIONS SEE TYPICAL DETAIL I.
24. EACH SLOP PUMP SHALL BE DIMENSIONED TO COMPLY WITH THE FOLLOWING DESIGN POINT OF OPERATION:
    - HEAD - 150 m WC OR THE NECESSARY HEAD TO SUPPLY CLEANING WATER TO ALL FIXED CLEANING MACHINES OF THE CARGO TANK 1 PORT, WICHEVER IS THE GREATER VALUE.
    - FLOWRATE (m3/h) - 1.25 x FLOWRATE NECESSARY TO SUPPLY CLEANING WATER TO ALL CLEANING MACHINES OF THE CARGO TANK WITH MAXIMUM CAPACITY.
25. EACH CARGO, SLOP AND PRODUCED WATER TANK SHALL HAVE A SHADOW DIAGRAM ISSUED BY THE CLEANING MACHINES VENDOR DURING THE DETAIL ENGINEERING PHASE. THESE SHADOW DIAGRAMS SHALL COMPLY WITH MARPOL RULES AND THEY SHALL BE SUBMITTED TO PETROBRAS FOR APPROVAL.
26. THE ARRANGEMENT OF THE CARGO, SLOP AND PRODUCED WATER TANKS FIXED CLEANING MACHINES SHOWED IN THIS DRAWING IS PRELIMINAR. THE FINAL ARRANGEMENT OF THESE CLEANING MACHINES SHALL BE DEFINED IN THE DETAIL ENGINEERING PHASE, AFTER APPROVAL OF THE SHADOW DIAGRAMS. THIS ARRANGEMENT SHALL GUARANTEE A MAXIMUM SHADOW OF 5% IN THE HORIZONTAL PLANE AND 10% IN THE VERTICAL PLANE OF EACH CARGO, SLOP AND PRODUCED WATER TANK.
27. THE FIXED CLEANING MACHINES OF THE CARGO AND PRODUCED WATER TANKS SHALL BE TOP CLEANING MACHINES, WITH THEIR OWN PIPE STACKS. THE MAXIMUM LENGTH OF THESE PIPESTACKS IS 2m. FOR MORE INFORMATIONS, SEE TYPICAL DETAIL G.
28. THE FIXED CLEANING MACHINES OF THE SLOP TANKS SHALL HAVE PREFERABLY THE SAME SPECIFICATION OF THE CARGO AND PRODUCED WATER TANKS CLEANING MACHINES. IF IT IS NOT POSSIBLE TO COMPLY WITH THE SHADOW REQUIREMENT OF NOTE 26 IN THE SLOP TANKS, THE USE OF BOTTOM CLEANING MACHINES IS ACCEPTABLE IN THESE TANKS. IN THIS CASE, THE FEED PIPELINE OF BOTTOM CLEANING MACHINES SHALL BE BUILT WITH STEEL SPEC B18H.
29. PORTABLE CLEANING MACHINE CONNECTION.
30. BUTTERWORTH HEATER SHALL COMPLY WITH THE FOLLOWING REQUIRENTS:
    - IT SHALL BE INSTALED ON MAIN DECK WITH A MINIMUM CLEARANCE OF 2.5m FROM THE TOP PART OF THE HEATER SKID TO THE PROCESS PLANT LOWER DECK PLATING.
    - THE BUTTERWORTH HEATER HEAT SOURCE IS THE HOT WATER SYSTEM FROM THE PROCESS PLANT.
    - THE BUTTERWORTH HEATER SHALL BE DIMENSIONED FOR THE SEA WATER FLOWRATE OF 1.25 x FLOWRATE NECESSARY TO SUPPLY CLEANING WATER TO ALL FIXED CLEANING MACHINES OF THE CARGO TANK WITH MAXIMUM CAPACITY
    - THE SEA WATER INLET TEMPERATURE IS THE TEMPERATURE AT 20m WATER DEPTH-P95 OF THE METOCEAN DATA OF THE FPSO PROJECT
    - THE SEA WATER OUTLET TEMPERTAURE IS 60°C
31. THE CONNECTION BETWEEN THE PORT SLOP TANK (DIRTY SLOP) AND THE STARBOARD SLOP TANK (CLEAN SLOP TANK) SHALL BE DONE BY A BALANCE LINE. FOR MORE INFORMATIONS OF THIS BALANCE LINE SEE THE TYPICAL DETAIL III AND THE P&ID I-DE-3010.1M-5336-944-P4X-005 - SLOPS DISCHARGE SYSTEM.
32. SYSTEM DATA:
    - WORKING PRESSURE = 17,7 bar
    - DESIGN PRESSURE = 17,7 bar
    - TEST PRESSURE = 26,6 bar
    - DESIGN TEMPERATURE = 60°C
33. THE P&ID'S I-DE-3010.1M-5271-944-P4X-001, I-DE-3010.1M-5271-944-P4X-001_2 AND I-DE-3010.1M-5271-944-P4X-001_3 SHALL BE UPDATED DURING DETAILED DESIGN PHASE FOLLOWING ALL EQUIPMENT MANUFACTURERS RECOMMENDATIONS.



