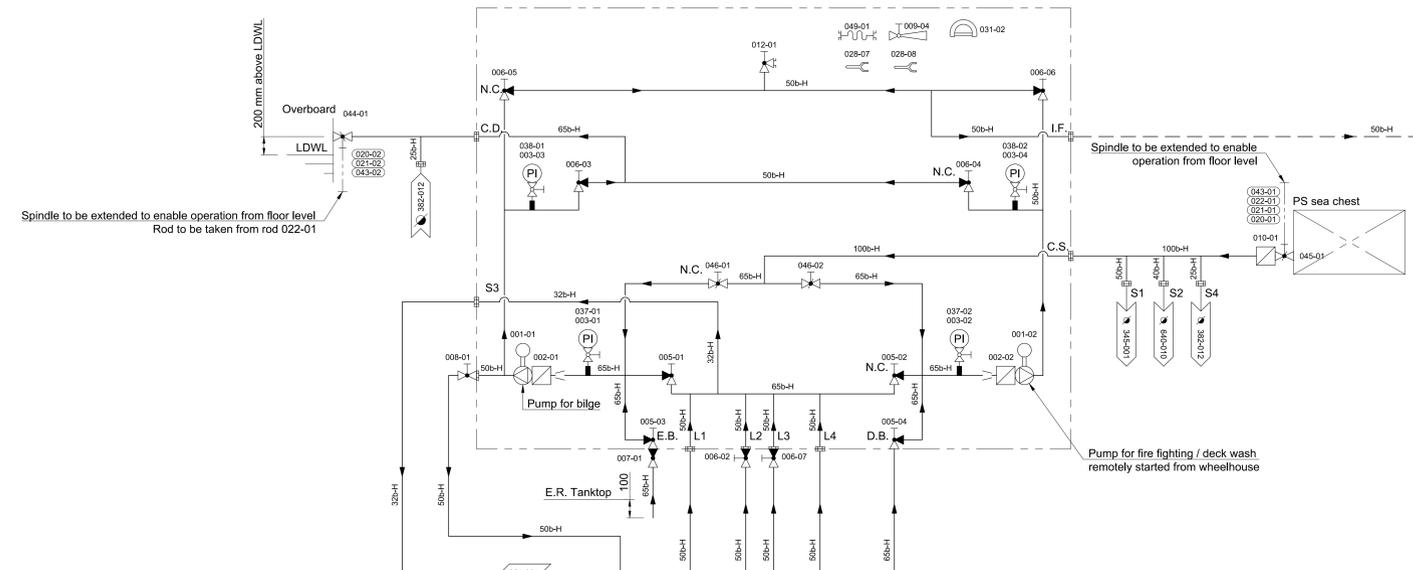
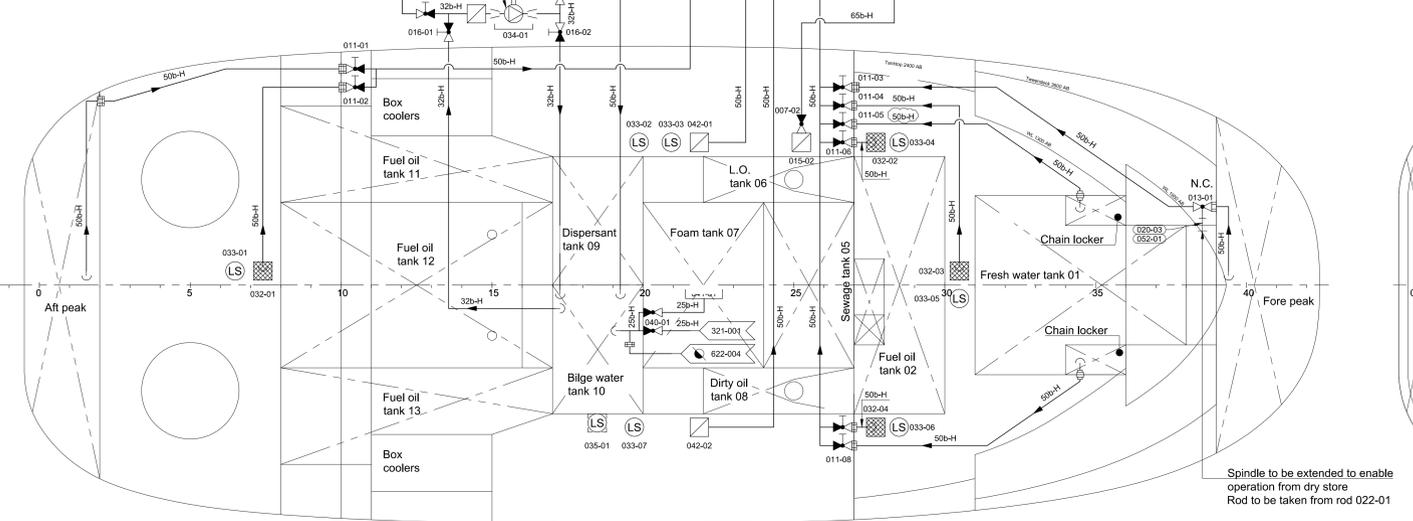


