



ITEM	DESCRIPTION	NUMBER QUANTITE	MANUFACTURER FABRICANT	MODEL MODELE	TECHNICAL FEATURES CARACTERISTIQUES TECHNIQUES	WEIGHT POIDS (kg)
41040001	BALLAST, BILGE AND FIFI PUMP	2	AZCUE	LN-EP-32-200-3208	Bureau Veritas Classification 48/32 m³/h at 24 bar 11 kW at 2.900 rpm, 400V 50 Hz DN50 DN50 Vertical IN-LINE pump with priming system. Mechanical seal, pump casing bronze, impeller bronze, shaft stainless steel.	200
41060001	OILY WATER SEPARATOR	1	FACET	CPS-SB MKII+ EB1 14.1	Built in carbon steel, internally and externally epoxy protected and suitable for a flow rate of 1 m³/h, and giving an effluent with less than 15 ppm of hydrocarbons. This model is tested and approved to the IMO resolution MEPC.107(49) and CE, including installation pump (0.55kW) and heating (1.5kW).	280
41060002	BILGE EJECTOR	1	TEAMTEC	Type 1 1/2 - 2 - 2 1/2 (1034)	Capacity: 15.8 m³/h Body: Ni-Al-bronze. Nozzle: AISI 316. Flanges: PN10. Suction lift: 2 mWC, discharge head: 3 mWC, total head: 5 mWC. Driving water: 7.8 m³/h at 4 bar. Suction flange: DN50, driving flange: DN40, discharge flange: DN65.	23

	HIGH LEVEL ALARM		BUTTERFLY VALVE		GATE VALVE		STRAINER STRAIGHT
	PRESSURE GAUGE		BALL VALVE		CHECK VALVE		MUD BOX ANGLE
	VACUUM METER		BALL VALVE 3 WAY		SELF-CLOSING DRAIN-SOUNDING VALVE		Y TYPE STRAINER
	REDUCTION		NON-RETURN/CLOSING GLOBE VALVE STRAIGHT		FOOT CHECK VALVE		
	PUMP		NON-RETURN/CLOSING GLOBE VALVE ANGLE		EJECTOR		

- NOTES:
- ITEM NUMBER ACCORDING TO EQUIPMENT LIST.
 - FOR VALVES DETAILS SEE BALLAST AND BILGE SYSTEM FITTING LIST.
 - VALVES MARKED WITH "BV" WITH BUREAU VERITAS APPROVAL AND CERTIFICATE.
 - THE BALLAST AND BILGE SYSTEM SHALL BE BUILT WITH HOT DIP GALVANIZED STEEL ACCORDING TO STANDARD DIN 2441, WHERE IS ALLOWED BY IMO RESOLUTION A.753(18) IT SHALL BE BUILT WITH PE100 S8,3/SDR17,6 PIPES FROM +07+, E.G. INSIDE BALLAST AND FUEL OIL TANKS, INSIDE COFFERDAMS, VOID SPACES, PIPE TUNNEL AND DUCTS. FLANGED JOINTS AND SOCKET WELDED UNIONS SHALL BE USED IN BOTH CASES.
 - CONNECTIONS BETWEEN SHIP'S HULL AND CERTIFIED VALVE TO BE OF REINFORCED THICKNESS.
 - FLOODING ALARM IN ENGINE ROOM, PUMP ROOM AND HYDRAULIC ROOM (TOTAL 3), LOCATED 200 mm HIGHER THAN BILGE LEVEL ALARM. ALARM TO BE GIVEN AT THE NAVIGATION BRIDGE.

REFERENCE DRAWINGS:

DRW. NUMBER 307.415.000.01 FIFI SYSTEM.
 DRW. NUMBER 307.435.000.01 COMPRESSED AIR SYSTEM.
 DRW. NUMBER 307.440.000.01 SANITARY HOT AND COLD FRESH WATER SYSTEM.