REV.	DESCRIPTION	DATE	EXEC.	CHECK	APPROV.
A	REVISED WHERE INDICATED	31/May/2019	GMONTEIRO	RDIMAT	CHRISTINO
0	ORIGINAL ISSUE	17/Apr/2019	GMONTEIRO	ALVARES	CHRISTINO

PETROBRAS — DP&T-SRGE

CLIENT: SRGE

JOB: REFERENCE BASIC DESIGN

AREA: BÚZIOS

TITLE: PIPING AND INSTRUMENT DIAGRAM TANKS CLEANING AND RECIRCULATION SYSTEM (TANKS CLEANING)

DESIGN	ESUP	EXEC.	GMONTEIRO	CHECK	ALVARES	APPROV.	CHRISTINO
SCALE	NO SCALE	DRAWING		1001056398 0010		SHEET	01 of 03
DATE	5/23/2019	No.	I-DE-3010.1M-5271-944-P4X-001				

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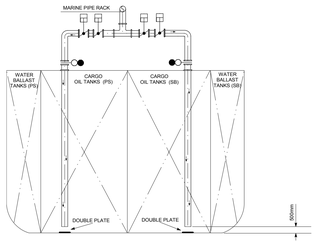
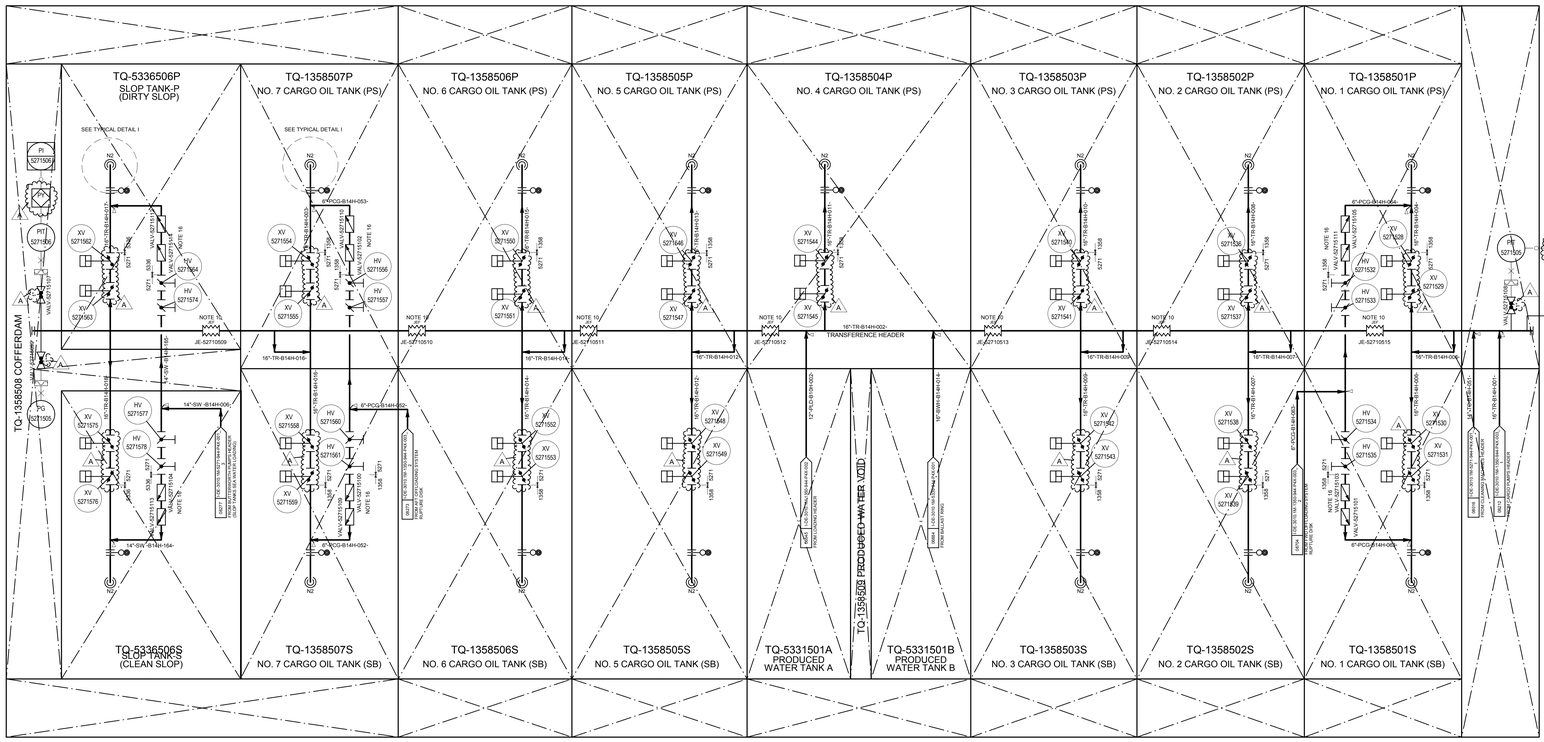
TYPICAL DETAIL I

