1. PRINCIPAL DIMENSIONS

LENGTH	O.A.	: APPX.	228.00 M
LENGTH	B.P.	:	219.00 M
BREADTH	MLD.	:	32.24 M
DEPTH	MLD.	:	20.65 M
DRAFT	MLD.(DESIGN)	:	12.50 M
DRAFT	MLD.(SCANTLING)	:	14.20 M

2. CLASSIFICATION : Lloyd's Register(LR)
+100A1 "Double hull Oil Tanker", ESP, +LMC, CSR, Shipright(CM), LI, SCM, UMS, IGS, IWS, PCWBT, SPM(fixed fitting only), SERS, COW
: Indian Register of Shipping(IRS)
SUL, "Oil Tanker, ESP", IY, SYJ

3. INTENDED CARGO LIST (Refer to Intended Cargo List (DWG. NO.: B0040000))
The Vessel shall carry the following cargoes which are compatible to the coating system in cargo oil tanks, all systems in connection with coargo oil handling and other provisions specified in the Specifications set forth hereinafter.

- Crude oil
- Clean & dirty petroleum products(Marpol Annex I Cargoes)
  : Oils, Distillates, Gas oil. Gasoline blending stocks, Gasolines, Jet fuels, Naphtha, Kerosene, Lubricating oil, Aviation gas oil
- Molasses
- Products to which the IBC code does not apply(Chapter 18 cargoes)

4. Registration
- The Vessel shall be registered under Indian flag.

업 무 협 조	
선장 배관	
기장 기본	
기장 관철	
방식 연구	
자동화 설계	
선장 철의	
선실 설계	
기본 연구	
전략 제품	

PLAN HISTORY

DATE	REV.	DESCRIPTION	DWN.	CHKD.	MGR.
2010.07.08	F	ISSUED FOR FINAL DRAWING			

HULL NOS. : S-1291/93/94/95/96/97 ( )SHEETS WITH A COVER

MODEL NO.	60KPC01				
TYPE	60,470 DWT CRUDE/PRODUCT OIL TANKER				
MANAGER : K.I.YOO C.G.JEON	TITLE HULL PIPING DIAGRAM				
CHECKED : P.S.YOUK					
DRAWN : G.Y.BANG					
TEL. NO. 055)548-7356					
DEP'T: HULL OUTFITTING DESIGN 2 TEAM		SCALE: NONE	DATE: 2009.01.13.	DWG. NO.: D5000000	REV. NO. △

STX Offshore & Shipbuilding

FORM NAME : STXSE-PC317

PLAN HISTORY

DATE	REV.	DESCRIPTION	DWN.	CHKD.	MGR.
2010.07.08.	F	ISSUED FOR FINAL DRAWING			

STX Shipbuilding Co., Ltd.

PLAN HISTORY

DATE	REV.	DESCRIPTION	DWN.	CHKD.	MGR.

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STX Shipbuilding Co., Ltd.

CONTENTS

* PIPE SPECIFICATION : KS AND/OR JIS STANDARD

C 2 X
- X — CERTIFICATION (NON-CERT)
- 2 — PRESSURE (JIS 10K)
- C — PIPE MATERIAL (STPG370 SCH80 ERW)

PIPE MATERIAL

CODE \ N.D	15A	32A	40A	50A	65A	80A	150A	200A	250A	300A	350A	400A	500A	550A	600A	650A
A	SPP ERW															
B	STPG370 SCH40 ERW									STPG370 9.5T ERW						STPY400 9.5T SAW
C	STPG370 SCH80 ERW								STPG370 12.7T ERW							STPY400 12.7T SAW
D	STPG370 SCH160 SMLS								STPG370 16.0T ERW							STPY 16.0T SAW
E	STPG370 SCH40 SMLS															
F	STPG370 SCH80 SMLS															
G	SUS304 WELDED SCH10S															
H	SUS304 WELDED SCH20S															
I	SUS304 WELDED SCH40															
J	SUS304 WELDED SCH80															
K	SUS304L WELDED SCH10S															
L	SUS304L WELDED SCH20S															
M	SUS304L WELDED SCH40															
N	SUS304L WELDED SCH80															
P	SUS316 WELDED SCH10S															
Q	SUS316 WELDED SCH20S															
R	SUS316 WELDED SCH40															
S	SUS316 WELDED SCH80															
T	SUS316L WELDED SCH10S															
U	SUS316L WELDED SCH20S															
V	SUS316L WELDED SCH40															
W	SUS316L WELDED SCH80															
X	COPPER JIS H3300-C1220T SMLS															
Y	AL-BR C6870 SER-I SMLS								AL-BR C6870 SER-I WELDED							
Z	AL-BR C6870 SER-II SMLS								AL-BR C6870 SER-II WELDED							
1	CU-NI 90/10 C7060 SER-I SMLS								CU-NI 90/10 C7060 SER-I WELDED							
2	CU-NI 90/10 C7060 SER-II SMLS								CU-NI 90/10 C7060 SER-II WELDED							
3	GRP PIPE															
4																
5																

PRESSURE		CERTIFICATION			
CODE	PRESSURE	CODE	CERTIFICATION	CODE	CERTIFICATION
1	5K	A	CLASS I	T	
2	10K	B	CLASS II	U	
3	16K	C	DNV III WITH CERT	V	
4	20K	D		W	
5	30K	E		Y	
6	63K	F		Z	
7	5K (E-TYPE FLANGE)	G		X	NON-CERT
8	10K (E-TYPE FLANGE)	H			
9	16K (E-TYPE FLANGE)	J			
0	210K S/W SQ FLANGE	K			
C	280K S/W SQ FLANGE	L			
D	350K S/W SQ FLANGE	M			
E	5K (E-TYPE 65~100A ADJ ONLY)	N			
F	10K (E-TYPE 65~100A ADJ ONLY)	P			
G	16K (E-TYPE 65~100A ADJ ONLY)	Q			
H	40K	R			
J	6000PSI	S			
K	70K S/W SQ FLANGE				

PIPE TABLE

PAGE	4
MODEL NO.	60KPC01
DWG. NO.	D5000000

STAINLESS STEEL PIPE

MATERIAL			SUS 304TP, SUS 316TP, SUS 316LTP								SMLS	
N.D		O.D (mm)	SCH.10S		SCH.20		SCH.40		SCH.80		SCH.120	
(A)	(inch)		T	W	T	W	T	W	T	W	T	W
10	3/8	17.3	1.65	0.637	2.0	0.755	2.3	0.851	3.2	1.11		
15	1/2	21.7	2.1	1.02	2.5	1.18	2.8	1.31	3.7	1.64		
20	3/4	27.2	2.1	1.30	2.5	1.52	2.9	1.74	3.9	2.24		
25	1	34.0	2.8	2.15	3.0	2.29	3.4	2.57	4.5	3.27		
32	1(1/4)	42.7	2.8	2.76	3.0	2.94	3.6	3.47	4.9	4.57		
40	1(1/2)	48.6	2.8	3.16	3.0	3.37	3.7	4.10	5.1	5.47		
50	2	60.5	2.8	3.98	3.5	4.92	3.9	5.44	5.5	7.46		
65	2(1/2)	76.3	3.0	5.43	3.5	6.28	5.2	9.12	7.0	12.0		
80	3	89.1	3.0	6.37	4.0	8.39	5.5	11.3	7.6	15.3		
100	4	114.3	3.0	8.23	4.0	10.9	6.0	16.0	8.6	22.4	11.1	28.2
125	5	139.8	3.4	11.4	5.0	16.6	6.6	21.7	9.5	30.5	12.7	39.8
150	6	165.2	3.4	13.6	5.0	19.8	7.1	27.7	11.0	41.8	14.3	53.2
200	8	216.3	4.0	20.9	6.5	33.6	8.2	42.1	12.7	63.8	18.2	88.9
250	10	267.4	4.0	26.0	6.5	41.8	9.3	59.2	15.1	93.9	21.4	150
300	12	318.5	4.5	34.8	6.5	50.0	10.3	78.3	17.4	129	25.4	184
350	14	355.6	5.0	43.2								
400	16	406.4	5.0	49.3								

MILD STEEL PIPE

N.D		O.D (mm)	SPP		7.9T		SCH.40		9.5T		9.5T		SCH.80		12.7T		12.7T		SCH.160		16.0T		16.0T	
(A)	(inch)		T	W	T	W	T	W	T	W	T	W												
10	3/8	17.3																						
15	1/2	21.7	2.8	1.31			2.8	1.31					3.7	1.64					4.7	1.97				
20	3/4	27.2	2.8	1.68			2.8	1.74					3.9	2.24					5.5	2.90				
25	1	34.0	3.2	2.43			3.4	2.57					4.5	3.27					6.4	4.36				
32	1(1/4)	42.7	3.5	3.38			3.6	3.47					4.9	4.57					6.4	5.70				
40	1(1/2)	48.6	3.5	3.89			3.7	4.10					5.1	5.47					7.1	7.27				
50	2	60.5	3.8	5.31			3.9	5.44					5.5	7.46					8.7	11.1				
65	2(1/2)	76.3	4.2	7.47			5.2	9.12					7.0	12.0					9.5	15.6				
80	3	89.1	4.2	8.79			5.5	11.3					7.6	15.3					11.1	21.4				
100	4	114.3	4.5	12.2			6.0	16.0					8.6	22.4					13.5	33.6				
125	5	139.8	4.5	15.0			6.6	21.7					9.5	30.5					15.9	46.4				
150	6	165.2	5.0	19.8			7.1	27.7					11.0	41.8					18.2	66.0				
200	8	216.3	5.8	30.1			8.2	42.1					12.7	63.8							16.0	79.0		
250	10	267.4	6.6	42.4			9.3	59.2							12.7	79.8					16.0	99.2		
300	12	318.5	6.9	53.0					9.5	72.4					12.7	95.8					16.0	119.0		
350	14	355.6	7.9	67.7					9.5	81.1					12.7	107.0					16.0	134.0		
400	16	406.4	7.9	77.6					9.5	93.0					12.7	123.0					16.0	154.0		
450	18	457.2	7.9	87.5					9.5	105.0					12.7	139.0					16.0	-		
500	20	508.0	7.9	97.4					9.5	117.0					12.7	155.0					16.0	-		
550	22	558.8							9.5	129.0					12.7	171.0					16.0	-		
600	24	609.6							9.5	141.0					12.7	187.0					16.0	-		
650	26	660.4									9.5	152.0					12.7	203.0					16.0	254.0
700	28	711.2									9.5	164.0					12.7	219.0					16.0	274.0
750	30	762.0									9.5	176.0					12.7	235.0					16.0	294.0
800	32	812.8									9.5	188.0					12.7	254.0					16.0	314.0
850	34	863.6									9.5	200.0					12.7	266.0					16.0	335.0
850	34	863.6									9.5	212.0					12.7	282.0					16.0	355.0
850	34	863.6									9.5	236.0					12.7	315.0					16.0	395.0
SGP			0																					
STPG370/STS370							0		0				0		0				0		0			
STPY 400					0						0						0						0	
ERW			0		0		0		0		0		0		0		0							
SMLS							0						0						0		0		0	

NOTES

1)SPP (JIS G3457, KS D3507):CARBON STEEL PIPE FOR ORDINARY PIPING.
2)STPG(JIS G3454, KS D3562):CARBON STEEL PIPE FOR PRESSURE SERVICE.
3)STS (JIS G3455):CARBON STEEL PIPE FOR HIGH PRESSURE SERVICE.
4)STPY(JIS G3457):ELECTRIC ARC WELDED CARBON STEEL PIPE.
5)ERW S:ELECTRIC RESISTANCE WELDED SPECIAL CARBON STEEL PIPE.
6)STPT(JIS G3456):CARBON STEEL PIPE FOR HIGH TEMPERATURE SERVICE.
7)PIPING STANDARD: KS AND/OR JIS
8)"*"MARK IS STX SHIPBUILDING STANDARD.
9)THE ALLOWANCE OF PIPE THICKNESS UP TO 1MM SHOULD BE CONSIDERED IN MANUFACTURING OF PIPES ON THE ABOVE TABLE.

REMARK :	(K.S)	(JIS)	(K.S)	(JIS)
	SPP	: SGP	SPW	: STPY
	SPPS	: STPG	SPPH	: STS

COPPER PIPE

N.D	O.D (mm)	10K		70K	
		T	W	T	W
4A	6	1.2	0.161		
5A	8	1.2	0.230		
6A	10	1.2	0.295	2.0	0.447
8A	12	1.2	0.370		
10A	15	1.4	0.532	2.3	0.216
15A	20	1.6	0.823	3.0	1.425
20A	25	1.6	1.246	3.5	2.103
25A	30	1.6	1.270	4.0	2.906
32A	35	1.6	1.494	5.0	4.611
40A	45	2.0	2.403		
50A	55	2.0	2.962		
65A	70	2.0	3.801		
80A	85	2.5	5.764		
100A	110	3.0	8.971		
125A	140	3.0	11.45		
150A	160	3.5	15.31		

MATERIAL : C1220T (JIS H3300)

AL-BRASS/CU-NI PIPE

N.D	O.D (mm)	T	W	
			AL-BR	CU-NI
10	15.0	1.0	0.37	0.37
15	20.0	1.0	0.50	0.53
20	25.0	1.5	0.98	1.05
25	30.0	1.5	1.12	1.20
32	38.0	1.5	1.43	1.53
40	44.5	1.5	1.69	1.81
50	57.0	1.5	2.18	2.33
65	76.1	2.0	3.88	4.15
80	88.9	2.5	5.66	6.05
100	108.0	2.5	6.91	7.39
125	133.0	2.5	8.55	9.14
150	159.0	2.5	10.20	10.90
200	219.0	3.0	17.00	18.10
250	267.0	3.0	20.70	22.10
300	323.9	4.0	33.50	35.80
350	368.0	4.0	38.10	40.70

MATERIAL		
AL-BRASS		C6870T
CU-NI	90:10	C7060T
	70:30	C7150T

NOTE : 1)MATERIAL : BASED ON JIS H3300
2) N.D.≤ 200A : SEAMLESS PIPE
3) N.D ≥ 250A : ERW(WELDED PIPE)

STAINLESS STEEL TUBE (SEAMLESS)

OUT DIA. (Φ: mm)	Φ6	Φ8	Φ10	Φ12	Φ15
WALL THICKNESS (mm)	1.0	1.0	1.0	1.5	1.5
DESIGEN PRESSURE (Kg/Cm2)	477	340	265	340	265

PIPING SYMBOL (1/2)

PAGE	5/
MODEL NO.	60KPC01
DWG. NO.	D5000000

NO.	SYMBOL	SYMBOL DESIGNATION
1.	GENERAL CONVENTIONAL SYMBOL	
1.1		PIPE
1.2		PIPE WITH INDICATION OF DIRECTION OF FLOW
1.3		APPLIANCES
1.4		INDICATING AND MEASURING INSTRUMENTS
2.	PIPES AND PIPE JOINTS	
2.1		CROSSING PIPES NOT CONNECTED
2.2		CROSSING PIPES CONNECTED
2.3		TEE PIPES
2.4		FLEXIBLE JOINT FLEXIBLE PIPES JOINT
2.5		FLANGED JOINT
2.6		SLEEVE JOINT
2.7		REDUCER
2.8		SCREWED JOINT
2.9		WELDED JOINT
2.10		JOINT QUICK-RELEASING
2.11		SLEEVE TYPE EXPANSION PIPE JOINT
2.12		BELLOWS TYPE EXPANSION PIPE JOINT
2.13		DRESSER TYPE EXPANSION PIPE JOINT
2.14		FLANGE ADAPTER TYPE EXPANSION PIPE JOINT
2.15		EXPANSION PIPE
2.16		CAP NUT
2.17		BLANK FLANGE

NO.	SYMBOL	SYMBOL DESIGNATION
2.18	OPEN CLOSE	SPECTACLE FLANGE
2.19	OPEN CLOSE	SPOOL PIECE
2.20		PENETRATING WATERTIGHT BULKHEAD & DECK CROSSING
2.21		PENETRATING WATERTIGHT BULKHEAD & DECK CROSSING
2.22		TO BILGE (TO BE RELEASED LOCALLY)
2.23		PIPE GOING UPWARDS
2.24		PIPE GOING DOWNWARDS
2.25		ORIFICE
2.26		OFF PAGE CONNECTOR
2.27		GRATING
2.28	(A) (A)	CONNECTED TO SAME MARKED NUMBER (SAME SYSTEM DRAWING)
2.29		RUBBER COMPENSATOR
2.30		
3.	VALVES, COCKS AND FLAPS	
3.1		GLOBE VALVE (STRAIGHT THROUGH)
3.2		ANGLE VALVE
3.3		GATE VALVE
3.4		SCREW DOWN NON-RETURN (SDNR) VALVE (GLOBE)
3.5		SCREW DOWN NON-RETURN (SDNR) VALVE (ANGLE)
3.6		NON-RETURN VALVE (GLOBE)
3.7		NON-RETURN VALVE (ANGLE)
3.8		SWING CHECK VALVE
3.9	JIS STORZ ANPT DIN	HOSE GLOBE VALVE
3.10	JIS STORZ ANPT DIN	HOSE ANGLE VALVE

NO.	SYMBOL	SYMBOL DESIGNATION
3.11		VALVE, THREE WAY
3.12		PRESSURE REDUCING VALVE
3.13		SAFETY VALVE, GLOBE
3.14		SAFETY VALVE, ANGLE
3.15		SELF-CLOSING VALVE, GLOBE(STRAIGHT THROUGH)
3.16		SELF-CLOSING VALVE, ANGLE
3.17		REGULATING VALVE
3.18		QUICK-OPENING VALVE
3.19		QUICK-CLOSING VALVE
3.20		KINGSTON VALVE
3.21		BUTTERFLY VALVE (WAFER LEVER TYPE)
3.22		BUTTERFLY VALVE (WAFER, GEAR BOX TYPE)
3.23		BUTTERFLY VALVE (FLANGE LEVER TYPE)
3.24		BUTTERFLY VALVE (FLANGE GEAR BOX TYPE)
3.25		BUTTERFLY VALVE (LUG LEVER TYPE)
3.26		BUTTERFLY VALVE (LUG GEAR BOX TYPE)
3.27		BUTTERFLY CHECK VALVE (WAFER TYPE)(DUO CHECK)
3.28		BUTTERFLY CHECK VALVE (FLANGE TYPE)(DUO CHECK)
3.29		BUTTERFLY CHECK VALVE (LUG TYPE)(DUO CHECK)
3.30		BALL VALVE
3.31		HOSE BALL VALVE (JIS COUPLING)
3.32		HOSE BALL VALVE (DIN CUPLING)
3.33		BALL CHECK WITHOUT SPRING VALVE
3.34		BALL CHECK WITH SPRING VALVE

NO.	SYMBOL	SYMBOL DESIGNATION
3.35		FOOT VALVE
3.36		NEEDLE VALVE AND V-PORT VALVE, STRAIGHT THROUGH
3.37		NEEDLE VALVE AND V-PORT VALVE, ANGLE
3.38		RELIEF VALVE STRAIGHT THROUGH
3.39		RELIEF VALVE ANGLE
3.40		BREATHER VALVE
3.41		COCK, GLOBE (STRAIGHT THROUGH)
3.42		COCK, ANGLE
3.43		COCK, THREE-WAY L-PORT IN PLUG
3.44		COCK, THREE-WAY, T-PORT IN PLUG
3.45		COCK, FOUR-WAY, STRAIGHT THROUGH IN PLUG
3.46		MANIFOLD VALVE, CHECK VALVE
3.47		STORM VALVE STRAIGHT THROUGH
3.48		STORM VALVE ANGLE
3.49		AIR FILTER REGULATOR
3.50		TEMPERATURE CONTROL VALVE (WAX TYPE)
3.51		HIGH VELOCITY PRESSURE/VACUUM VALVE WITH (WITHOUT) GAS FREE COVER
3.52		GAS FREEING COVE
3.53		AUTOMATIC DE-AERATING V/V
3.54		TEMPERATURE CONTROL VALVE (DIRECT TYPE)
3.55		REMOTELY OPERATED ON/OFF TYPE VALVE (CONTINUOUS TYPE)
4.	CONTROL AND REGULATION PARTS	
4.1		HAND-OPERATED
4.2		REMOTE CONTROL

PIPING SYMBOL (2/2)

PAGE	6
MODEL NO.	60KPC01
DWG. NO.	D5000000

NO.	SYMBOL	SYMBOL DESIGNATION
4.3		SPRING
4.4		MASS
4.5		FLOAT
4.6	OR H	HYDRAULIC OPERATED, OPEN/SHUT
4.7	OR H	HYDRAULIC OPERATED, CONTINUES
4.8	P	PNEUMATIC PISTON
4.9		DIAPHRAGM OPERATED
4.10	M	ELECTRIC MOTOR DRIVEN
4.11	A	AIR MOTOR DRIVEN
4.12	S	SOLENOID ACTUATOR
4.13		DECK STAND(REACH ROD)
4.14		DECK STAND(HTDRAULIC)
4.15		
5.	FITTING	
5.1		SUCTION BELL MOUTH
5.2		SCUPPER FOR COAMING
5.3		HOPPER WITHOUT COVER
5.4		HOPPER WITH HINGED COVER
5.5		SOUNDING HEAD WITH CAP
5.6		SOUNDING HEAD WITH SELF CLOSING VALVE
5.7		SOUNDING HEAD WITH SELF CLOSING AND TEST COCK
5.8		OBSERVATION GLASS
5.9		ROSE BOX
5.10		MUD BOX

NO.	SYMBOL	SYMBOL DESIGNATION
5.11		SIMPLEX STRAINER
5.12		DUPLEX OIL STRAINER
5.13		SEPARATOR
5.14		DRAIN TRAP
5.15		Y-TYPE STRAINER
5.16		Y-TYPE STEAM TRAP WITH STRAINER & COCK
5.17		Y-TYPE STEAM TRAP WITH STRAINER & COCK,BY-PASS
5.18		DRAIN SLIENCER
5.19		HULL DISTANCE PIECE
5.20		BILGE HAT
5.21		SIGHT GLASS
5.22		FUSING PLUG
5.23		BOSS
5.24		BOSS AND PLUG
5.25		THERMOWELL
5.26		ROSE PLATE
5.27		GOOSE NECK TYPE AIR VENT PIPE HEAD(WITHOUT WIRE NET)
5.28		BONNET TYPE AIR PIPE HEAD(WITHOUT WIRE NET)
5.29		GOOSE NECK TYPE AIR PIPE HEAD(WITH WIRE NET)
5.30		BONNET TYPE AIR PIPE HEAD(WITH WIRE NET)
5.31		OIL TRAY COAMING
5.32		AIR DRAIN TRAP
5.33		GLYCERINE POT
5.34		VACUUM BREAKER

NO.	SYMBOL	SYMBOL DESIGNATION
5.35		SOUNDING CAP (DECK PIECE TYPE)
5.36		FLAME SCREEN
5.37		SCUPPER WITH WATER SEAL AND ROSE PLATE
5.38		
6.	PUMP, EQUIPMENT	
6.1		CENTRIFUGAL PUMP
6.2		GEAR PUMP
6.3		SCREW PUMP
6.4		PISTON PUMP
6.5		HAND PUMP
6.6		MONO PUMP
6.7		AIR MOTOR DRIVEN DIAPHRAGM PUMP
6.8		DOSING PUMP
6.9		VANE PUMP
6.10		
6.11	A	AIR HORN
6.12	VM	VISCOMETER
6.13	FM	FLOWMETER
6.14		EJECTOR, EDUCTOR
6.15		SHELL/TUBE TYPE HEAT EXCHANGER
6.16		COOLER PLATE TYPE
6.17	DR *	MAKER SUPPLY ITEM
6.18		PRIMA-VAC UNIT
6.19	R	RECIRC. TANK FOR PRIMA-VAC SYS.

NO.	SYMBOL	SYMBOL DESIGNATION
6.20		SILENCER (FOR EXHAUST GAS)
6.21		
7.	CONTROL & INSTRUMENT	
7.1	OR	HYDRAULIC OIL LINE
7.2	OR	CONTROL AIR LINE
7.3	OR	CAPILLARY TUBE
7.4	OR	ELECTRIC WIRING
7.5		INSULATION
7.6		STEAM TRACING & INSULATION
7.7		HEATING COIL
7.8		ELECTRIC COIL
7.9	XS	AUXILIARY SWITCH
7.10	AUTO CH-OVER	CHANGE OVER SWITCH BOX
7.11		SEAL POT
7.12		LOOP SEAL
7.13		LOCAL INSTRUMENT
7.14		REMOTE CONTROL INSTRUMENT
7.15		GLASS LEVEL GAUGE(○:OPEN ⊖ :CLOSE ● : SELF CLOSING V/V)
7.16		FLAT LEVEL GAUGE(○:OPEN ⊖ :CLOSE ● :SELF CLOSING V/V)
7.17		FLOAT TYPE LEVEL GAUGE (DIAL FLOAT/FLOAT)TYPE
7.18		CONTENT METER (DIAL TYPE)
7.19		MANOMETER
7.20		
7.11		

INSTRUMENT SYMBOL LIST

ABBREVIATION	CONTENTS	ABBREVIATION	CONTENTS
CI	COMPOUND GAUGE	TAH	TEMPERATURE ALARM HIGH
DPI	DIFFERENTIAL PRESSURE INDICATOR	TI	TEMPERATURE INDICATOR
DPS	DIFFERENTIAL PRESSURE SWITCH	TIAL	TEMPERATURE INDICATOR ALARM LOW
DPT	DIFFERENTIAL PRESSURE TRANSMITTER	TIAH	TEMPERATURE INDICATOR ALARM HIGH
FD	FLOW DETECTOR	TIAHL	TEMPERATURE INDICATOR ALARM HIGH LOW
FS	FLOW SWITCH	TIC	TEMPERATURE INDICATING CONTROLLER
FT	FLOW TRANSMITTER	TS	TEMPERATURE SWITCH
IL	INDICATION LAMP	TT	TEMPERATURE TRANSMITTER
LI	LEVEL INDICATOR	VAL	VISCOSITY ALARM LOW
LIC	LEVEL INDICATING CONTROLLER	VAH	VISCOSITY ALARM HIGH
LAL	LEVEL ALARM LOW	VCA	VACUUM ALARM
LAH	LEVEL ALARM HIGH	VCI	VACUUM INDICATOR
LIAL	LEVEL INDICATOR ALARM HIGH	VI	VISCOSITY INDICATOR
LIAHL	LEVEL INDICATOR ALARM HIGH LOW	VT	VISCOSITY TRANSMITTER
LIAHH	LEVEL INDICATOR ALARM HIGH HIGH	XS	AUXILIARY UNSPECIFIED SWITCH
LS	LEVEL SWITCH	ZI	POSITION INDICATOR
LT	LEVEL TRANSMITTER	ZS	LIMIT SWITCH
ODAH	OIL DETECTOR ALARM HIGH		
PAL	PRESSURE ALARM LOW		
PI	PRESSURE GAUGE / INDICATOR		
PIAL	PRESSURE INDICATOR ALARM LOW		
PIAH	PRESSURE INDICATOR ALARM HIGH		
PIAHL	PRESSURE INDICATOR ALARM HIGH LOW		
PIC	PRESSURE INDICATING CONTROLLER		
PS	PRESSURE SWITCH		
PT	PRESSURE TRANSMITTER		
SAH	SALINITY ALARM HIGH		
SD	SOLINITY DETECTOR		
SI	SALINITY INDICATOR		
SOD	SMOKE DETECTOR		
SV	SOLENOID VALVE		
TAL	TEMPERATURE ALARM LOW		

ABBREVIATION	EXPLANATION
A/B	ABOVE BASE LINE
A/C	AIR CONDITION
ACCOM.	ACCOMMODATION
A.C./H	AIR CHANGES PER HOUR
A/E	AUXILIARY ENGINE
AFT	AFTER
AIR CLR(A.C)	AIR COOLER
A.P	AIR PIPE
APPX.	APPROXIMATELY
A.P.TK	AFT(OR AFTER) PEAK TANK
ARR.	ARRIVAL
ATM.	ATMOSPHERE
AUTO.	AUTOMATIC
AUX.	AUXILIARY
A.V	ANGLE VALVE
A/V	AIR VENT
BA.	BALLAST
BCC	BALLAST CONTROL CONSOLE
B.C.C	BRIDGE CONTROL CONSOLE
B.C.D.B	BATTERY CHARGING AND DISCHARGING BOARD
B.F	BLANK FLANGE
BFLY V/V	BUTTERFLY VALVE
BG	BILGE
BHD	BULKHEAD
B.H.TK	BILGE HOLDING TANK
B.L	BASE LINE
BLK	BLOCK
BLR	BOILER
BLWG	BLOWING
BRG	BEARING
BSN STORE	BOSUN STORE
B.V.I	BEARING VIBRATION INDICATOR
B.W	BILGE WELL
B/W	BUTT WELDING
B.W.L	BALLAST WATER LINE
C.C.C	CARGO CONTROL CONSOLE
C.C.P	CHART CONSOLE PORT
C.C.R	CARGO CONTROL ROOM
C.C.S	CHART CONSOLE STARBOARD
C/D	COFFERDAM
CERT.	CERTIFICATE
CENT.	CENTRIFUGAL
C.F.W	COOLING FRESH WATER
CHEM.	CHEMICAL
CH-OVER	CHANGE OVER

ABBREVIATION	EXPLANATION
C/H	CARGO HOLD
CIRC.	CIRCULATING
CLASS	CLASSIFICATION SOCIETY
CLENG	CLEANING
CLR	COOLER
C.L (℄)	CENTER LINE
C/L	CHAIN LOCKER
COMP.	COMPRESSOR
COMP. AIR	COMPRESSED AIR
COMP. BLR	COMPOSITE BOILER
COMP'T	COMPARTMENT
COND.	CONDENSATE
COND'R	CONDENSER
CONN.	CONNECTION
C.O.P.T	CARGO OIL PUMP TURBINE
C.O.(T.)	CARGO OIL (TANK)
CO2P	CO2 FIRE EXTINGUISHING PIPE
C.P	CONTROL PANEL
C.P.P	CONTROLLABLE PITCH PROPELLER
C/S	CAMSHAFT
CST	CENTISTOKES
C.S.W	COOLING SEA WATER
C.T.S	CHART TABLE SPACE
CYL.	CYLINDER
D/B(D.B)	DOUBLE BOTTOM
D.B.W.B.T	DOUBLE BOTTOM WATER BALLAST TANK
D/E	DIESEL ENGINE
DEP.	DEPARTURE
DET.	DETAIL
DIA.	DIAMETER
DISCH.	DISCHARGE
DK	DECK
D/K	DUCK KEEL
DMCR	DERATED MAXIMUM CONTINUOUS RATING
DN	DOWN
D.P	DRAIN PIPE
DRIV'G W.	DRIVING WATER
DRN	DRAIN
DWG	DRAWING
E.C.C	ENGINE CONTROL CONSOLE
E.C.P	ELECTRIC CABLE PIPE
E.C.R	ENGINE CONTROL ROOM
E.F.P	EMERGENCY FIRE PUMP
E.G.B	EXHAUST GAS BOILER

