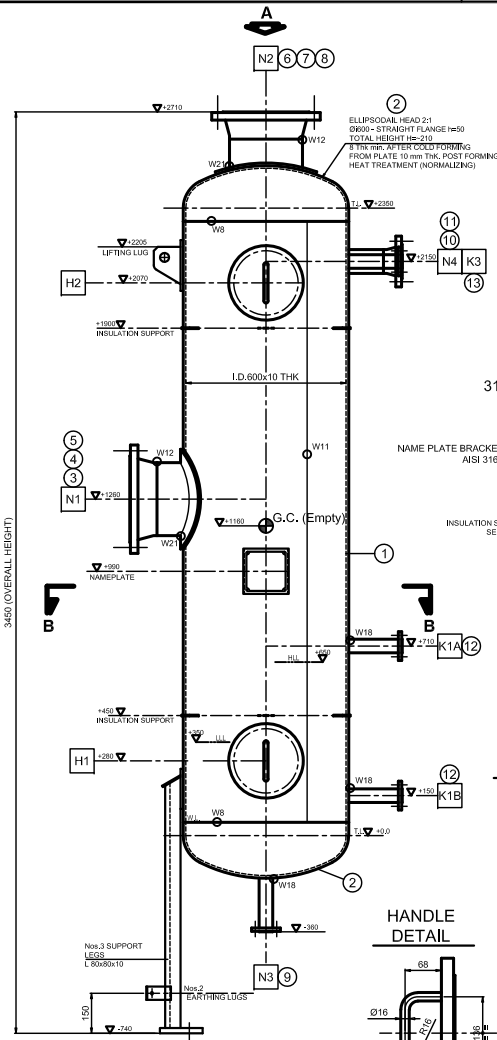
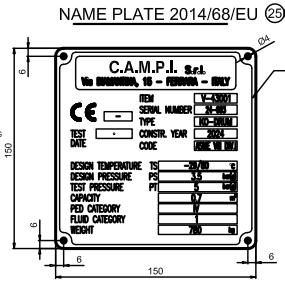
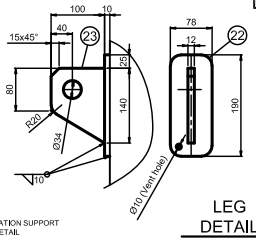
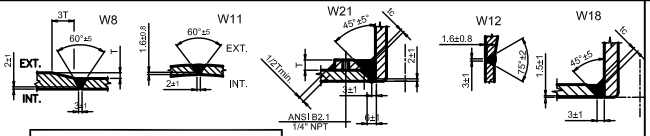
DRAWING NO. 1724000163-MAC-DA-00004 REV. 02

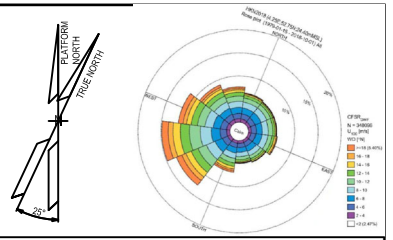

A
N2 6 7 8
ELLIPSOIDAIL HEAD 2:1
Ø600 + STRAIGHT FLANGE h=50
TOTAL HEIGHT H=~210
8 Thk min. AFTER COLD FORMING
FROM PLATE 10 mm Thk, POST FORMING
HEAT TREATMENT (NORMALIZING)
LIFTING LUG
INSULATION SUPPORT
I.D.600x10 THK
G.C. (Empty)
NAMEPLATE
INSULATION SUPPORT
INSULATION SUPPORT
Nos.3 SUPPORT LEGS L 80x80x10
Nos.2 EARTHING LUGS
B.C.D. 570
NO.3 ANCHOR BOLTS M24
3450 (OVERALL HEIGHT)
B
B


NAME PLATE 2014/68/EU 25 26
C.A.M.P.I. S.r.l.
Via Ghiardina, 15 - FERRARA - ITALY
ITEM
SERIAL NUMBER
TYPE
CONSTR. YEAR
CODE
TEST DATE
DESIGN TEMPERATURE TS
DESIGN PRESSURE PS
TEST PRESSURE PT
CAPACITY
PED CATEGORY
FLUID CATEGORY
WEIGHT
AISI 316L THK. 2 MM