TRANSFERENCE DROP LINES





REFERENCE DOCUMENTS

- I-MD-3010.1M-1200-940-P4X-017 - DESCRIPTIVE MEMORANDUM - GENERAL
- I-DE-3010.1M-1200-944-P4X-001 - PIPING INSTRUMENT DIAGRAM - GENERAL NOTES
- I-ET-3010.1M-1200-200-P4X-002 - PIPING SPECIFICATION FOR HULL
- I-ET-3000.00-0000-940-P4X-002 - SYMBOLS FOR PRODUCTION UNITS DESIGN
- I-ET-3000.00-1200-940-P4X-001 - TAGGING PROCEDURE FOR PRODUCTION UNITS DESIGN
- I-DE-3010.1M-1350-960-P4X-002 - CAPACITIES PLAN
- I-MC-3010.1M-5271-941-P4X-001 - TANKS CLEANING AND RECIRCULATION SYSTEM
- I-DE-3010.1M-5271-944-P4X-001 - TANKS CLEANING AND RECIRCULATION SYSTEM (TANKS CLEANING)
- I-DE-3010.1M-5271-944-P4X-001_3 - TANKS CLEANING AND RECIRCULATION SYSTEM (BUTTERWORTH PUMPS)
- I-DE-3010.1M-1350-944-P4X-003_1 - CARGO SYSTEM (CARGO PUMPS)
- I-DE-3010.1M-1350-944-P4X-003_2 - CARGO SYSTEM (OFFLOADING)
- I-DE-3010.1M-5335-944-P4X-001 - BALLAST SYSTEM
- I-DE-3010.1M-1300-944-P4X-002 - LOADING SYSTEM

GENERAL NOTES

1 - NO VALVES OF THE TANKS CLEANING AND RECIRCULATION SYSTEM SHALL HAVE ANY KIND OF AUTOMATIC ACTUATION.

2 - THE TANKS CLEANING AND RECIRCULATION SYSTEM REMOTE ACTUATED VALVES SHALL BE ACTUATED AND SHALL HAVE THEIR STATUS MONITORED IN THE SOS-HMI.

3 - THE TANKS CLEANING AND RECIRCULATION SYSTEM MANUAL HV VALVES SHALL HAVE THEIR STATUS MONITORED IN THE SOS-HMI.

4 - DOUBLE PLATES SHALL BE WELDED TO THE HULL IN THE REGION OF ALL DISCHARGES AND SUCTIONS INSIDE THE CARGO, SLOP AND PRODUCED WATER TANKS. THESES DOUBLE PLATES SHALL HAVE AT LEAST THE SAME THICKNESS OF THE HULL IN THE REGIONS WHERE THEY WILL BE INSTALED AND THEY SHALL BE COATED WITH THE LOCAL COATING SCHEME PLUS A LAST LAYER OF ANTIFRICTION COATING.

5 - THE TANKS CLEANING AND RECIRCULATION SYSTEM LONGITUDINAL HEADERS ON MAIN DECK ARE THE CLEANING MACHINES HEADER (I-DE-3010.1M-5271-944-P4X-001), THE TRANSFERENCE HEADER (I-DE-3010.1M-5271-944-P4X-001_2) AND THE BUTTERWORTH PUMPS HEADER (I-DE-3010.1M-5271-944-P4X-001_3).

6 - THE TANKS CLEANING AND RECIRCULATION SYSTEM LONGITUDINAL HEADERS ON MAIN DECK SHALL BE LOCATED IN HULL SYSTEMS PIPE-RACK ON MAIN DECK.