ABBREVIATION	EXPLANATION
E.G.E	EXHAUST GAS ECONOMIZER
E.G.P	EXHAUST GAS PIPE
EJEC.	EJECTOR
ELE.	ELECTRIC
ELEV.	ELEVATION
EM'CY	EMERGENCY
ENG.	ENGINE
E.R	ENGINE ROOM
E.R.W	ELECTRIC RESISTANCE WELDING
E/R O/H CRANE	ENGINE ROOM OVERHEAD CRANE
E.S.B	EMERGENCY SWITCH BOARD
EXH.	EXHAUST
EXP.	EXPANSION
EXP.JOINT	EXPANSION JOINT
F'CLE	FORECASTLE
FIL'G	FILLING
FLG	FLANGE
FLR	FLOOR
FLUS'G	FLUSHING
FM	FROM
F/M	FLOW METER
F.O	FUEL OIL
F.P.P	FIXED PITCH PROPELLER
F.P.TK	FORE PEAK TANK
FR.	FRAME
FRP	REIFORCED FIBERGLASS PLASTIC
FTR	FILTER
F.W	FRESH WATER
F.W CLR	FRESHWATER COOLER
FWD. fwd	FORWARD
F.W.E	FINISHED WITH ENGINE
G.A	GENERAL ARRANGEMENT
GALV.	GALVANIZED
G.C	GALSS CLOTH
GEN.	GENERAL
GEN'TR	GENERATOR
G.E	GENERATOR ENGINE
GRAV.	GRAVITY
G/S	GENERAL SERVICE
G.S.I	GENERAL STOCK ITEM
G.V	GLOBE VALVE
G.W	GLASS WOOL
H.C	HEATING COIL
H/C	HATCH COVER
HTR	HEATER

ABBREVIATION	EXPLANATION
H.F.O	HEAVY FUEL OIL
H-H	HIGH-HIGH
HORI.	HORIZONTAL
H.S.C	HIGH SEA CHEST
H.TEMP.(H.T)	HIGH TEMPERATURE
H/W	HARDWARE
HYD.	HYDRAULIC
HYD.P	HUDRAULIC OIL PIPE
HYDRO.	HYDROPHORE
HYDRO. UNIT	HYDROPHORE UNIT
H.P.P	HYDRAULIC POWER PACK
I.C.C.P	INPRESSED CURRENT CATHODIC PROTECTION
I.D	INSIDE DIAMETER
I.G.G	INERT GAS GENERATOR
I.G.S.	INERT GAS SYSTEM
INCIN.	INCINERATOR
IND.	INDICATION
INDEP. TK	INDEPENDENT TANK
INL.(IN.)	INLET
INST.	INSTALLATION
INTER.	INTERMEDIATE
I.O.P.P	INTERNATIONAL OIL POLLUTION PREVENTION
ISO.	ISOLATION
ISO	INTERNATIONAL STANDARD ORGANIZTION
J.F.W	JACKET FRESHWATER
JIS	JAPANESE INDUSTRY STANDARD
J.W HTR	JACKET WATER HEATER
K	KG/CM^2 ($1KG/CM^2$=0.98BAR)
K/L	KEEL LAYING
KS	KOREA INDUSTRIAL STANDARD
LBP	LENGTH BETWEEN PERPENDICULAR
L/C	LAUNCHING
L.C.V	LOW CALRORIFIC VALUE
L-L	LOW-LOW
L.O	MARINE LUBRICANTING OIL
LOA	LENGTH OVERALL
L.S.C	LOW SEA CHEST
LTR	LETTER
L.TEMP.(L.T)	LOW TEMPERATURE
LUB.	LUBRICATING
L.W.L	LOAD WATER LINE

ABBREVIATION (2/2)

ABBREVIATION	EXPLANATION
MACH.	MACHINERY
MAX.	MAXIMUM
M.A	MACHINERY ARRANGEMENT
MCR	MAXIMUM CONTINUOUS RATING
(M.)D.O	(MARINE) DIESEL OIL
M.E	MAIN ENGINE
MEAS'G	MEASURING
MFG.	MANUFACTURING
M.G.P.S	MARINE GROWTH PREVENTING SYSTEM
M/H	MAN HOLE
MIC.	MICRON
MID, mid	MIDDLE
MIN.	MINIMUM
M.I.P	MEAN INDICATING PRESSURE
MISC.	MISCELLANEOUS
MLC	METER LIQUID COLUMN
M.S.B	MAIN SWITCH BOARD
MT	METRIC TON
MWC	METER WATER COLUMN
NAV.	NAVIGATION
NBR	NATURAL BUTADIENE RUBBER
N.C	NORMAL CLOSE
N.C.O	NOZZLE COOLING OIL
NCR	NORMAL CONTINUOUS RATING
N.D	NOMINAL DIAMETER
NID	NAVIGATION INSTRUMENT DISTRIBUTION
NIL	NAVIGATION LIGHT CONTROL PANEL
NM	NAUTICAL MILE
NMCR	NOMINAL MAXIMUM CONTINUOUS RATING
NO.	NUMBER
N.O	NORMAL OPEN
NON-ASB.	NON-ASBESTOS
NOR.	NORMAL
NOZ.	NOZZLE
OBS	OBSERVATION
O.C.R	OWNER COMMENT REQUEST
O.D	OUTSIDE DIAMETER
ODMS(ODME)	OIL DISCHARGE MONITORING SYSTEM (EQUIPMENT)
OLI	OUTDOOR LIGHT CONTROL PANEL
OMD	OIL MIST DETECTOR
OPER'G	OPERATING
OUTL.(OUT.)	OUTLET

ABBREVIATION	EXPLANATION
OVBD	OVERBOARD
O.W.S	OILY WATER SEPARATOR
P(P)	PORT(PORT SIDE)
(PA)	PORT SIDE AFTER (AFT)
P.B	PUSH BUTTON
(PF)	PORT SIDE FORWARD
P/F	PLATFORM
POT.W	PORTABLE WATER
P/P	PUMP
PRESS.	PRESSURE
P&S	PORT & STARBOARD
PURI.	PURIFIER
Q/C	QUICK CLOSING
Q'TY	QUANTITY
R.C.V(V/V)	REMOTE CONTROL VALVE
REDC'G	REDUCING
REFL'G	REFILLING
REG.	REGULATION
REM. CONT.	REMOTE CONTROL
RESV.	RESERVOIR
R.H	RELATIVE HUMIDITY
RM	ROOM
RMT	REMOTE
RPM	REVOLUTION PER MINUTE
RTN	RETURN
R.V.I	ROTOR VIBRATION INDICATOR
R.W	ROCK WOOL
S.B.M	SUCTION BELL MOUTH
S/C	SEA CHEST
SCAV.	SCAVENGE
SCH.	SCHEDULE
SCUP.P	SCUPPER PIPE
SDNR V/V	SCREW DOWN NON-RETURN VALVE
SEC.	SECTION
SEPT	SEPARATOR
SERV.	SERVICE
SETT.TK	SETTLING TANK
(S.)F.O.C	(SPECIFIC) FUEL OIL CONSUMPTION
S.G	SPECIFIC GRAVITY
S/G	STEERING GEAR
S.GEN	SHAFT GENERATOR
SL.V	SLUICE VALVE (OR GATE VALVE)
SLI	SIGNAL LIGHT CONTROL PANEL
S.L.W.L	SUMMER LOAD WATER LINE
S.M	SUCTION MOUTH

ABBREVIATION	EXPLANATION
SMLS	SEAMLESS
SOUN.P	SOUNDING PIPE
SPEC.	SPECIFICATION
SPLY	SUPPLY
S/S	SHIPSIDE
STBD(S)	STARBOARD (STARBOARD SIDE)
ST-BY	STAND-BY
S.T	SEA TRIAL
S/T	STERN TUBE
ST.	STARTER
STM	STEAM
STOR.	STORAGE
STR	STRAINGER
STRIP.	STRIPPING
STUFF. B	STUFFING BOX
SUCT. (SUC.)	SUCTION
S.V	STOP VALVE
S/V	SOLENOID VALVE
S.W	SEA WATER
S. WEL'G	SOCKET WELDING
SWL	SAFETY WORKING LOAD
SYS	SYSTEM
T/C	TURBO CHARGER
TEMP.	TEMPERATURE
T.H.D.P	TANK HEATING DRAIN PIPE
THK	THICKNESS
T.H.S.P	TANK HEATING STEAM PIPE
TK	TANK
TK/C	TANK CLEANING
TRANS	TRANSFER
TRANSM	TRANSMITTER
T.S.W.TK	TOP SIDE WING TANK
T.TOP(T.T)	TANK TOP
TYP.	TYPICAL
UND(U)	UNDER
UPP.DK	UPPER DECK
U.S.(A)	UNITED STATES (OF AMERICA)
U.S.C.G	UNITED STATES COAST GUARD
VAC. COND.	VACCUM CONDENSER
VENT.	VENTILATION
VERT.	VERTICAL
VISCO.(VISC.)	VISCOSITY
V/V(V.)	VALVE
WAS'G	WASHING

ABBREVIATION	EXPLANATION
W/B	WASH BASIN
W.B.STR.P	WATER BALLAST STRIPPING PIPE
W.B.(T.)	WATER BALLAST (TANK)
W.C	WATER CLOSET
W.C.C	WHEEL-HOUSE CONTROL CONSOLE
W.D.P	WASH DECK PIPE
W/H	WHEEL HOUSE
W.M.C	WHEEL-HOUSE MANUEVRING CONSOLE
W.N.C	WHEEL-HOUSE NAVIGATION CONSOLE
W.O.TK	WASTE OIL TANK

HULL PIPING EQUIPMENT LIST

PAGE	10
MODEL NO.	60KPC01
DWG. NO.	D5000000

SYSTEM	EQUIPMENT NAME	SPECIFICATION	Q'TY	LOCATION	MAKER (DWG. NO.)
CARGO/BALLAST HANDLING SYSTEM	MAIN HYDRAULIC POWER PACK UNIT WITH AUXILARY HYD. UNIT	4 ELEC. MOTOR. HYD UNIT(390KW) + 3 DIESEL ENGINE(390KW)	1	E/R	FRAMO (V5100000)
	HYD. OIL TRANSFER UNIT	EQUIPPED WITH 1 OFF ELECTRIC FEED PUMP (1.3KW)	1	E/R	
	CARGO OIL PUMP	900m3/h x 130mlc @ S.G. 0.8, 1.0 CST (SUB.,CEN.,HYD.DRI.)	12	C.O.Tk	
	SLOP PUMP	300m3/h x 130mlc @ S.G. 0.8, 1.0 CST (SUB.,CEN.,HYD.DRI.)	2	SLOP TK	
	RESIDUE PUMP	100m3/h x 130mlc @ S.G. 0.8, 1.0 CST (SUB.,CEN.,HYD.DRI.)	1	RESIDUE TK	
	TANK CLEANING PUMP	225m3/h x 130mlc @ S.G. 1.025, 1.0 CST (DECK MOUNTED, HYD. DRI.)	1	DECK STORE(S)	
	PORTABLE CARGO OIL PUMP	300m3/h x 50mlc @ S.G. 0.8, 1.0 CST (TRANSPORTABLE,CEN.,HYD.DRI.)	1	INVENTORY	
	CARGO HEATER FOR NO.1 C.O.TK(P&S)	820 KW, 1280 KG/H STEAM VERTICAL TYPE CARGO HEATER	2	UPPER DECK	
	CARGO HEATER FOR NO.2~6 C.O.TK(P&S)	1030 KW, 1610 KG/H STEAM VERTICAL TYPE CARGO HEATER	10	UPPER DECK	
	WATER BALLAST PUMP	1700m3/h x 25mlc @ S.G. 1.025, 1.0 CST (SUB.,CEN.,HYD.DRI.)	2	NO.5 WBT(P&S)	
	BALLAST BOOSTER PUMP	900m3/h x 130mlc @ S.G. 1.025, 1.0 CST (DECK MOUNITED,CEN.,HYD.DRI.)	1	DECK STORE	
	IR THERMOMETER	LASER TYPE	1	-	
T/C MACHINE	TANK CLEANING MACHINE	PROGRAMMABLE, SINGLE NOZZLE	25	UPPER DECK	POLAR MARINE <V5200000>
		PROGRAMMABLE, MULTI NOZZLE FOR SLOP TK	2		
T/C HEATER	TANK CLEANING HEATER	225 M3/H (20~70 C) HORIZONTAL, SHELL & TUBE TYPE	1	DECK STORE(S)	DONGHWA ENTEC <V5210000>
INERT GAS GENERATING SYSTEM	INERT GAS GENERATING SCRUBBER UNIT	6750 M3/H MDO BURNING	1	E/R CASING	KANGRIM <V5301000>
	INERT GAS BLOWER	6750 M3/H(EACH 100% CAPACITY), CENTRIFUGAL FAN, ELECTRIC MOTOR DRIVEN	2	E/R CASING	
	F.O PUMP UNIT	MAKER STANDARD	1	E/R	
	DECK WATER SEAL	SEMI-DRY TYPE	1	UPPER DECK	
	P/V BREAKER	2160 / -700 MMWG	4	UPPER DECK	
HIGH VELOCITY P/V VALVE	HIGH VELOCITY P/V VALVE WITH GAS FREE COVER	1800 mmWG / -350 mmWG	15	UPPER DECK	SEWON <V5320000>
	VENT RISER	-	4		
FIXED CO2 FIRE EXTINGUISHING SYSTEM	CO2 CYLINDER	45KG CO2 CYLINDER & CYLINDER VALVE ASSEMBLY	162	CO2 ROOM	NK <V5400000>
	RELEASE CONTROL CABINET	-	1	CO2 ROOM	
			1	F.C.STATION	
DECK FOAM SYSTEM	FOAM TANK UNIT WITH FOAM LIQUID PUMP & PROPORTIONER	TANK CAPA. :3.0 M3 / PUMP CAPA. : 6.1 M3/H X 9 BAR /PROPORTIONING RATIO: 3%	1	FOAM ROOM	NK <V5420000>
	FOAM MONITOR	100A CAPACITY : 3000 L/MIN	5	UPPER DECK	
			2	A-DK	
	FOAM APPLICATOR WITH BOX	BS 336 CAPACITY : 800 L/MIN	2	UPPER DECK	
			2	A-DK	
EMERGENCY FIRE PUMP SYSTEM	EMERGENCY FIRE PUMP	72 M3/H X 80MTH (VER.,CEN., SELF PRIM'G)	1	E.F.P.RM	SHIN SHIN <V5430000>
EDUCTOR	BALLAST EDUCTOR	100 M3/H	1	NO.5 W.B.T(S)	- <V5102000>
	BILGE EDUCTOR FOR BOSUN STORE	10 M3/H	1	BOSUN STORE	
	BILGE EDUCTOR FOR CHAIN LOCKER		1		

SYSTEM	EQUIPMENT NAME	SPECIFICATION	Q'TY	LOCATION	MAKER (DWG. NO.)
PORTABLE CARGO MEASURING SYSTEM	PORTABLE U.T.I	CLOSED TYPE	2	INVENTORY	TANKSYSTEM <V5530000>
	PORTABLE CARGO SAMPLING UNIT	CLOSED TYPE SAMPLING CAPA. : 0.5L	1		
	PORTABLE HAND DIPPING UNIT	CLOSED TYPE	2		
	TWO(2) INCH VAPOUR CONTROL V/V	5K-50A	15	EACH CARGO/ SLOP/RESIDUE TK	
	ONE(1) INCH DECK V/V	5K-25A	42	EACH CARGO/ SLOP/RESIDUE TK	
CARGO MONITORING SYSTEM	CARGO MONITORING SYSTEM	RADAR BEAM TYPE	12	EACH CARGO TANK	MUSASINO <V5500000>
		MAGNETIC FLOAT TYPE (INCLUDED TEMP. SENSOR)	3	RESIDUE TANK/ SLOP TANK	
		TEMPERATURE GAUGE DETECTOR	12	EACH CARGO TANK	
HIGH & OVERFILL ALARM SYSTEM	HIGH & OVERFILL ALARM SYSTEM FOR CARGO/SLOP TANK	MAGNETIC FLOAT TYPE	14	EACH CARGO/ SLOP TANK	PANASIA <V5520000>
BALLAST TANK LEVEL & DRAFT GAUGING SYSTEM	BALLAST TANK LEVEL SENSOR	ELECTRIC PRESSURE TRANSMITTER TYPE	15	NO1~6 W.B.T(P&S) F.P.T(U&L),A.P.TK	PANASIA <V5510000>
	DRAFT SENSOR	ELECTRIC PRESSURE TRANSMITTER TYPE	4	NO4 W.B.T(P&S) F.P.T & E/R	
OIL DISCHARGE MONITORING SYSTEM	COMPUTER UNIT	MAKER STANDARD	1	CCR	JOWA <V5700000>
	OIL CONTENT METER	MAKER STANDARD	1	FOAM ROOM	
	ANALYZING UNIT	MAKER STANDARD	1	ACCOM FRONT WALL	
	FLOW METER	MAKER STANDARD	1	UPPER DECK	
VALVE REMOTE CONTROL SYSTEM	HYDRAULIC POWER UNIT	LARGEST 3 VALVE OPERATION WORKING PRESSURE : 135 BAR	1	E/R	EMERSON <V5600000>
	SOLENOID VALVE CABINET	- UNITS ELECTRIC MOTOR DRIVEN	1	FOAM ROOM	
	CONTROL CONSOLE	PIANO TYPE MIMIC CONTROL	1	CCR	
	STATIONARY HAND PUMP WITH PROTECTION BOX	WORKING PRESSURE : 135 BAR	2	UPPER DECK	
	PORTABLE HAND PUMP WITH RUBBER HOSE(5M)	WORKING PRESSURE : 135 BAR	2	INVENTORY	
PORTABLE GAS DETECTOR	COMBINED TYPE PORTABLE OXYGEN & FLAMMABLE GAS DETECTOR	MAKER STANDARD	2	INVENTORY	-
	PORTABLE TOXIC GAS DETECTOR	MAKER STANDARD	2	INVENTORY	-
FIXED GAS DETECTION SYSTEM	FIXED GAS DETECTION SYSTEM	NO.1~6 W.B.TK(P&S) UPP.&LOWER U.F.P.TK/L.F.P.TK UPP.&LOWER	1	CCR	CONSILIUM <V5710000>
		REPEATER UNIT	1	NAV. DECK	
FIXED DIAPHRAGM P/P	PORTABLE DIAPHRAGM PUMP	ABT. 10M3/H (AIR DRIVEN)	3	UPPER DECK	DA-HO <V5102000>

HULL PIPING INVENTORY LIST

PAGE	11
MODEL NO.	60KPC01
DWG. NO.	D5000000

SYSTEM	NAME	SIZE(CAPACITY)	Q'TY	MATERIAL	SUPPLIER	REMARK
CARGO/BALLAST HANDLING SYSTEM	FLEXIBLE HOSE FOR HYD. OIL TRANSFER UNIT IN E/R	1" X 2M	2	MAKER STANDARD	FRAMO	
	PORTABLE CARGO OIL PUMP INCLUDING HYD. OIL HOSES WITH FLOW CONTROL VALVE AND CARGO ADAPTER	300m3/h x 50mlc 24M JIS 16K-150A	1	MAKER STANDARD		
	EQUIPMENT FOR CONNNECTION OF PORTABLE CARGO PUMP	-	1	MAKER STANDARD		
	PRESS.TEST KIT FOR CARGO PUMPING SYSTEM	-	1	MAKER STANDARD		
	PORTABLE WINCH FOR HANDLING OF PORTABLE CARGO PUMP	CAPACITY : 800 KG AIR MOTOR : 700 KG	1	MAKER STANDARD		
	AIR HOSE FOR CARGO PUMP STRIPPING	1/2" X 3M	3	MAKER STANDARD		
	CARGO HOSE FOR PORTABLE CARGO OIL PUMP	AS NECESSARY			BUYER	
	AIR HOSE FOR PORTABLE WINCH	15A X 15M (JIS /CLAW)	1	RUBBER/ BRONZE	BUILDER	
	PORTABLE PRESSURE GAUGE WITHOUT COCK	PF 3/8" (0~25kg/cm2)	4	SUS316	BUILDER	
	BAR TYPE THERMOMETER	PF 1/2" (0~100℃) FOR 400A	4	SUS316	BUILDER	
TANK CLEANING SYSTEM	PORTABLE TANK CLEANING MACHINE WITH HOSE, SADDLE COUPLING, TORLLEY & ETC	34.5M3/H X 10KG/CM2	2	MAKER STANDARD	POLAR MARINE	
	TRIPOD FOR FIXED T/C MACHINE MAINTENANCE	MAKER STANDARD	2	MAKER STANDARD		
	Y-PIECE FOR PORTABLE TANK CLEANING MACHINE	16K-65A WITH BSP 2.5" MALE CONN.	2	SUS316	BUILDER	
	SPECIAL BLIND FLANGE FOR FIXED T/C MACHINE HOLE	5K-200A X 16K-65A	4	MILD STEEL WITH COATING		
	BAR TYPE THERMOMETER FOR T/C MAIN LINE	PF1/2"(0~100℃),100A	2	SUS316		
INERT GAS SYS & VAPOUR SHORE CONN.	HOSE FOR INERT GAS UPPER PART FILLING FOR W.B.T(P&S) & F.P.T	5K-200A L = 20 M	2	POLYETHYLEN	BUILDER	
	ANODE PIECE	5K-200A	1	ZINC ANODE	BUILDER	
		5K-80A	1			
GAS FREEING SYSTEM	PORTABLE GAS FREEING FAN WITH ACCESSORY (SEA WATER DRIVEN TYPE)	CAPACITY : 8000M3/H	4	IMPELLER : SUS316L		
FIXED CO2 FIRE EXTINGUSH'G SYSTEM	BEAM SCALE ASSEMBLY FOR CO2 BOTTLE	MAKER STANDARD	1	MAKER STANDARD	NK	
	RUBBER HOSE FOR FLUSHING OF CO2 MANIFOLD	M42X2P, 5M	1	RUBBER /BRONZE		
COMPRESSED AIR & PURGING SYSTEM	RUBBER HOSE FOR COMPRESSED AIR GENERAL SERVICE & CO M/F STRIPPING	15A X 50M	2	RUBBER /BRONZE	BUILDER	
	ADAPTOR FOR COMP. AIR HOSE EXTENSION	15A X 15A	2	BRONZE		
SOUNDING SYSTEM	SOUNDING TAPE FOR WATER BALLAST TANK	30M	1	MAKER STANDARD	BUILDER	
	SOUNDING TAPE FOR H.F.O. TANK	30M	1			

SYSTEM	NAME	SIZE(CAPACITY)	Q'TY	MATERIAL	SUPPLIER	REMARK
BUNKERING SYSTEM	PORTABLE PRESSURE GAUGE WITHOUT COCK FOR H.F.O./M.D.O. MANIFOLD	PF 3/8" (0~5 kg/cm2)	2	SUS316	BUILDER	
	BAR TYPE THERMOMETER FOR H.F.O MANIFOLD	PF 1/2" (0~100 C) FOR 200A	1	SUS316		
	BAR TYPE THERMOMETER FOR D.O MANIFOLD	PF 1/2" (0~100 C) FOR 100A	1	SUS316		
SCUPPER SYSTEM	SELF-EXPANED TYPE SCUPPER PLUG	150A(#80)	14+7	RUBBER /BRONZE	BUILDER	7 AS SPARE
VALVE REMOTE CONTROL SYSTEM	PORTABLE HAND PUMP WITH RUBBER HOSE	-	2	MAKER STANDARD	EMERSON	
PORTABLE CARGO MEASURING SYSTEM	PORTABLE U.T.I	2"	2	MAKER STANDARD	TANKSYSTEM	
	PORTABLE CARGO SAMPLING UNIT	2"	1	MAKER STANDARD		
	PORTABLE HAND DIPPING UNIT	1"	2	MAKER STANDARD		
PORTABLE SAFETY EQUIPMENT	COMBINED TYPE PORTABLE OXYGEN & FLAMMABLE GAS DETECTOR	MAKER STANDARD	2	MAKER STANDARD	-	
	PORTABLE TOXIC GAS DETECTOR	MAKER STANDARD	2	MAKER STANDARD	-	

NOTE: HULL PIPING INVENTORY LIST (DWG. NO. G5014000) WITH DETAIL INFORMATION WILL BE PREPARED LATER ON.

FORM NAME : STXSE-PC313

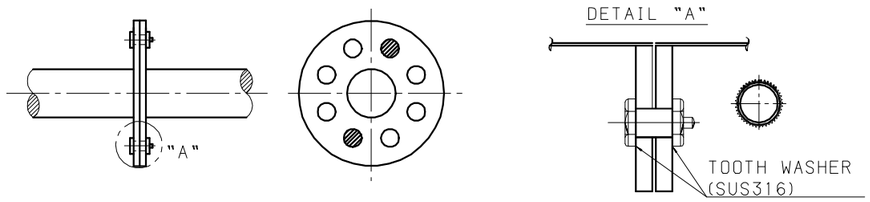
1) The General requirements for the piping systems contained herein are particularly applicable to the hull piping system

2) Loop and/or expansion coupling shall be applied on each main line of longitudinal direction for contraction/expansion of the pipes. The actual quantity and position of coupling shall be decided according to piping arrangement

3) The type of expansion coupling shall be applied as below.

System	System	Material		Remarks
		Body	Seal	
Water ballast system	Dresser	FCD	NBR	IN W.B.TK
Tank Cleaning system	Dresser	SUS	TEFLON	
Inert Gas system	Dresser	FCD	TEFLON	
Steam/Cond. system	Bellows	SUS	-	
Fire/wash deck	Dresser	FCD	Viton	Fire resistance type
Bunkering system	Dresser	FCD	Viton	Fire resistance type

4) Electric bonding device (tooth washer, material SUS316) to be applied flange connection for cargo handling, tank cleaning, inert gas system, F.O/D.O, cable pipe which coated outside by paint as below details.



5) The longitudial direction main pipe only for 125A and above size between pipe and support on upper deck in cargo area and water ballast tank, except cable pipe, shall be provided with sliding pad made of TEFLON (app.10t) or equivalent.

6) ※ marked shipside valve shall be provided with Class certificates.
The sea chest grill to be provided with the clear area of at least 1.5 times the area of inlet pipe sectional area.

7) Class approved type shall be applied for following items.

- Air vent head
- Pressure vacuum valves
- Expansion Coupling

8) Drain valve to be fitted where the well point of the pipe, which shall be decided according to the actual arrangement.

9) For general, all valves, piping fittings and flanges to be of recognized standard type acceptable to Class.

10) The pipes on upper deck center shall be arranged at position of appx. 1.8m above from upper deck.

SPECIFICATION OF PIPING SYSTEM(1/3)

PAGE	13 /
MODEL NO.	60KPC01
DWG. NO.	D5000000

ITEM: SYSTEM MAIN	ITEM: SYSTEM SUB	DESIGN CONDITION PRESS (kg/cm2g)	DESIGN CONDITION TEMP (℃)	CLASS OF PIPE	TEST PRESS SHOP	TEST PRESS ON BOARD	PIPE SPEC. NOM. DIA.	PIPE SPEC. MAT'L	PIPE SPEC. PIPE CODE	COATING IN	COATING OUT	PIPE CONNECTION TYPE	PIPE CONNECTION FLANGE RATING	PIPE CONNECTION FLANGE MAT'L	PIPE CONNECTION GASKET MAT'L	MATERIAL OF BOLT/NUT HEX-BOLT	MATERIAL OF BOLT/NUT U-BOLT	REMARK
CARGO HANDLING SYSTEM	CARGO LINE ON UPPER DECK	15.5	MAX.66	II	23.25	23.25	ALL	STPG370-E, #80	C3B	SAME AS C.O.TK	SAME AS SURROUND	FLANGE	JIS 16K SLIP-ON	SF440	TEFLON	SUS316	SUS316	EXPANSION LOOP
	DROP LINE ON UPPER DECK			III	-		ALL		C3X									
	CARGO STRIP. LINE	15.5	MAX.66	II	23.25	23.25	≤ 100A	SUS316L-E, #10S	T3B	NO-COATING	SAME AS SURROUND	BUTT WELD EXCEPT FLANGE FOR NECESSARY	JIS 16K SLIP-ON	SUS316	TEFLON	SUS316	SUS316	
	DRAIN LINE	-	AMB.	III		-	ALL		T3X									
	DROP LINE IN TANK & SLOP BALANCING LINE	-	AMB.	III	-	-	ALL	SUS316L-E, #10S	T1X	NO-COATING			JIS 5K SLIP-ON					
	ANNEX I OV'BD DISCH IN W.B.TK	15.5	AMB.	II	-	23.25	150A	SUS316L-E, #80	W3B	SAME AS C.O.TK			JIS 16K SLIP-ON					
	ANNEX II OV'BD DISCH IN W.B.TK	-	AMB.	II	-	-	150A	SUS316L-E, #80	W3B									
	SHIPSIDE DISTANCE PIECE FOR ANNEX I, II	-	AMB.	II	-	LEAK	≥ 250A	STPG370-E, 12.7T	C3B			FLANGE		SF440				
							≤ 200A	STPG370-E, #80										
WATER BALLAST SYSTEM	BALLAST MAIN & BRANCH UNTIL VALVE FLANGE	3.2	AMB.	III	-	6.0	ALL	GRE	31X	NO-COATING	NO-COATING	FLANGE COUPLING	JIS 5K SLIP-ON	GRE	NBR(FF)	REFER TO REMARK	REFER TO REMARK	* BOLT/NUT -IN BALLAST TANK : SUS316 -UPPER DECK : GALV.
	PENE.PCS, BELL MOUTH IN BALL.TK&ON UPP.DK						≤ 200A	STPG370-S, #160	D1X	GALV.	SAME AS SURROUND			SS400	NBR(FF)			
							≥ 250A	STPG370-E, 16.0T										
	BETWEEN EDUCTOR SUC. & DISCH. V/V	10.0	NOR	III	-	WORK	ALL	STPG370-E, #80	C2X				JIS 10K SLIP-ON					
	SHIPSIDE DISTANCE PIECE	-	NOR	II	-	LEAK	≥ 250A	STPG370-S, 16.0T	D1B				JIS 5K SLIP-ON					
	SEA CHEST VENT FROM S/C TO ISO. V/V	-	NOR	II	-	LEAK	40A	STPG370-S, #160	D2B			BUTT-WELDING	-					
	SEA CHEST VENT FROM ISO.V/V TO UPP.DK	-	NOR	III	-	-	40A	STPG370-S, #160	D2X			FLANGE	JIS 10K SLIP-ON		NBR(FF)			
	BALLAST LINE IN W.B.TK & UPP.DK EXCEPT ABOVE	-	NOR	III	-	-	40A	STPG370-S, #80	C1X				JIS 5K SLIP-ON					
TANK CLEAN'G SYSTEM	T/C LINE FROM ELBOW PIECE TO T/C MACHINE	15.5	MAX.75	III	-	23.25	≥ 125A	STPG370-E, #80	C3X	SAME AS C.O.TK	SAME AS SURROUND	FLANGE /BUTT. WELD	JIS 16K SLIP-ON	SUS316	TEFLON	SUS316	SUS316	LOOP/ DRESSOR COUPLING
							≤ 100A	SUS316L-E, #20S	U3X	NO-COATING								
	SEA WATER SUPPLY LINE TO ELBOW PIECE	13.0	NOR	III	-	WORK	400A	STPG370-E, 12.7T	C1X	SAME AS W.B.TK	SAME AS SURROUND	FLANGE	JIS 5K SLIP-ON	SS440	NON-ASB	SS400 GALV.	SS400 GALV.	
	BOOSTER PUMP DISCH.	15.5	NOR	III		23.25	350A	STPG370-E, 12.7T	C3X				JIS 10K SLIP-ON					
INERT GAS SYSTEM & VAPOUR SYSTEM	INERT GAS LINE AFTER D.W.SEAL & VAPOUR LINE	0.2	NOR	III	-	-	≥ 250A	STPG370-E, 12.7T	C1X	SAME AS C.O.TK	SAME AS SURROUND	FLANGE	JIS 5K SLIP-ON	SS400	TEFLON	GALV.	GALV.	DRESSOR COUPLING
							≥ 125A	STPG370-E, #80										
							≤ 100A	SUS316L-E, #10S	T1X	NO-COATING				SUS316		SUS316	SUS316	
	INERT GAS LINE BETWEEN SCRUBBER AND D.W.SEAL	0.2	NOR	III	-	-	≥ 250A	STPG370-E, 12.7T	C1X	TAR-FREE EPOXY				SS400	NON-ASB	SS400 GALV	SS400 GALV	
							≥ 125A	STPG370-E, #80										
							≤ 100A	SUS316L-E, #10S	T1X	NO-COATING				SUS316		SUS316	SUS316	
	AIR SUPPLY LINE BEFORE SCRUBBER	-	NOR	III	-	-	≥ 300A	STPG370-E, 9.5T	B1X	GALV				SS400	NON-ASB	SS400 GALV	SS400 GALV	IN E/R
							≤ 250A	STPG370-E, #40										
	SCRUBBER OV'BD DISCH LINE	-	NOR	III	-	-	≥ 300A	STPG370-E, 12.7T	C1X	POLY-ETHYLENE								
	SHIPSIDE DISTANCE PIECE FOR SCRUBBER	-	NOR	II	-	LEAK	≥ 300A	STPG370-S, 16.0T	D2B	TAR-FREE EPOXY			JIS 10K SLIP-ON					
	D.W.SEAL OV'DB LINE ON UPPER DECK	-	NOR	III	-	-	80A	STPG370-S, #160	D1X	POLY-ETHYLENE			JIS 5K SLIP-ON	SS400	NON-ASB	SS400 GALV	SS400 GALV	
	D.W.SEAL OV'DB LINE LINE IN TANK	-	NOR	III	-	-	80A	STPG370-S, #160	D2X				JIS 10K SLIP-ON	SS400	TEFLON	SUS316	SUS316	IN W.B.TK
	SHIPSIDE DISTANCE PIECE FOR D.W.SEAL	-	NOR	II	-	LEAK	125A	STPG370-S, #160	D2B	TAR-FREE EPOXY								
	S.W. SUPPLY TO SCRUBBER	4.5	NOR	III	-	-	ALL		C1X	GALV			JIS 5K SLIP-ON		NON-ASB	SS400 GALV	SS400 GALV	IN E/R
	S.W. SUPPLY TO D.W.SEAL	2.5	NOR	III	-	-	ALL	STPG370-E, #80	C1X									
	FROM FUEL P/P TO BURNER UNIT	25	NOR	II	37.5	37.5	15A	STPG370-S, #80	F5A	PICKLING & OILING			MAKER'S COUNTER FITTING	SF440				
	FUEL OIL SUPPLY & RETURN TO/FROM TANK	-	NOR	III	-	-	15A	STPG370-E, #40	B2X					SS400				
	VENT PIPE FOR P/V VALVE	0.2	NOR	III	-	-	ALL	STPG370-E, #80	C1X	SAME AS C.O.TK			JIS 5K SLIP-ON		TEFLON	SUS316	SUS316	

