

ΑΣΦΑΛΙΣΤΙΚΑ ΛΕΒΗΤΑ ΜΟΝΑΔΑΣ V/380MW ΑΗΣ Κ.-Λ

A/A	TYPE	DISCRIPTION	KKS	Drawing No.	Serial No.	Set Pressure (bar)	Over Pressure (bar)	Closing Pressure (bar)	TEMPERATURE (°C)	INLET CONNECTION	DISCHARGE CONNECTION	Supplier	BODY	INSTALLED
1	1749WE	SUPERHEATER - H.P.	5LBA 30 AA901	453436	U 32293	115	118,45	110,4	567	WELDED	BOLTED	DRESSER	A217 WC9	1
2	1746WB	H.P DRUM	5HAE 30 AA901	414712	U 32291	124	127,72	119,04	399	WELDED	BOLTED	DRESSER	A216 WCC	1
3	1746WB	H.P DRUM	5HAE 30 AA902	414712	U 32291	126	129,78	120,96	399	WELDED	BOLTED	DRESSER	A216 WCC	1
4	1785B	COLD REHEATER	5HAH 25 AA901	414703	U 32295	29,7	30,59	28,51	353	BOLTED	BOLTED	DRESSER	A217 WC6	1
5	1785B	COLD REHEATER	5HAH 25 AA902	414703	U 32295	31,5	32,45	30,24	353	BOLTED	BOLTED	DRESSER	A217 WC6	1
6	1786 E	HOT REHEATER	5HAJ 26 AA901	414706	U 32296	28	28,84	26,58	548	BOLTED	BOLTED	DRESSER	A217 WC9	1
7	1811 MB	I.P DRUM	5HAE 20 AA901	93052 PM4	C 83917	33,8	34,81	32,45	243	BOLTED	BOLTED	CARRARO	A216 WCB	1
8	1811 PB	I.P DRUM	5HAE 20 AA902	93052 PM6	C 83919	35	36,05	33,6	243	BOLTED	BOLTED	CARRARO	A216 WCB	1
9	1811 MB	SUPERHEATER - I.P.	5HAH21 AA901	93052 PM5	C 83920	32,5	33,48	31,2	307	BOLTED	BOLTED	CARRARO	A216 WCB	1
10	1811 QB	DRUM	5HAE10 AA901	93052 PM8	C 83924	9,6	9,89	9,22	184	BOLTED	BOLTED	CARRARO	A216 WCB	1
11	1811 QB	DRUM	5HAE10 AA902	93052 PM9	C 83923	10	10,3	9,6	184	BOLTED	BOLTED	CARRARO	A216 WCB	1
12	1811 QB	DRUM	5HAE10 AA903	93052 PM10	C 83922	10,3	10,6	9,89	184	BOLTED	BOLTED	CARRARO	A216 WCB	1
13	1811 QB	SUPERHEATER - L.P.	5LBD30 AA901	93052 PM11	C 83925	8	8,24	7,68	300,5	BOLTED	BOLTED	CARRARO	A216 WCB	1
14	1914 Gt	ECONOMIZER I.P	5HAC20 AA901	453897		74	81,4	68,82	291	BOLTED	BOLTED	DRESSER	A216 WCC	1
15	1912 Pt	ECONOMIZER L.P	5HAC10 AA901	415112		40	44	37,2	252	BOLTED	BOLTED	DRESSER	A216 WCC	1
16	1811 KB	CONTINUOUS BLOW DOWN TANK	5HAN20 AA901	93052 PM12		10	11	9,3	185	BOLTED	BOLTED	CARRARO	A216 WCB	1

MODIFICATION		AUTEUR CONTROL INTERNE		AUTEUR CONTROL EXTERNE	
Ind	Désignation	Date	Ind	Désignation	Date
A	EMISSION	21/04/2004 PJ	PC	LC	
B	MODIFIED BY-PASS VALVE AND UP DATED	22/04/2004 PJ	PC	LC	
C	ADDED COARSE BAR SCREEN CHANGED LEVELS	13/01/2005 JM	PC	LC	
D	UP DATED SENSORS RESERVATIONS.	04/02/2005 AB	PC	LC	



N°	DESIGNATION
1	STOP LOG GUIDES
2	STOP LOG
3	AUTOMATIC TRASH RAKE
4	TRAVELLING BAND SCREEN
5	WASH WATER PUMP
6	POWER CABLE DUCT
7	INSTRUMENT CABLE DUCT
8	CONTROL CABLE DUCT
9	ELECTRICAL CABINET IN CHLORINATION ROOM
10	TRASH BASKET (BY OTHER)
11	TRASH PIT DRAIN
12	OVER PRESSURE DAMPER
13	HAND RAILS (BY OTHERS)
14	DIFFERENTIAL HEAD LOSS MESURING SYSTEM
15	COARSE BAR SCREEN