NOTE - tc min : The SMALLER of 6mm / 0.7xTmin

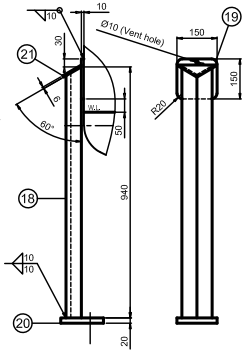


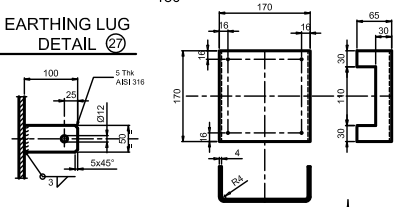
123A90-DDL-MAC-SP-50026	TECHNICAL SPECIFICATION FOR CS HORIZONTAL PRESSURE VESSELS IN H2 SERVICE	01
123A90-DDL-MAC-DS-50028	TDS - HYDROGEN VENT KO DRUM - V-43001	00
123A90-DDL-MAT-SP-60006	COATING AND PAINTING SPECIFICATION	02
123A90-DDL-ST-SP-90017	STRUCTURAL DESIGN BASIS	02
123A90-DDL-ST-SP-90018	STRUCTURAL MATERIAL SPECIFICATION	01
NUMBER	TITLE	REV.

REFERENCE DOCUMENTS

JOINT CATEGORY	RT	UT	PT/MT
A (SHELL LONGITUDINAL BUTT JOINT)	10% (100% for cross)	100%	-
B (SHELL CIRCUMFERENTIAL BUTT JOINT)	10% (100% for cross)	100%	-
C (NOZZLE-FLANGE BUTT JOINT)	10%	-	-
D (NOZZLE-SHELL/HEAD CORNER JOINT)	-	-	100%
LIFTING LUG AND LEGS	-	-	100%
WELD REPAIRS .	AS PER ORIGINAL WELD NDE		

WELDING EXAMINATIONS

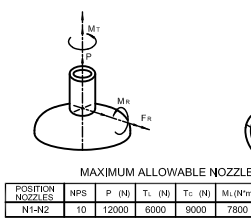




GASKETS FOR NOZZLES	1/16" FLEXIBLE GRAPHITE W/304 S.S. INSERT		-
STUD BOLTS / NUTS (EXTERNAL)	SA-320 Gr.L7 / SA-194 Gr.7		GALV., ACC. TO ASTM B633 Fe/Zn12
SUPPORT LEGS / BASE PLATES	S355J2 / SA-516 Gr.70		-
FLANGES NOZZLES AND BLIND	SA-350 LF2 CL1		-
NOZZLE NECKS	SA-333 Gr.6		-
REINFORCING PAD	SA-516 Gr.60N		-
SHELL / HEADS	SA-516 Gr.60N		-
DESCRIPTION	MATERIAL	CERT.	NOTES

MATERIAL LIST

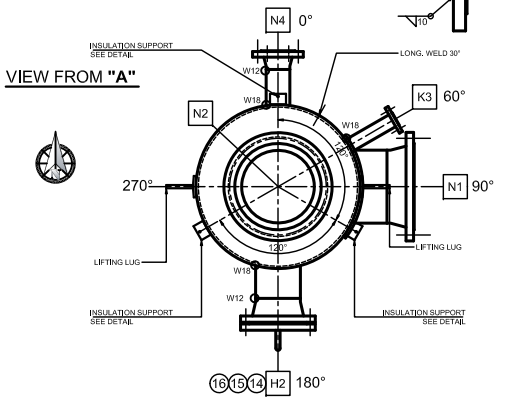
MATERIALS CERTIFICATION	THICKNESSES TOLERANCE
CERTIFICATE EN 10204 3.2	PLATES: -0,2 mm
CERTIFICATE EN 10204 3.1	PIPES: -12.5%
CERTIFICATE EN 10204 2.2	HEADS: -