VALVE

PURPOSE	NOM. DIA.	TYPE	MAT'L BODY	MAT'L DISK	MAT'L SEAT	REMARK
GENERAL	≥ 100A	BUTTERFLY (WAFER)	FCD	SUS316	TEFLON	
	≤ 80A	BALL	SUS316	SUS316	TEFLON	
PUMP DISCH	ALL	BUTTERFLY (SEMI-LUG)	FCD	SUS316	TEFLON	
MANIFOLD	ALL	BUTTERFLY (LUG)	FCD	SUS316	TEFLON	
IN SLOP TK	ALL	BUTTERFLY (LUG)	FCD	SUS316	TEFLON	JIS 10K
OTHER	ALL	DUO CHK (WAFER)	SUS316	SUS316	SUS316	
	ALL	SDNR GLOBE	SUS316	SUS316	SUS316	
SHIPSIDE VALVE	ALL	BUTTERFLY (FLANGE)	SC	SUS316	TEFLON	FLANGE TYPE
VRC VALVE IN TANK	≥ 125A	BUTTERFLY (WAFER)	FCD	AL-BRONZE	NBR	
MANUAL VALVE ON UPPER DK	≥ 125A	BUTTERFLY (WAFER)	FC	AL-BRONZE	NBR	
SHIPSIDE V/V	≥ 125A	BUTTERFLY (FLANGE)	SC	AL-BRONZE	NBR	
OTHER V/V IN TANK	ALL	DUO CHK (WAFER)	FCD	AL-BRONZE	NBR	
OTHER V/V ON UPP DK	≤ 80A	JIS VALVE	BC	BC	BC	
GENERAL	≤ 80A	BALL	SUS316	SUS316	TEFLON	
ARROUND T/C HEATER	≥ 100A	BUTTERFLY (WAFER)	FCD	SUS316	TEFLON	CARGO SPEC
ARROUND T/C PUMP	≥ 100A	BUTTERFLY (WAFER)	FCD	AL-BRONZE	NBR	BALLAST SPEC
OTHER	≤ 100A	ANGLE	SUS316	SUS316	SUS316	
GENERAL	≥ 100A	BUTTERFLY (WAFER)	FCD	SUS316	TEFLON	
	≤ 80A	BALL	SUS316	SUS316	TEFLON	
SHIPSIDE VALVE FOR SCRUBBER	ALL	BUTTERFLY (FLANGE)	SUS316	SUS316	NBR	
SHIPSIDE FOR D.W.S.	ALL	SDNR GLOBE	SC	SUS	SUS	M.H.C.
MANIFOLD	ALL	BUTTERFLY (LUG)	FCD	SUS316	TEFLON	
OTHER	ALL	IGG MAKER'S STANDARD				

SPECIFICATION OF PIPING SYSTEM (2/3)

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MODEL NO.	60KPC01
DWG. NO.	D5000000

ITEM / SYSTEM MAIN	SUB	DESIGN CONDITION PRESS (kg/cm2g)	DESIGN CONDITION TEMP (℃)	CLASS OF PIPE	TEST PRESS SHOP	TEST PRESS ON BOARD	PIPE SPEC. NOM. DIA.	PIPE SPEC. MAT'L	PIPE CODE	COATING IN	COATING OUT	PIPE CONNECTION TYPE	FLANGE RATING	FLANGE MAT'L	GASKET MAT'L	MATERIAL OF BOLT/NUT HEX-BOLT	MATERIAL OF BOLT/NUT U-BOLT	REMARK
IGG SYSTEM CONTROL PIPING	CONTROL AIR LINE IN DOOR	7.7	AMB.	III	11.5	11.5	15A	STPG370-S, #80	C2X	GALV	GALV	FLANGE	JIS 10K SLIP-ON	SS400	NON-ASB	SS400 GALV	SS400 GALV	-
							≤ ø 12		X2X	NO-COATING	NO-COATING	BITE UNION	-	-	-	-	-	-
	CONTROL AIR LINE ON DECK						10mm	SUS316	-									
	PRESSURE SENSING LING ON DECK	0.20	AMB.	III	-	-	10mm	SUS316 MULTI-CORE (1.0T)	-									
	VAPOUR MANIFOLD	-	NOR	III	-	-	350A	STPG370-E, #80	C1X	SAME AS C.O.TK	SAME AS SURROND	FLANGE	JIS 5K SLIP-ON	SS400	TEFLON	SS400 GALV	SS400 GALV	
STEAM & CONDENSATE SYS	STEAM SUPPLY LINE	7.7	MAX.169	II	11.5	11.5	≤ 250A	STPG370-E. #40	B2B	ACID PICKLING	ZINC SILICATE PRIMER	FLANGE	JIS 10K SLIP-ON	SS400	SPIRAL WOUND	SS400 GALV	SS400 GALV	SPECTACLE FLANGE : SUS316 BELLOWS COUPLING
	CONDENSATE RETURN LINE	ATM	MAX.100	III	-	-	≤ 250A	STPG370-E, #40	B1X				JIS 5K SLIP-ON		NON-ASB			
	HEATING COIL FOR SLOP TK	7.7	MAX.169	II	-	11.5	ALL	SUS316L-E, #10S	T2B	NO-COATING	NO-COATING	SLEEVE/ S/WELD	-	-	-	-	SUS316	
	TANK CLEAING HEATER CONTROL TUBE	7.7	NOR	III	-	-		COPPER TUBE (1.2T)	X0X	NO-COATING	NO-COATING	BITE UNION	-	-	-	-	-	-
FIRE WASH DECK & FOAM SYSTEM	FIRE WASH DECK & FOAM LINE	10.0	AMB.	III	-	15.0	≤ 250A	STPG370-E, #80	C2X	GALV	SAME AS SURROUND	FLANGE	JIS 10K SLIP-ON	SS400	NON-ASB	SS400 GALV	SS400 GALV	DRESSOR COUPLING
	EM'CY FIRE PUMP SUC. FROM ISO.V/V TO PUMP	-	AMB.	II	-	LEAK	≤ 125A	STPG370-E, #80	C2X	GALV								
	EM'CY FIRE PUMP SUC. FROM S/C TO ISO.V/V	-	AMB.	II	-	LEAK	125A	STPG370-S, #160	D2B	GALV						SS400 HOT DIP GALV		
CO2 SYSTEM	FROM CO2 CYLINDER TO MAIN ISO V/V		NOR.	I	-	NOTE 1	ALL	STPG370-S, #160	D0A	GALV	GALV	FLANGE	JIS 210K SQUARE	SF440	O-RING	GALV	GALV	-
	FROM MAIN ISO V/V TO FIRST BRANCH CONN.		NOR.	II	NOTE 2	NOTE 3	ALL	STPG370-E. #80	C5B	GALV	GALV	FLANGE	JIS 30K SLIP-ON	SF440	NON-ASB			-
	FROM FIRST BRANCH CONN. TO CO2 NOZZLE		NOR.	III	-	NOTE 3	ALL	STPG370-E, #80	C2X	GALV	GALV	FLANGE	JIS 10K SLIP-ON	SF440	NON-ASB			-
	PILOT CONTROL LINE FOR CO2 SYSTEM		NOR.	I	-	NOTE 3	6mm	COPPER TUBE	X0X	NO-COATING	NO-COATING	BITE UNION	-	-	-	-	-	-
COMP.AIR SYSTEM	COMP. AIR LINE	7.7	AMB.	III	11.5	11.5	≤ 40A	STPG370-E, #40	B2X	GALV	SAME AS SURROUND	FLANGE	JIS 10K SLIP-ON	SS400	NON-ASB	SS400 GALV	SS400 GALV	-
	CARGO PUMP EXHAUST LINE	ATM	AMB.	III	-	-	15A	SUS316L-E, #10S	T1X	NO-COATING	SAME AS SURROUND	FLANGE	JIS 5K SLIP-ON	SUS316	TEFLON	SUS316	SUS316	-
AIR VENT & SOUNDING SYS	AIR VENT PIPE	-	AMB.	III	-	-	ALL	STPG370-E, #80	C1X	GALV	SAME AS SURROUND	FLANGE	JIS 5K SLIP-ON	SS400	NON-ASB	SS400 GALV	SS400 GALV	ON DECK
	AIR VENT PIPE FOR H.F.O.TK	-	AMB.	III	-	-	ALL	STPG370-E, #80	C1X	PICKLING & OILING	SAME AS SURROUND	FLANGE	JIS 5K SLIP-ON	SS400	NON-ASB	SS400 GALV	SS400 GALV	ON DECK
	SOUNDING PIPE	-	AMB.	III	-	-	ALL	STPG370-E, #80	C1X	GALV	GALV	SLEEVE FLANGE	JIS 5K SLIP-ON	SS400	NON-ASB	SUS316	SUS316	IN W.B.TK
	SOUNDING PIPE FOR H.F.O.TK	-	AMB.	III	-	-	ALL	STPG370-E, #80	C1X	PICKLING & OILING	PICKLING & OILING	SLEEVE	-	-	-	-	SUS304	IN H.F.O.TK
	SOUNDING PIPE FOR BOILER FEED WATER TK	-	AMB.	III	-	-	ALL	STPG370-E, #80	C1X	GALV	GALV	SLEEVE FLANGE	JIS 5K SLIP-ON	SS400	NON-ASB	SS400 GALV	SS400 GALV	IN BOILER FEED WATER TK
	SOUNDING PIPE FOR F.W. TK	-	AMB.	III	-	-	ALL	SUS316L-E #80	W1X	NO-COATING		SLEEVE	JIS 5K JIS 5K	SUS316	NON-ASB	SUS316	SUS316	IN F.W.TK
BUNKRING SYSTEM	HEAVY FUEL OIL FILLING LINE ON DECK	3.0	45	III	-	4.5	ALL	STPG370-E, #80	C1X	PICKLING & OILING	SAME AS SURROUND	FLANGE	JIS 5K SLIP-ON	SS400	NON-ASB	SS400 GALV	SS400 GALV	DRESSOR COUPLING
	M.D.O FILLING LINE ON DECK		NOR	III	-	4.5	ALL	STPG370-E, #80	C1X									
	L.O./HYD OIL/CYLINDER OIL FILLING LINE	3.0	NOR	III	-	-	ALL	STPG370-E, #40	B1X									
	M.G.O. FILLING LINE	-	NOR	III	-	-	100A	STPG370-E, #80	C1X									
	BILGE/SWAGE SHORE CONN.	-	NOR	III	-	-	ALL	STPG370-E, #40	B1X	GALV W.B.TK	SAME AS SURROUND	FLANGE	JIS 5K SLIP-ON	SS400	NON-ASB			
BILGE SYSTEM	BILGE DRAIN LINE IN A.P.TK & S.T.C.W.T	-	NOR	III	-	-	≥ 65A	STPG370-E, #160	D1X	GALV	SAME AS SURROUND	FLANGE/ SLEEVE	JIS 5K SLIP-ON	SS400	NON-ASB	SUS316	SUS316	
	BILGE LINE IN BOSUN STORE FROM SUC V/V TO DISCH.	10.0	NOR	III	-	-	ALL	STPG370-E, #80	C2X				JIS 10K SLIP-ON		NON-ASB	SS400 GALV	SS400 GALV	
	BILGE LINE FROM ROSE BOX TO SUC V/V	5.0	NOR	III	-	-	ALL	STPG370-E, #80	C1X				JIS 5K SLIP-ON					
	BILGE DISCH LINE IN BOSUN STORE	10.0	NOR	III	-	-	ALL	STPG370-E, #80	C2X				JIS 10K SLIP-ON					
	BILGE OV'BD CONNECTION	-	NOR	II	-	LEAK	80A	STPG370-S, #160	D2B			FLANGE	JIS 10K SLIP-ON	SS400	NON-ASB	SS400 GALV	-	

VALVE

PURPOSE	NOM. DIA.	TYPE	MAT'L BODY	MAT'L DISK	MAT'L SEAT	REMARK
STEAM VALVE	≥ 50A	GLOBE	SC	JIS	JIS	
	≤ 40A	GLOBE	BC	JIS	JIS	
CONDENSATE VALVE	≥ 50A	GLOBE	FC	JIS	JIS	
	≤ 40A	GLOBE	BC	JIS	JIS	
ISOLATION V/V	≥ 50A	GATE/GLOBE	FC	JIS	JIS	
	≤ 40A	GLOBE	BC	JIS	JIS	
HYDRANT	50A	HOSE GLOBE	BC	JIS	JIS	
SHIPSIDE V/V FOR S/C SUC.	125A	BFLY V/V(FNG)	SC	AL-BRONZE	NBR	M.H.C

AS PER MAKER STANDARD

NOTE 1 : LEAKAGE TEST COMPRESSED AIR 6 BAR

NOTE 2 : A CERTIFICATE TO THE EFFECT THAT AT LEAST 10% OF THE DISTRIBUTION PIPING (PREFERABLY THAT SECTION IMMEDIATEDLY AFTER THE MAIN VALVE) HAS BEEN STISFACTORYILY TESTED TO PRESSURE OF 125 BAR(HYDRO TEST)

NOTE 3 : LEAKAGE TEST COMPRESSED AIR 6 BAR AND BLOWING THROUGH WITH COMPRESSED AIR 20 BAR

PURPOSE	NOM. DIA.	TYPE	MAT'L BODY	MAT'L DISK	MAT'L SEAT	REMARK
GENERAL	≤ 40A	JIS VALVE	BC	JIS	JIS	
CARGO P/P PURGE V/V	15A	BALL V/V	SUS316	MAKER STANDARD		FRAMO SUPPLY
GENERAL	≥ 100A	BUTTERFLY (WAFER)	FC	AL-BRONZE	NBR	
	≤ 100A	BALL	SUS304	SUS304	TEFLON	
MANIFOLD VALVE	≥ 100A	BUTTERFLY (LUG)	FCD	AL-BRONZE	NBR	
GENERAL VALVE	≥ 50A	GLOBE / SDNR GLOBE	FC	BC	JIS	
SHIPSIDE VALVE	65A	SDNR GLOBE	SC	BC	JIS	

SPECIFICATION OF PIPING SYSTEM(3/3)

PAGE	15
MODEL NO.	60KPC01
DWG. NO.	D5000000

ITEM / SYSTEM MAIN	SUB	DESIGN CONDITION PRESS (kg/cm2g)	DESIGN CONDITION TEMP (℃)	CLASS OF PIPE	TEST PRESS SHOP	TEST PRESS ON BOARD	PIPE SPEC. NOM. DIA.	PIPE SPEC. MAT'L	PIPE SPEC. PIPE CODE	COATING IN	COATING OUT	PIPE CONNECTION TYPE	FLANGE RATING	FLANGE MAT'L	GASKET MAT'L	MATERIAL OF BOLT/NUT HEX-BOLT	MATERIAL OF BOLT/NUT U-BOLT	REMARK
SCUPPER SYS.	DECK SCUPPER PIPE BELOW UPPER DECK	-	AMB.	III	-	-	ALL	STPG370-E, #80	C1X	GALV	SAME AS SURROUND	FLANGE/ SLEEVE	-	-	-	-	-	
	SCUPPER PIPE ABOVE UPPER DECK	-		III	-	-	ALL	STPG370-E, #40	B1X									
	DECK SPILLAGE SYSTEM	-	AMB.	III	-	-	ALL	SUS316L-E, #10	T3X	NO-COATING	SAME AS SURROUND	FLANGE/ SLEEVE	JIS 16K SLIP-ON	SUS316	TEFLON	SUS316	SUS316	
HYDRAULIC PIPING SYSTEM	HYDRAULIC MAIN & BRANCH PIPE ON DECK	260.0	MAX.60	I	390.0	390.0	ALL	DUPLEX STAINLESS STEEL SEAMLESS PRECISION (DIN 2462-D2/T3 MATR. W.NO.1.4362)	-	AS PER MAKER STANDARD								BOLT & NUT : STAINLESS STEEL
	HYDRAULIC MAIN & BRANCH PIPE IN DOOR							CARBON SEEL SEAMLESS PRECISION (DIN 1630 MATR. ST. 52.4 N)	-									
	HYDRAULIC RETURN PIPE ON DECK	6.0	MAX.60	III	-	WORK	ALL	ERW STAINLESS STEEL (DIN 2463-D2/T3)	-									
	HYDRAULIC RETURN PIPE IN DOOR						≥ 42mm	ERW CARBON STEEL (DIN 1626 MATR. ST. 37.0N)	-									
							< 42mm	SMLS CARBON STEEL (DIN 2391-C MATR. ST. 35NBK)	-									
	PILOT PIPE ON DECK	260.0	MAX.60	I	390.0	390.0	Ø18	DUPLEX STAINLESS STEEL-ERW(DIN 2463-D2/T3MATR.W.NO.1.4362)	-									
	PILOT PIPE IN DOOR	260.0	MAX.60	I	390.0	390.0	Ø18	DUPLEX STAINLESS STEEL-ERW(DIN2463-D2/T3 MATR.A1S1 316L)	-									
DECK MACH.	HYD. PRESS. PIPE	64.0	-	I	96.0	96.0	ALL	STPG370-S, #40	E6A	PICKING & OILING	SAME AS SURROUND	FLANGE	JIS 63K WELD.NECK	SF440	SPIRAL WOUND	SUS316	SUS316	AS PER MAKER STANDARD
	HYD. RETURN PIPE	10.0	-	II	15.0	15.0	ALL	STPG370-E, #40	B2B			FLANGE	JIS 10K SLIP-ON	SS400	NON-ASB	SUS316	SUS316	
	FILLING PIPE	-	-	III	-	-	40A	STPG370-E, #40	B1X			FLANGE	JIS 5K SLIP-ON	SS400	NON-ASB	SUS316	SUS316	
	BRAKE CYLINDER PRESS.	163.2	-	I	-	WORK	Ø15	SUS316L-SMLS 1.5T	-	NO-COATING	NO-COATING	BITE UNION	-	-	-	-	-	
	BRAKE CYLINDER RETURN	-	-	III	-	-		SUS316L-SMLS 1.5T	-			BITE UNION	-	-	-	-	-	
VRC SYSTEM	HYD. PRESS. PIPE	135.0	MAX.60	I	202.5	202.5	25A	STPG370-S, #80	F0A	PICKING & OILING	SAME AS SURROUND	FLANGE	JIS 210K SQUARE	SF440	O-RING	S45C GALV	PLASTIC CLAMP	-
	HYD. RETURN. PIPE	3.0	AMB.	III	-	WORK	25A	STPG370-E, #40	B1X			FLANGE	JIS 5K SLIP-ON	SS400	NON-ASB	SS400 GALV	PLASTIC CLAMP	-
	CONTROL TUBE FOR VALVE ACTUATOR	135.0	AMB.	I	-	WORK	Ø10	SUS316L-ERW MULTI-CORE (1.0T)	-	NO-COATING	NO-COATING	BITE UNION	-	-	-	-	-	-
	VENT PIPE FOR VRC HYD. OIL TANK	-	AMB.	III	-	-	40A	STPG370-E, #40	B1X	PICKING & OILING	SAME AS SURROUND	FLANGE	JIS 5K SLIP-ON	SS400	NON-ASB	SS400 GALV	SS400 GALV	AS PER MAKER STANDARD
TK LEV. & DRAFT	SHIPSIDE DISTANCE PIECE FOR DRAFT	-	AMB.	II	-	LEAK	50A	STPG370-S, #160	D2B	GALV	SAME AS SURROUND	FLANGE	JIS 10K SLIP-ON	SS400	NON-ASB	SUS316	-	-
	CABLE PROTECTION PIPE IN W.B.T	-	AMB.	III	-	-	40A	STPG370-E, #40	B1X	GALV	GALV		-	-	-	-	SUS316	-
ODME SYSTEM	ODME SAMPLING & DRAIN PIPING	-	AMB.	III	-	-	Ø12X1.0T	SUS316L ERW	-			BITE UNION	-	-	-	-	-	-
	CONTROL AIR PIPING FOR ODME	7.7	AMB.	III	-	-	15A	STPG370-E, #40	B2X	GALV	GALV	FLANGE	JIS 10K SLIP-ON	SS400	NON-ASB	SS400 GALV	SS400 GALV	-
							Ø15X1.5T	SUS316L ERW				BITE UNION						
	FRESH WATER SUPPLY	-	NOR	III	-	-	Ø12X1.0T	SUS316L ERW				BITE UNION						
FIXED GAS DETECTION SYS.	GAS DETECTION TUBE	-	NOR	III	-	-	Ø8X1.0T	SUS316L ERW				BITE UNION						
																		AS PER MAKER STANDARD

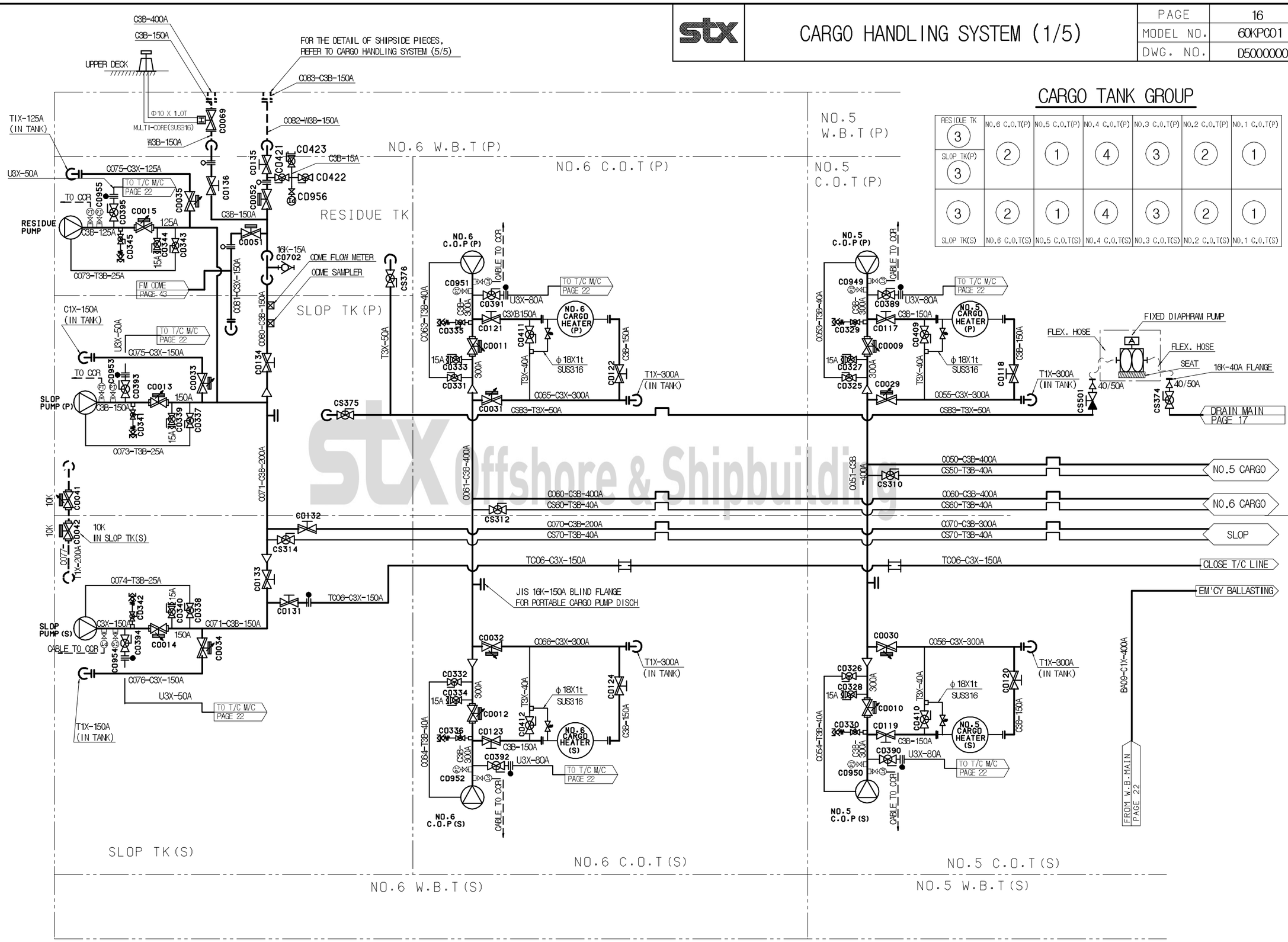
VALVE PURPOSE	NOM. DIA.	TYPE	MAT'L BODY	MAT'L DISK	MAT'L SEAT	REMARK
DECK SPILLAGE VALVE	ALL	SDNR GLOBE	SUS316	SUS316	SUS316	
AS PER MAKER STANDARD						

CARGO HANDLING SYSTEM (1/5)

PAGE	16
MODEL NO.	60KPC01
DWG. NO.	D5000000

CARGO TANK GROUP

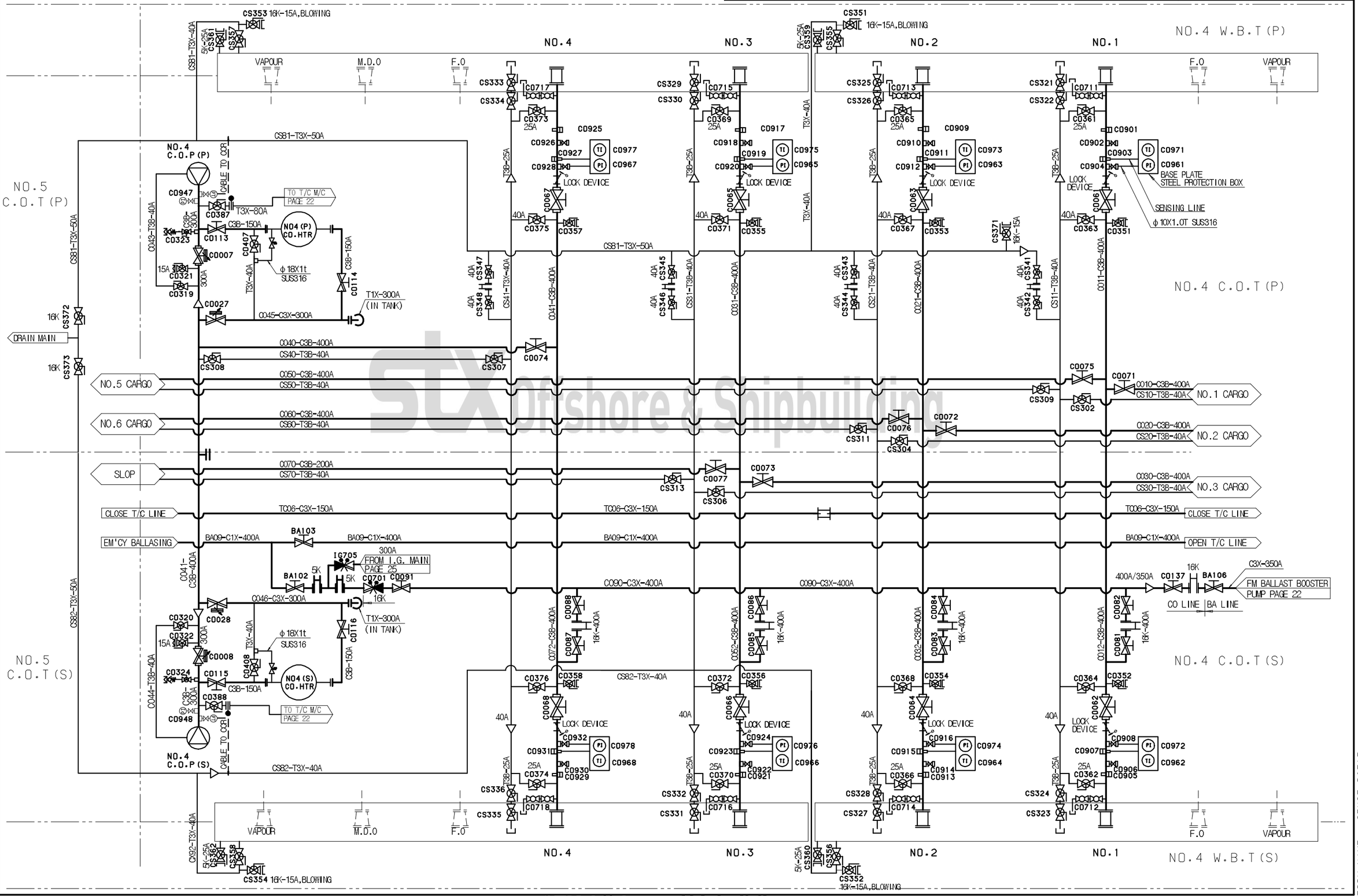
RESIDUE TK ③ / SLOP TK(P) ③	NO.6 C.O.T(P) ②	NO.5 C.O.T(P) ①	NO.4 C.O.T(P) ④	NO.3 C.O.T(P) ③	NO.2 C.O.T(P) ②	NO.1 C.O.T(P) ①
③ SLOP TK(S)	NO.6 C.O.T(S) ②	NO.5 C.O.T(S) ①	NO.4 C.O.T(S) ④	NO.3 C.O.T(S) ③	NO.2 C.O.T(S) ②	NO.1 C.O.T(S) ①



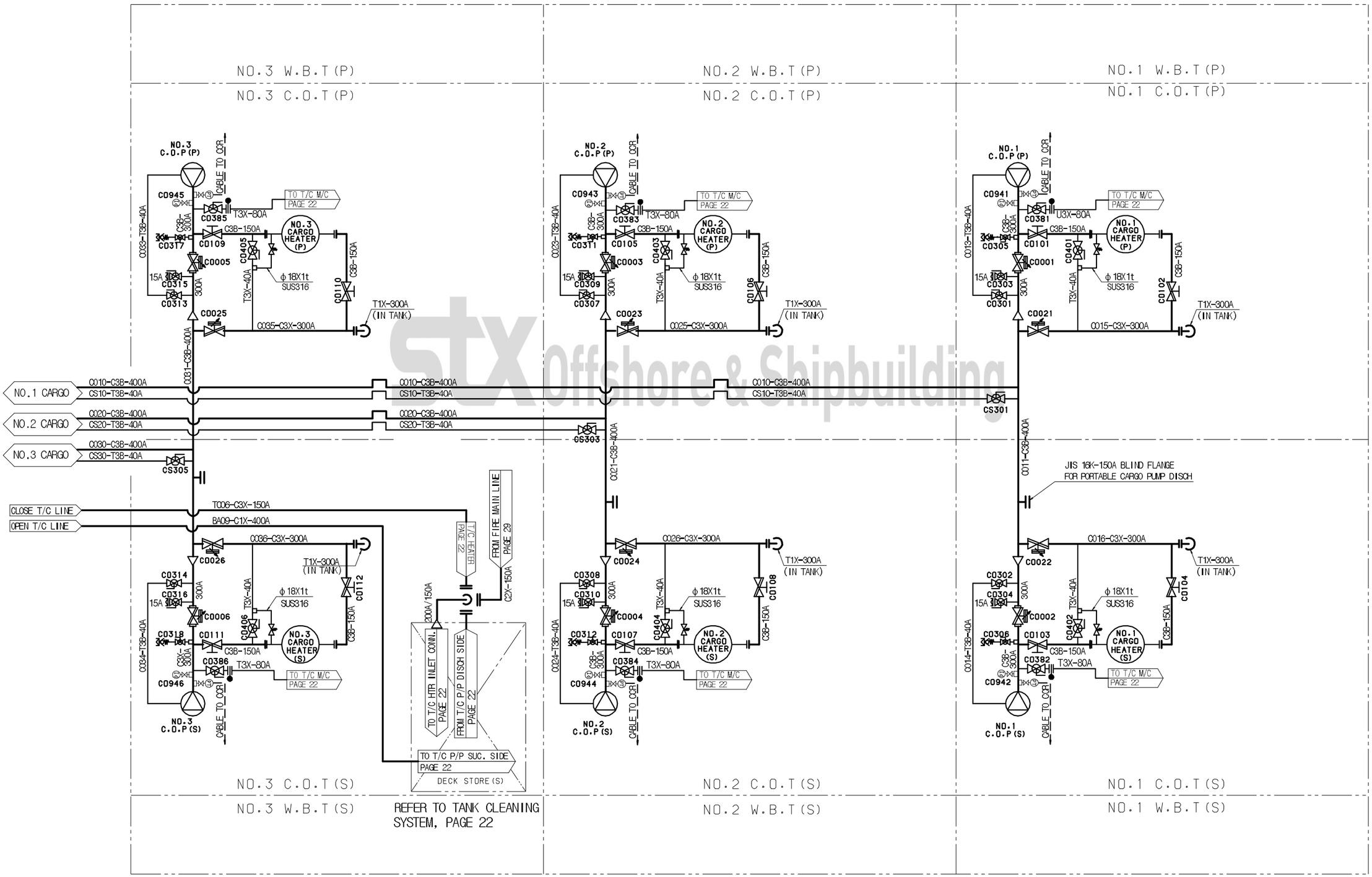
※ NOTE : THE MAIN CARGO LINE OF EACH SEGREGATION SHALL BE CONNECTED TO THE TOPSIDE OF THE MANIFOLD CROSSOVER.