7 - THE TANKS CLEANING AND RECIRCULATION SYSTEM PIPING ON MAIN DECK (CARGO AREA AND FORWARD DECK) AND ON POOP DECK SHALL HAVE ANTI-FRICTION PTFE PAD ON THE HORIZONTAL SUPPORTS TO AVOID PIPING WEARING.

8 - THE TANKS CLEANING AND RECIRCULATION SYSTEM PIPING ON MAIN DECK SHALL HAVE ELECTRICAL CONTINUITY AND SHALL BE GROUNDED ACCORDING CLASSIFICATION SOCIETY RULES.

9 - THE TANKS CLEANING AND RECIRCULATION SYSTEM PIPING ON MAIN DECK BOLTS, SCREWS, NUTS AND JUMPERS DEDICATED TO MAINTAIN THE CONTINUITY AND TO THE GROUNDING PROCEDURE SHALL BE CONSTRUCTED IN STAINLESS STEEL AISI 316 OR SIMILAR.

10 - THE TANKS CLEANING AND RECIRCULATION SYSTEM LONGITUDINAL HEADERS ON MAIN DECK SHALL HAVE THE EXPANSION PERFORMED ONLY BY DRESSER JOINTS. THE NUMBER AND LOCATION OF THE EXPANSION JOINTS SHALL BE DEFINED IN THE DETAILED ENGINEERING DESIGN PHASE FINAL PIPING FLEXIBILITY CALCULATION.

11 - THE TANKS CLEANING AND RECIRCULATION SYSTEM SPECTACLE FLANGES ON MAIN DECK SHALL BE MADE WITH STAINLESS STEEL AISI 316 OR SIMILAR MATERIAL.

12 - THE HYDRAULIC DRIVEN SUBMERSIBLE PUMPS AND OTHERS COMPONENTS INCLUDED IN THE HYDRAULIC DRIVEN SUBMERGED PUMPS PACKAGE SHALL BE IDENTIFIED IN THE P&ID'S I-DE-3010.1M-5271-944-P4X-001, I-DE-3010.1M-5271-944-P4X-001_2 AND I-DE-3010.1M-5271-944-P4X-001_3 WITH "(S)".

13 - IT IS NOT ALLOWED TO HAVE ANY PIPING OR VALVE INSIDE THE SLOP TANKS, EXCLUDING THE FOLLOWING ITEMS:
- THE SLOP TANKS TRANSFERENCE DROPLINES
- THE BALANCE LINE AND THEIR VALVES
- THE PROCESS PLANT OPEN DRAIN (CLASSIFIED AREAS) DISCHARGE LINE IN THE SLOP TANKS
- THE PROCESS PLANT OPEN DRAIN (NON CLASSIFIED AREAS) DISCHARGE LINE IN THE SLOP TANKS
- THE MAIN DECK DRAINING SYSTEM DISCHARGE IN THE SLOP TANKS
- THE ENGINE ROOM BILGE PUMPS AND SLUDGE PUMPS DISCHARGE IN THE SLOP TANKS
- THE CHEMICAL PRODUCTS (BIOCIDE AND BIOSTATIC) INJECTION LINES IN THE SLOP TANKS
- SLOP TANKS BOTTOM CLEANING MACHINES FEED PIPES, IF IT IS APPLICABLE

14 - IT IS NOT ALLOWED TO HAVE ANY PIPING OR VALVE INSIDE THE CARGO TANKS, EXCLUDING THE CARGO TANKS TRANSFERENCE DROPLINES AND THE LOADING SYSTEM DROPLINES.

15 - THE TANKS CLEANING AND RECIRCULATION SYSTEM PENETRATION PIECES ON MAIN DECK SHALL BE BUILT WITH INTERNALLY LINED STEEL PIPE SPEC B18H.

16 - DISSIMILAR NON RETURN VALVES.

17 - THE TRANSFERENCE LONGITUDINAL HEADER ON MAIN DECK AND EACH DROPLINE OF THE TANKS CLEANING AND TRANSFERENCE SYSTEM SHALL BE DIMENSIONED TO THE FLOWRATE OF 2,25 x NOMINAL FLOWRATE OF ONE CARGO PUMP.

18 - THE TRANSFERENCE DROPLINES SHALL BE INSTALLED IN EACH OF THE CARGO AND SLOP TANKS. THE TRANSFERENCE DROPLINES IN THE CARGO TANKS SHALL BE INDEPENDENT FROM THE LOADING SYSTEM DROPLINES.

19 - THE TRANSFERENCE DROPLINES ARE VERTICAL PIPES FITTED IN EACH OF THE CARGO AND SLOP TANKS, FROM THE MAIN DECK UP TO A HEIGHT OF 500MM OVER THE BOTTOM PLATING. FOR MORE INFORMATIONS SEE TYPICAL DETAIL I.