MAXIMUM ALLOWABLE NOZZLE LOADS TABLE

POSITION NOZZLES	NPS	P (N)	T_L (N)	T_C (N)	M_L (N*m)	M_C (N*m)	M_T (N*m)
N1-N2	10	12000	6000	9000	7800	6000	9000

NOTE: NOZZLE FLANGE VERIFIED ACCORDING TO MANDATORY UG-44 TAKING INTO ACCOUNT THE EXTERNAL LOADS



N1	1	10	XS/12.7	150#	GAS INLET	WN-RF	3.2 ÷ 6.3 µm Ra	10x50	510	
N2	1	10	XS/12.7	150#	GAS OUTLET	WN-RF	3.2 ÷ 6.3 µm Ra	10x50	SEE DWG	
N3	1	1	- /12.7	150#	LIQUID OUTLET	LWN-RF	3.2 ÷ 6.3 µm Ra	-	SEE DWG	
N4	1	3	XS /7.62	150#	VENT	WN-RF	3.2 ÷ 6.3 µm Ra	-	510	
K1A	1	1	- /12.7	150#	LT FOR ALARM	LWN-RF	3.2 ÷ 6.3 µm Ra	-	510	
K1B	1	1	- /12.7	150#	LT FOR ALARM	LWN-RF	3.2 ÷ 6.3 µm Ra	-	510	
K3	1	1	- /12.7	150#	PT	LWN-RF	3.2 ÷ 6.3 µm Ra	-	510	
H1	1	6	XS /10.97	150#	INSPECTION PORT	WN-RF + BF	3.2 ÷ 6.3 µm Ra	-	510	1)
H2	1	6	XS /10.97	150#	INSPECTION PORT	WN-RF + BF	3.2 ÷ 6.3 µm Ra	-	510	1)
POSITION NOZZLE	N° OF	ND (NPS)	SCHEDULE/ THICKNESS	ASME PRESS. CLASS	SERVICE	TYPE AND FACING FLANGE	FLANGE FACE FINISH	REINFORCING PLATE THK./WIDTH	PROJ. FROM CENTER LINE	NOTES

LIST OF CONNECTIONS

NOZZLE NOTES

1) WITH BLIND FLANGE, GASKET, STUD BOLTS, NUTS, HANDLE

NOTES

27) NO WELD REPAIR ARE ADMITTED AFTER PWHT
26) MECHANICAL TEST ON PRODUCTION TEST COUPON (TENSILE TEST AT ROOM TEMPERATURE AND CHARPY TESTING AT -29°C, TEST ISO 17025 IN ACCREDITATED LABORATORY)
25) FOR SHIPMENT ALL NOZZLES SHALL BE BLANKED OF (WITH METALLIC BLIND, BOLTS AND GASKETS)
24) FOR PRESERVATION AND PREPARATION FOR SHIPMENT DESSICANT BAG WILL BE USED
23) COMMISSIONING SPARE PARTS:
- 10% SPARE BOLTING FOR EACH SIZE, WITH A MINIMUM OF 2 BOLTS WITH 4 NUTS AND WASHERS
- TWO COMPLETE SETS OF NEW SPARE GASKETS OF THE SAME MATERIAL THAN GASKETS INSTALLED ON THE EQUIPMENT, FOR EACH SIZE.