CARGO HANDLING SYSTEM (2/5)

PAGE	17
MODEL NO.	74KPC01
DWG. NO.	D5000000

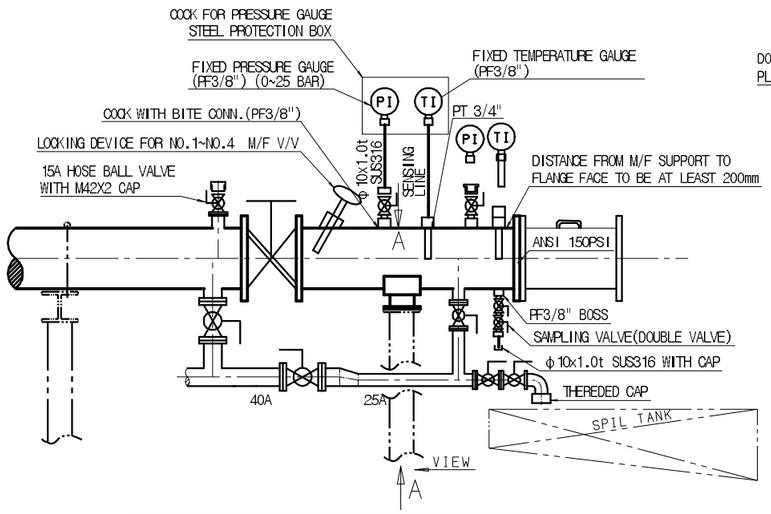


stx	CARGO HANDLING SYSTEM (3/5)	PAGE	18
		MODEL NO.	74KPC01
		DWG. NO.	D5000000

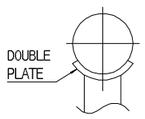


CARGO HANDLING SYSTEM (4/5)

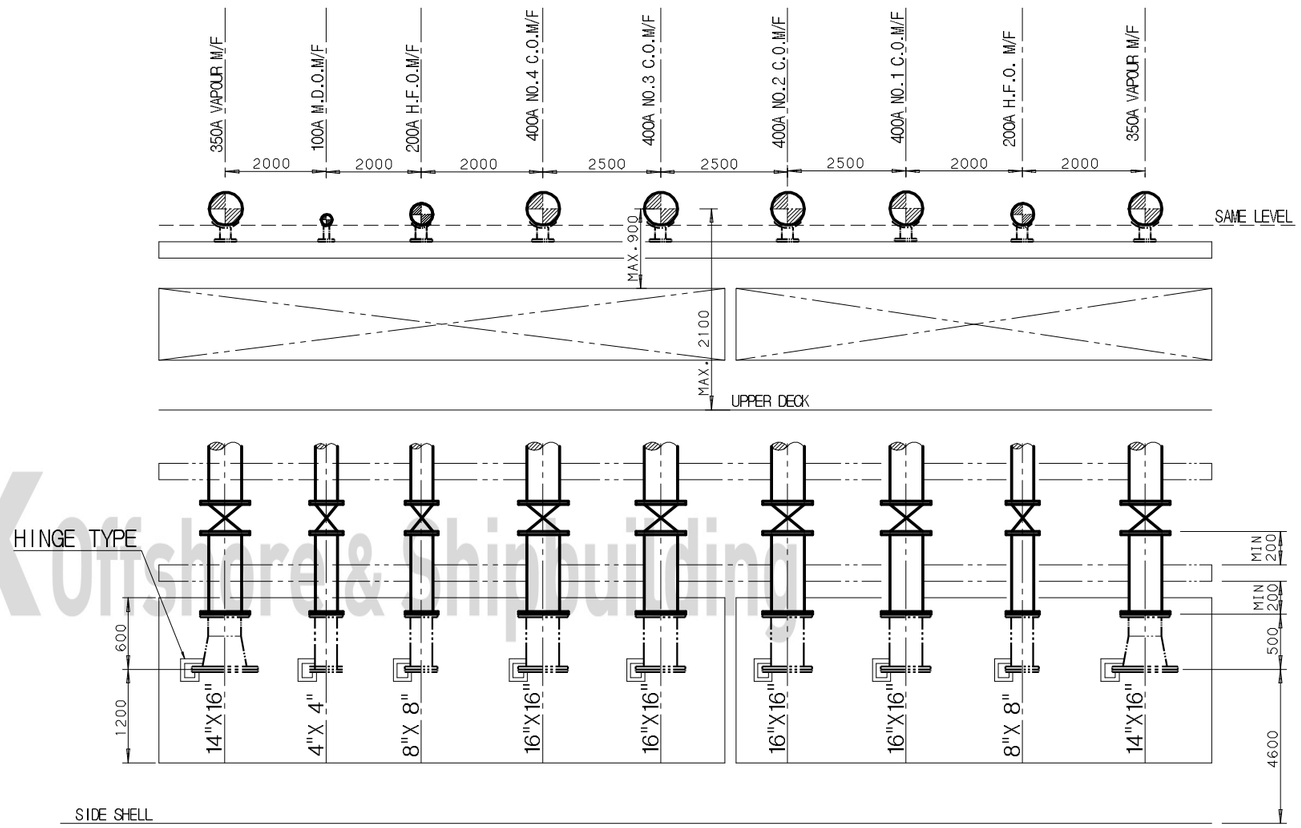
TYPICAL OF CARGO MANIFOLD



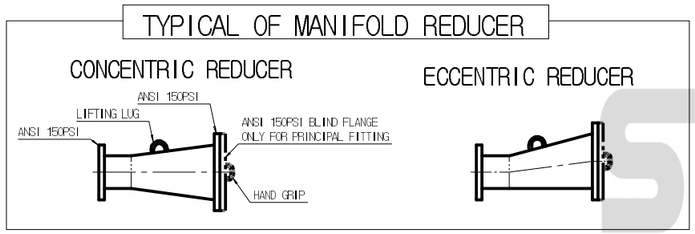
SEC. A-A



ARRANGEMENT OF MANIFOLD



TYPICAL OF MANIFOLD REDUCER



CARGO REDUCER (CONCENTRIC)

KIND	SIZE		Q'TY	MATERIAL	REMARK
	PIPE	SHORE			
PRINCIPAL FITTINGS	16"	16"	8	MILD STEEL WITH COATING SAME AS CARGO PIPE	FITTED WITH BLANK FLANGE (HINGE TYPE)
RESERVED REDUCER STOCK	16"	8"	4	MILD STEEL WITH COATING SAME AS CARGO PIPE	STOCKED WITHOUT BLANK FLANGE
	16"	10"	4		
	16"	12"	4		

ALL MANIFOLD BLIND FLANGES (CARGO, VAPOUR, BUNKER ETC.) TO BE MADE SAME THICKNESS AS THE FLANGE IT IS ATTACHED.

BLIND FLANGES SHALL BE OF SUFFICIENT STRENGTH FOR THE CERTIFIED LINE PRESSURE IN ACCORDANCE WITH THE REQUIREMENTS OF EXXON/MOBIL.

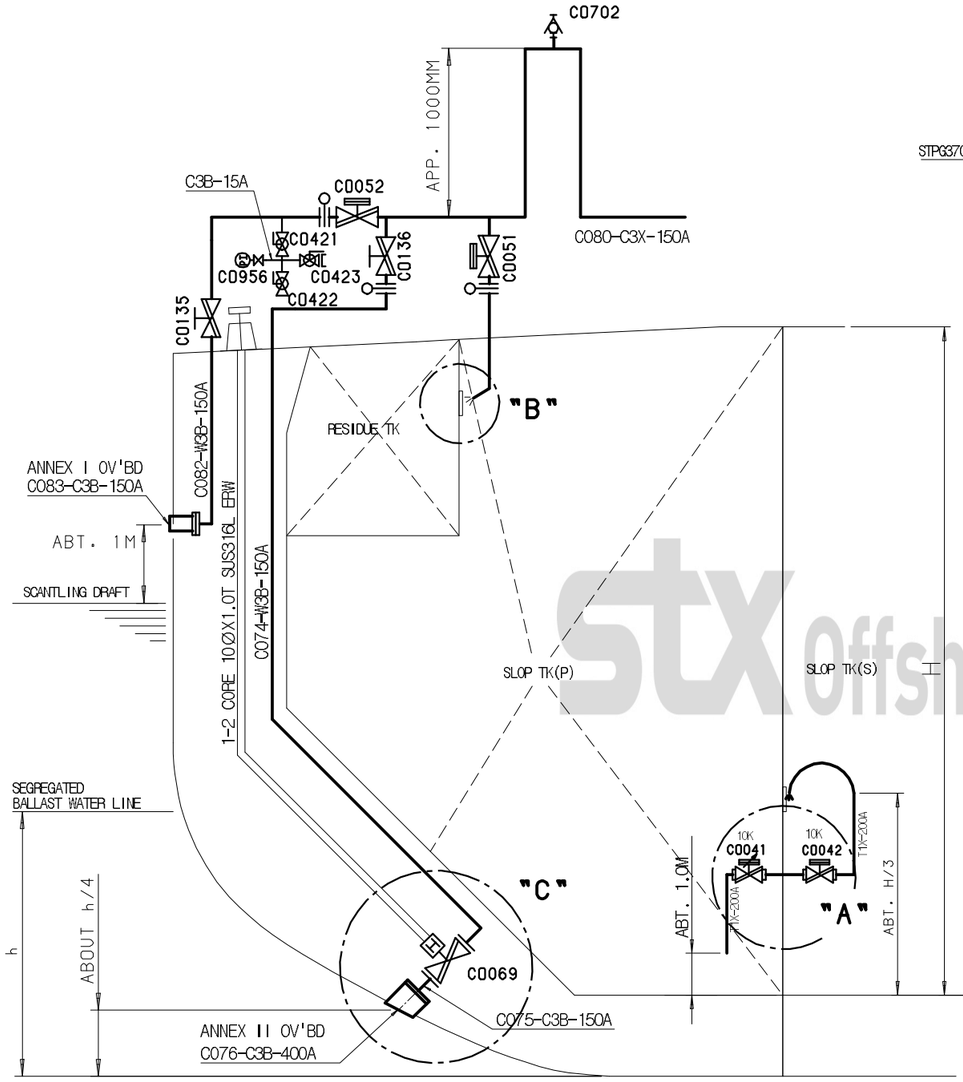
VAPOUR REDUCER (CONCENTRIC)

KIND	SIZE		Q'TY	MATERIAL	REMARK
	PIPE	SHORE			
PRINCIPAL FITTINGS	14"	16"	4	MILD STTEL WITH INSIDE COATING : SAME AS C/O TK OUTSIDE COATING : SAME AS SURROUND	FITTED WITH BLANK FLANGE (HINGE TYPE)
RESERVED REDUCER STOCK	14"	12"	2		STOCKED WITHOUT BLANK FLANGE

BUNKER REDUCER (ECCENTRIC)

KIND	SIZE		Q'TY	MATERIAL	REMARK
	PIPE	SHORE			
PRINCIPAL FITTINGS	8"	8"	4	MILD STEEL WITH COATING SAME AS BUNKER PIPE	FITTED WITH BLANK FLANGE (HINGE TYPE)
	4"	4"	2		
RESERVED REDUCER STOCK	8"	12"	1	MILD STTEL WITH COATING SAME AS BUNKER PIPE	STOCKED WITHOUT BLANK FLANGE
	8"	10"	1		
	8"	6"	1		

CARGO HANDLING SYSTEM (5/5)



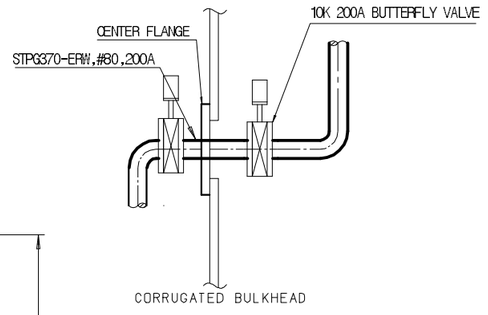
NOTE) REFER TO TRIM & STABILITY BOOKLET(DWG.B011200)
FOR SEGREGATED BALLAST WATER LEVEL(H)

DETERMINATION OF THE UNDER WATER DISCHARGE SIZE

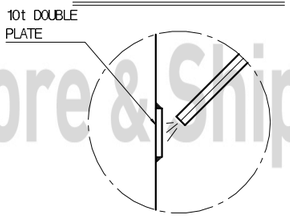
$$D = \frac{Qd}{5L} = \frac{300\ m^3/h}{5 \times 173.60M} = 0.3456$$

THEREFORE,APPLIED SIZE=400A(I.D=381.0mm)
D=MIN. DIAMETER OF THE DISCHARGE(M)
L=DISTANCE FROM THE FORWARD PERPENDICULAR TO
TO THE DISCH. OUTLET(M)
Qd=THE MAX.RATE SELECTED WHICH THE SHIP MAY DISCH.
A RESIDUE/WATER MIXTURE THROUGH THE OUTLET(M3/H)

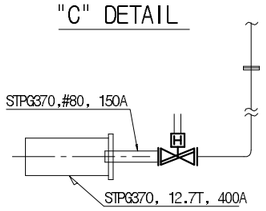
"A" DETAIL



"B" DETAIL

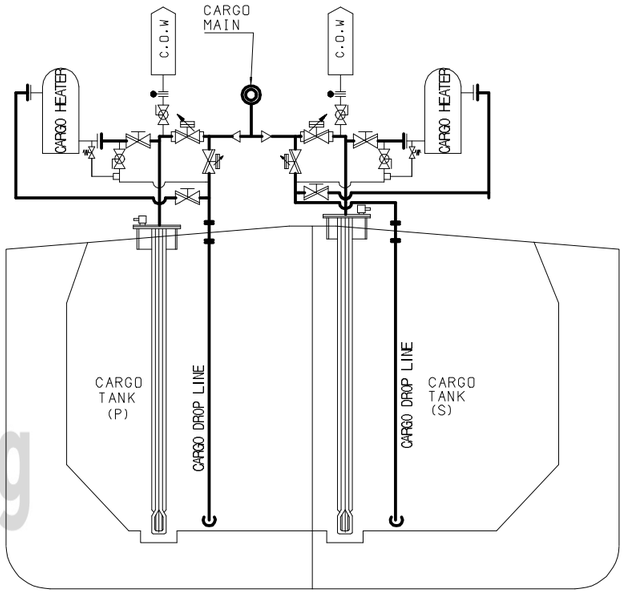


"C" DETAIL

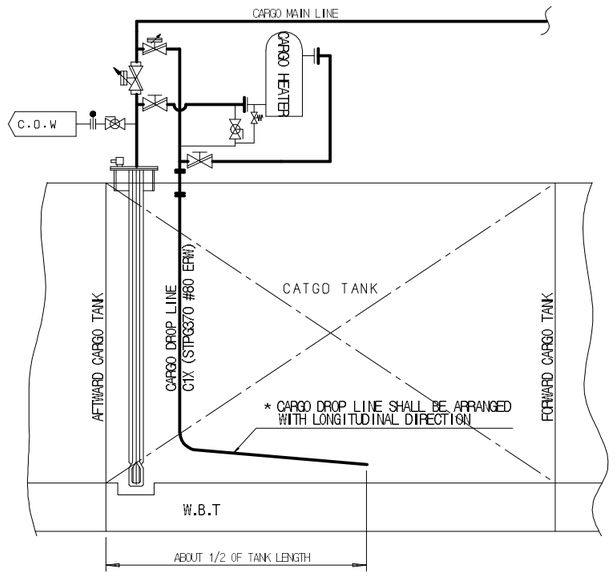


* FOLLOWING TYPICAL ARR'T CAN BE CHANGED
AFTER ACTUAL PIPING ARR'T.

TYP. SECTION OF C.O. TANK



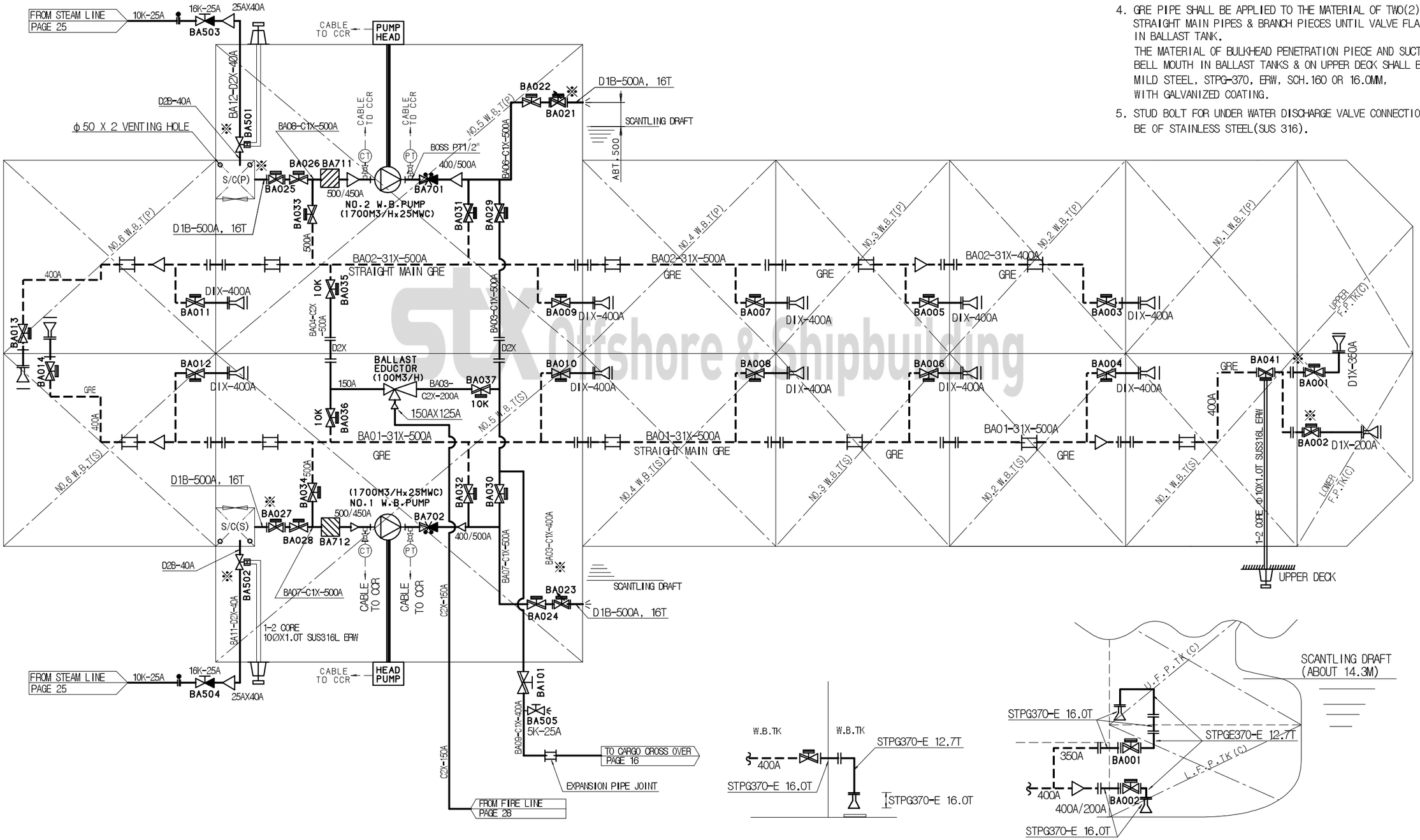
TYP. ELEVATION OF C.O.TANK



stx	WATER BALLAST SYSTEM	PAGE	21
		MODEL NO.	60KPC01
		DWG. NO.	D5000000

NOTE

1. THE OPERATION & INDICATION OF WATER BALLAST VALVES IN W.B.TANK TO BE DONE BY THE CONTORL CONSOLE IN C.C.R.
2. ※ STANDS FOR A SHIPSIDE VALVE
3. DOUBLE PLATE (MILD STEEL) WITH THICKNESS 10MM SHALL BE PROVIDED BELOW SUCTION BELLMOUTH.
4. GRE PIPE SHALL BE APPLIED TO THE MATERIAL OF TWO(2) STRAIGHT MAIN PIPES & BRANCH PIECES UNTIL VALVE FLANGE IN BALLAST TANK.
   THE MATERIAL OF BULKHEAD PENETRATION PIECE AND SUCTION BELL MOUTH IN BALLAST TANKS & ON UPPER DECK SHALL BE OF MILD STEEL, STPG-370, ERW, SCH.160 OR 16.0MM, WITH GALVANIZED COATING.
5. STUD BOLT FOR UNDER WATER DISCHARGE VALVE CONNECTION SHALL BE OF STAINLESS STEEL(SUS 316).



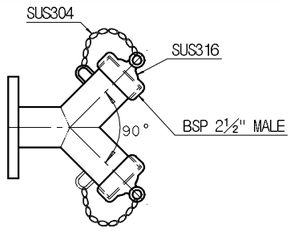
BA41-C1X-300A

TANK CLEANING SYSTEM

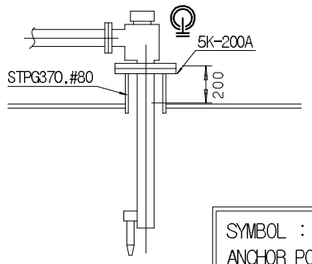
PAGE	22
MODEL NO.	60KPC01
DWG. NO.	D5000000

※ INVENTORY ITEM (2SETS/SHIP)

DETAIL OF "Y" PIECE FOR PORTABLE T/C MACHINE

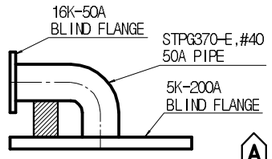


INSTALLATION GUIDIANCE OF FIXED T/C MACHINE



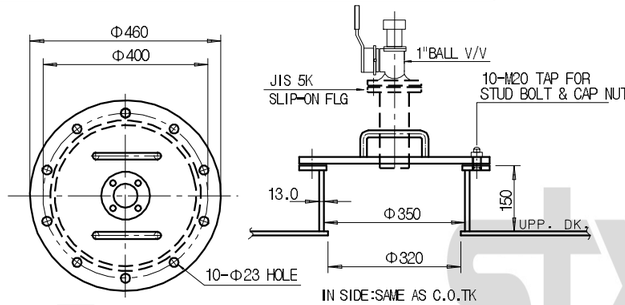
※ INVENTORY ITEM (4SETS/SHIP)

SPECIAL BLIND FLANGE FOR FIXED T/C MACHINE

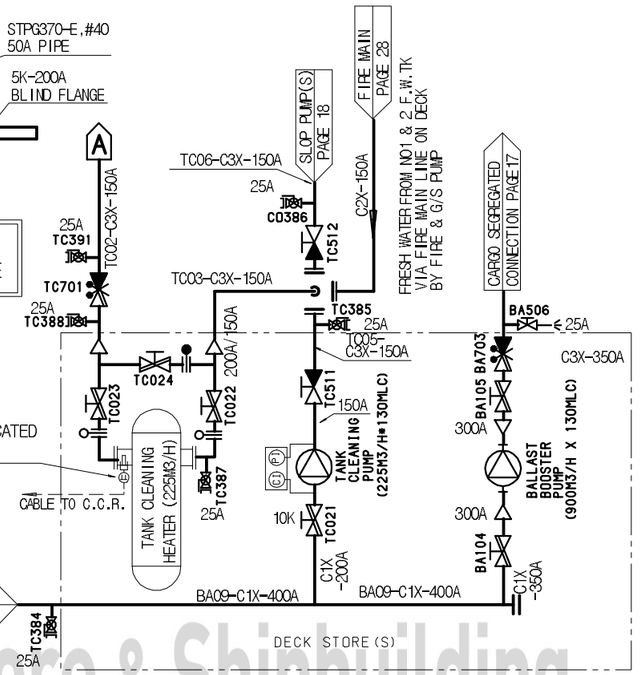


SYMBOL : ×
ANCHOR POINT FOR T/C LINE

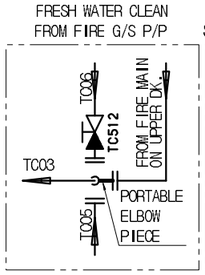
DETAIL OF COVER FOR PORTABLE T/C MACHINE & PORTABLE GAS FREEING FAN FOR CARGO & SLOP TANK (PTH)



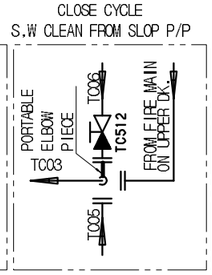
THERMOMETER SHALL BE INDICATED BOTH LOCAL AND C.C.R.



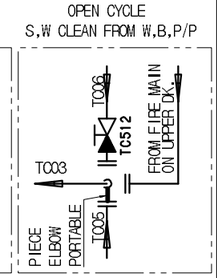
FRESH WATER CLEAN FROM FIRE G/S P/P



CLOSE CYCLE S.W CLEAN FROM SLOP P/P

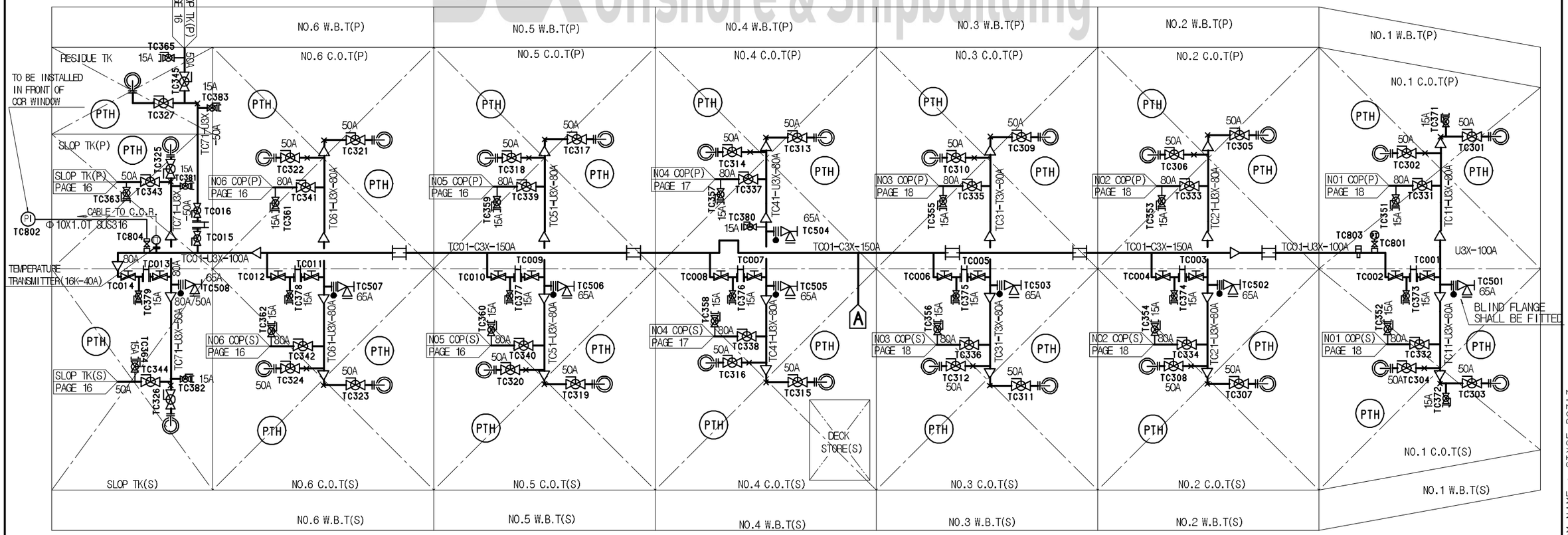


OPEN CYCLE S.W CLEAN FROM W.B.P/P



NOTE

1. THE FIXED T/C MACHINE IS OF PROGRAMMABLE SINGLE NOZZLE TYPE.
2. THE PORTABLE T/C MACHINE WITH ACCESSORY(HOSE,COUPLING, SADDLE,TROLLEY & ETC.) WILL BE SUPPLIED BY BUILDER.
3. THE DETAIL POSITION AND Q'TY OF FIXED AND PORTABLE T/C MACHINES TO BE FINALLY DETERMINED AFTER SHADOW ANALYSIS.
4. TWO(2) SETS OF Y-PIECE FOR PORTABLE TANK CLEANING MACHINE SHALL BE SUPPLIED AS INVENTORY ITEM.