20 - THE TRANSFERENCE DROPLINES SHALL BE APPROVED BY CLASSIFICATION SOCIETY.

21 - IN CASE OF EMERGENCY LEVEL IN ANY CARGO OR SLOP TANK (98%), A SHUTDOWN SIGNAL TO THE TOPSIDE PROCESS AND CONTROL PANNEL AND THE HPU OF THE HYDRAULIC DRIVEN SUBMERGED PUMPS SHALL BE SIMULTANEOUSLY TRIPPED. FOR MORE DETAILS REFER TO I-DE-3010.1M-5271-944-P4X-005 - CARGO, PRODUCED WATER AND SLOP TANKS PRESSURE, TEMPERATURE AND ULLAGE MONITORING SYSTEM.

22 - SYSTEM DATA:
- WORKING PRESSURE = 17,7 bar
- DESIGN PRESSURE = 15,0 bar
- TEST PRESSURE = 22,5 bar
- DESIGN TEMPERATURE = 60°C

23 - THE P&ID'S I-DE-3010.1M-5271-944-P4X-001, I-DE-3010.1M-5271-944-P4X-001_2 AND I-DE-3010.1M-5271-944-P4X-001_3 SHALL BE UPDATED DURING DETALED DESIGN PHASE FOLLOWING ALL EQUIPMENT MANUFACTURERS RECOMMENDATIONS.

REV.	DESCRIPTION	DATE	EXEC.	CHECK	APPROV.
A	REVISED WHERE INDICATED	31 May 2019	GMONTEIRO	ROMAT	CHRISTINO
0	ORIGINAL ISSUE	17 Apr 2019	GMONTEIRO	ALVARES	CHRISTINO

PETROBRAS — DP&T-SRGE

CLIENT:	SRGE
JOB:	REFERENCE BASIC DESIGN
AREA:	BÚZIOS
TITLE:	PIPING AND INSTRUMENT DIAGRAM TANKS CLEANING AND RECIRCULATION SYSTEM (TRANSFERENCE

DESIGN:	ESUP	EXEC.:	GMONTEIRO	CHECK:	ALVARES
APPROV.:	CHRISTINO	SCALE:	NO SCALE	DRAWING	1001056398.0015
SHEET	02 of 03	DATE:	5/23/2019	No.	I-DE-3010.1M-5271-944-P4X-001

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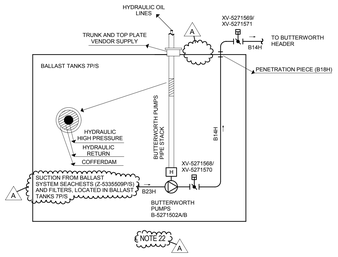
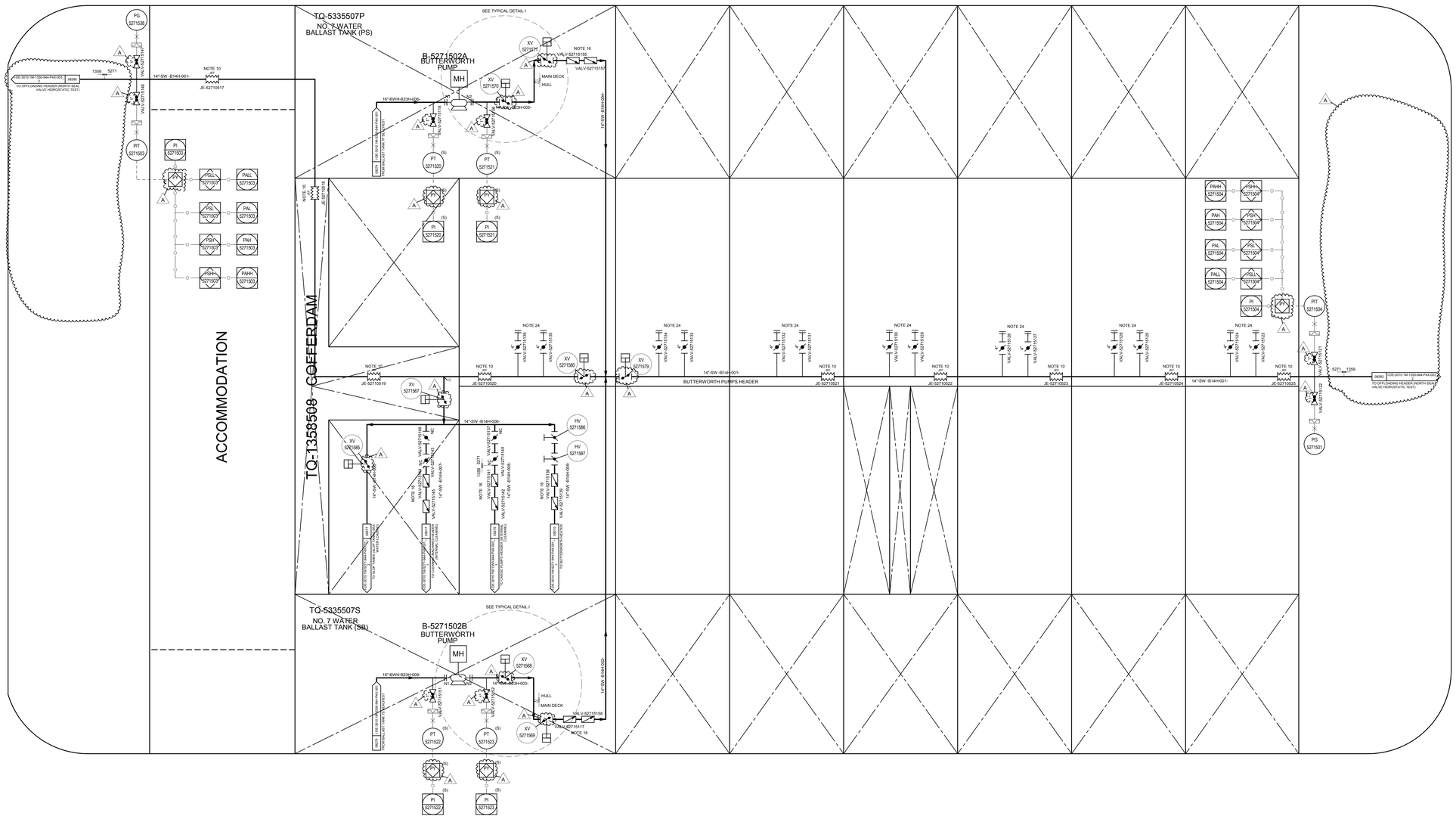
1189mm X 841mm