DIN 2441			DIN 2441			PE100 S8,3/SDR17,6		
DN	EXT. Ø (mm)	THK. (mm)	DN	EXT. Ø (mm)	THK. (mm)	DN	EXT. Ø (mm)	THK. (mm)
8	10,2	2,65	40	48,3	4,05	40	50	2,9
10	13,5	2,90	50	60,3	4,50	50	63	3,6
12	17,2	2,90	65	76,1	4,50	65	75	4,3
15	21,3	3,25	80	88,9	4,85	80	90	5,1
20	26,9	3,25	100	114,3	5,40	100	110	6,3
25	33,7	4,05	125	139,7	5,40	125	140	8,0
32	42,4	4,05	150	165,1	5,40	150	180	10,2
						200	225	12,8

SIZE OF BILGE PIPES acc. Bureau Veritas Steelships, Pt C, Ch 1, Sec 10 [6]

BILGE MAIN LINE

$$d = 25 + 1,68 \sqrt{L(B+D)}$$

d: Internal diameter of the bilge main, in mm.
 L: Length between perpendiculars = 58,20 m
 B: Breadth moulded = 13,40 m
 D: Depth moulded = 5,10 m

$$d = 80,13 \text{ mm} - \text{pipe } \phi 114,30 \times 5,40 \text{ ins. } \phi = 103,50 \text{ mm}$$

BILGE ENGINE ROOM

$$d1 = 25 + 2,16 \sqrt{L1(B+D)}$$

d1: Internal diameter of the branch bilge suction pipes, is not to be less than 50 mm and need not exceed 100 mm.
 L1: Length of the compartment, in m. = 14,70 m

$$d1 = 60,62 \text{ mm} - \text{pipe } \phi 76,10 \times 4,50 \text{ ins. } \phi = 67,10 \text{ mm}$$

BILGE PUMP ROOM AND HYDRAULIC ROOM

$$d2 = 25 + 2,16 \sqrt{L2(B+D)}$$

L2: Length of the compartment, in m. = 6,30 m

$$d2 = 48,32 \text{ mm} - \text{pipe } \phi 60,30 \times 4,50 \text{ ins. } \phi = 51,30 \text{ mm}$$

PUMP CAPACITY

$$Q = 0,00565d^3$$

Q: Minimum capacity of each pump or group of pumps, in m³/h
 d: Internal diameter, in mm, of the bilge main line = 80,13

$$Q = 36,28 \text{ m}^3/\text{h}$$

REV.	DATE	DESCRIPTION
2	14/07/2015	DRAWING UPDATED
1	13/04/2015	BUREAU VERITAS APPROVED 10/12/2014

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CCI BAYONNE PAYS BASQUE
Euskal Herri

ASTILLEROS DE MURUETA
BARRIO MURUETA, S.A. - SEPA
MURUETA - BASQUE

TRAILING SUCTION HOPPER DREDGER 1.200 m³

BALLAST AND BILGE SYSTEM

CLASS. SOCIETY	DRAWN	SCALE
BUREAU VERITAS	M.U.	-
OWNER	CHECKED	DRAWING N°
CCI BAYONNE	M.U.	307.410.000.01
DATE	APPROVED	FORMAT
25/09/2014	J.A.	A1
		SHEET
		1/1

MODIFICATION LIST

DRAWING N°
307.410.000.01

DRAWING TITLE
BALLAST AND BILGE SYSTEM

REVISION 1

- Change valves BI032, BI034, BI036 and BI038 to straight type.
- Change strainers BW011 and BW012 from type A to Type B and C.
- Add non return valves BI073 and BI074 in engine room fore PS and SB bilge suction.
- Add butterfly valve BI075 in the main bilge line to separate engine room and foreship.
- Add butterfly valve BW027 for the cleaning of the fore box cooler.

REVISION 2

- Poop deck drains converge in engine room. Diameter increased to DN65.
- Add non return valves BI076 and BI077 in engine room aft PS and SB bilge suction.
- Add drains to steering gear room, purifiers room and the workshop. Add selfclosing valves BI078, BI079 and BI080.
- Remove one suction from chain lockers. Remove butterfly valve BI018.