INERT GAS/CARGO TANK VENTING SYSTEM(1/4)

PAGE	23
MODEL NO.	60KPC01
DWG. NO.	D5000000

REFER TO MAKER DRAWING, INERT GAS SYSTEM (V5301000)

ENGINE CASING

B2X-15A

B2X-15A

I.G.G. UNIT

CONTROL AIR SUPPLY
E/R DIAGRAM (P.34)

C2X-15A

φ15 COPPER

PNEUMATIC PANEL

PURGE + EXCESS GAS VENT

PF 3/8 BOSS

φ10 COPPER

φ10 COPPER

φ10 COPPER

15A PIPE

IG92-C1X-300A

M

1070

0030

NO.2 BLOWER

M

1080

0040

NO.1 BLOWER

IG93-C1X-350A

IG95-B4X-15A

IG94-F5A-15A

IG93-C1X-350A

FRESH WATER SUPPLY
E/R DIAGRAM (P.30)

B1X-25A

FRESH WATER RINSING CONN. (5K-25A)

300A X 350A

IG91-C1X-350A

0060

0020

0010

PF 3/8 BOSS

φ10 SUS

MAX. 3M

0500

0050

OXYGEN PANEL

CASING ENGINE

0010

I.G SUPPLY TO D.W.SEAL (P.22)

FOAM ROOM

A-DECK

I.G SUPPLY TO D.W.SEAL (P.22)

IG03-C1X-350A

2 X φ10 MULTI-CORE

φ10 COPPER

S

0472

CONTROL AIR TO BLEED V/V (P.22)

IG322 T1X-25A

S.W. TO D.W.SEAL (P.23)

IG95-B4X-15A

IG94-F5A-15A

C1X-250A

RETURN TO LIGHT FUEL OIL TANK
B4X-15A

P/D IN ENGINE ROOM PAGE 17

COMPOUND INDICATOR

PF 3/8"

IG901

B1X-25A

16K-25A FLANGE

SUPPLY FROM LIGHT FUEL OIL TANK

P/D IN ENGINE ROOM PAGE 17

FUEL OIL PUMP UNIT

FROM NO.2 SCRUBBER COOLING WATER PUMP

C1X-250A

FROM NO.1 SCRUBBER COOLING WATER PUMP

C1X-250A

REFER TO E/R DIAGRAM (P.29)

IG90-C1X-400A (INSIDE POLYETHYLENE COATING)

φ15 COPPER

SCANTLING DRAFT

MIN. SLOPE 20°

E/R DESIGN SUPPLY
REFER TO E/R DIAGRAM(P.29)

LIGHT BALLAST WATER LINE

φ10 COPPER

NEAR TO 22 VALVE

φ10 COPPER

ANODE 5K-200A

MIN. 4000mm

0220

0170

50A

TOP OF OV'BD PIPE

SHIPSIDE DISTANCE PIECE
D2B-400A, 16.0 MM PIPE
INSIDE TAR FREE EPOXY CAOTING)

DRAIN TO BILGE TANK

ENGINE ROOM

C1X-25A

PIPE TRUNK

PS

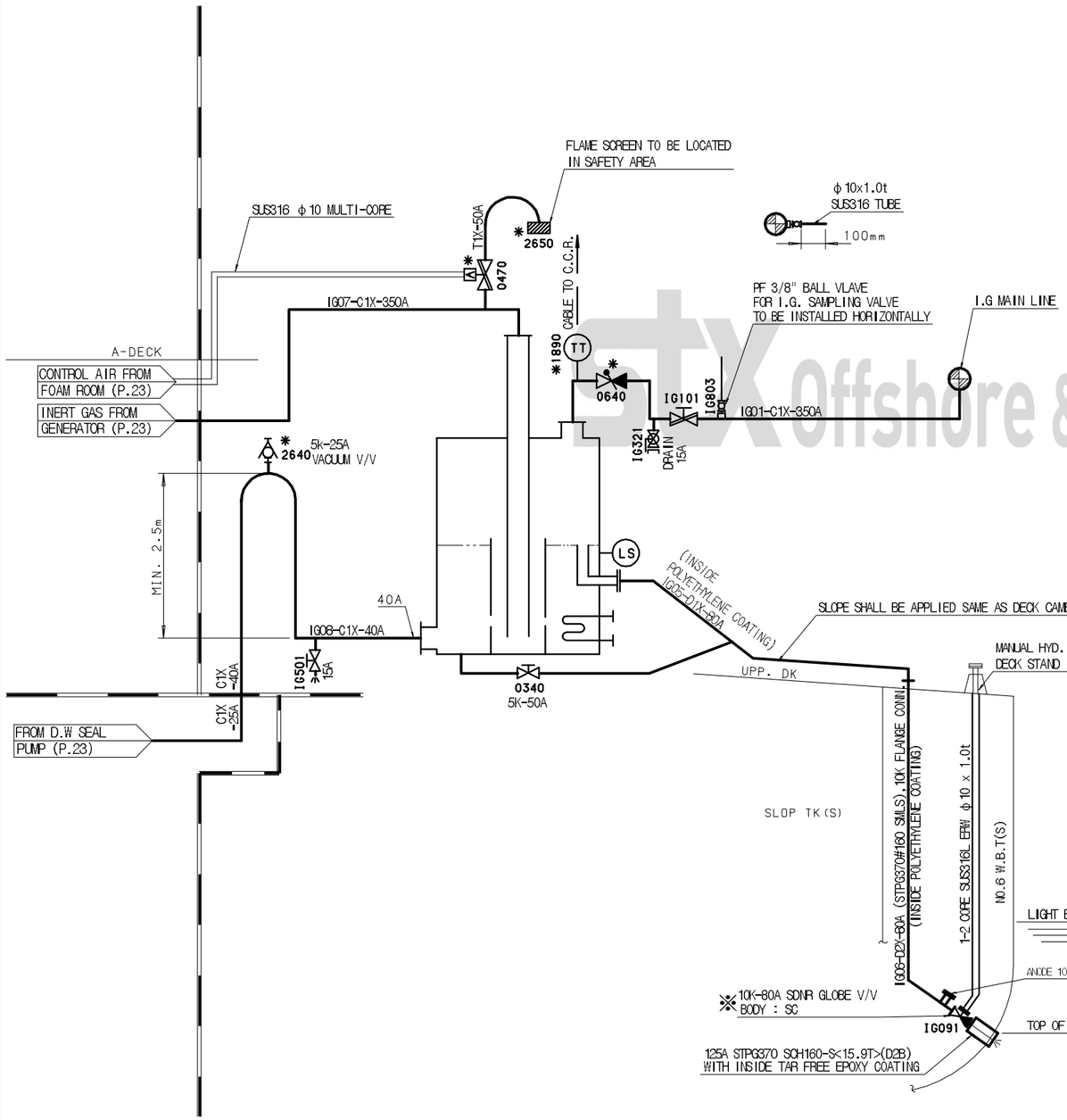
PI

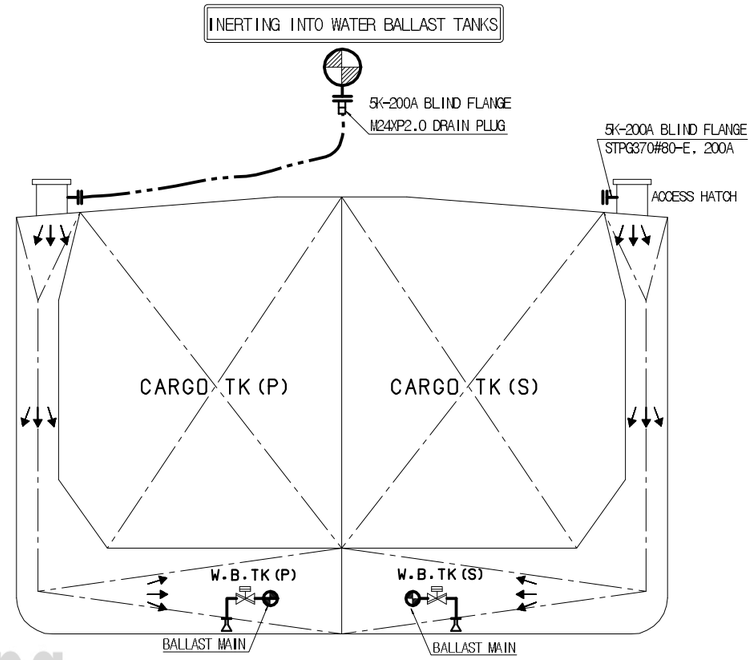
0421

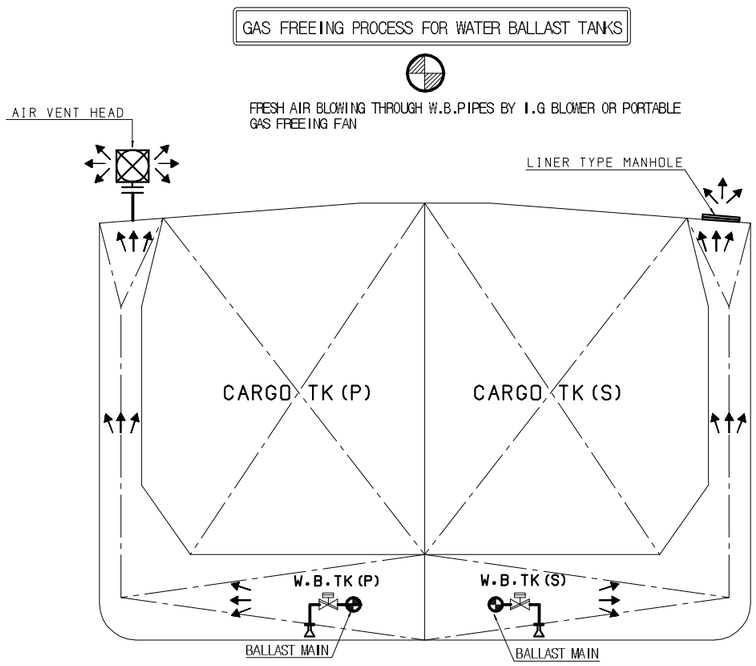
FROM NO.2 DECK WATER SEAL PUMP

FROM NO.1 DECK WATER SEAL PUMP

REFER TO E/R DIAGRAM PAGE 26

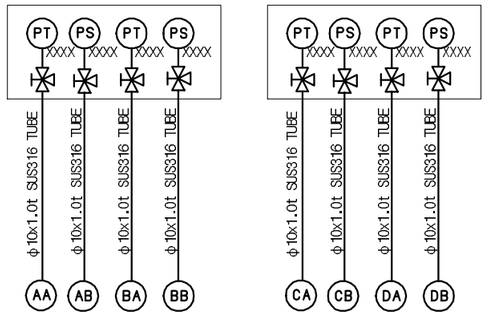


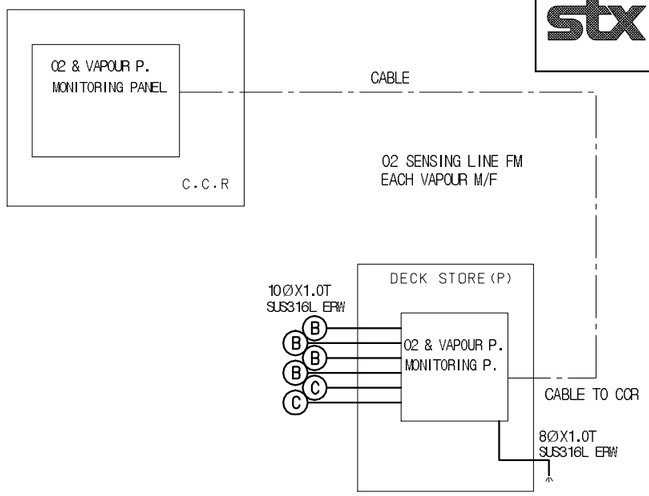


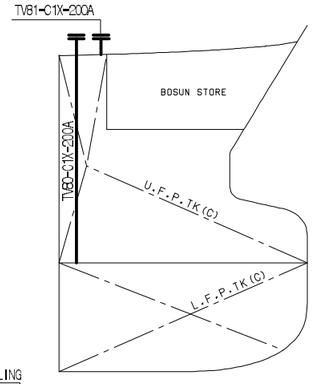


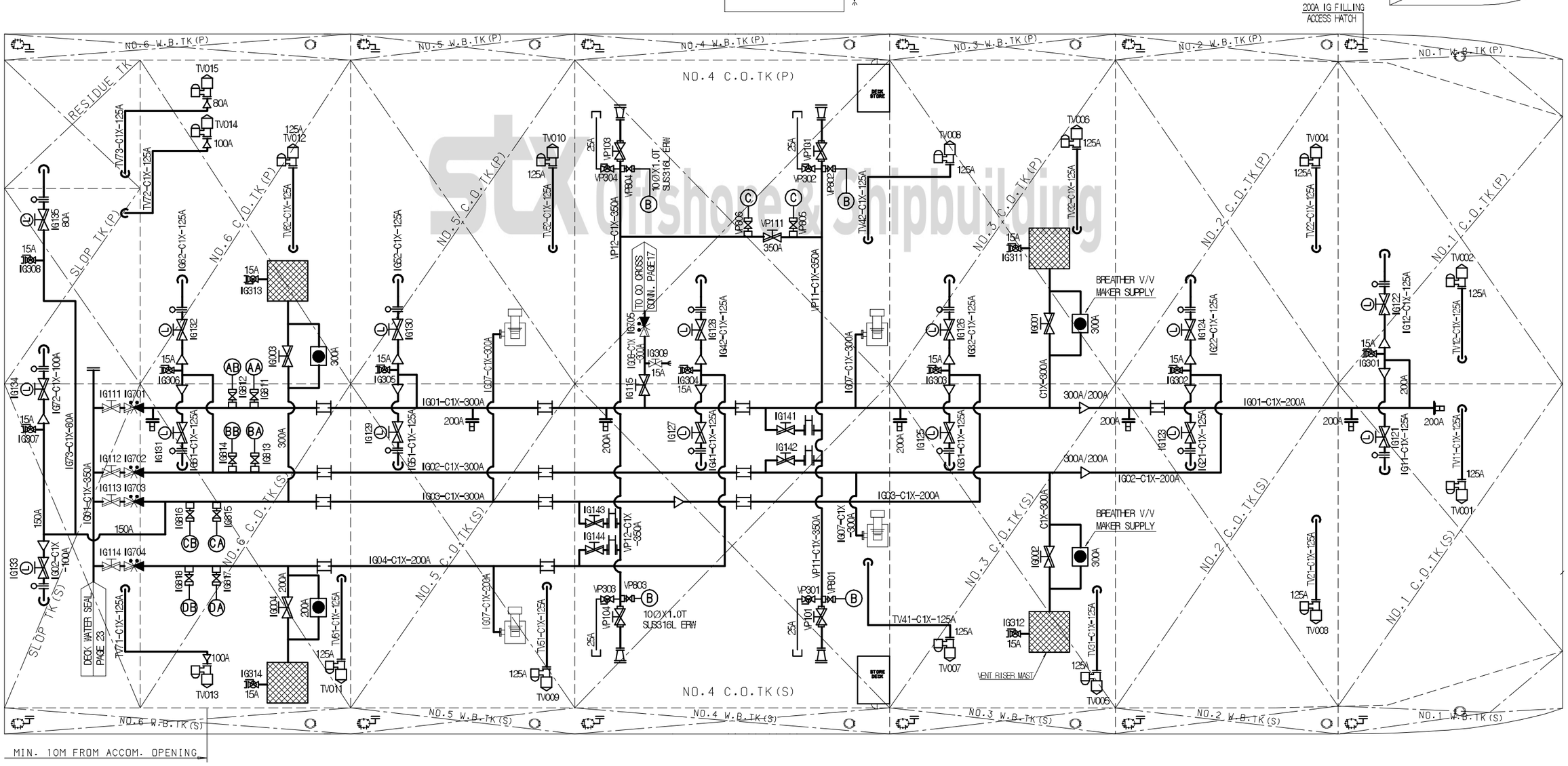
INERT GAS/CARGO TANK VENTING SYSTEM(3/4)

PAGE	25
MODEL NO.	60KPC01
DWG. NO.	D5000000

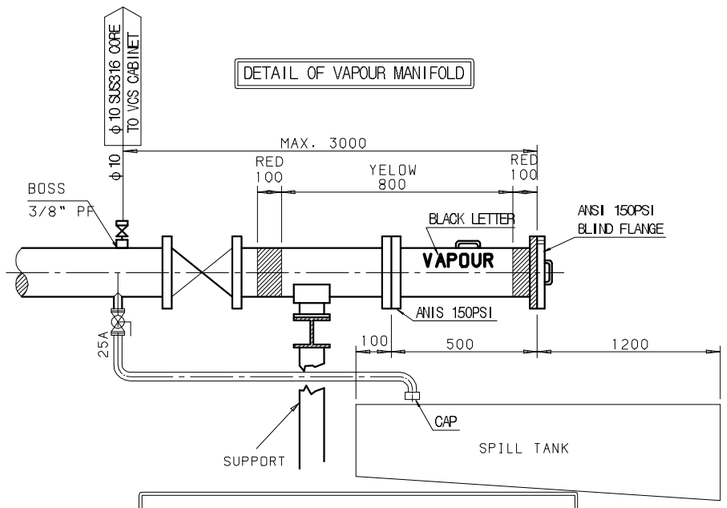




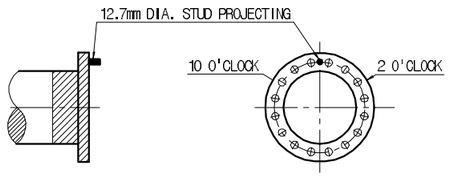




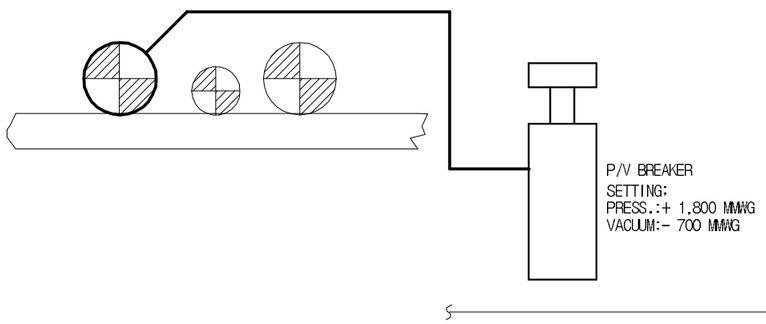
DETAIL OF VAPOUR MANIFOLD



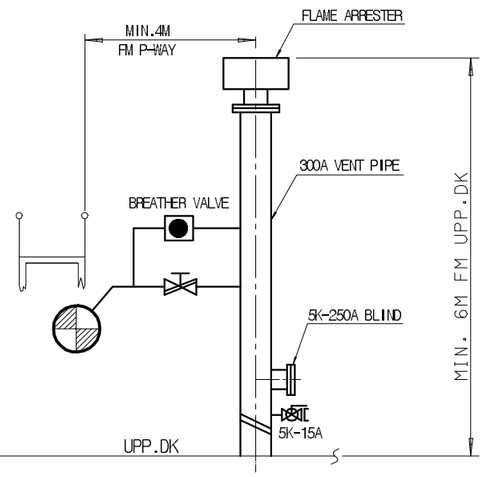
VAPOUR MANIFOLD END FLANGE ORIENTATION



DET. OF INSTALL. FOR BRANCH OF P/V BREAKER

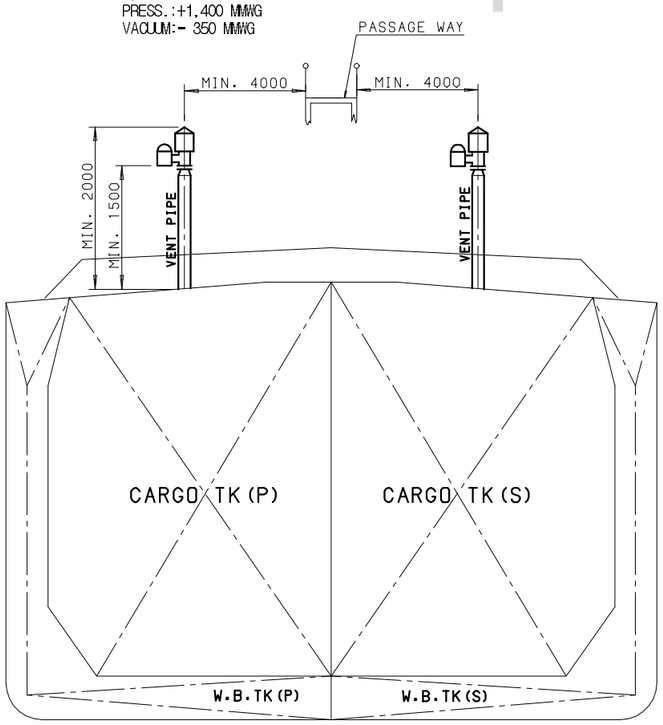


DET. OF INSTALL. FOR VENT RISER MAST

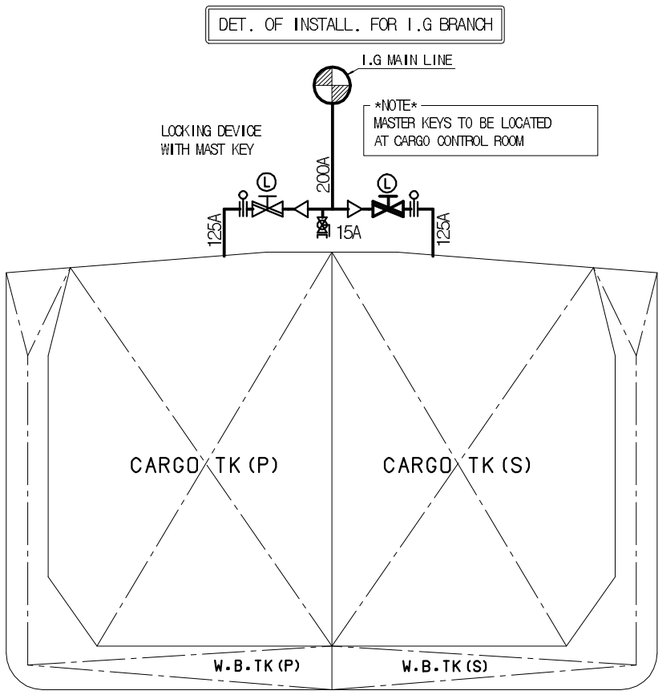


TYPICAL INSTALLATION OF P/V VALVE & GAS FREE COVER

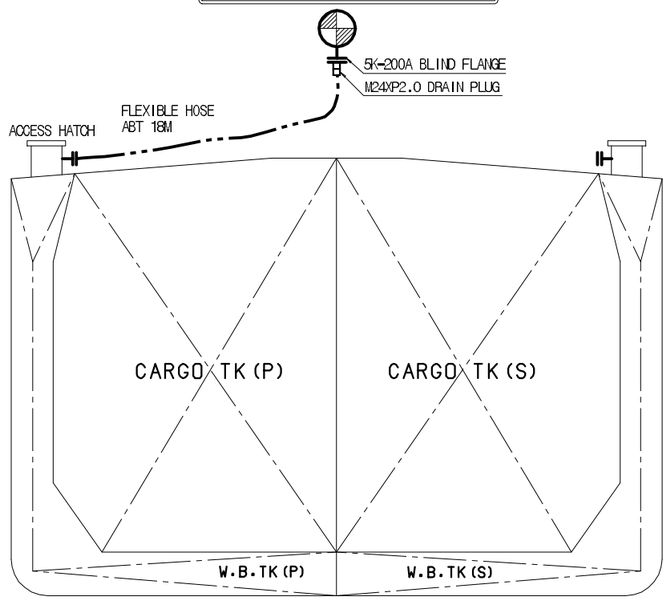
P/V VALVE SETTING
PRESS.:+1,400 MMWG
VACUUM:- 350 MMWG



DET. OF INSTALL. FOR I.G BRANCH



TYPICAL OF IG CONNECTION TO WBT



INSULATION SCHEME

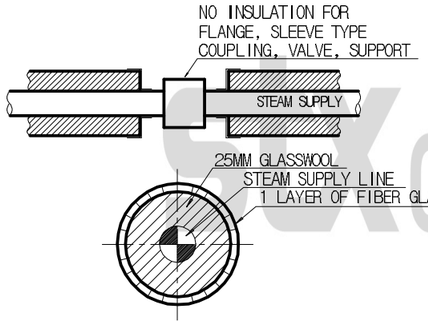
SYSTEM	APPLICATION	INSULATION MATERIAL	OUTSIDE COVER
STEAM PIPE	MAIN LINE ON UPPER DECK	NO INSULATION	NO INSULATION
	BRANCH LINE ON UPPER DECK		
	FOR T/C HEATER IN DECK STORE	25MM GLASS WOOL	1 LAYER FIBER GLASS CLOTH
CONDENSATE PIPE	MAIN LINE ON UPPER DECK	NO INSULATION	NO INSULATION
	BRANCH LINE ON UPPER DECK		
	FOR T/C HEATER IN DECK STORE	25MM GLASS WOOL	1 LAYER FIBER GLASS CLOTH

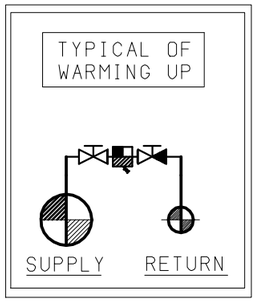
HEAT CALCULATION TABLE FOR SLOP & R.O. TANK

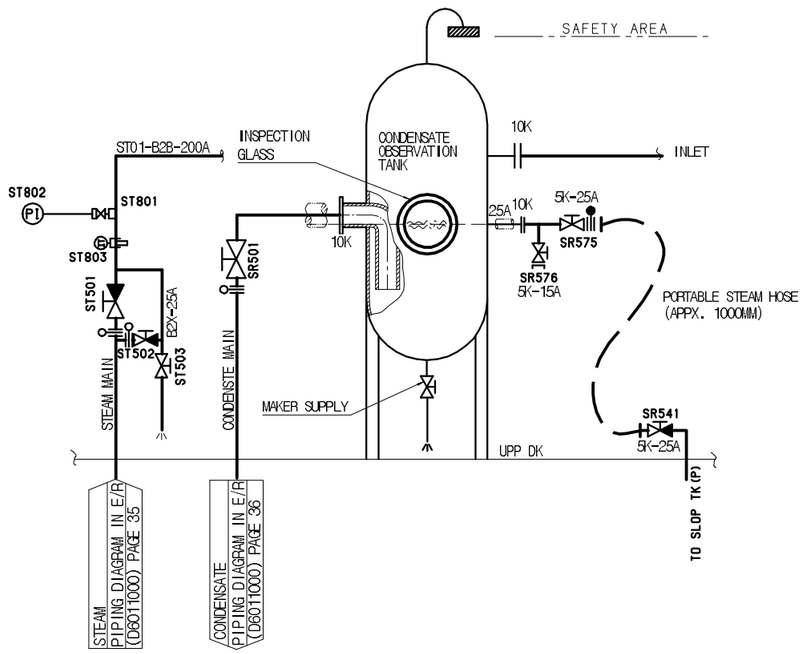
* DESIGN BASE
  - STEAM SUPPLY PRESSURE : 7KG/CM2G
  - LOADING CONDITION : 98% FILL WITH OIL (S.G. 0.85) FOR SLOP TK(P)
    50% FILL WITH SEA WATER (S.G. 1.025) FOR SLOP TK(S)
  - SEA WATER TEMPERATURE : 5℃
  - AMBIENT AIR TEMPERATURE : 2℃

TANK NAME	TANK VOL (m3)	%	% VOLUME (m3)	HEATING RATIO (m2/m3)	H/COIL LENGTH(m)	LAYER OF H/COIL	INITIAL TEMP. (℃)	FINAL TEMP. (℃)	HEATING TIME(H)
SLOP TANK(P)	1233.7 M3	98	1209.03	0.03785	240.75	2	33	66	24
SLOP TANK(S)	1392.7 3	50	696.35	0.08372	306.72	3	33	66	24
RESIDUE TANK	161.8 M 3	98	158.56	0.1	78.66	2	33	66	24

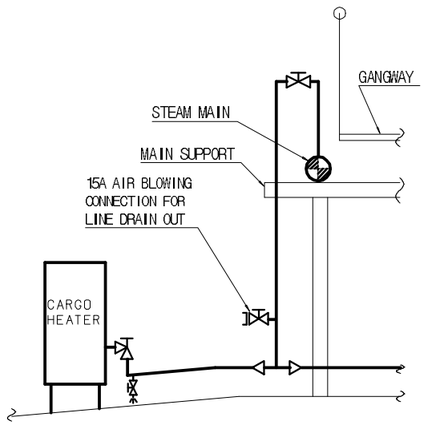
DETAIL OF INSULATION FOR STEAM SUPPLY IN DECK STORE ONLY

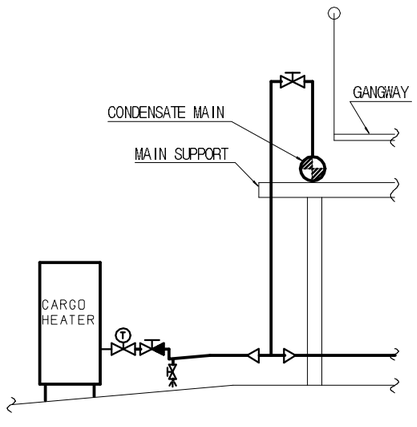


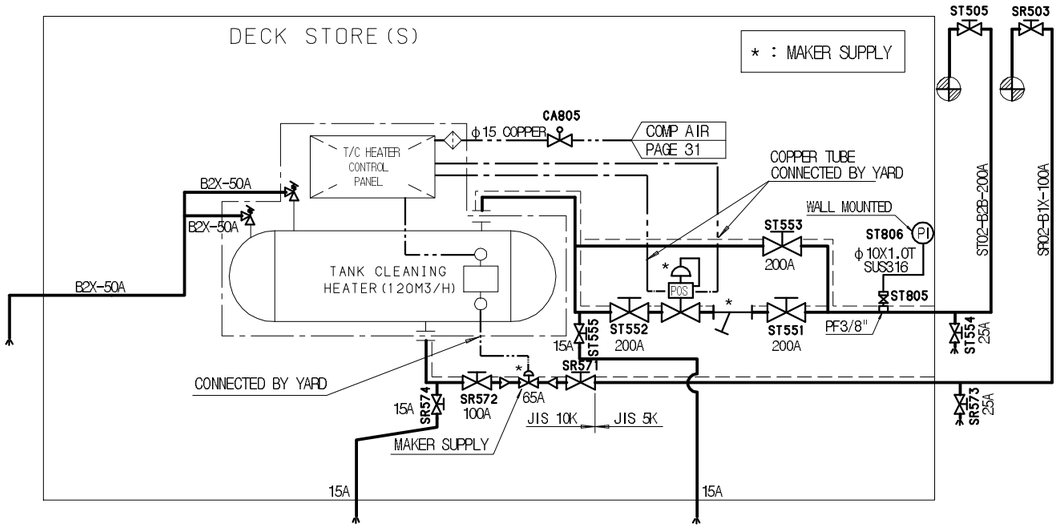


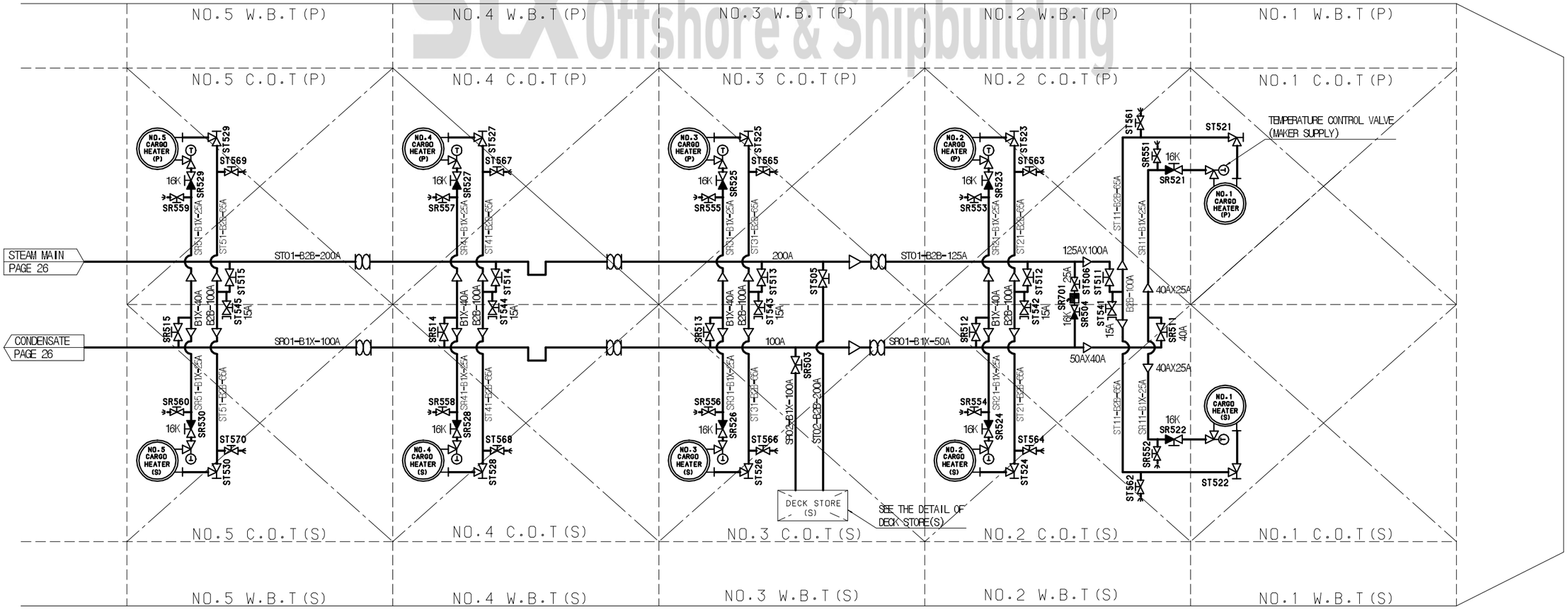


* HEATING COILS (AISI 316L) IN SLOP TANKS SHALL BE OF DOUBLE LOOP ARRANGEMENT.