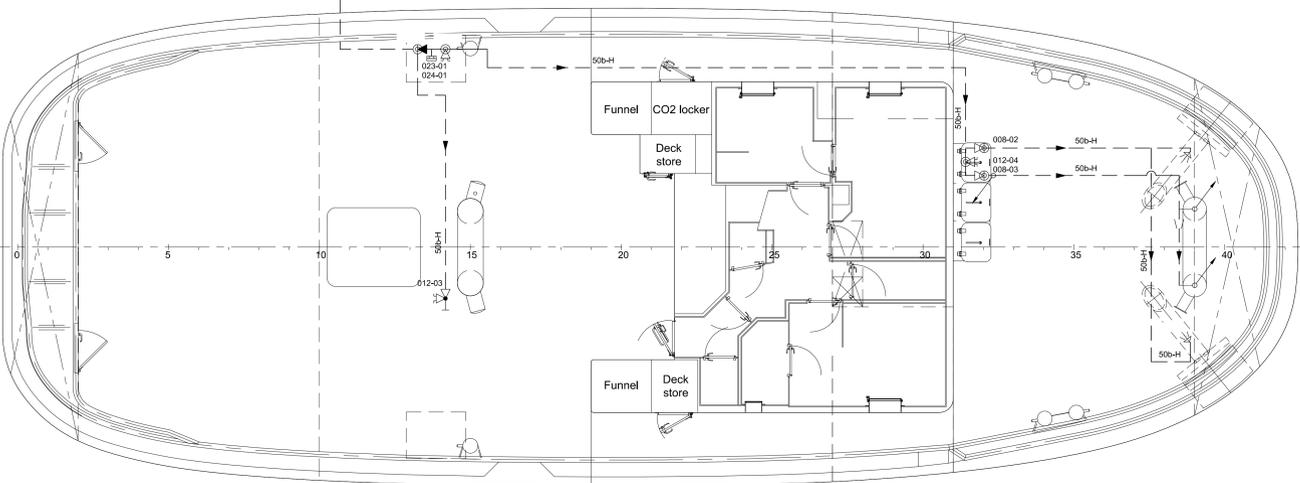
BILGE WATER MODULE



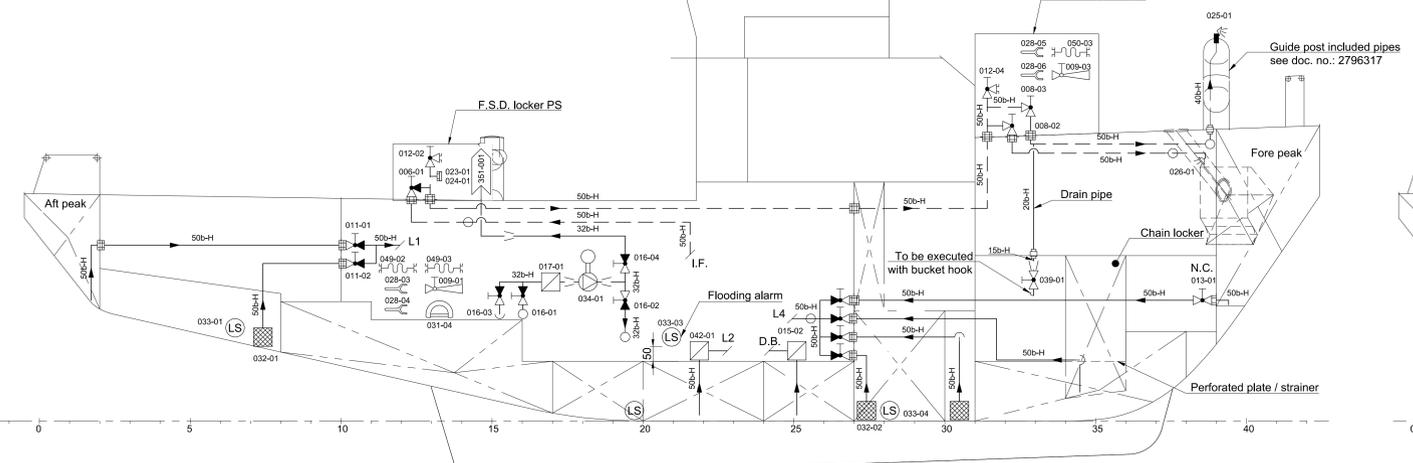
TOP VIEW BELOW MAIN DECK



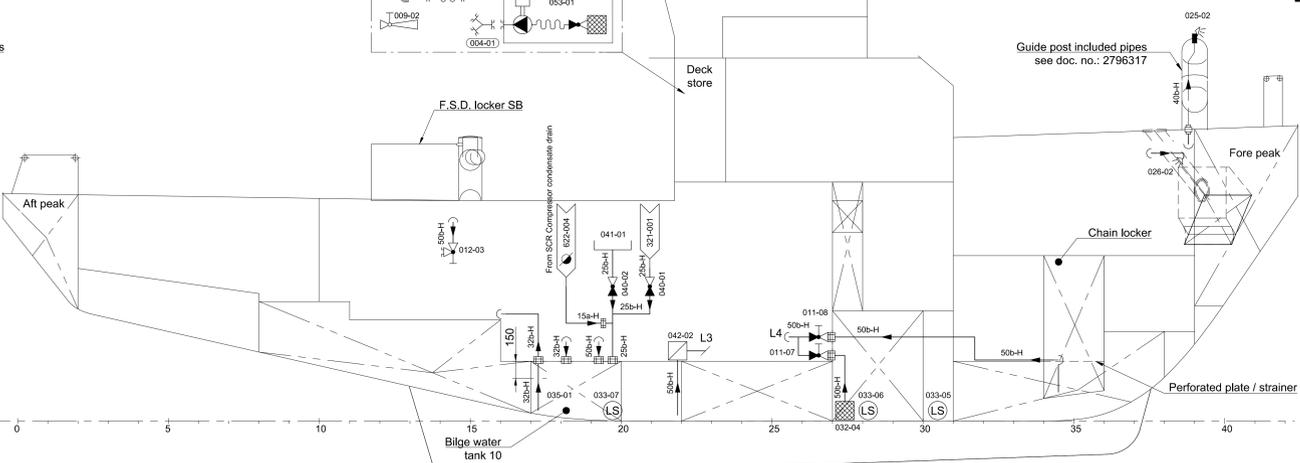