TYPICAL DETAIL I





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- I-DE-3010.1M-5271-944-P4X-001 - TANKS CLEANING AND RECIRCULATION SYSTEM (TANKS CLEANING)
- I-DE-3010.1M-5271-944-P4X-001_2 - TANKS CLEANING AND RECIRCULATION SYSTEM (TRANSFERENCE)
- I-DE-3010.1M-1350-944-P4X-003_1 - CARGO SYSTEM (CARGO PUMPS)
- I-DE-3010.1M-1350-944-P4X-003_2 - CARGO SYSTEM (OFFLOADING)
- I-DE-3010.1M-5335-944-P4X-001 - BALLAST SYSTEM

EQUIPMENT

TAG	DESCRIPTION	TYPE	CAPACITY
B-5271502A/B (2 x 100%)	BUTTERWORTH PUMP	VERTICAL SUBMERGED	

GENERAL NOTES

1. NO VALVES OF THE TANKS CLEANING AND RECIRCULATION SYSTEM SHALL HAVE ANY KIND OF AUTOMATIC ACTUATION.
2. THE TANKS CLEANING AND RECIRCULATION SYSTEM REMOTE ACTUATED VALVES SHALL BE ACTUATED AND SHALL HAVE THEIR STATUS MONITORED IN THE SOS-HMI.
3. THE TANKS CLEANING AND RECIRCULATION SYSTEM MANUAL HV VALVES SHALL HAVE THEIR STATUS MONITORED IN THE SOS-HMI.
4. DOUBLE PLATES SHALL BE WELDED TO THE HULL IN THE REGION OF ALL DISCHARGES AND SUCTIONS INSIDE THE CARGO, SLOP AND PRODUCED WATER TANKS. THESES DOUBLE PLATES SHALL HAVE AT LEAST THE SAME THICKNESS OF THE HULL IN THE REGIONS WHERE THEY WILL BE INSTALED AND THEY SHALL BE COATED WITH THE LOCAL COATING SCHEME PLUS A LAST LAYER OF ANTIFRICTION COATING.
5. THE TANKS CLEANING AND RECIRCULATION SYSTEM LONGITUDINAL HEADERS ON MAIN DECK ARE THE CLEANING MACHINES HEADER (I-DE-3010.1M-5271-944-P4X-001), THE TRANSFERENCE HEADER (I-DE-3010.1M-5271-944-P4X-001_2) AND THE BUTTERWORTH PUMPS HEADER (I-DE-3010.1M-5271-944-P4X-001_3).
6. THE TANKS CLEANING AND RECIRCULATION SYSTEM LONGITUDINAL HEADERS ON MAIN DECK SHALL BE LOCATED IN HULL SYSTEMS PIPE-RACK ON MAIN DECK.
7. THE TANKS CLEANING AND RECIRCULATION SYSTEM PIPING ON MAIN DECK (CARGO AREA AND FORWARD DECK) AND ON POOP DECK SHALL HAVE ANTI-FRICTION PTFE PAD ON THE HORIZONTAL SUPPORTS TO AVOID PIPING WEARING.
8. THE TANKS CLEANING AND RECIRCULATION SYSTEM PIPING ON MAIN DECK SHALL HAVE ELECTRICAL CONTINUITY AND SHALL BE GROUNDED ACCORDING CLASSIFICATION SOCIETY RULES.
9. THE TANKS CLEANING AND RECIRCULATION SYSTEM PIPING ON MAIN DECK BOLTS, SCREWS, NUTS AND JUMPERS DEDICATED TO MAINTAIN THE CONTINUITY AND TO THE GROUNDING PROCEDURE SHALL BE CONSTRUCTED IN STAINLESS STEEL AISI 316 OR SIMILAR.