FIRE/WASH DECK & DECK FOAM SYSTEM

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MODEL NO.	60KPC01
DWG. NO.	D5000000

THE HOSE VALVES SHALL BE PROVIDED WITH AN INSTANTANEOUS BRONZE HOSE COUPLING OF BS 336 TYPE

CAUTION
THE VALVES FOR EM'CY FIRE PUMP SUC./DISCH (FD541/FD542) TO BE KEPT IN OPEN POSITION

CAUTION PLATE & LOCKING DEVICE SHALL BE PROVIDED

MULTI-CORE(SUS316) Φ 10 X 1.0T

EM'CY FIRE PUMP (72M3/H * 80 MTH)

REFER TO PIPING DIAGRAM IN E/R (D6011000) PAGE 26

SEA CHEST FOR E.F.P/P TO BE LOCATED UNDER LIGHT SHIP CONDITION

* CALCULATION OF REQUIRED NOZZLE FOR PAINT STORE & DECK STORE(P)
- REQUIRED WATER FLOW RATE : 5L/M2/MIN
- CAPACITY OF EACH NOZZLE : 30L/MIN

LOCATION	AREA	CALCUALTION
PAINT STORE	25.80 M2	(25.80 x 5) / 30 = 4.3 (∴ MIN. 5 EA)
SAMPLING STR	12.89 M2	(12.89 x 5) / 30 = 2.14 (∴ MIN. 3 EA)

SWIMMING POOL DRAIN

DETAIL OF FOAM ROOM

FOAM FILLING CONNECTION JIS 10K-50A BLIND FLANGE ON A-DECK

FOAM TANK UNIT
ASSEMBLED BY MKAER
REFER TO MAKER DWG.
(DWG NO.: V5420000)

FM PIPING DIAGRAM IN E/R (D6011000) PAGE 26

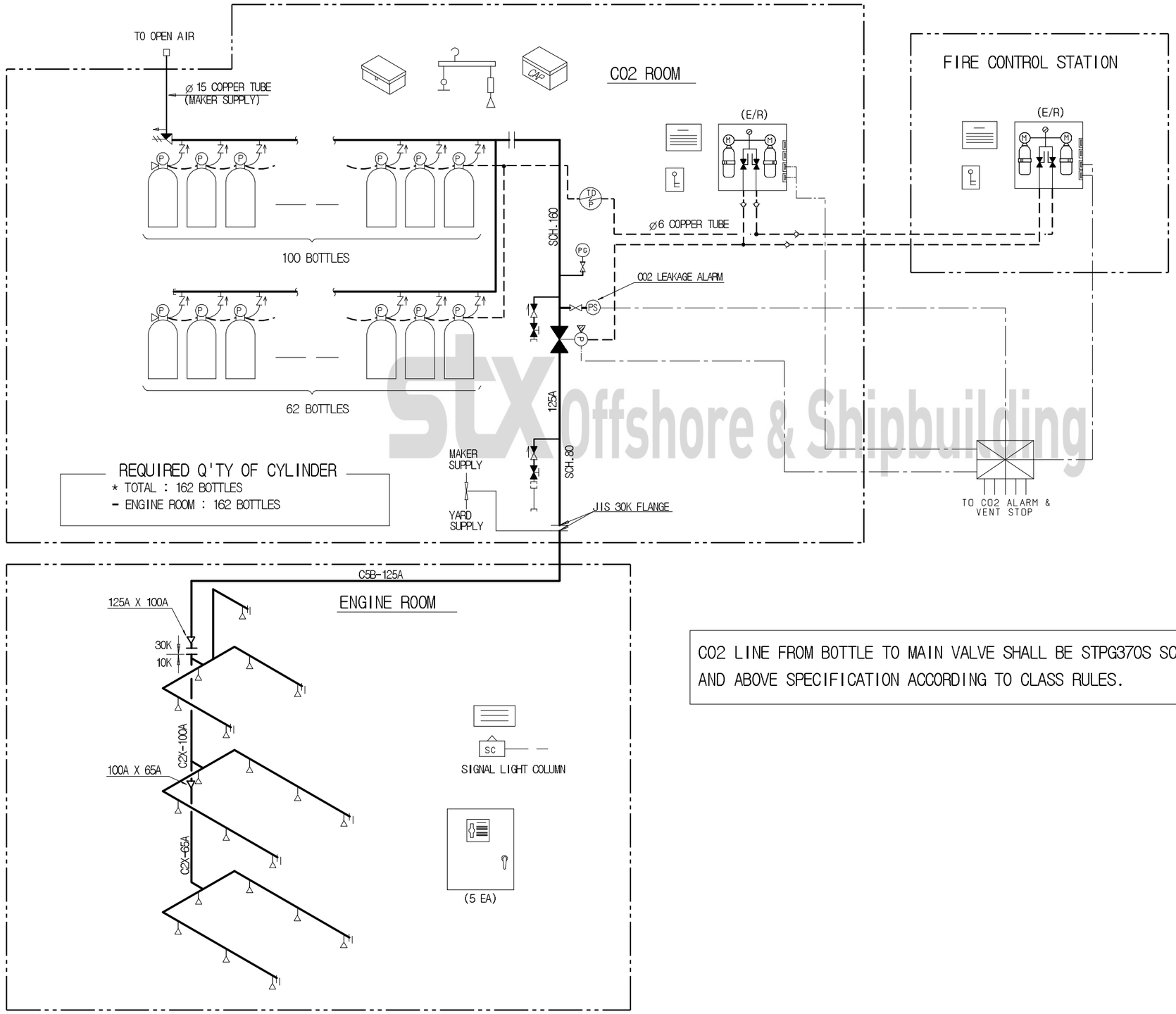
TO DECK SCUPPER PAGE 36

BA. EDUCTOR DRIVING SEE PAGE 21

TO BSN STR BILGE EDUCTOR PAGE 34

TO C/L BILGE EDUCTOR PAGE 34

REFER TO THE DRAWING, FIXED CO2 FIRE EXTINGUISHING SYSTEM(V5400000)



CO2 LINE FROM BOTTLE TO MAIN VALVE SHALL BE STPG370S SCH.160S AND ABOVE SPECIFICATION ACCORDING TO CLASS RULES.

SYMBOL	DESCRIPTION
	FLEX.HOSE W/ADAPTOR
A	AIR HORN
A	ALARM BELL WITH LAMP
E	ELECTRIC HORN
	BUZZER WITH LAMP
	JUNCTION BOX
	CO2 DISCHARGE NOZZLE
T/D P	TIME DELAY (PNEUMATIC TYPE)
	HOSE CONNECTION VALVE
	PILOT END PLUG
	PILOT VENT BLEED
	BALL VALVE
	BEAM SCALE
	INSTRUCTION CHART
	CAUTION PLATE
	WARNING NOTICE
	LIMIT SWITCH
	SPARE PARTS
	KEY BOX
	PRESSURE GAUGE WITH STOP VALVE
	PRESSURE RELIEF VALVE
	CHECK VALVE(PILOT LINE)
	CHECK VALVE(DISCHARGE LINE)
S	SOLENOID VALVE
P	MAIN DISCHARGE VALVE (PNEUMATIC & MANUAL CONTROLLED)
	PILOT CYLINDER (MANUAL CONTROLLED)
	DISCHARGE CO2 CYLINDER (PNEUMATIC & MANUAL CONTROLLED)

COMPRESSED AIR SYSTEM

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MODEL NO.	60KPC01
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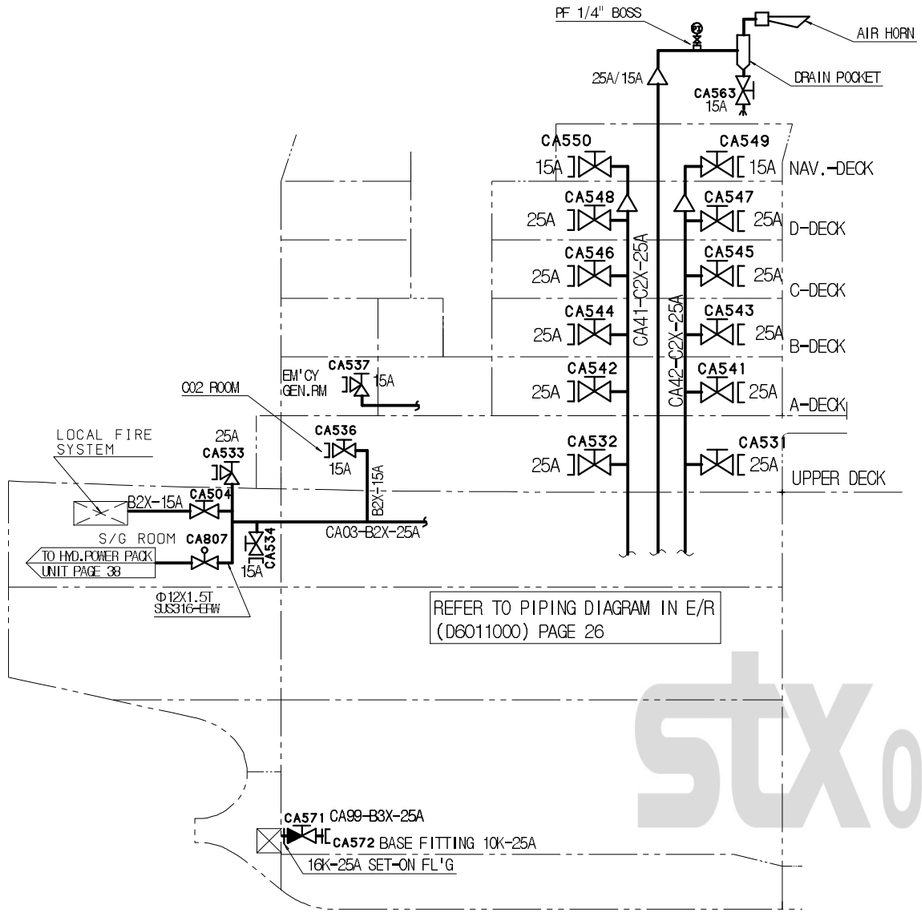
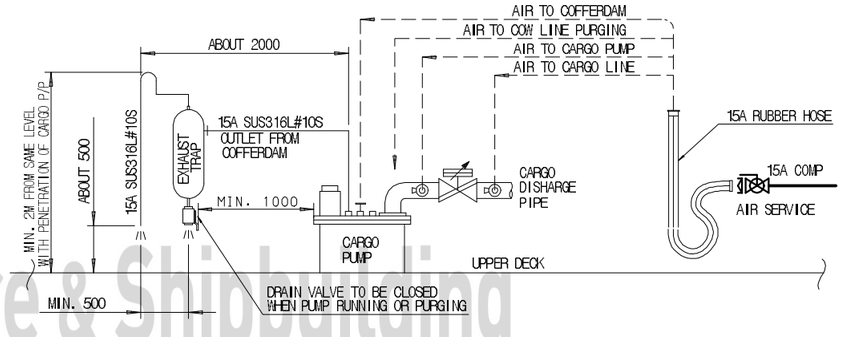
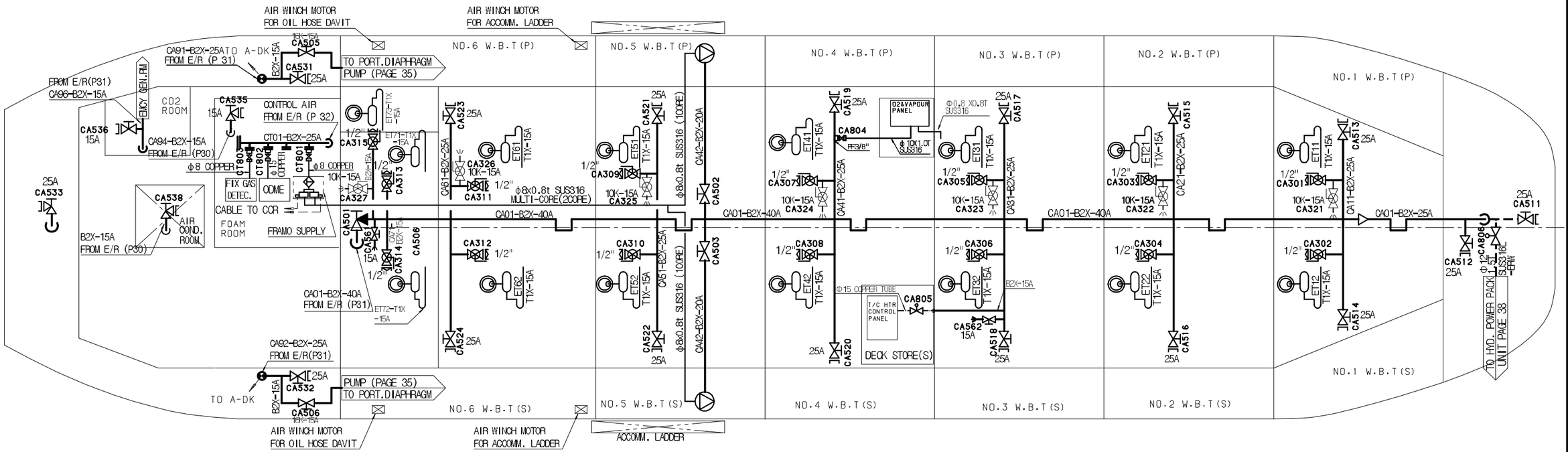
CAUTION !
ALL FIRE & AIR CONNECTOR/CONNECTION ON UPPER DECK SHALL BE ARRANGED AT HORIZONTAL DIRECTION OF APPX. 1.5M ABOVE FROM UPPER DECK.



DET. OF CARGO PUMP PURGING SYS.





☆BALLAST PIPING SYSTEM SHALL BE DESIGNED BASED ON TWO(2) BALLAST TANKS SERVICE BY ONE(1) BALLAST PUMP IN PRINCIPLE.
DISC FLOAT TYPE AIR VENT HEAD SHALL BE APPLIED FOR THE BALLAST, HFO, F.W TANKS.

* VENTING RATIO OF AIR ESCAPE PIPE

TANK NAME	FILLING PIPE						AIR ESCAPE PIPE								VENTING RATIO (B/A)
	N.D (A)	O.D (mm)	SCH	THK (mm)	I.D (mm)	AREA(A) (cm^2)	N.D (A)	O.D (mm)	SCH	THK (mm)	I.D (mm)	AREA (cm^2)	Q'TY	AREA(B) (cm^2)	
U.F.P.TK	350A	355.6	#160	16.0	323.6	822.44	200A	216.3	#80	12.7	190.9	286.22	1	1134.68	2.43
							350A	355.6	#80	12.7	330.2	856.34	2		
L.F.P.TK	200A	216.3	#160	23.0	170.3	227.78	200A	216.3	#80	12.7	190.9	286.22	2	572.44	2.145
NO.1~6 WBTK	400A	406.4	#160	16.0	374.4	1100.93	400A	406.4	#80	12.7	381.0	1140.09	2	2280.18	2.071
A.P.TK	150A	165.2	#80	11.0	143.2	161.06	125A	139.8	#80	9.5	120.8	114.61	2	241.6	1.854
F.W.TK	80A	89.1	#80	7.6	73.9	42.89	100A	114.3	#80	8.6	97.1	74.05	1	74.05	1.73
STCW.TK	65A	76.3	#80	7.0	62.3	30.48	80A	89.1	#80	7.6	73.9	42.89	1	42.89	1.407
NO.1 HFOTK	200A	216.3	#80	12.7	190.9	286.22	200A	216.3	#80	12.7	190.9	286.22	1	447.28	1.562
							150A	165.2	#80	11.0	143.2	161.06	1		
B.F.W.TK	40A	45.0	-	2.0	41.0	13.21	65A	76.3	#80	7.0	62.3	30.48	1	30.48	2.307

CAPACITY OF USCE BOX

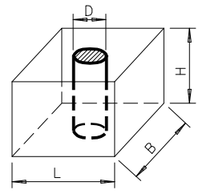
* THE CAPACITY OF USCG BOX FOR F.O/D.O/L.O VENT TO BE DESIDED AS FOLLOWING FORMULA.

  $V = [L \times B \times H] - [\sum n \{ (\pi/4) \times (D^2) \times H \}]$

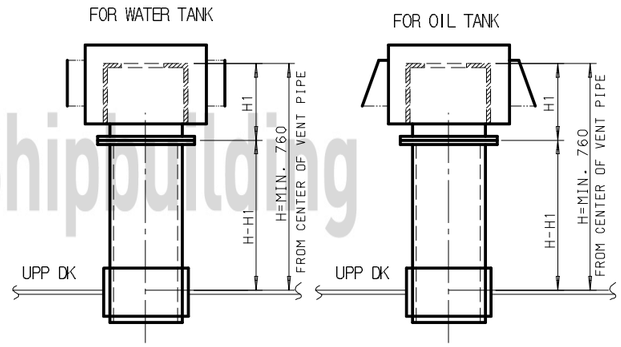
  $V \geq 159 \times N$ (LITER)

* DISCRIPTION

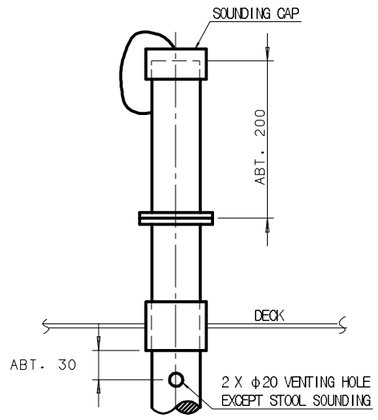
  V : NET VOLUME OF USCG BOX EXCEPT VENT AND/OR SODUNDING PIPE
  D : O.D OF EACH PIPE
  n : TOTAL Q'TY OF ALL PIPE IN USCG BOX
  N : TOTAL Q'TY OF AIR VENT PIPE WHICH ARE USED SIMULTANEOUSLY FOR BUNKER (F.O./D.O./L.O) IN USCG BOX



DETAIL OF PENETRATION FOR AIR VENT

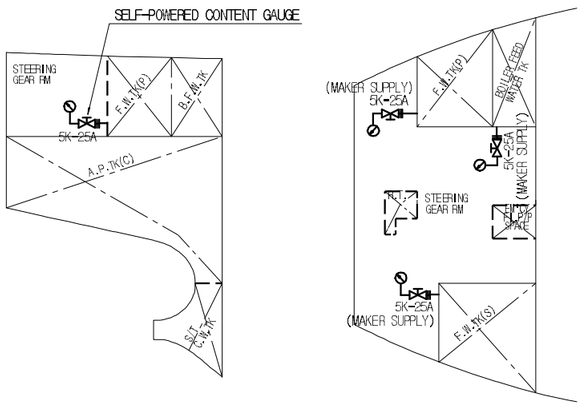


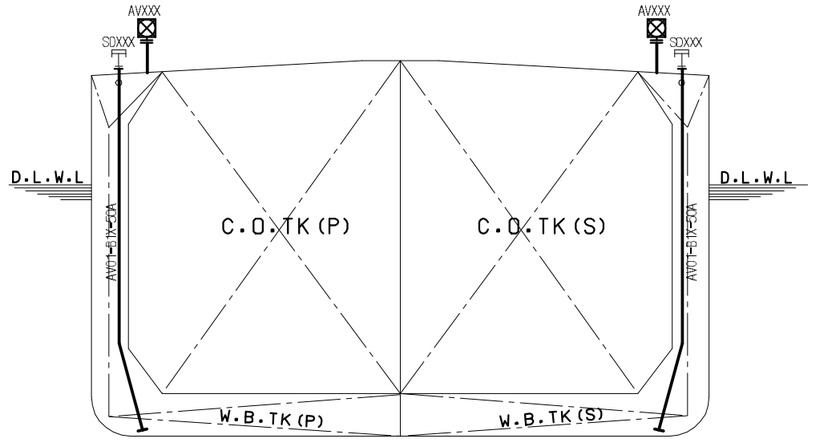
SOUNDING CAP FOR GENERAL

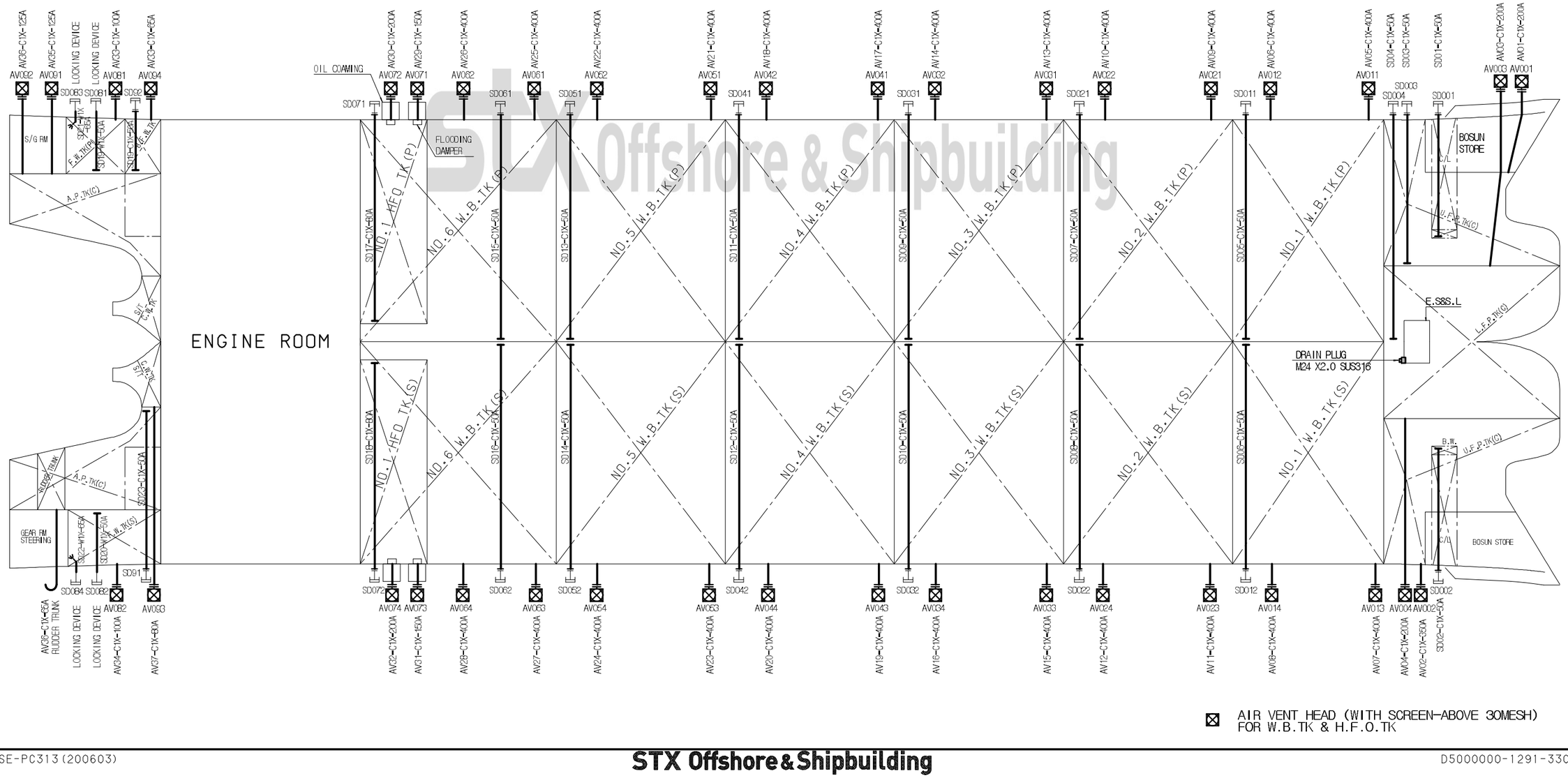


stx	AIR VENT & SOUNDING SYSTEM(2/2)	PAGE	33
		MODEL NO.	60KPC01
		DWG. NO.	D5000000

F.W. TK(P&S) & BOILER FEED WATER TK LEVEL GAUGE

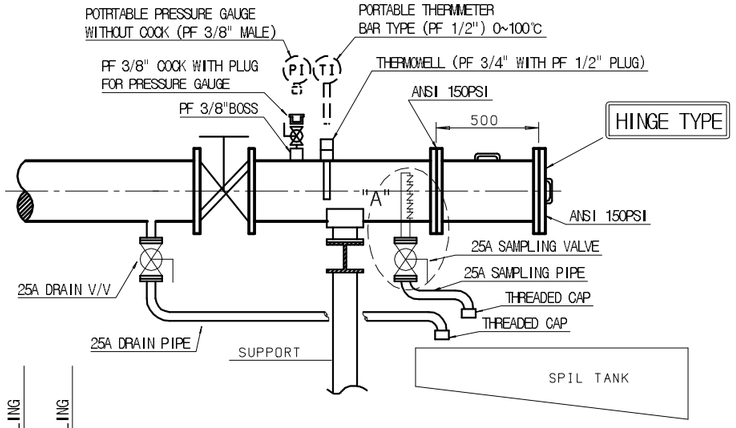




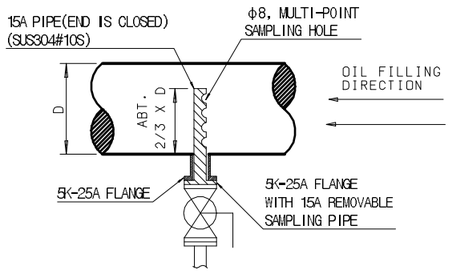


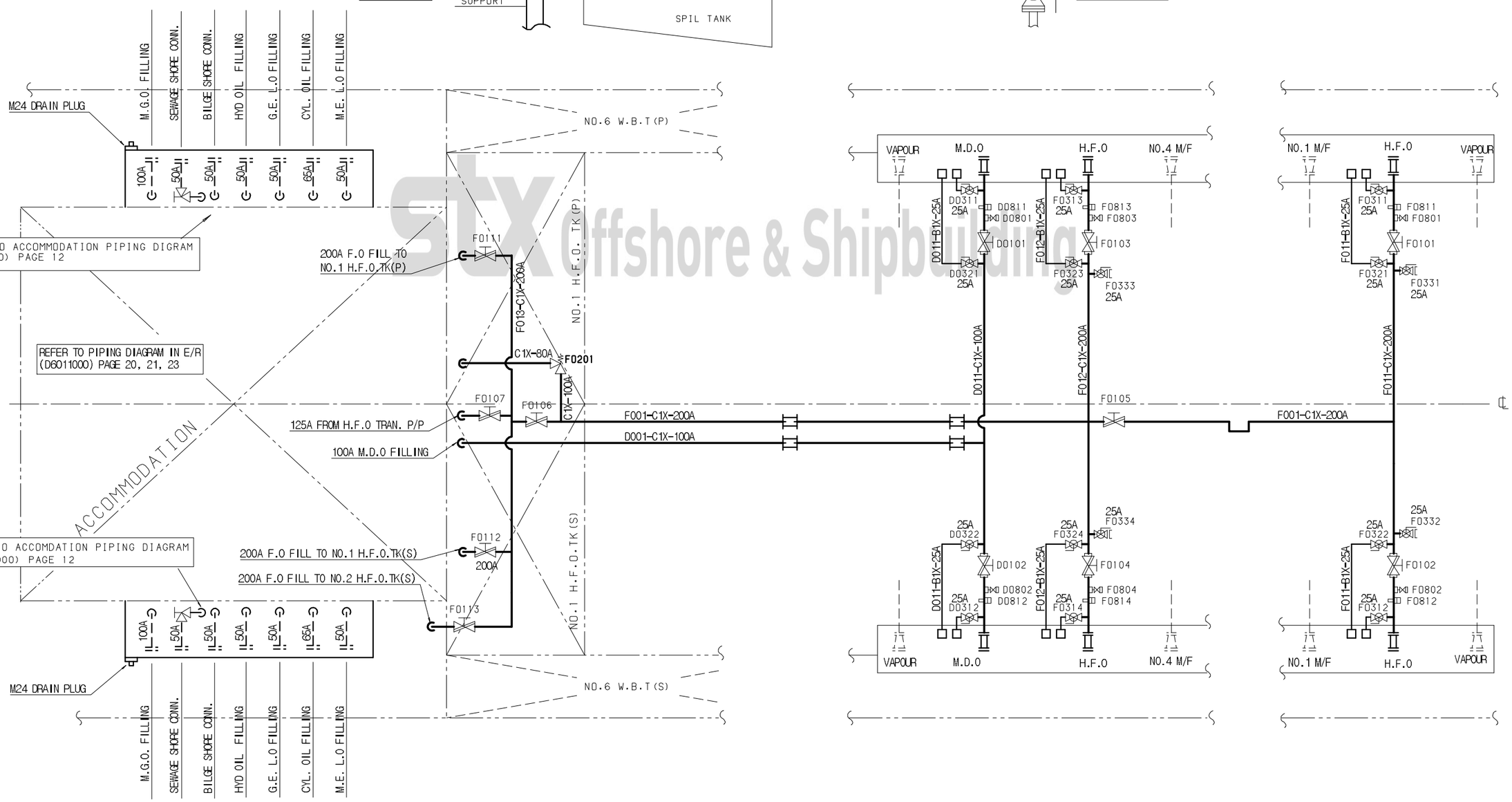
⊠ AIR VENT HEAD (WITH SCREEN-ABOVE 30MESH) FOR W.B.TK & H.F.O.TK

TYPICAL OF F.O & M.D.O MANIFOLD

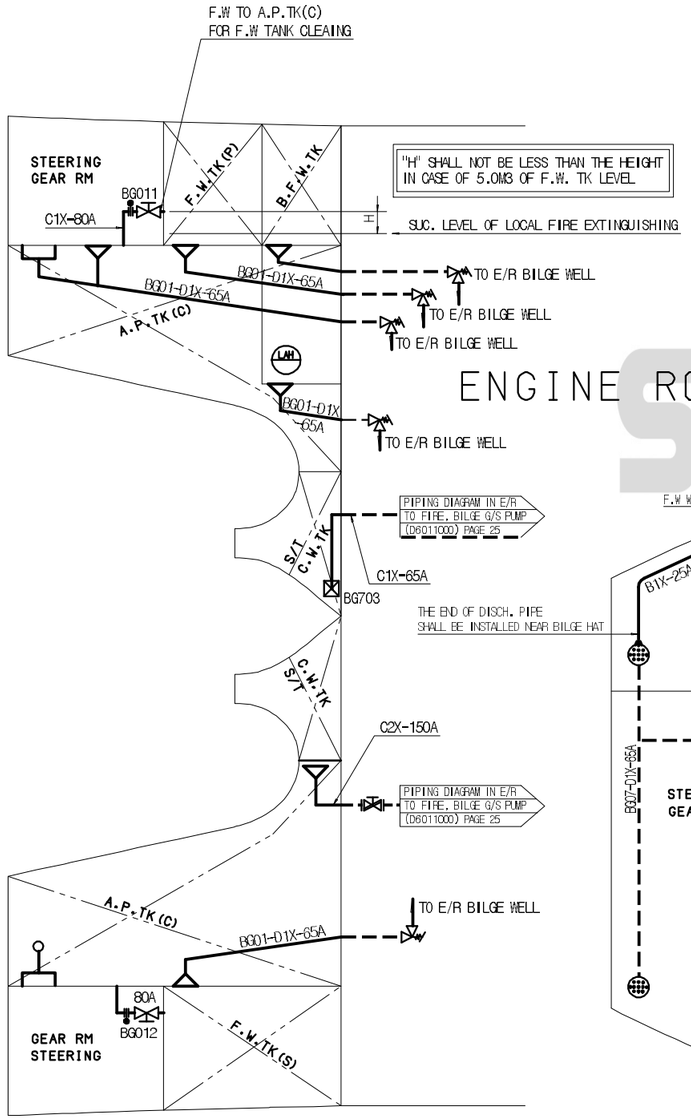


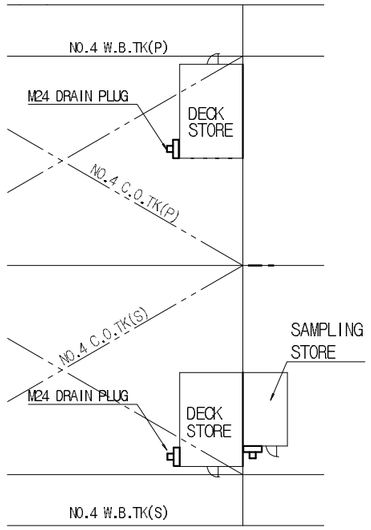
DETAIL "A"