TOP VIEW ON MAIN DECK AND FORECASTLE DECK



LONGITUDINAL VIEW FROM CL TO PS



LONGITUDINAL VIEW FROM SB TO CL



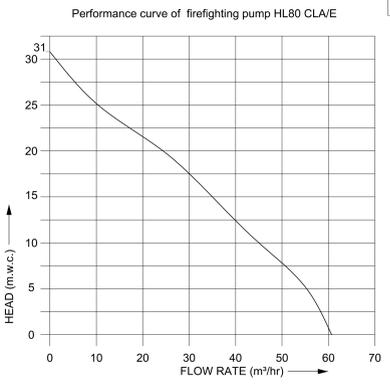
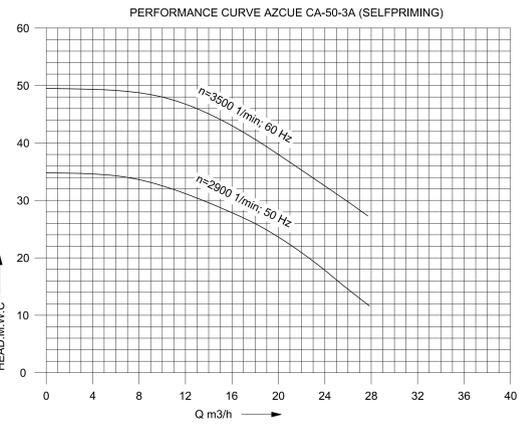
SYSTEM REQUIREMENTS