DN	Ser. Numb.	Class	Fabricante Manufact.	Modelo Model	Clase Type	Cuerpo Body	Eje Shaft	Obturador Shutter	Asiento Seat	Volante Handwheel	PN	Observaciones Remarks	Posición Position
40	BI001	BV	MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10	Bureau Veritas	Bilge water sep. overboard disch.
80	BI002	BV	MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10	Bureau Veritas	Bilge ejector overboard disch.
50	BI003		MACASA	fig. 234	mud box angle	cast iron					10		E-motor room PS bilge suct.
50	BI004		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		E-motor room PS bilge suct.
50	BI005		MACASA	fig. 234	mud box angle	cast iron					10		E-motor room fore bilge suct.
50	BI006		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		E-motor room fore bilge suct.
50	BI007		MACASA	fig. 234	mud box angle	cast iron					10		E-motor room SB bilge suct.
50	BI008		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		E-motor room SB bilge suct.
50	BI009		MACASA	fig. 234	mud box angle	cast iron					10		Pump room PS bilge suct.
50	BI010		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Pump room PS bilge suct.
50	BI011		MACASA	fig. 234	mud box angle	cast iron					10		Pump room valve well bilge suct.
50	BI012		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Pump room valve well bilge suct.
50	BI013		MACASA	fig. 234	mud box angle	cast iron					10		Pump room SB bilge suct.
50	BI014		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Pump room SB bilge suct.
50	BI015		MACASA	23386	foot valve flanged	brass B283	brass B283	brass B283	rubber		10		Void V1 bilge suct.
50	BI016		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Void V1 bilge suct.
50	BI017		MACASA	fig.206 NAE4511916	globe clos./non ret. straight	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Bilge ejector suct. from bilge main
50	BI019		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Chain locker drain
50	BI020		HERBE	65	check valve wafer type	stainless st. AISI 316 L	AISI 316 L s steel	AISI 316 L s steel	NBR		16		Bilge ejector suct. from chain lockers
50	BI021		MACASA	fig. 234	mud box angle	cast iron					10		Bilge ejector suct. from dredge pump well
50	BI022		MACASA	fig.206 NAE4511916	globe clos./non ret. straight	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Bilge ejector suct. from dredge pump well
50	BI023		ICP	type Y	strainer	cast iron EN-GJL-250					16	s steel screen	Bilge ejector suction
50	BI024		MACASA	fig.300	selfcl. v. double thr. conn.	bronze	bronze	bronze	bronze	cast iron	10		Hydraulic room drain
50	BI025		MACASA	fig.300	selfcl. v. double thr. conn.	bronze	bronze	bronze	bronze	cast iron	10		Paint locker drain
50	BI026		MACASA	fig.300	selfcl. v. double thr. conn.	bronze	bronze	bronze	bronze	cast iron	10		Frequency converter room drain
50	BI027		MACASA	fig.300	selfcl. v. double thr. conn.	bronze	bronze	bronze	bronze	cast iron	10		CO2 room drain
50	BI028		MACASA	fig.300	selfcl. v. double thr. conn.	bronze	bronze	bronze	bronze	cast iron	10		Aft store drain
50	BI029		MACASA	fig.300	selfcl. v. double thr. conn.	bronze	bronze	bronze	bronze	cast iron	10		Fan room drain
50	BI030		MACASA	fig.300	selfcl. v. double thr. conn.	bronze	bronze	bronze	bronze	cast iron	10		Emergency generator room drain
65	BI031		MACASA	fig. 234	mud box angle	cast iron					10		Engine room PS bilge suct.
65	BI032		MACASA	fig.206 NAE4511916	globe clos./non ret. straight	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Engine room PS bilge suct.
65	BI033		MACASA	fig. 234	mud box angle	cast iron					10		Engine room aft PS bilge suct.
65	BI034		MACASA	fig.206 NAE4511916	globe clos./non ret. straight	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Engine room aft PS bilge suct.
65	BI035		MACASA	fig. 234	mud box angle	cast iron					10		Engine room SB bilge suct.
65	BI036		MACASA	fig.206 NAE4511916	globe clos./non ret. straight	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Engine room SB bilge suct.
65	BI037		MACASA	fig. 234	mud box angle	cast iron					10		Engine room aft SB bilge suct.
65	BI038		MACASA	fig.206 NAE4511916	globe clos./non ret. straight	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Engine room aft SB bilge suct.
50	BI039		MACASA	23386	foot valve flanged	brass B283	brass B283	brass B283	rubber		10		Void V2 bilge suct.