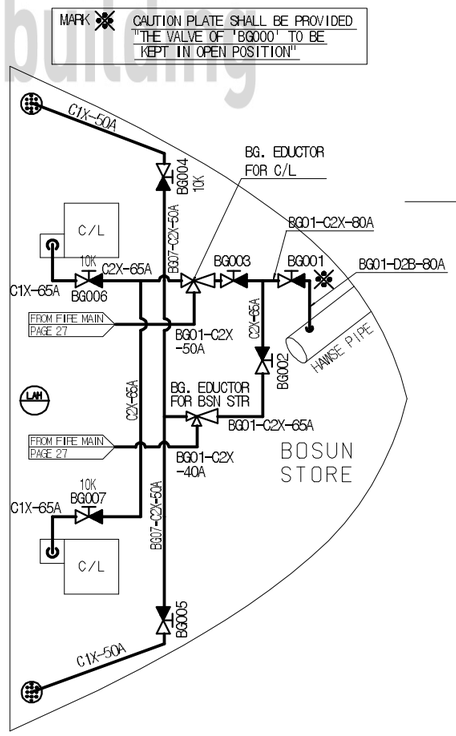


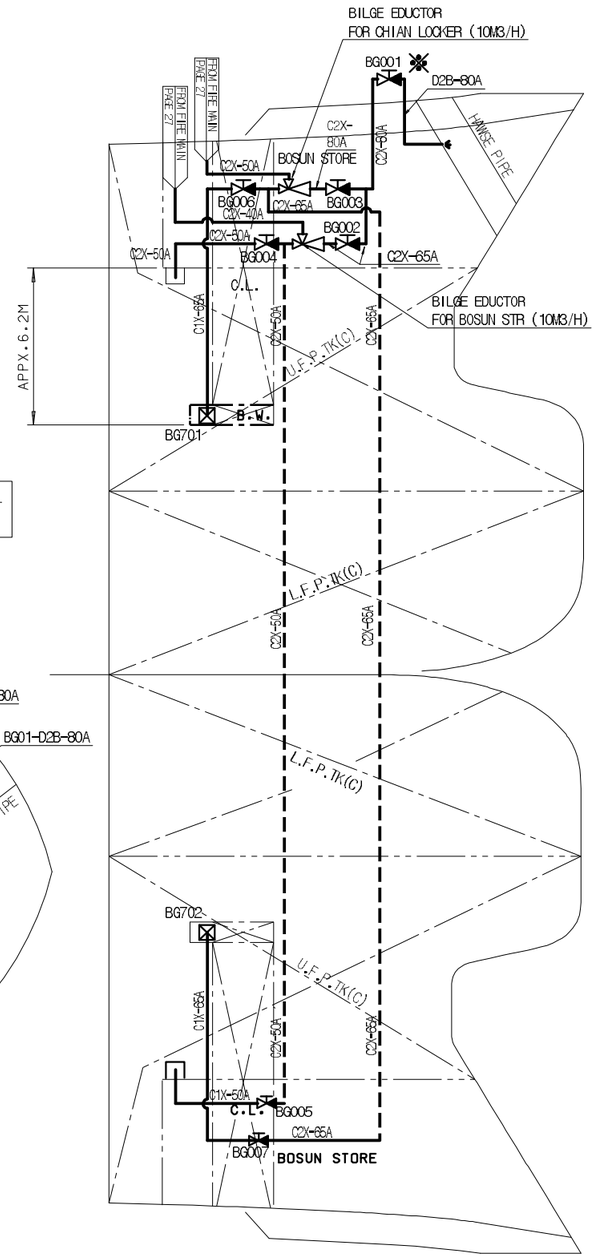
BILGE SYSTEM





MARK ※ CAUTION PLATE SHALL BE PROVIDED "THE VALVE OF 'BG000' TO BE KEPT IN OPEN POSITION"





DESIGN BASIS OF SCUPPER PIPE

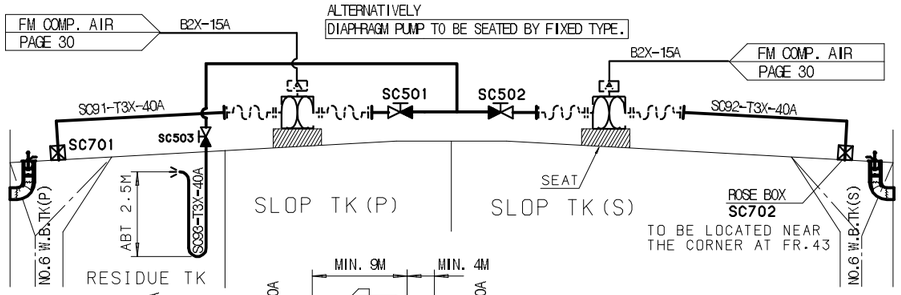
* FLOW CONSUMPTION ON UPPER DECK (Q1)
  Q1 = B X L X q
  B : BREADTH / 2
  L : LENGTH BETWEEN SCUPPER PIPES
  q : RAINFALL (100 mm/h)
* FLOW CAPACITY @ ONE(1) SCUPPER PIPE (Q2)
  Q2 = (π/4) X (D^2) X V
  FLOW VELOCITY (V) @ 150A PIPE : 1.3 m/s

* Q1 ≤ Q2
  B X L X q ≤ (π/4) X (D^2) X V
  L ≤ {π X (D^2) X V} / {4 X B X q}

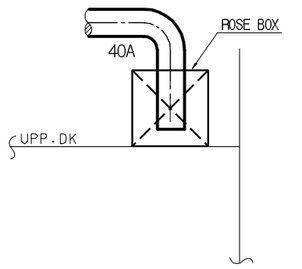
∴ L≤{πX(0.1432^2)X1.3X3600}/{4X16.12X 0.1}≒46.758 m

DECK SPILLAGE DUMPING SYSTEM

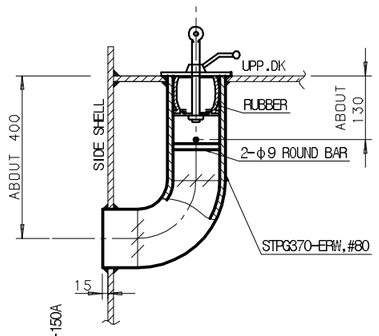
* ONE(1) SET OF PORTABLE DIAPHRAGM PUMP TO BE USED FOR POR & STARBOARD SIDE DECK SPILLAGE ALTERNATIVELY
DIAPHRAGM PUMP TO BE SEATED BY FIXED TYPE.



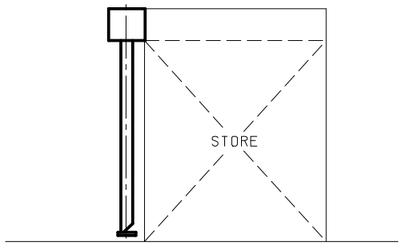
DETAIL OF "A"

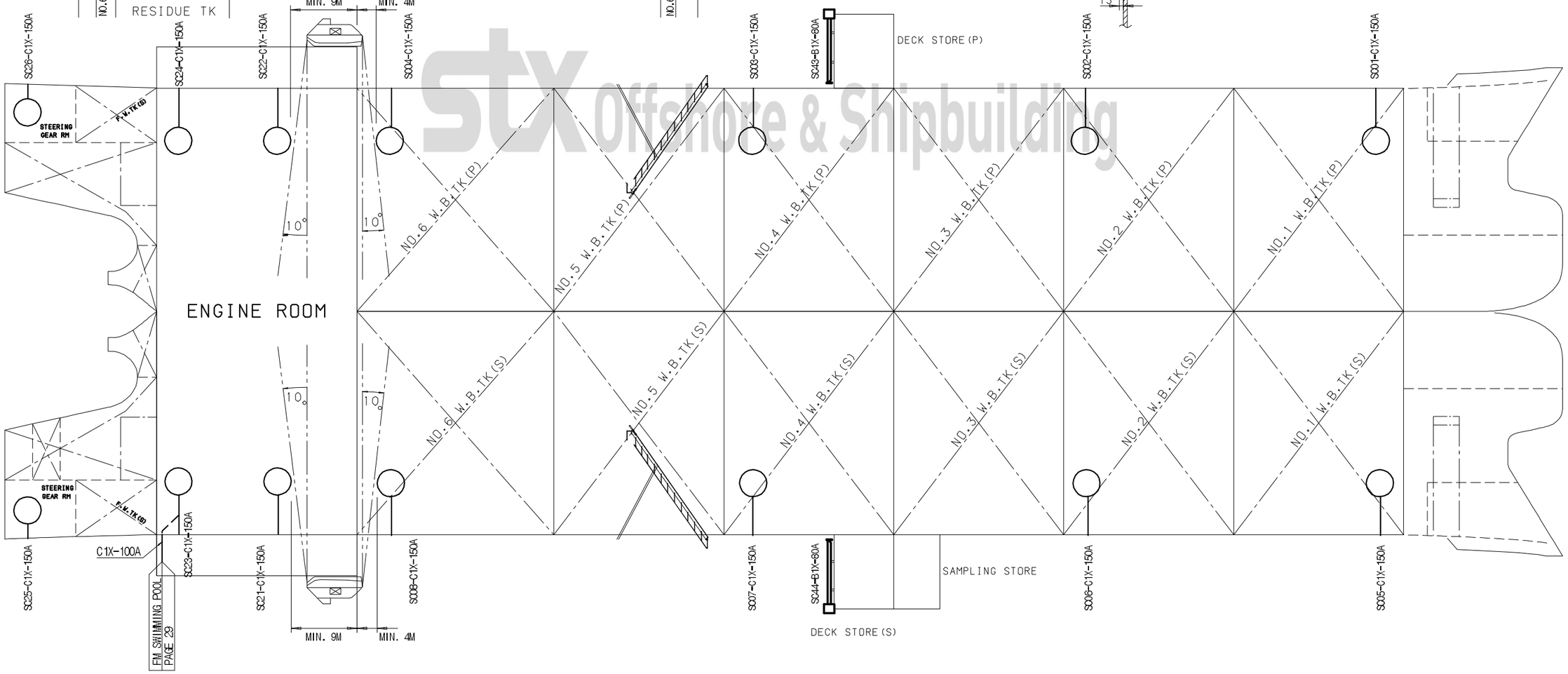


SELF EXPANDED TYPE SCUPPER PLUG



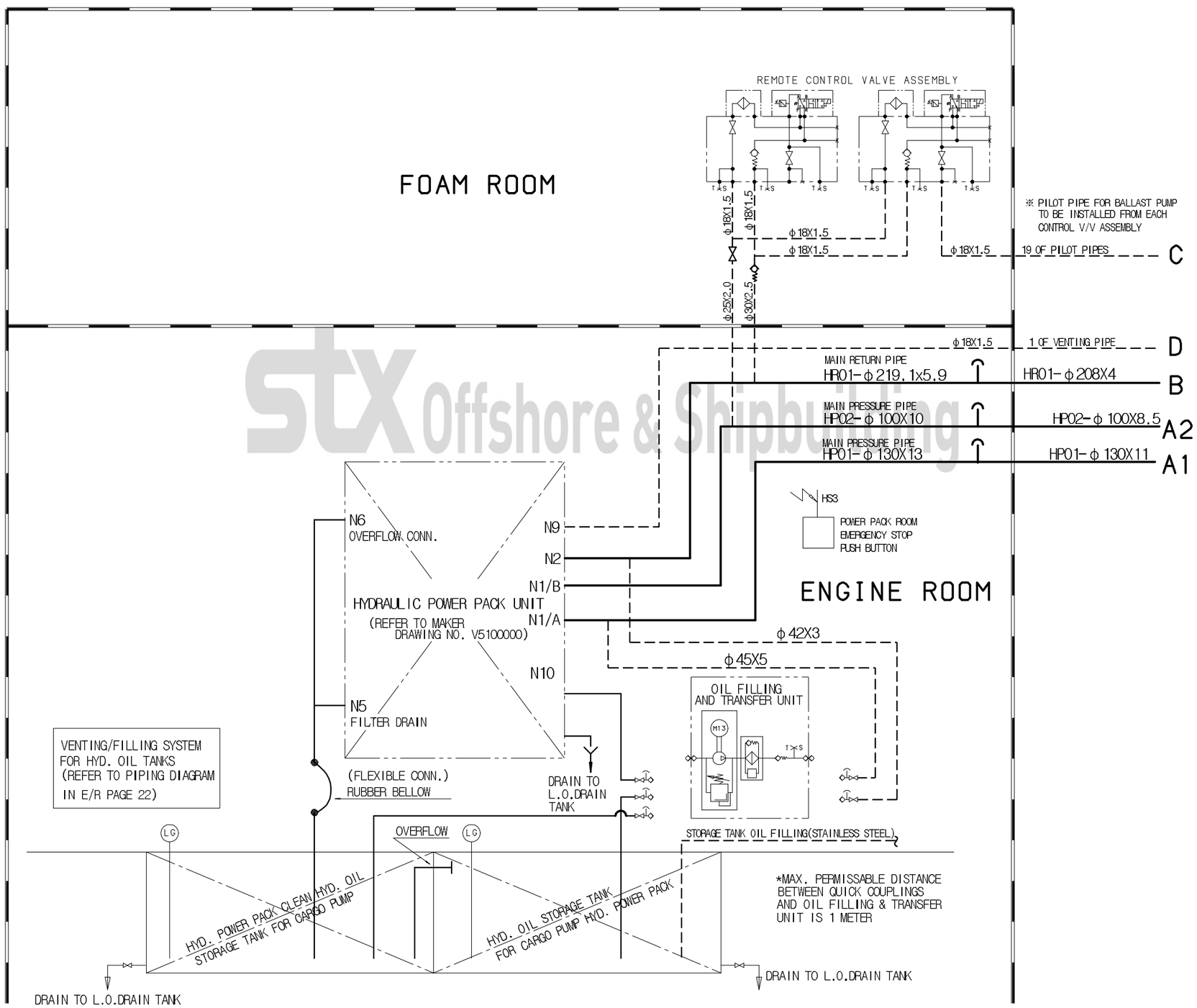
SCUPPER PIPE ON UPPER DECK





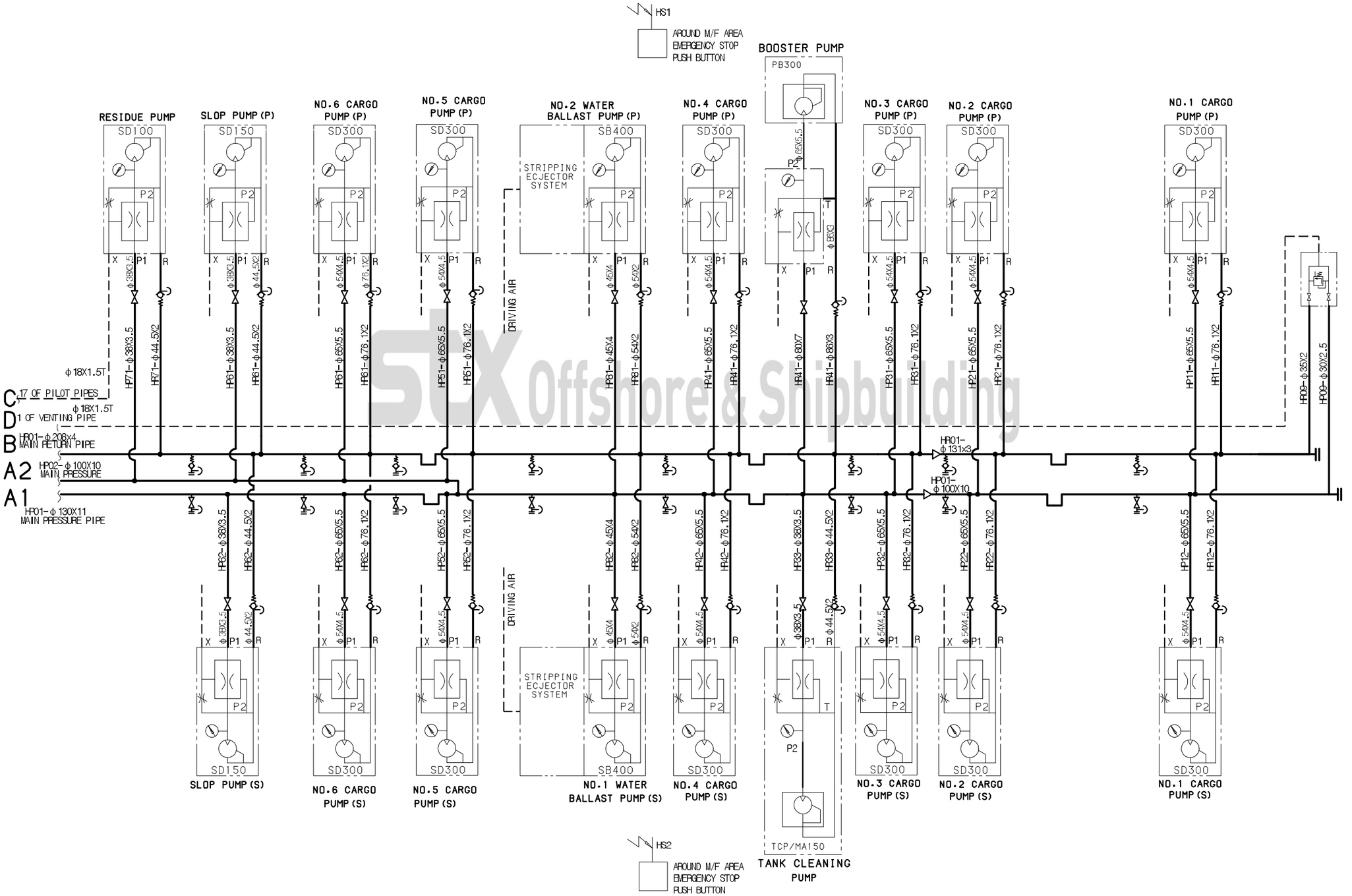
HYDRAULIC PIPING SYSTEM (1/3)

REFER TO MAKER DRAWING, CARGO/BALLAST HANDLING SYSTEM (V5100000)

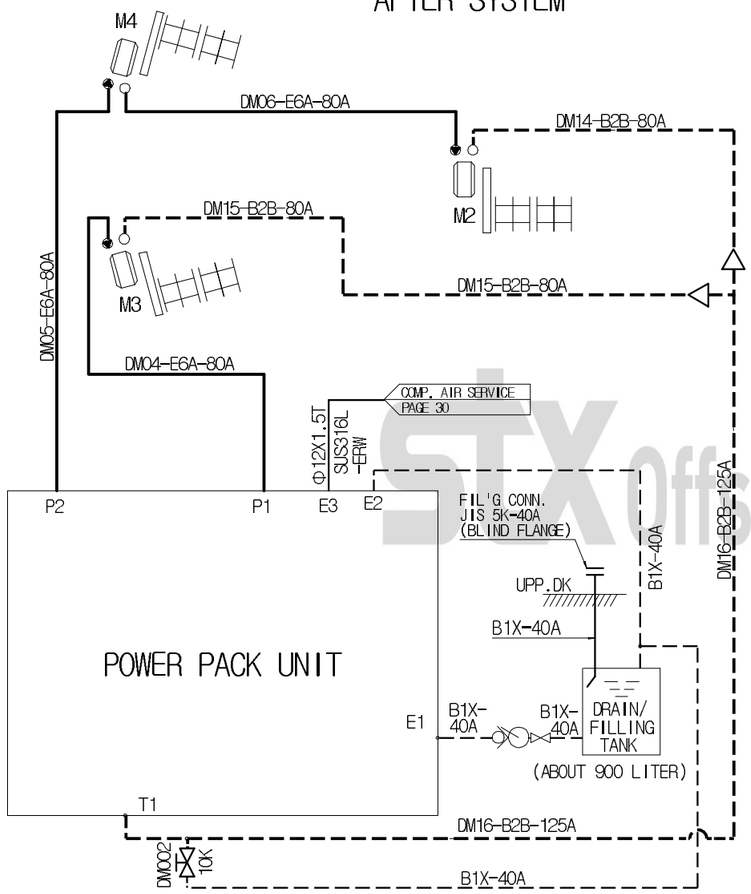


stx	HYDRAULIC PIPING SYSTEM (2/3)	PAGE	38
		MODEL NO.	60KPC01
		DWG. NO.	D5000000

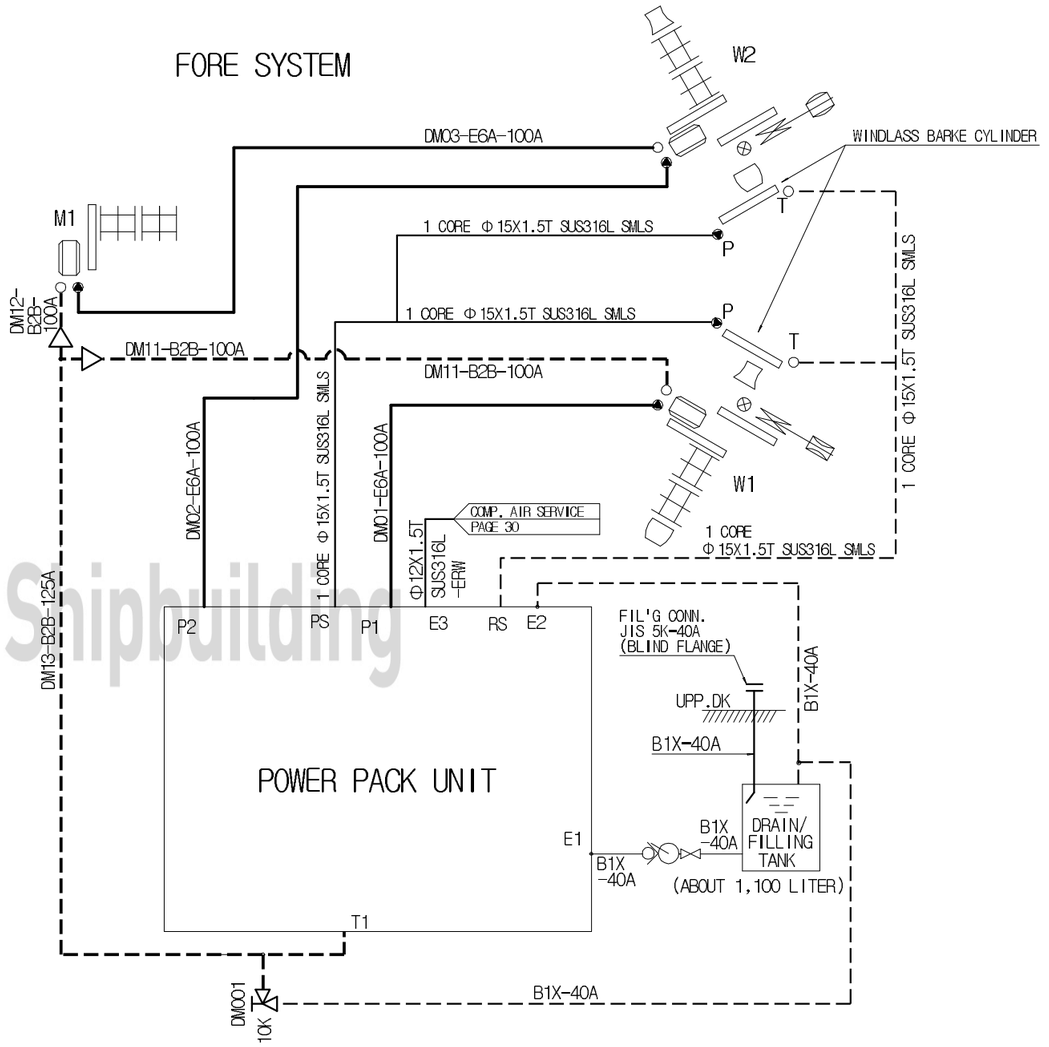
REFER TO MAKER DRAWING, CARGO/BALLAST HANDLING SYSTEM (V5100000)



AFTER SYSTEM



FORE SYSTEM



NOTE !

- PRESSURE SETTINGS : SAFETY VALVE MAIN PUMP FWD. 64 BAR
  SAFETY VALVE MAIN PUMP AFT. 64 BAR
  CHOCK RELIEF VALVE WINDLASS 62 BAR
- RETURN PRESSURE LESS THAN 10 BAR.
- DE-HUMIDIFIED AND CLEAN AIR SUPPLY MIN. 2 BAR MAX 10 BAR FROM THE SHIP'S SUPPLY OF COMPRESSED AIR. THE AIR PRESSURE FROM THE REDUCTION VALVE TO EXPANSION TANK SHALL NEVER EXCEED 1,7 BAR.