L = 25,734 m, B = 10.8 m, D = 4.6 m, C_{wp} (ER length) = 11.05 m

Size of Main bilge line $d_m = 1.68 \times \sqrt{L(B+D)} + 25 = 58.4 \text{ mm}$

Size of ER branch bilge suction $d_b = 2.16 \times \sqrt{C_{wp}(B+D)} + 25 = 53.2 \text{ mm}$

Capacity of pumps $Q = 5.75/10^3 \times d_m^2 = 19.6 \text{ m}^3/\text{hour}$



NOMENCLATURE ADDITIONAL PIPE TREATMENT: H = HOT DIP GALVANIZED, P = PICKLED and NEUTRALIZED, T = TRACING, I = INSULATED

| PIPE CODE | SPECIFICATIONS | MATERIAL | DOCUMENT |
|-----------|-------------------------|----------|----------|
| 15a | OD=21.3, DN 15, Normal | Steel | 1010971 |
| 15b | OD=21.3, DN 15, Heavy | Steel | 1591742 |
| 20b | OD=28.9, DN 20, Heavy | Steel | 1591742 |
| 25b | OD=33.7, DN 25, Heavy | Steel | 1591742 |
| 32b | OD=42.4, DN 32, Heavy | Steel | 1591742 |
| 40b | OD=48.3, DN 40, Heavy | Steel | 1591742 |
| 50b | OD=60.3, DN 50, Heavy | Steel | 1591742 |
| 65b | OD=76.1, DN 65, Heavy | Steel | 1591742 |
| 100b | OD=114.3, DN 100, Heavy | Steel | 1591742 |

NOMENCLATURE

- C.D. = Central discharge
- C.S. = Central suction
- D.B. = Direct bilge
- E.B. = Emergency bilge
- I.F. = Internal fire fighting
- L1 = Bilge aft peak / RPP room
- L2 = Bilge engine room PS
- L3 = Bilge engine room SB
- L4 = Bilge void / chain lockers / fore peak
- LDWL = Loaded water line
- N.O. = Normally open
- N.C. = Normally closed
- S1 = Sea water supply sewage treatment system (DN50)
- S2 = Sea water supply dispersant system (DN40)
- S3 = Suction bilge water stripping pump
- S4 = Sea water supply urea transfer system (DN25)
- — — Indicates internal fire fighting lines
- ☉ = Optional system or equipment

NOTE

- 1/2" drain plugs must be installed at lowest points of all lines;
- 1/2" measure plugs must be installed at places where necessary;
- Internal FIJI lines routed above accommodation ceilings are to be insulated;
- Bilge suction to mud boxes must be a straight pipe and preferable as vertical as possible;
- Blind flange needs to be fitted if optional system / equipment will not be installed.

REFERENCE DOCUMENTS

| Function | Doc.nr | Class | Title |
|----------|-----------|---------|--|
| 300 | 1217800 | INS-EXT | Mounting instructions remote control system |
| 310 | 1230054 | INS-EXT | Hawse Pipe Spraying Piece |
| 340 | 1243566 | INS-EXT | Instruction, Deck Scuppers |
| 391 | 1209712 | INS-EXT | Notes for piping drawings |
| Function | Func.seq. | Class | Title |
| 321 | 001 | DRAW-2D | Fuel oil transfer system |
| 345 | 001 | DRAW-2D | Sewage treatment system-Bluesea2500 (Optional) |
| 351 | 001 | DRAW-2D | Filling, sounding and de-aeration system |
| 382 | 012 | DRAW-2D | Urea transfer system (2 tanks) |
| 622 | 004 | DRAW-2D | Working Air System - Supply (Work Air, SCR) |
| 640 | 010 | DRAW-2D | Dispersant system completion - Optional |

Bureau Veritas Marine & Offshore
Section 47158L
REVIEWED
 only for parts concerning Classification, and as per contract.
 Rotterdam, 13-May-2024
 (Electronic document)
 The plan approval office

| | | | |
|--|--------|-------|-------------------------|
| A01 02-11-2023 QKON01/CPAD01 Initially created | | | |
| Rev | Date | Drawn | Checked / Revision text |
| DAMEN DAMEN SHIPYARDS GORINCHEM | | | |
| Projection | Format | Scale | Units |
| AO-1 | A0-1 | 1:1 | mm |
| Doc class: DRAW-2D Drawn: QKON01 Derived from: 2783554-1401 Project No.: 513233 Function: 310 Sequence: 001 Checked: CPAD01 Date: 09-11-2023 Yard No.: Section/Compartment: Document number: 5502623 Sheet: 1 Revision: A01 HB: COPYRIGHT DAMEN SHIPYARDS GROUP | | | |