NOTE: HANDRAILS / LADDERS BY OTHERS

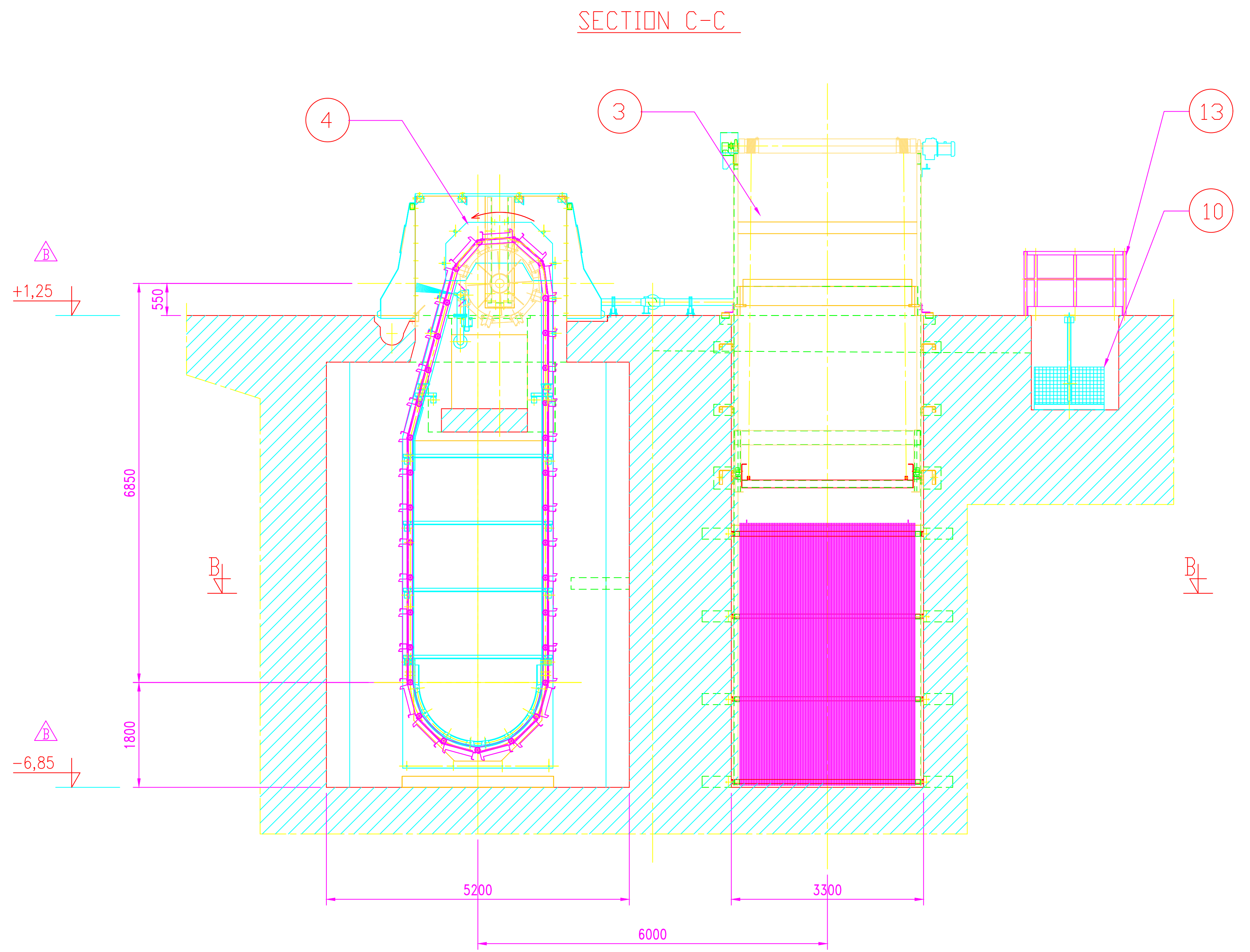
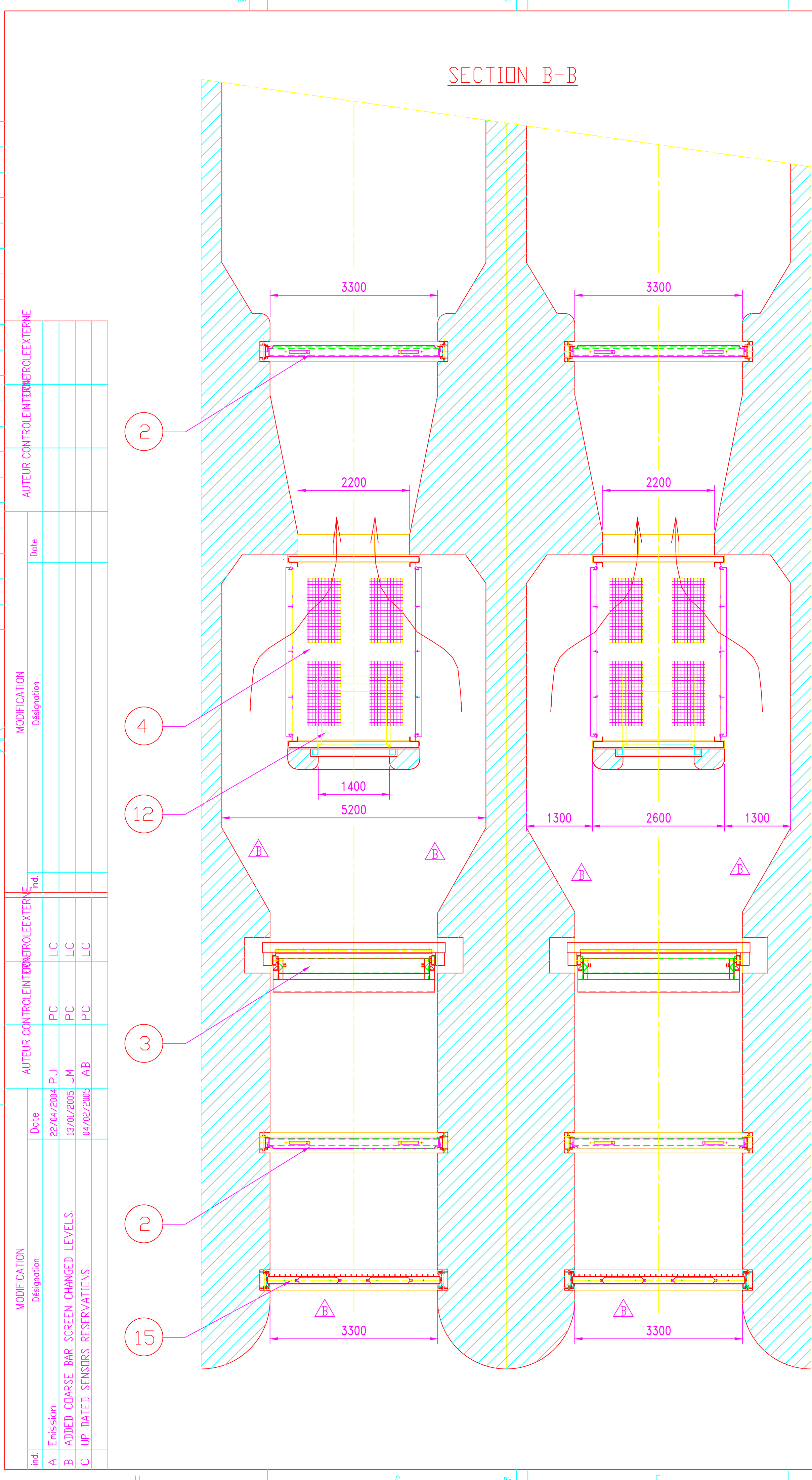
FILTERING SYSTEM DESIGN SPECIFICATION	
-NUMBER OF LINES : 2	
-SEAWATER	
-NOMINAL CAPACITY PER LINE : 28500 m3/h	
-OPERATING DECK LEVEL : GROUND LEVEL +1.25 M	
-CHANNEL BOTTOM LEVEL : GROUND LEVEL -6.85 M	
-HIGH WATER LEVEL : GROUND LEVEL +0.75 M	
-LOW WATER LEVEL : GROUND LEVEL -0.75 M	