10. THE TANKS CLEANING AND RECIRCULATION SYSTEM LONGITUDINAL HEADERS ON MAIN DECK SHALL HAVE THE EXPANSION PERFORMED ONLY BY DRESSER JOINTS. THE NUMBER AND LOCATION OF THE EXPANSION JOINTS SHALL BE DEFINED IN THE DETAILED ENGINEERING DESIGN PHASE. FINAL PIPING FLEXIBILITY CALCULATION.
11. THE TANKS CLEANING AND RECIRCULATION SYSTEM SPECTACLE FLANGES ON MAIN DECK SHALL BE MADE WITH STAINLESS STEEL AISI 316 OR SIMILAR MATERIAL.
12. THE HYDRAULIC DRIVEN SUBMERSIBLE PUMPS AND OTHERS COMPONENTS INCLUDED IN THE HYDRAULIC DRIVEN SUBMERGED PUMPS PACKAGE SHALL BE IDENTIFIED IN THE P&IDS I-DE-3010.1M-5271-944-P4X-001, I-DE-3010.1M-5271-944-P4X-001_2 AND I-DE-3010.1M-5271-944-P4X-001_3 WITH "(S)".
13. IT IS NOT ALLOWED TO HAVE ANY PIPING OR VALVE INSIDE THE SLOP TANKS, EXCLUDING THE FOLLOWING ITEMS:
    - THE SLOP TANKS TRANSFERENCE DROPLINES
    - THE BALANCE LINE AND THEIR VALVES
    - THE PROCESS PLANT OPEN DRAIN (CLASSIFIED AREAS) DISCHARGE LINE IN THE SLOP TANKS
    - THE PROCESS PLANT OPEN DRAIN (NON CLASSIFIED AREAS) DISCHARGE LINE IN THE SLOP TANKS
    - THE MAIN DECK DRAINING SYSTEM DISCHARGE IN THE SLOP TANKS
    - THE ENGINE ROOM BILGE PUMPS AND SLUDGE PUMPS DISCHARGE IN THE SLOP TANKS
    - THE CHEMICAL PRODUCTS (BIOCIDE AND BIOSTATIC) INJECTION LINES IN THE SLOP TANKS
    - SLOP TANKS BOTTOM CLEANING MACHINES FEED PIPES, IF IT IS APPLICABLE
14. IT IS NOT ALLOWED TO HAVE ANY PIPING OR VALVE INSIDE THE CARGO TANKS, EXCLUDING THE CARGO TANKS TRANSFERENCE DROPLINES AND THE LOADING SYSTEM DROPLINES.
15. THE TANKS CLEANING AND RECIRCULATION SYSTEM PENETRATION PIECES ON MAIN DECK SHALL BE BUILT WITH INTERNALLY LINED STEEL PIPE SPEC B18H.
16. DISSIMILAR NON RETURN VALVES
17. THE BUTTERWORTH PUMPS HEADER ON MAIN DECK SHALL BE DIMENSIONED TO THE MAXIMUM FLOWRATE OF ONE BUTTERWORTH PUMP.
18. THE BUTTERWORTH PUMPS ARE INCLUDED IN THE HYDRAULIC DRIVEN SUBMERGED PUMPS PACKAGE.
19. THE BUTTERWORTH PUMPS SHALL HAVE THEIR OWN PIPE STACK LOCATED INSIDE THE BALLAST TANKS 7 PORT AND STARBOARD. FOR MORE INFORMATIONS SEE TYPICAL DETAIL I.
20. THE BUTTERWORTH PUMPS PIPE STACKS MATERIAL SHALL BE DEFINED BY THE HYDRAULIC SDRIVEN SUBMERGED PUMPS PACKAGE VENDOR.
21. THE BUTTERWORTH PUMPS PIPE STACKS SHALL BE SPLIT IN PARTS TO ALLOW THEIR REMOVAL OR INSTALATION CONSIDERING A FREE HEIGHT EXISTING BETWEEN MAIN DECK PLATING AND THE PROCESS PLANT LOWER DECK.