Bilge and internal fire fighting system

Top Part M310

| | | | | | | | | | | | |
|---------------------------------|---------------------|----------|-----|-------|-----------------|---------|--------|-------|------------|----------|-----|
| Project No. | 513233 | Function | 310 | Drawn | QKON01 | Check | CPAD01 | Date | 09-11-2023 | | |
| Yard No. | Section/Compartment | | | | Document number | 5502623 | | Sheet | 1 | Revision | A01 |
| COPYRIGHT DAMEN SHIPYARDS GROUP | | | | | | | | | | | |

BUREAU VERITAS
Stamped document, refer to 1st page

| POS | PART | | DESCRIPTION | DOC NO |
|-----|---------|-------|--|---------|
| | QT. | UNITS | | |
| 001 | 1404674 | | [TA], Pump, Electrical, CA-50/3B, 50Hz/4KW/400V/2900rpm, 60Hz/4.8kW/44 | |
| | 2 | pcs | 0V/3500rpm, G2", G2", Cast iron, Impeller:Bronze, Sealing:NBR Gra | |
| 002 | 1011348 | | Y-filter, 1019, DN50, PN16, Flange, FL:PN16, Mesh=1mm, With drainage | 1324903 |
| | 2 | pcs | conn., Cast iron GG 25 (EN-JL 1040) | 1 |
| 003 | 1233497 | | Pressure gauge valve, 868, 1/4" (8), BSPP male, BSPP female, | 1378915 |
| | 4 | pcs | Hand wheel, PN250, St st AISI 316Ti (1.4571) | 1 |
| 004 | 1490073 | | Fifi Equipment, Storz Divider, Y-Piece, Inlet 2", Outlet 2", Cam 66 | |
| | 1 | pcs | | |
| 005 | 1000664 | | Globe valve, 269, Right-angled, SDNR disc, DN65, Flange, Hand wheel, | 1153692 |
| | 4 | pcs | PN16, FL:PN16, Cast iron GG 25 (EN-JL 1040), EN 558-1 | 1 |
| 006 | 1000663 | | Globe valve, 269, Right-angled, SDNR disc, DN50, Flange, Hand wheel, | 1153692 |
| | 7 | pcs | PN16, FL:PN16, Cast iron GG 25 (EN-JL 1040), EN 558-1 | 1 |
| 007 | 1000281 | | Check valve, 70GY, Swing type, Straight, DN65, Flange, Sealing:NBR, | 1063019 |
| | 2 | pcs | PN16, FL:PN16, Cast iron GG 25 (EN-JL 1040) | 1 |
| 008 | 1000477 | | Globe valve, 269, Right-angled, Fixed disc, DN50, Flange, Hand wheel, | 1153692 |
| | 3 | pcs | PN16, FL:PN16, Cast iron GG 25 (EN-JL 1040), EN 558-1 | 1 |
| 009 | 1551052 | | ASSY, Fifi Hand Branch Pipe, AWG Fittings, type D12, including cam 66 | |
| | 4 | pcs | coupling | |
| 010 | 1340665 | | Bucket filter, Single, 1187, DN100, PN4, Flange, FL:PN10, Straight, | 2788786 |
| | 1 | pcs | Mesh=8mm, Cast iron GG 25 (EN-JL 1040), Coated, Toggle nuts | 1 |
| 011 | 1000655 | | Globe valve, 268, Straight, SDNR disc, DN50, Flange, Hand wheel, | 1063609 |