DN	Ser. Numb.	Class	Fabricante Manufact.	Modelo Model	Clase Type	Cuerpo Body	Eje Shaft	Obturador Shutter	Asiento Seat	Volante Handwheel	PN	Observaciones Remarks	Posición Position
50	BI040		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Void V2 bilge suct.
50	BI041		MACASA	23386	foot valve flanged	brass B283	brass B283	brass B283	rubber		10		Void V3 bilge suct.
50	BI042		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Void V3 bilge suct.
50	BI043		MACASA	23386	foot valve flanged	brass B283	brass B283	brass B283	rubber		10		Void V8 bilge suct.
50	BI044		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Void V8 bilge suct.
50	BI045		MACASA	23386	foot valve flanged	brass B283	brass B283	brass B283	rubber		10		Void V9 bilge suct.
50	BI046		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Void V9 bilge suct.
50	BI047		MACASA	23386	foot valve flanged	brass B283	brass B283	brass B283	rubber		10		Void V4 bilge suct.
50	BI048		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Void V4 bilge suct.
50	BI049		MACASA	23386	foot valve flanged	brass B283	brass B283	brass B283	rubber		10		Void V5 bilge suct.
50	BI050		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Void V5 bilge suct.
50	BI051		MACASA	23386	foot valve flanged	brass B283	brass B283	brass B283	rubber		10		Void V6 bilge suct.
50	BI052		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Void V6 bilge suct.
50	BI053		MACASA	23386	foot valve flanged	brass B283	brass B283	brass B283	rubber		10		Void V6 bilge suct.
50	BI054		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Void V6 bilge suct.
50	BI055		MACASA	23386	foot valve flanged	brass B283	brass B283	brass B283	rubber		10		Void V7 bilge suct.
50	BI056		MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Void V7 bilge suct.
100	BI057		CALDEVI	BC-03-05 A	strainer straight patt. type A	galvanized steel					10	s steel screen 8 mm diameter	Ballast pumps suct. from bilge
100	BI058		MACASA	fig.206 NAE4511916	globe clos./non ret. straight	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Ballast pump suct. from bilge
100	BI059		MACASA	fig.206 NAE4511916	globe clos./non ret. straight	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Ballast pump suct. from bilge
100	BI060		MACASA	fig. 234	mud box angle	cast iron					10		Direct bilge suct.
100	BI061		MACASA	fig.206 NAE4511916	globe clos./non ret. straight	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10		Direct bilge suct.
100	BI062		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pumps disch. to tank 10C
100	BI063		HERBE	65	check valve wafer type	stainless st. AISI 316 L	AISI 316 L s steel	AISI 316 L s steel	NBR		16		Ballast pumps disch. to tank 10C
40	BI064		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Bilge water sep. suct. from tank 10C
40	BI065		HERBE	65	check valve wafer type	stainless st. AISI 316 L	AISI 316 L s steel	AISI 316 L s steel	NBR		16		Bilge water sep. disch. to tank 10C
40	BI066		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Bilge water sep. suct. from bilge
40	BI067		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Bilge water sep. oily water inlet
40	BI068		ICP	type Y	strainer	cast iron EN-GJL-250					16	s steel screen	Bilge water sep. oily water inlet
40	BI069		HERBE	65	check valve wafer type	stainless st. AISI 316 L	AISI 316 L s steel	AISI 316 L s steel	NBR		16		Bilge water sep. oily water inlet
25	BI070		ICP	fig. 150	ball valve with flanges	EN-GJL-250	AISI 304 s steel	DN15 to 25: AISI 303 DN32 to 200: AISI 304	PTFE	carbon steel	16		Bilge water sep. oily water disch.
25	BI071		ICP	fig. 150	ball valve with flanges	EN-GJL-250	AISI 304 s steel	DN15 to 25: AISI 303 DN32 to 200: AISI 304	PTFE	carbon steel	16		Bilge water sep. oil disch.
25	BI072		JC	fig. 916	3 way ball valve	carbon steel 1.0619	A 479 Tp.316	A 351 Gr. CF8M	PTFE	nodular iron	16	L port	Bilge water sep. water disch.
65	BI073		HERBE	65	check valve wafer type	stainless st. AISI 316 L	AISI 316 L s steel	AISI 316 L s steel	NBR		16		Engine room PS bilge suct.
65	BI074		HERBE	65	check valve wafer type	stainless st. AISI 316 L	AISI 316 L s steel	AISI 316 L s steel	NBR		16		Engine room SB bilge suct.