22. THE BUTTERWORTH PUMPS TOP PLATE ON MAIN DECK SHALL HAVE ALL INTERFACE BETWEEN PIPE STACKS AND THE CARGO SYSTEM, PIPE STACKS NITROGEN PURGING SYSTEM AND CARGO PUMPS HYDRAULIC ACTUATION SYSTEM ON MAIN DECK. THIS TOP PLATES SHALL BE SUPPLIED BY HYDRAULIC DRIVEN SUBMERGED PUMPS PACKAGE VENDOR. FOR MORE INFORMATIONS SEE TYPICAL DETAIL I.
23. EACH BUTTERWORTH PUMP SHALL BE DIMENSIONED TO COMPLY WITH THE FOLLOWING DESIGN POINT OF OPERATION:
    24.1 - HEAD:
    24.1.1 - 150 m WC; OR
    24.1.2 - THE NECESSARY HEAD TO SUPPLY SEA WATER TO DRIVE SIMULTANEOULY TWO DESGASEFICATION EXHAUST FANS (FOR CARGO, SLOP AND PRODUCED WATER TANKS) WITH CAPACITY OF 10000 (TEN THOUSAND) m3/H OF GAS; OR
    24.1.3 - THE NECESSARY HEAD TO FEED SEA WATER TO THE CLEANING MACHINES OF ONE SLOP TANK; OR
    24.1.4 - THE NECESSARY HEAD FOR ONE OFFLOADING HOSE INTERNAL CLEANING. WHICHEVER IS THE GREATER
    24.2 - FLOWRATE:
    24.2.1 - THE NECESSARY FLOWRATE TO SUPPLY SEA WATER TO DRIVE SIMULTANEOULY TWO DESGASEFICATION EXHAUST FANS (FOR CARGO, SLOP AND PRODUCED WATER TANKS) WITH CAPACITY OF 10000 (TEN THOUSAND) m3/H OF GAS; OR
    24.2.2 - THE NECESSARY FLOWRATE TO SUPPLY SEA WATER TO THE CLEANING MACHINES OF ONE SLOP TANK; OR
    24.2.3 - THE NECESSARY FLOWRATE TO FEED SEA WATER TO THE CLEANING MACHINES OF ONE SLOP TANK. WHICHEVER IS THE GREATER
24. PORTABLE EXHAUST FANS CONNECTIONS
25. SYSTEM DATA:
    - WORKING PRESSURE = 17,7 bar
    - DESIGN PRESSURE = 17,7 bar
    - TEST PRESSURE = 26,6 bar
    - DESIGN TEMPERATURE = 60°C
26. THE P&ID'S I-DE-3010.1M-5271-944-P4X-001, I-DE-3010.1M-5271-944-P4X-001_2 AND I-DE-3010.1M-5271-944-P4X-001_3 SHALL BE UPDATED DURING DETAILED DESIGN PHASE FOLLOWING ALL EQUIPMENT MANUFACTURERS RECOMMENDATIONS.

REV.	DESCRIPTION	DATE	EXEC.	CHECK	APPROV.
A	REVISED WHERE INDICATED	31/May/2019	GMONTEIRO	RODMAT	CHRISTINO
0	ORIGINAL ISSUE	16/Apr/2019	GMONTEIRO	ALVARES	CHRISTINO

PETROBRAS — DP&T-SRGE

CLIENT:

JOB: SRGE

AREA: REFERENCE BASIC DESIGN

TITLE: BÚZIOS

PIPING AND INSTRUMENT DIAGRAM
TANKS CLEANING AND RECIRCULATION SYSTEM (BUTTERWORTH PUMPS)

DESIGN	ESUP	EXEC.	GMONTEIRO	CHECK	ALVARES	APPROV.	CHRISTINO
SCALE	NO SCALE	DRAWING		1001056398 0010		SHEET	03 of 03
DATE	5/23/2019	No.	I-DE-3010.1M-5271-944-P4X-001				

A0 1189mm X 841mm