| | 8 | pcs | PN16, FL:PN16, Cast iron GG 25 (EN-JL 1040), EN 558-1 | 1 |
| 012 | 1000181 | | ASSY, Firefighting valve, 912/920, Right-angled, DN50, Flange, | |
| | 4 | pcs | Cam:66mm, Hand wheel, PN16, FL:PN16, Bronze RG5, With sealing cap | |
| 013 | 1000549 | | [C], Globe valve, 1270, Straight, Fixed disc, DN50, Flange, Hand | |
| | 1 | pcs | wheel, PN16, FL:PN16, Bronze RG5 | |
| 015 | 1340680 | | Bucket filter, Single, 1188, DN65, PN4, Flange, FL:PN10, Right-angled, | 2788939 |
| | 1 | pcs | Mesh=8mm, Cast iron GG 25 (EN-JL 1040), Coated, Toggle nuts | 1 |
| 016 | 1195976 | | Globe valve, 269, Right-angled, SDNR disc, DN32, Flange, Hand wheel, | 1153692 |
| | 4 | pcs | PN16, FL:PN16, Cast iron GG 25 (EN-JL 1040), EN 558-1 | 1 |
| 017 | 1011346 | | Y-filter, 1019, DN32, PN16, Flange, FL:PN16, Mesh=1mm, With drainage | 1324637 |
| | 1 | pcs | conn., Cast iron GG 25 (EN-JL 1040) | 1 |
| 020 | 1004510 | | Coupling, U-joint 104 AL, cylindrical bore 12mm, single, L=50 mm, | |
| | 5 | pcs | OD=25 mm, Steel | |
| 021 | 1004009 | | Pipe support, Low pressure clamp, Standard series, OD=15mm, Double | |
| | 4 | pcs | bolt hole, TPE, With single weld plate, cover plate and bolts | |
| 022 | 1004913 | | Remote Control For Valve, Manual, rod 12+conn.ring, d.rod=12mm, | 1169110 |
| | 1 | pcs | L.rod=3000mm, St.St. rod, steel connection ring, St st AISI 316L | 1 |
| 023 | 1012007 | | S.C. Flange: Firefighting, DN50, PN16, OD=178mm, di=61.5mm, t=14.5mm, | 1247284 |
| | 1 | pcs | PCD=132mm, n=4x, 19mm, St st AISI 316L (1.4404) | 1 |
| 024 | 1034626 | | S.C. Flange: Firefighting blind, PN10, OD=178mm, t=14.5mm, PCD=132mm, | 1070016 |
| | 1 | pcs | n=4x, 19mm, St st AISI 316L (1.4404), DN40-DN80, With handle | 1 |
| 025 | 1011932 | | Spray nozzle, 3/4" (20), BSPP, L=66.8mm, SW=35.1mm, K=6.64-, | |
| | 2 | pcs | Spray angle=145deg, Brass, FF484 | |
| 026 | 1011841 | | Spray nozzle, 1" (25), BSPT, L=76.2mm, SW=50.8mm, K=171-, Spray | |
| | 2 | pcs | angle=90deg, Brass, NF750 | |
| 028 | 1007000 | | Tool, Miscellaneous, Wrench BC for Storz coupling, 2 - 3 inch, | 1112624 |
| | 8 | pcs | Isolated handle, cam 66, 81 and 89, NEN 1464, Brass | 1 |
| 031 | 1006962 | | Hose saddle, W=430mm, H=245mm, Depth=150mm, Wall mounting, Steel, | 1000244 |
| | 3 | pcs | Half round box, With branch holder | 1 |