22) SURFACE PREPARATION AND PAINTING AS PER C3 CORROSIVITY CATEGORY OF ISO 9223
21) MATERIALS SHALL BE CERTIFIED EN 10204 TYPE 3.1 FOR PRESSURE PARTS AND TYPE 2.2 FOR OTHER PARTS.
20) CS FABRICATION MATERIAL FOR PRESSURE VESSELS IN HYDROGEN SERVICE SHALL HAVE CE MAX. = 0,35%.
19) PHOSPHORUS MAXIMUM TO BE 0,015%
18) IMPACT TESTING SHALL BE AT -46°C FOR BASE METAL AND WELD METAL IN H2 SERVICE REGARDLESS OF MDMT
17) STEEL SHALL BE HIC RESISTANT TO ISO 15156-2
16) MAX HARDNESS IN BASE METAL SHALL BE 235 HV10
15) ALL CARBON STEEL MATERIALS SHALL BE SUPPLIED IN FULLY KILLED AND NORMALIZED CONDITIONS,
14) COLD FORMED CARBON STEEL HEADS SHALL BE NORMALIZED AFTER FORMING.
13) FLANGES SHALL BE THROUGH-BOLTED WITH STUD BOLTS. THREADED FULL-LENGTH WITH A REMOVABLE NUT ON EACH END. THE LENGTH OF THE STUD BOLTS SHALL BE SELECTED SUCH THAT AFTER ASSEMBLY THE LENGTH OF THE STUD PROTRUDING BEYOND THE NUT IS 3,5MM ÷ 7,5MM.
12) WELDS ON REINFORCING PADS SHALL BE TESTED WITH BUBBLE (SOAP) SOLUTION AND COMPRESSED AIR AT A PRESSURE OF 0,5 TO 1 ,0 BAR (G), BEFORE PWHT AND HYDROSTATIC TESTING OF THE VESSEL.
11) REINFORCING PADS SHALL PREFERABLY BE OF ONE-PIECE CONSTRUCTION, IF THIS IS NOT POSSIBLE, THE WELDS IN SEGMENTED REINFORCING PADS SHALL BE ALIGNED IN THE DIRECTION OF THE VESSEL'S CIRCUMFERENCE.
10) REINFORCING PADS SHALL BE PROVIDED WITH ONE ½" NPT TELLTALE HOLE. TWO-PIECE REINFORCING PADS SHALL BE PROVIDED WITH TWO TELLTALE HOLES (ONE PER SEGMENT), AFTER TESTING, THE TELLTALE HOLE SHALL BE PLUGGED.
9) FABRICATION TEST COUPONS SHALL INCLUDE AS MINIMUM 1(ONE) TEST PIECE OF BASE MATERIAL BEFORE PWHT AND ANOTHER 1(ONE) OF MATERIAL WITH PWHT. TEST PLATES SHALL BE OF THE SAME HEAT OF THE SHELL MATERIAL USED IN THE CONSTRUCTION OF THE VESSEL AND SHALL BE HEAT TREATED WITH THE VESSEL IN THE SAME FURNACE WHEN APPLICABLE.
8) MACHINED SURFACES, FLANGE FACES, ETC., SHALL BE PROTECTED FROM OXIDATION DURING HEAT TREATMENT. NO WELDING, HAMMERING OR DEFORMATION IS PERMITTED AFTER PWHT.
7) THE MINIMUM DISTANCE BETWEEN THE EDGE OF THE NOZZLE WELDS OR REINFORCEMENT PLATE WELDS AND THE EDGE OF THE WELDED SEAM SHALL BE AS FOLLOWS:
- FOR A LONGITUDINAL WELD, THE GREATER OF 100 MM AND 2*t (WHERE t IS THE WALL THICKNESS);
- FOR CIRCUMFERENTIAL WELD, THE GREATER OF 50 MM AND 2*t.

6) NOZZLES PROJECTIONS REFERRED FROM EQUIPMENT CENTERLINE TO FLANGE CONTACT FACE. NOZZLE PROJECTIONS : FOR NOZZLE INSTALLED ON HEADS ARE REFERRED TO TANGENT LINE.
5) NOZZLES FLANGE STUD BOLTS HOLES STRADDLE C.L.
4) ALL THICKNESS SHOWN ON THIS DRAWING ARE MINIMUM AFTER FORMING AND MACHINING.
3) FLANGES ACCORDING TO ASME B16.5/2020 - , PIPES CARBON STEEL ACCORDING TO ASME B36.10/2022, PIPE FITTING ACCORDING TO ASME B16.9/2018 + B16.11/2021
2) CONSTRUCTION TOLERANCES AS PER ASME VIII DIV.1 ED.2023 PAR. UG-80 + UG-81. FOR ANGULAR AND LINEAR PARTS SEE C.A.M.P.I. SPEC. CTD-004/09 REV. 0
1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.

DESIGN DATA

			SIDE	SHELL	NOTES
DESIGN CODES				ASME VIII Div.1 _ 2023 Ed.+2014/68/EU	
AUTHORIZED INSPECTION AGENCY				-	
ASME CERTIFICATION				NONE	
NATIONAL BOARD REGISTRATION				NONE	
PED CATEGORY				IV	
MODULE				G	
ATEX CLASSIFICATION				ZONE IIB T1+H2	
PRESSURE	DESIGN	bar (g)		3.5	
	OPERATING	bar (g)		ATM	
	HYDROTEST	bar (g)		5,0	
	M.A.W.P. (HOT AND CORRODED)	bar (g)		18 @ 80°C	
TEMPERATURE	DESIGN	°C		80	
	OPERATING	°C		25	
	MDMT	°C		-29 @ 18 bar (g)	18)
CORROSION ALLOWANCE		mm		1.0	
FLUID	TYPE			HYDROGEN / WATER	
	FLUID GROUP			1 / 2	
	PHYSICAL STATE			GAS / LIQUID	
	DENSITY	Kg/m³		0.085/1000	
	CAPACITY	m³		0.7	
JOINTS EFFICIENCY		SHELL		0.85	
		HEADS		0.85	
X-RAY TEST				SPOT	
POSTWELD HEAT TREATMENT AS PER UCS-56				YES (FOR PROCESS REQUIREMENT)	
OUT OF ROUND AS PER UG-80(a)		%		<1	
EXTREME FIBER ELONG SHELL AS PER UG-79-1		%		1.31 (NO Post forming heat treatment)	
EXTREME FIBER ELONG HEAD AS PER UG-79-1		%		7 (Post forming heat treatment see note 14)	
IMPACT TEST				SEE NOTE 18)	
INSPECTION OPENING AS PER UG-46(f)				SEE CONNECTION "H1" & "H2"	
SERVICE RESTRICTION AS PER UW-2				NONE	
INSULATION				YES / BY OTHERS	
FIREPROOFING				NONE	
SEISMIC ZONE FACTOR				NONE	
WIND DATA				1 Year Return, 3 sec. gust = 35 m/sec, 100 Year Return, 3 sec. gust = 45 m/sec	
INSTALLATION	VERTICAL			SUPPLY WEIGHT (MASS) 780 kg	
LOCATION	OFFSHORE			OPERATING WEIGHT 1015 kg	
				WEIGHT FULL OF WATER 1500 kg	