DN	Ser. Numb.	Class	Fabricante Manufact.	Modelo Model	Clase Type	Cuerpo Body	Eje Shaft	Obturador Shutter	Asiento Seat	Volante Handwheel	PN	Observaciones Remarks	Posición Position
100	BI075		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Engine room and foreship bilge segregation
65	BI076		HERBE	65	check valve wafer type	stainless st. AISI 316 L	AISI 316 L s steel	AISI 316 L s steel	NBR		16		Engine room aft PS bilge suct.
65	BI077		HERBE	65	check valve wafer type	stainless st. AISI 316 L	AISI 316 L s steel	AISI 316 L s steel	NBR		16		Engine room aft SB bilge suct.
50	BI078		MACASA	fig.300	selfcl. v. double thr. conn.	bronze	bronze	bronze	bronze	cast iron	10		Steering gear room drain
50	BI079		MACASA	fig.300	selfcl. v. double thr. conn.	bronze	bronze	bronze	bronze	cast iron	10		SB Workshop drain
50	BI080		MACASA	fig.300	selfcl. v. double thr. conn.	bronze	bronze	bronze	bronze	cast iron	10		Purifiers room drain
80	BW001	BV	TTV	lug	butterfly	cast carbon steel	AISI 316 s steel	AISI 316 s steel	EPDM		10	Bureau Veritas	PS box cooler sea inlet cleaning
100	BW002	BV	TTV	lug	butterfly	cast carbon steel	AISI 316 s steel	AISI 316 s steel	EPDM		10	Bureau Veritas	Ballast pumps suct. from sea chest
80	BW003	BV	TTV	lug	butterfly	cast carbon steel	AISI 316 s steel	AISI 316 s steel	EPDM		10	Bureau Veritas	SB box cooler sea inlet cleaning
100	BW004	BV	TTV	lug	butterfly	cast carbon steel	AISI 316 s steel	AISI 316 s steel	EPDM		10	Bureau Veritas	Ballast pumps suct. from sea chest
100	BW005	BV	MACASA	fig.207 NAE4512916	globe clos./non ret. angle	cast carbon steel	AISI 316 s steel	AISI 316 s steel	AISI 316 s steel	cast iron	10	Bureau Veritas	Ballast pumps overboard disch.
100	BW006		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Tank 2P fill/suct.
100	BW007		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Tank 2S fill/suct.
100	BW008		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Tank 3P fill/suct.
100	BW009		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Tank 3S fill/suct.
100	BW010		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pump suct./disch. from/to tanks
100	BW011		CALDEVI	BC-03-05 B	strainer straight patt. type B	galvanized steel					10	s steel screen 8 mm diameter	Ballast pumps suct. from sea chest
100	BW012		CALDEVI	BC-03-05 C	strainer straight patt. type C	galvanized steel					10	s steel screen 8 mm diameter	Ballast pumps suct. from sea chest
100	BW013		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pump suct. from sea chest
100	BW014		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pump suct. from sea chest
100	BW015		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pump suct. from tanks
100	BW016		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pump suct. from tanks
100	BW017		HERBE	65	check valve wafer type	stainless st. AISI 316 L	AISI 316 L s steel	AISI 316 L s steel	NBR		16		Ballast pump disch.
100	BW018		HERBE	65	check valve wafer type	stainless st. AISI 316 L	AISI 316 L s steel	AISI 316 L s steel	NBR		16		Ballast pump disch.
100	BW019		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pump disch. to tanks
100	BW020		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pump disch. to tanks
100	BW021		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pump overboard and tank 10P disch.
100	BW022		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pump overboard and tank 10P disch.
100	BW023		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pump disch. to fire main
100	BW024		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pump disch. to fire main
100	BW025		HERBE	65	check valve wafer type	stainless st. AISI 316 L	AISI 316 L s steel	AISI 316 L s steel	NBR		16		Ballast pump disch. to fire main
100	BW026		TTV	wafer	butterfly	nodular iron GGG 50	AISI 316 s steel	AISI 316 s steel	nitrile (BUNA N)		10		Ballast pump disch. to fire main
80	BW027	BV	TTV	lug	butterfly	cast carbon steel	AISI 316 s steel	AISI 316 s steel	EPDM		10	Bureau Veritas	Fore box cooler sea inlet cleaning