TransNo: TE-513233-00012-01 / Issue: For Approval / Date: 22-01-2024

Bilge and internal fire fighting system

Top Part M310

| | | | | | | | | | | | |
|---------------------------------|---------------------|----------|-----|-------|-----------------|---------|--------|-------|------------|----------|-----|
| Project No. | 513233 | Function | 310 | Drawn | QKON01 | Check | CPAD01 | Date | 09-11-2023 | | |
| Yard No. | Section/Compartment | | | | Document number | 5502623 | | Sheet | 1 | Revision | A01 |
| COPYRIGHT DAMEN SHIPYARDS GROUP | | | | | | | | | | | |

BUREAU VERITAS
Stamped document, refer to 1st page

| POS | PART | | DESCRIPTION | DOC NO | |
|-----|---------|-------|--|---------|--|
| | QT. | UNITS | | SHT | |
| 032 | 1011710 | | Suction basket, square, L=160mm, W=160mm, H=160mm, Mesh size=3mm, Steel S235JR (1.0038), Treatment:zinc coated | 1168386 | |
| | 4 | pcs | | 1 | |
| 033 | 1011096 | | Composition for Level switch, Bilge, LS-270E-NC, complete St, incl. steel bar, plate, bolts, nuts etc., Steel | 1146982 | |
| | 7 | pcs | | 1 | |
| 034 | 1011266 | | ASSY, Pump Set Electr Driven, L 125V-DBP incl. driptray, 2,2KW,50Hz 3m3/h-60Hz 3,6m3/h, 2x 1" FEM,400/440V, incl. safety valve, Steel | | |
| | 1 | pcs | | | |
| 035 | 1011093 | | [TA], Level Switch, A01041 FL-SQR Besta, FLANGE 92x92, max 300 deg.C, IP65, cable connection M20 x 1.5, Stainless steel | 1102581 | |
| | 1 | pcs | | 1 | |
| 037 | 1204252 | | Pressure gauge, Bourdon tube, 3660, -1/0.6bar, D=63mm, 1/4", BSPP male, Mount:Direct, Conn:Below, Liquid-damped, Case:Stainles | 2188438 | |
| | 2 | pcs | | 1 | |
| 038 | 1155843 | | Pressure gauge, Bourdon tube, 3660, 0/6bar, D=63mm, 1/4", BSPP male, Mount:Direct, Conn:Below, Liquid-damped, Case:Stainless steel, Co | 2188438 | |
| | 2 | pcs | | 1 | |
| 039 | 1000481 | | Globe valve, 275, Straight, Fixed disc, DN15, Flange, Hand wheel, PN16, FL:PN16, Bronze RG5 | 1154063 | |
| | 1 | pcs | | 1 | |
| 040 | 1011066 | | Check valve, 505BR, Swing type, Straight, 1" (25), BSPP female, Sealing:Bronze, PN16, Bronze RG5 | 1062920 | |
| | 2 | pcs | | 1 | |
| 041 | 1011316 | | Driptray, 250x250x150 with drain, For drain points in lub. oil system, Steel S235JR (1.0038) | 1233684 | |
| | 1 | pcs | | 1 | |
| 042 | 1340679 | | Bucket filter, Single, 1188, DN50, PN4, Flange, FL:PN10, Right-angled, Mesh=8mm, Cast iron GG 25 (EN-JL 1040), Coated, Toggle nuts | 2788939 | |
| | 2 | pcs | | 1 | |
| 043 | 1001550 | | Flanged bush, M12, OD=15mm, di=12.3mm, OD flange=24mm, t flange=1mm, L=15mm, White, PA 6 | | |
| | 8 | pcs | | | |
| 044 | 1000116 | | [C], Butterfly valve, 4622, DN65, Flange, Sealing:NBR, Worm gearbox, PN16, FL:PN16, Cast iron GGG 40 (EN-JS 1030), EN 558-1 | | |
| | 1 | pcs | | | |
| 045 | 1000120 | | [C], Butterfly valve, 4622, DN100, Flange, Sealing:NBR, Worm gearbox, PN16, FL:PN16, Cast iron GGG 40 (EN-JS 1030), EN 558-1 | | |
| | 1 | pcs | | | |
| 046 | 1410848 | | Butterfly valve, 6722, DN65, Wafer type, Sealing:NBR, Worm gearbox, PN16, Cast iron GGG 40 (EN-JS 1030), Coated, EN 558-1 | | |
| | 2 | pcs | | | |
| 049 | 1446342 | | [TA MED], Fire hose, With 2 Storz coupling, Red, L=6.6m, di=50mm, 20bar, Cam=66mm, Rubber with textile inlay | 3137770 | |
| | 3 | pcs | | 1 | |
| 050 | 1446344 | | [TA MED], Fire hose, With 2 Storz coupling, Red, L=10m, di=50mm, 20bar, Cam=66mm, Rubber with textile inlay | 3137770 | |
| | 3 | pcs | | 1 | |
| 052 | 1002975 | | Pipe Passage, Bulkhead, Deck / bulkhead, D=12, Penetration guide (Steel) incl., body, plug, packing, nipple, Steel | 1154158 | |
| | 1 | pcs | | 1 | |
| 053 | 1593253 | | ASSY, Pump Set Diesel Driven, Fi-Fi emergency pump set, HL 80 CLA/E, portable, incl. suction hose, filter, Storz couplings, Steel | | |
| | 1 | pcs | | | |

TransNo: TE-513233-00012-01 / Issue: For Approval / Date: 22-01-2024