PAINTING (IN WORKSHOP)

EXTERNAL SURFACES:
- SANDBLASTING SA 2½ Std ISO 8501-1 (SSPC - SP10).
- COATING SYSTEM : N°1 OF NORSOK M-501
- TOP COAT COLOUR : WHITE RAL 9002

LOADS ON FOUNDATION

		ERECTION	TEST	OPERATING
VERTICAL LOAD	kN	7.6	14.7	9.9
SHEAR	kN	3.6	0.9	3.1
MOMENT	kN*m	3.8	0.95	3.2

LEGEND

HOLDS

A) -
B) -
C) -
D) -

FERRARA C.A.M.P.I. ITALY
Via Ghiardina, 15 - 44122 FERRARA - ITALY
Tel. (+39) 0532 770048-772232 e-mail: camp@campi.it

C.A.M.P.I. DWG No. 24003-VE-10
Manufacturer Serial No. 24-003

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
04	02/09/24	CATTINI	BENINI	DALL'ARCHE	ACCEPTED FOR CONSTRUCTION (AFC)
03	01/07/24	CATTINI	BENINI	DALL'ARCHE	ACCEPTED FOR CONSTRUCTION (AFC)
02	14/06/24	CERVELLATI	BENINI	DALL'ARCHE	ADDED INSULATION SUPPORT
01	22/03/24	CERVELLATI	BENINI	DALL'ARCHE	ISSUE FOR CLIENT REVIEW (ICR)
00	29/02/24	CERVELLATI	BENINI	DALL'ARCHE	ISSUE FOR CLIENT REVIEW (ICR)

CROSSWIND

ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
HYDROGEN VENT KO DRUM V-43001
GA DRAWING & FOUNDATION LOADING

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK | SCALE 1:10
DRAWN CERVELLATI | CHECKED BENINI | APPROVED DALL'ARCHE | DATE 28/02/24
A1 | DRAWING NO. 1724000163-MAC-DA-00004 | SHEET 1/3 | REV. 04

File Name : 1724000163-MAC-DA-00004

MATERIAL LIST

Job 24003

ROSETTI Ref 1724000163-MAC-DA-00004

Drawn CERVELLATI

Customer ROSETTI MARINO

Dwg Ref 24003-VE-10

Serial N° 24-003

Checked BENINI

P.O. No.