◗ INLET CONTROL VALVE
○ OUTLET CONTROL VALVE

EQ. NO.		PIPE SIZE		FLANGE DRAWING	
		INLET	OUTLET	INLET	OUTLET
WINCH	W1/W2	ND100	ND100	402-243-N1	402-243-N1
	M1	ND100	ND100	402-243-N1	402-243-N1
	M2-M4	ND80	ND80	402-243-N3	402-243-N3
POWER PACK	P1 - P2 FWD	ND100	ND100		402-243-21
	P1 - P2 AFT	ND80	ND80		402-243-22
	E1	ND40	-		271-265-10
	E2	ND40	-		271-265-10
	E3	Φ12 MM	-		
	T1	ND125	-	111-180-02	

MAKER`S MINIMUM REQUIREMENT FOR PIPE SIZE			
NOM DIA.	O.D. JIS	MIN. THK	MATERIAL. MIN QUALITY RECOMENDED MAIN PIPE SYSTEM-ST35.8I/DIN 17175
Φ12	12	1,5	PRECISION STEEL PIPE
ND 40	48,6	3,7	STEEL PIPE
ND 80	89,1	5,5	STEEL PIPE
ND 100	114,3	6,0	STEEL PIPE
ND 125	139,8	6,6	STEEL PIPE

REFER TO MAKER DRAWING, VALVE REMOTE CONTROL SYSTEM (V5600000)

TYP. OF EM'CY HAND P/P CONN. FOR ACTUATOR IN TANK

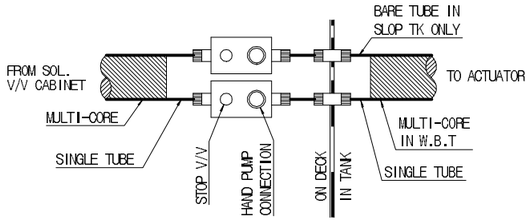
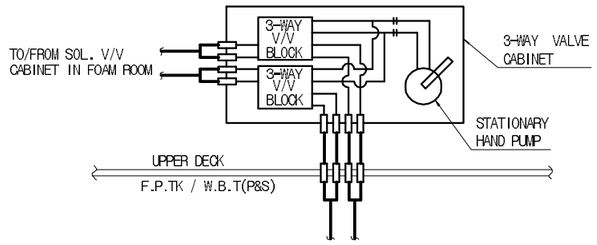
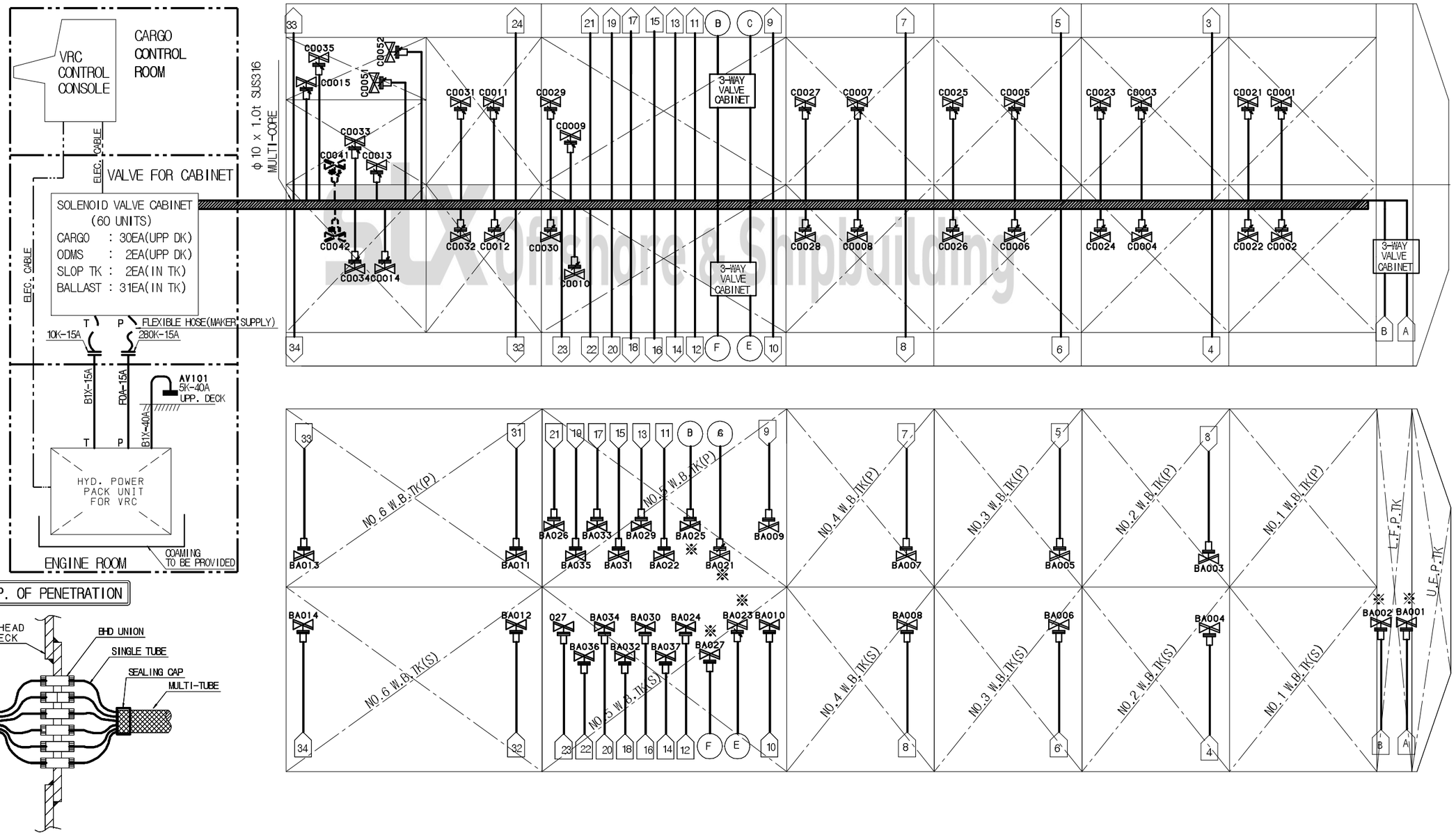
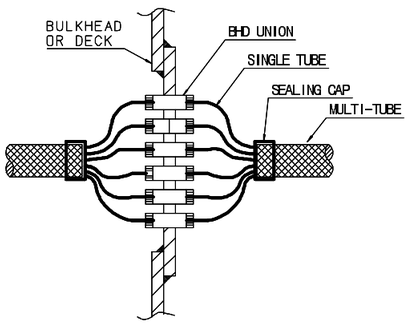


DIAGRAM IN 3-WAY V/V CABINET FOR SHIPSIDE VALVES (BA001/002/021/022/025/027) (X)



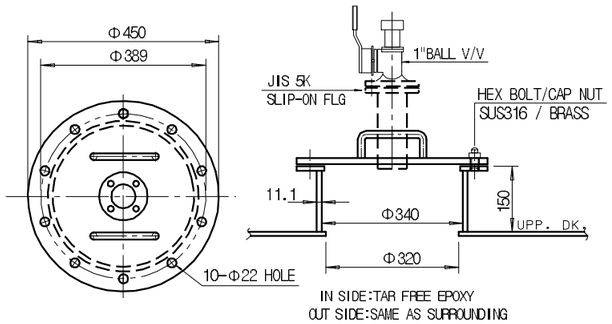


TYP. OF PENETRATION



	CARGO TANK LEVLE GAUGING SYSTEM(1/2)	PAGE	41
stx		MODEL NO.	60KPC01
		DWG. NO.	D5000000

SEAT FOR 1" HAND DIPPING

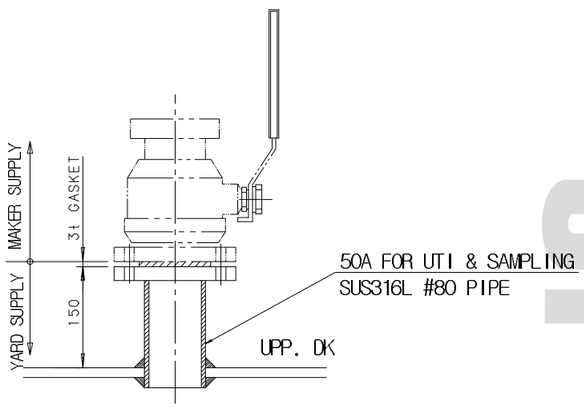


CAUTION !

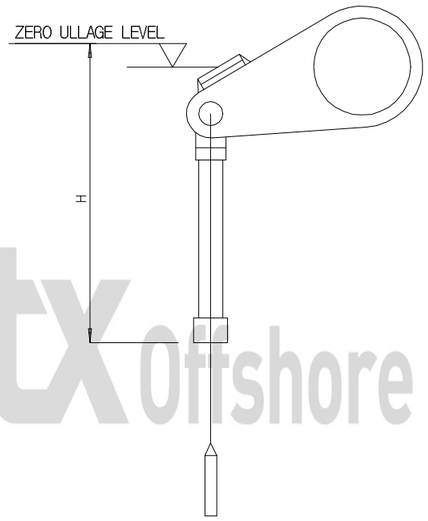
ONE(1) 1" HAND DIPPING CONNECTION SHALL BE DIRECTLY FITTED ON CARGO /SLOP TANK(P&S) DECK.

TANK CLEANING HEATCH SHALL BE PROVIDED AS AS BELLOWS ONLY;
- TWO(2) FOR CARGO TANK & ONE(1) FOR SLOP TANK.

SEAT FOR 2" UTI VALVE



ZERO ULLAGE LEVEL



REFER TO MAKER DRAWING, PORTABLE CARGO MEASURING SYSTEM (V5530000)
REFER TO MAKER DRAWING, CARGO MONITORING SYSTEM (V5500000)
REFER TO MAKER DRAWING, HIGH & OVERFILL LEVEL ALARM SYSTEM (V5520000)

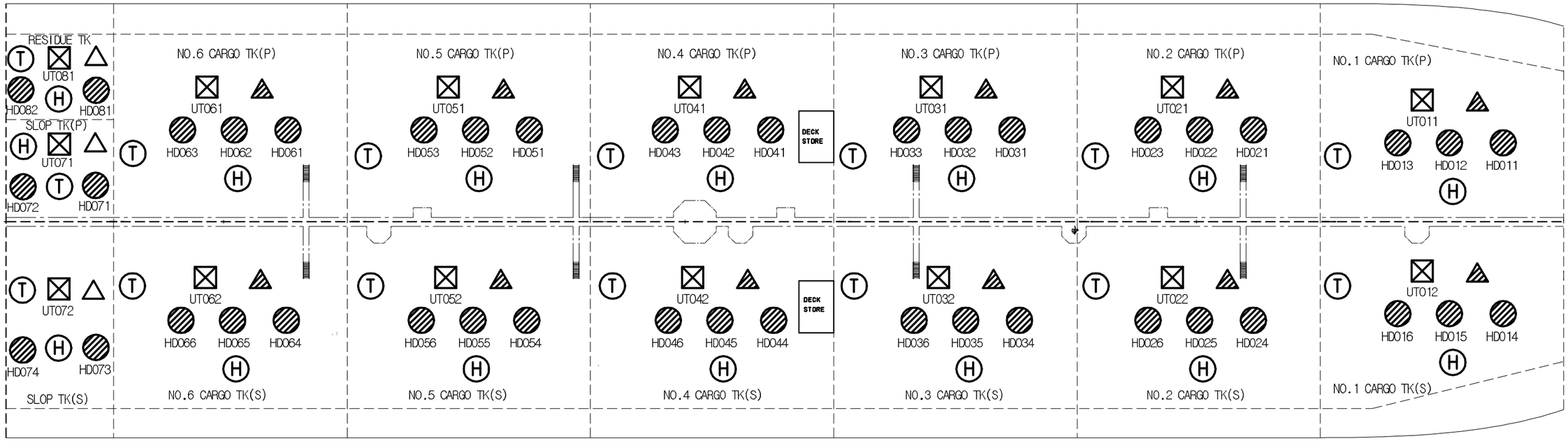
* DECK VALVE FOR PORTABLE CARGO MEASURING DEVICE

TYPE	PERPOSE	SYMBOL	TANK	Q'TY/TANK	MAKER
2" VAPOUR CONTROL VALVE (5K-50A)	UTI, SAMPLING	⊠	NO1~6 CARGO TK(P&S) & SLOP TK(P&S) AND RESIDUE TK	1	TANKSYSTEM
1" DECK VALVE (5K-25A)	HAND DIPPING	⊘	NO1~6 CARGO TK(P&S)	3	
			SLOP TK(P&S), RESIDUE TANK	2	

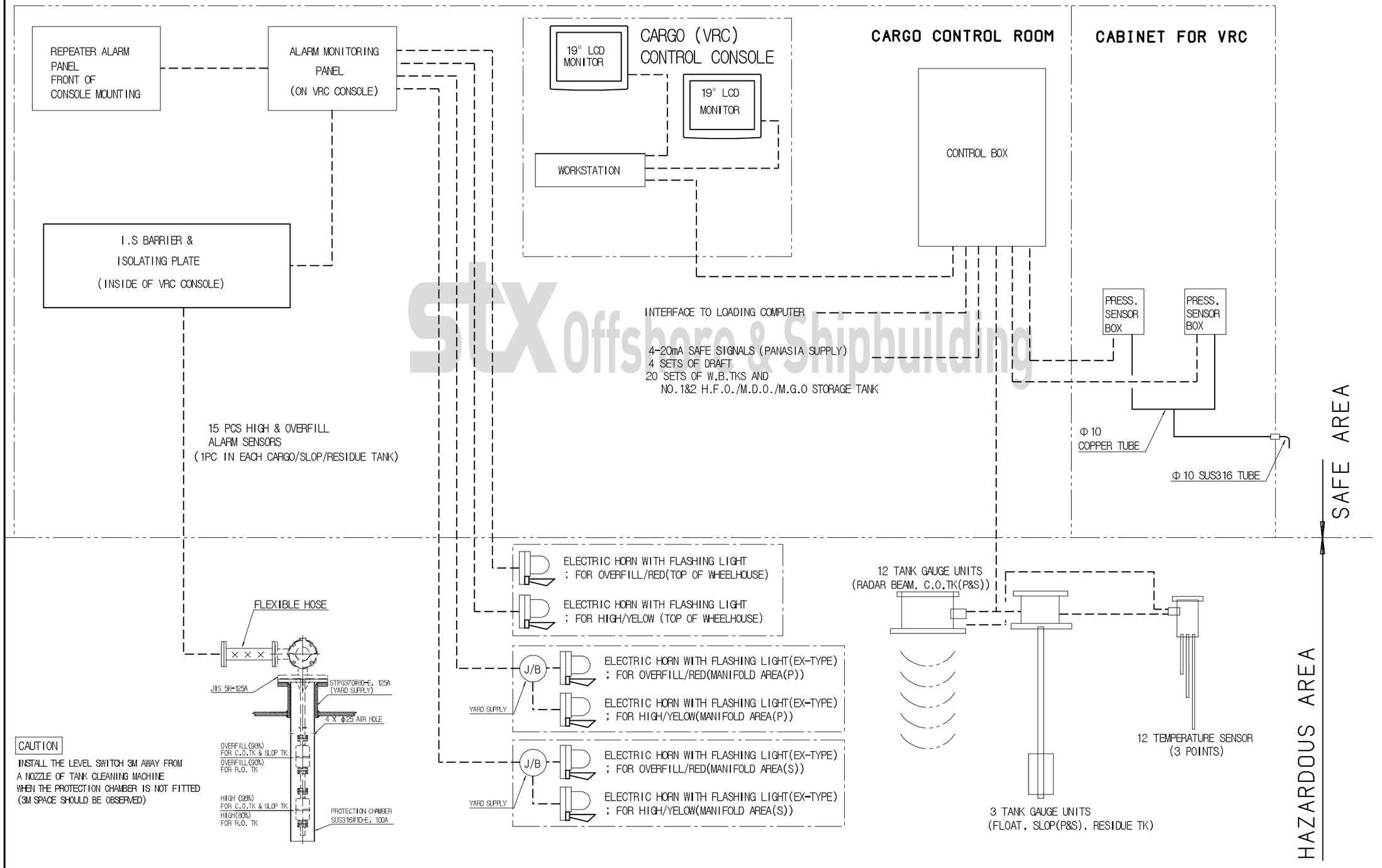
NOTE 1. THE 1" DECK VALVES FOR DIPPING UNIT TO BE INSTALLED AT FORE PART & AFT PART ON UPPER DECK FOR EACH CARGO TANK.
NOTE 2. THE 1" DECK VALVES FOR DIPPING UNIT TO BE INSTALLED AT AFT PART ON UPPER DECK FOR EACH SLOP TANK(P&S) & RESIDUAL TANK.

* FIXED CARGO MONITORING SYSTEM / HIGH & OVERFILL ALARM SYSTEM

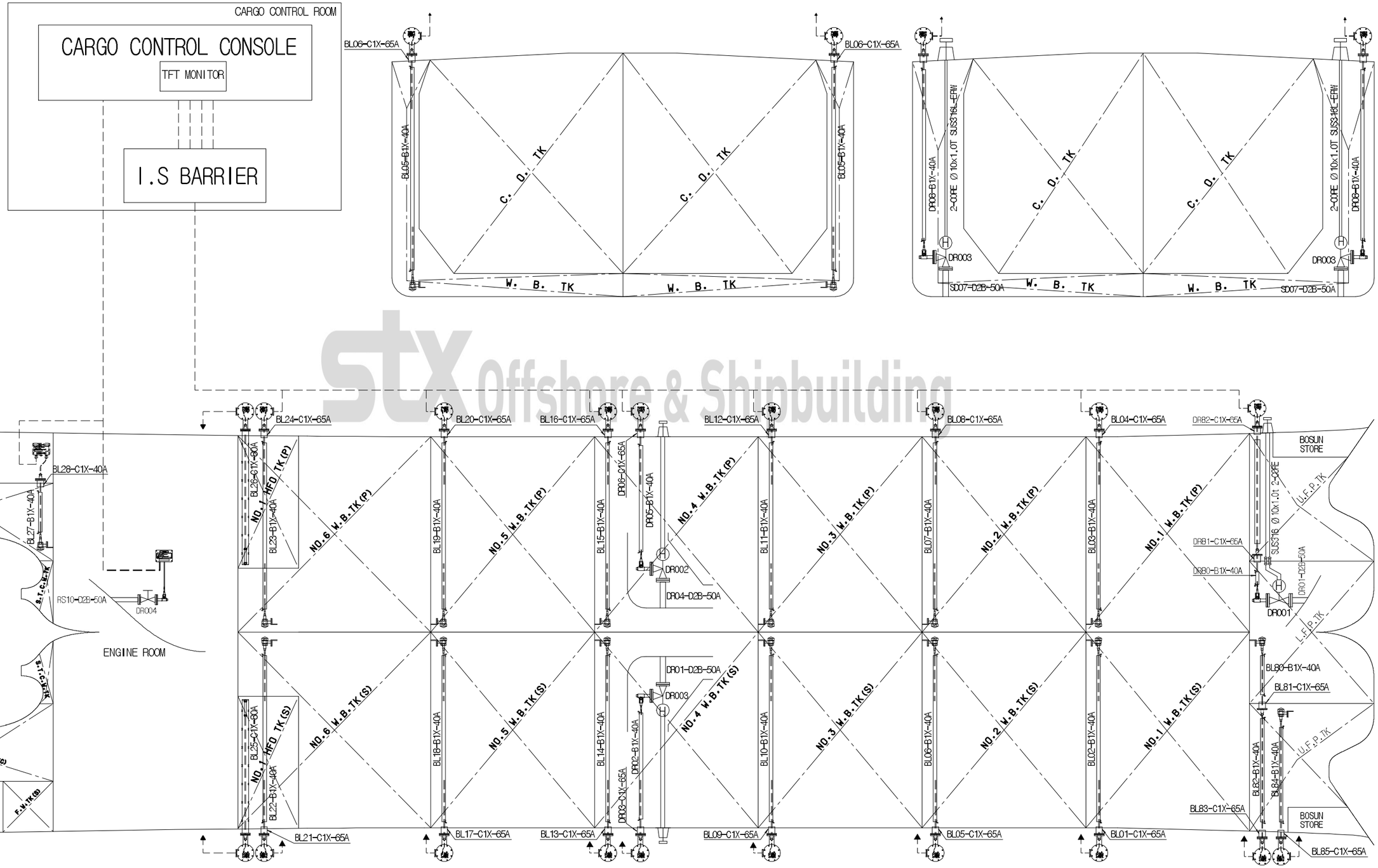
SYSTEM	TYPE	SYMBOL	TANK	Q'TY/TANK	MAKER
CARGO MONITORING SYSTEM	RADAR BEAM TYPE	◬	NO1~6 CARGO TK(P&S)	12	MUSASINO
CARGO MONITORING SYSTEM	MAGNETIC FLOAT TYPE	△	RESIDUE TK & SLOP TK(P&S)	3	MUSASINO
HIGH & OVERFILL LEVEL ALARM	MAGNETIC FLOAT TYPE	Ⓗ	NO1~6 CARGO TK(P&S) & SLOP TK(P&S)	14	PANASIA
TEMP. SENSOR (INSIDE PUMP SOCKET)	CONDUCTOR TYPE	Ⓣ	NO1~6 CARGO TK(P&S) & SLOPTK(P&S) AND RESIDUE TK	15	MUSASINO



REFER TO MAKER DRAWING, CARGO MONITORING SYSTEM (V5500000)
REFER TO MAKER DRAWING, HIGH & OVERFILL ALARM SYSTEM (V5520000)



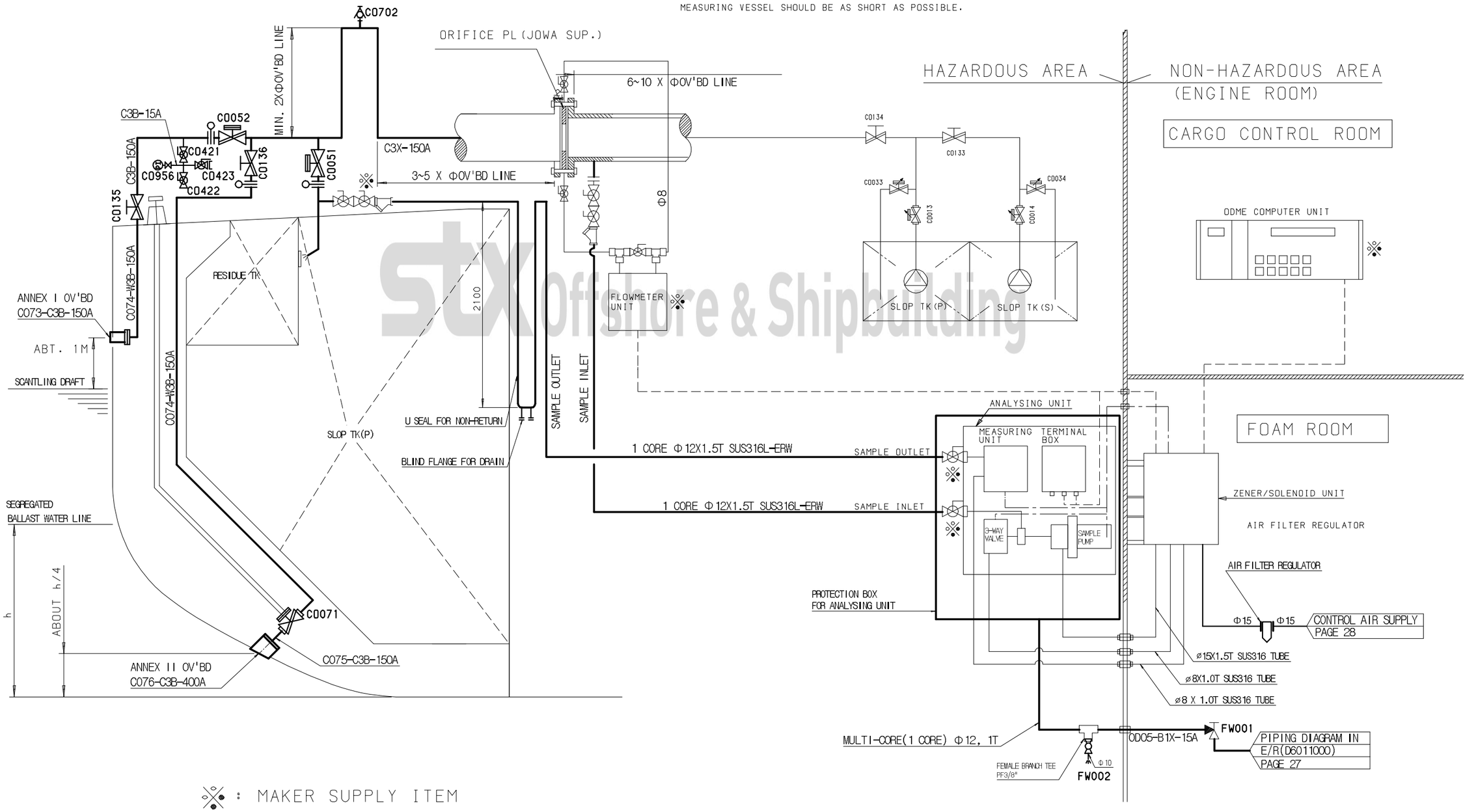
FORM NAME : STXSE-PC313



REFER TO MAKER DRAWING, OIL DIACHARGE MONITORING SYSTEM (V5700000)

NOTE

1. LENGTH OF PIPING BETWEEN SAMPLING PROBE AND INLET MEASURING VESSEL SHOULD BE AS SHORT AS POSSIBLE.



※ : MAKER SUPPLY ITEM

FIXED GAS DETECTION SYSTEM

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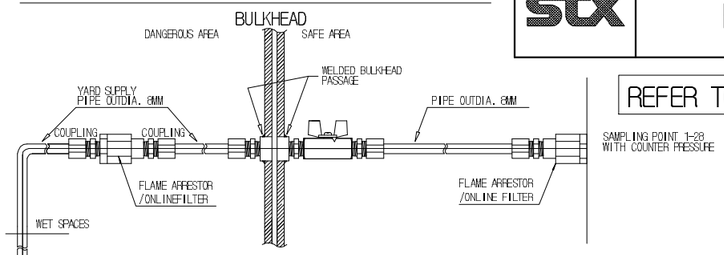
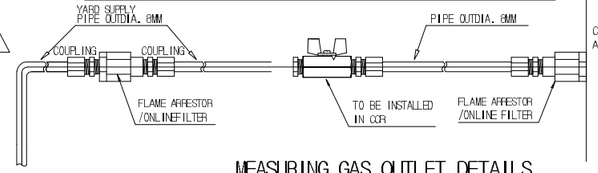
REFER TO MAKER DRAWING, FIXED GAS DETECTION SYSTEM (V5710000)

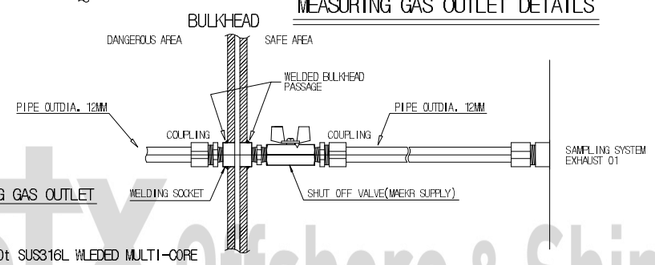
SAMPLING POINT DETAILS FOR W.B.TK AND F.P.TK

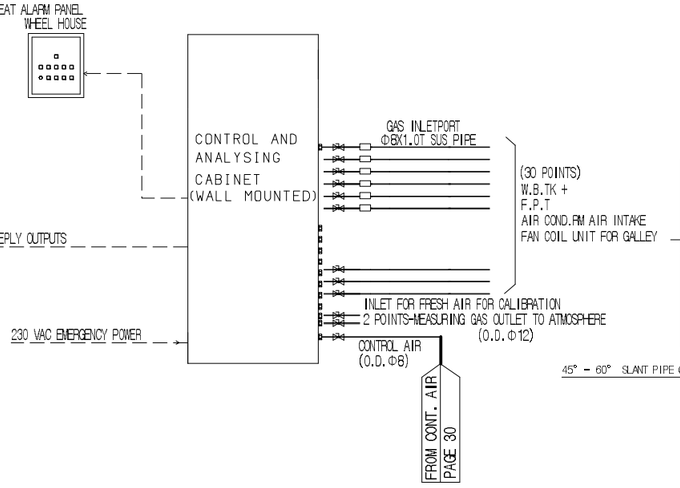


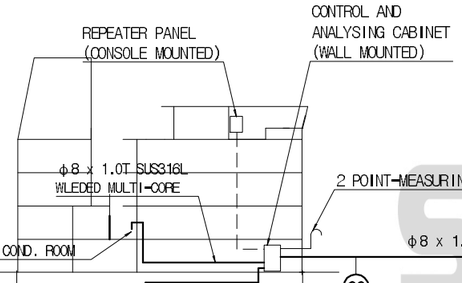
SAMPLING POINT DETAILS FOR AIR COND. ROOM & FAN COIL UNIT

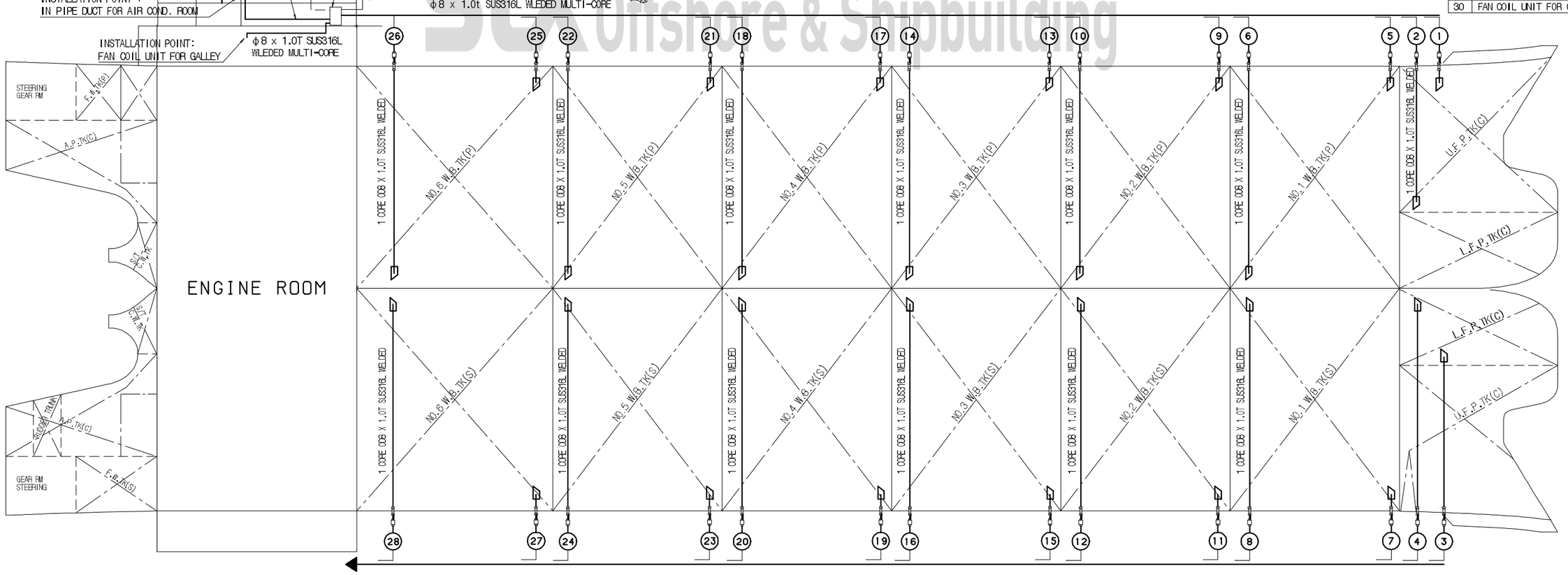


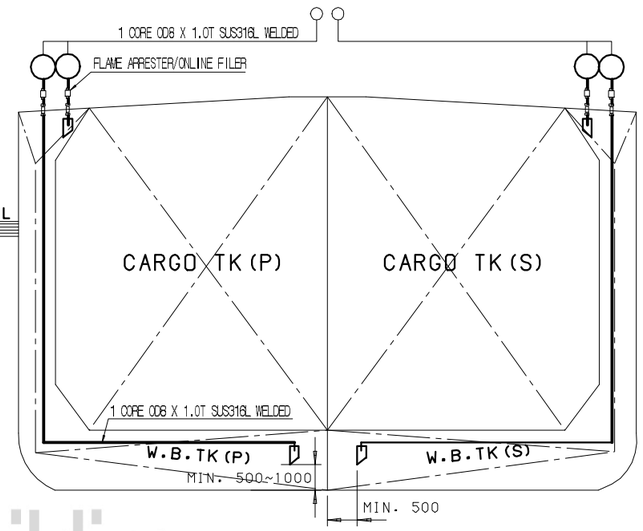
MEASURING GAS OUTLET DETAILS











ITEM NO.	SAMPLING LOCATION
1	UPPER F.P.TK HIGH
2	UPPER P.TK LOW
3	LOW F.P.TK HIGH
4	LOW F.P.TK LOW
5	NO.1 W.B.T(P) HIGH
6	NO.1 W.B.T(P) LOW
7	NO.1 W.B.T(S) HIGH
8	NO.1 W.B.T(S) LOW
9	NO.2 W.B.T(P) HIGH
10	NO.2 W.B.T(P) LOW
11	NO.2 W.B.T(S) HIGH
12	NO.2 W.B.T(S) LOW
13	NO.3 W.B.T(P) HIGH
14	NO.3 W.B.T(P) LOW
15	NO.3 W.B.T(S) HIGH
16	NO.3 W.B.T(S) LOW
17	NO.4 W.B.T(P) HIGH
18	NO.4 W.B.T(P) LOW
19	NO.4 W.B.T(S) HIGH
20	NO.4 W.B.T(S) LOW
21	NO.5 W.B.T(P) HIGH
22	NO.5 W.B.T(P) LOW
23	NO.5 W.B.T(S) HIGH
24	NO.5 W.B.T(S) LOW
25	NO.6 W.B.T(P) HIGH
26	NO.6 W.B.T(P) LOW
27	NO.6 W.B.T(S) HIGH
28	NO.6 W.B.T(S) LOW
29	AIR COND. RM AIR INTAKE
30	FAN COIL UNIT FOR GALLEY