ITEM G.A. DRAWING FOR 38-V-001

Q.ty 1

Date 22.03.2024

ITEM .	REV	Q.TY	DESCRIPTION	DIMENSIONS		MATERIAL CODE DESIGNATION	APPLICABLE CODE	MATERIAL CERT.	OIS N°	NOTES
1		1	SHELL PLATE	2250x1916	10 Thk	SA 516 Gr. 60N		EN10204 - 3.1		
2		2	ELLIPSOIDAL HEAD 2:1	Øi600 h50 H210	8 Thk	SA 516 Gr. 60N		EN10204 - 3.1		Thk min AFTER COLD FORMING
3		1	FLANGE ASME W.N. R.F. Sch.XS	10"	150#	SA 350 LF2 Cl.1		EN10204 - 3.1		
4		1	PIPE	Ø273x12,7	~143	SA 333 Gr.6		EN10204 - 3.1		**N1**
5		1	PLATE	Ø373/277	10 Thk	SA 516 Gr. 60N		EN10204 - 3.1		
6		1	FLANGE ASME W.N. R.F. Sch.XS	10"	150#	SA 350 LF2 Cl.1		EN10204 - 3.1		
7		1	PIPE	Ø273x12,7	~126	SA 333 Gr.6		EN10204 - 3.1		**N2**
8		1	PLATE	Ø373/277	10 Thk	SA 516 Gr. 60N		EN10204 - 3.1		
9		1	FLANGE ASME L.W.N. R.F. L=STD	1"	150#	SA 350 LF2 Cl.1		EN10204 - 3.1		***N3***
10		1	FLANGE ASME W.N. R.F. Sch.XS	3"	150#	SA 350 LF2 Cl.1		EN10204 - 3.1		**N4**
11		1	PIPE	Ø88,9x7,62	~144	SA 333 Gr.6		EN10204 - 3.1		
12		2	FLANGE ASME L.W.N. R.F. L=STD	1"	150#	SA 350 LF2 Cl.1		EN10204 - 3.1		***K1A-K1B***
13		1	FLANGE ASME L.W.N. R.F. L=STD	1"	150#	SA 350 LF2 Cl.1		EN10204 - 3.1		***K3***
14		2	FLANGE ASME W.N. R.F. Sch.XS	6"	150#	SA 350 LF2 Cl.1		EN10204 - 3.1		
15		2	PIPE	Ø168,3x10,97	~133	SA 333 Gr.6		EN10204 - 3.1		
16		2	BLIND FLANGE ASME R.F.	6"	150#	SA 350 LF2 Cl.1		EN10204 - 3.1		
16a		2	GASKET	6"	150#	1/16" FLEXIBLE GRAPHITE W/304 S.S. INSERT		EN10204 - 2.2		***H1-H2***
16b		16	STUD BOLT	3/4"X120 10UNC-2A		SA 320 Gr. L7		EN10204 - 3.1		
16c		32	HEXAGONAL NUT	3/4" 10UNC-2B		SA 194 Gr. 4		EN10204 - 3.1		
16d		32	PLAIN WASHER	3/4"		F 436 Gr. 1				

MATERIAL LIST

Job 24003

ROSETTI Ref 1724000163-MAC-DA-00004

Drawn CERVELLATI

Customer ROSETTI MARINO

Dwg Ref 24003-VE-10

Serial N° 24-003

Checked BENINI

P.O. No.

ITEM G.A. DRAWING FOR 38-V-001

Q.ty 1

Date 22.03.2024

ITEM .	REV	Q.TY	DESCRIPTION	DIMENSIONS		MATERIAL CODE DESIGNATION	APPLICABLE CODE	MATERIAL CERT.	OIS N°	NOTES
17		2	ROD	Ø16	251	S355J2				
18		3	L-SHAPE	80x80x10	940	S355J2				
19		3	PLATE	150x150	10 Thk	SA 516 Gr. 60N		EN10204 - 3.1		
20		3	PLATE	150x160	20 Thk	SA 516 Gr. 60N				
21		3	PLATE	140x80	6 Thk	C.S.				
22		2	PLATE	78x190	10 Thk	SA 516 Gr. 60N		EN10204 - 3.1		
23		2	PLATE	100x140	12 Thk	SA 516 Gr. 60N				
24		1	PLATE	170x286	4 Thk	AISI 316L				
25		1	NAME PLATE	150x150	2 Thk	AISI 316L				
26		4	RIVET	Ø3,5x11		AISI 316L				
27		2	PLATE	50x100	5 Thk	AISI 316				
SPARE PARTS (Commissioning) - 2 SET OF GASKET (FOR EACH SIZE) + 10% OF BOLTS (FOR EACH SIZE) Min. 2 PCS.										
A		4	GASKET	6"	150#	1/16" FLEXIBLE GRAPHITE W/304 S.S. INSERT		EN10204 - 2.2		*Pos.16a*
B		2	STUD BOLT	3/4"X120 10UNC-2A		SA 320 Gr. L7		EN10204 - 3.1		*Pos.16b*
C		2	HEXAGONAL NUT	3/4" 10UNC-2B		SA 194 Gr. 4		EN10204 - 3.1		*Pos.16c*
D		2	PLAIN WASHER	3/4"		F 436 Gr. 1				*Pos.16d*
			NOTE >>>>> *- STUD BOLTS, NUTS AND WASHER SHALL BE GALVANIZED ACCORDING TO ASTM B633 FeZn12*							
		*	APPLICABLE CODE (for all materials certified 3.1) : ASME VIII							