DEMANDER EN CAS DE DOUTE / IF IN DOUBT ASK

GRILLE DE MODIFICATIONS/MODIFICATION TABLE				
Indice : D	Date	Auteur/Author	Vérif.	Approb.
Rev. : D	04/02/2005	AB	PC	LC
Désignation : UP DATED SENSORS RESERVATIONS.				
14, boulevard Ornano 75018 PARIS Tél.: (33)1.42.57.14.35 Fax: (33)1.42.64.74.62 E-mail: beaudrey@beaudrey.fr				
CODE PLAN	ECHELLE/SCALE	DATE	DESSINE/DRAWN	D102391
IFCA420	1/50	21/04/04	PJ	

				PUBLIC POWER CORPORATION		LAVRION V CC PF	
				DMKT 11 21 302			
				METKA		LAVRION GENERAL ARRANGEMENT CROSS - SECTION 1 / 3	
				METKA DWG.No.		DIN	
				KKS DWG.No. 5-GA-GDA-BEA-009		SCALE 1/50	
				EA DWG.No.		SHEET 1 OF 1	

 METKA	LAVRION TOP VIEW 2/3 GENERAL ARRANGEMENT	
 EMPRESARIOS AGRUPOADOS	METKA DWG.No. . KKS DWG.No. 5-GA-GDA-BEA-001 EA DWG.No. .	DIN SCALE 1/50 SHEET 1 OF 1



N°	DESIGNATION
1	STOP LOG GUIDES
2	STOP LOG
3	AUTOMATIC TRASH RAKE
4	TRAVELLING BAND SCREEN
5	WASH WATER PUMP
6	POWER CABLE DUCT
7	INSTRUMENT CABLE DUCT
8	CONTROL CABLE DUCT
9	ELECTRICAL CABINET IN CHLORINATION ROOM
10	TRASH BASKET (BY OTHER)
11	TRASH PIT DRAIN
12	BY-PASS VALVE
13	HAND RAILS (BY OTHERS)
14	DIFFERENTIAL HEAD LOSS MESURING SYSTEM
15	COARSE BAR SCREEN

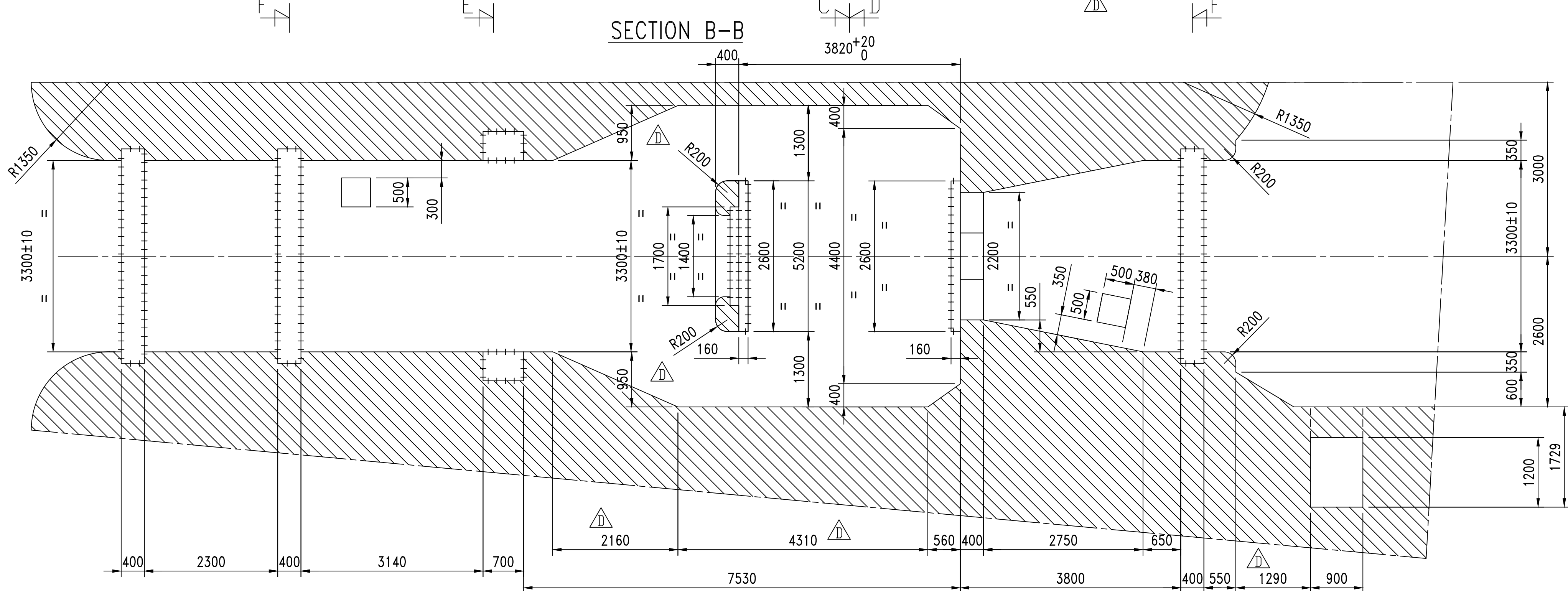
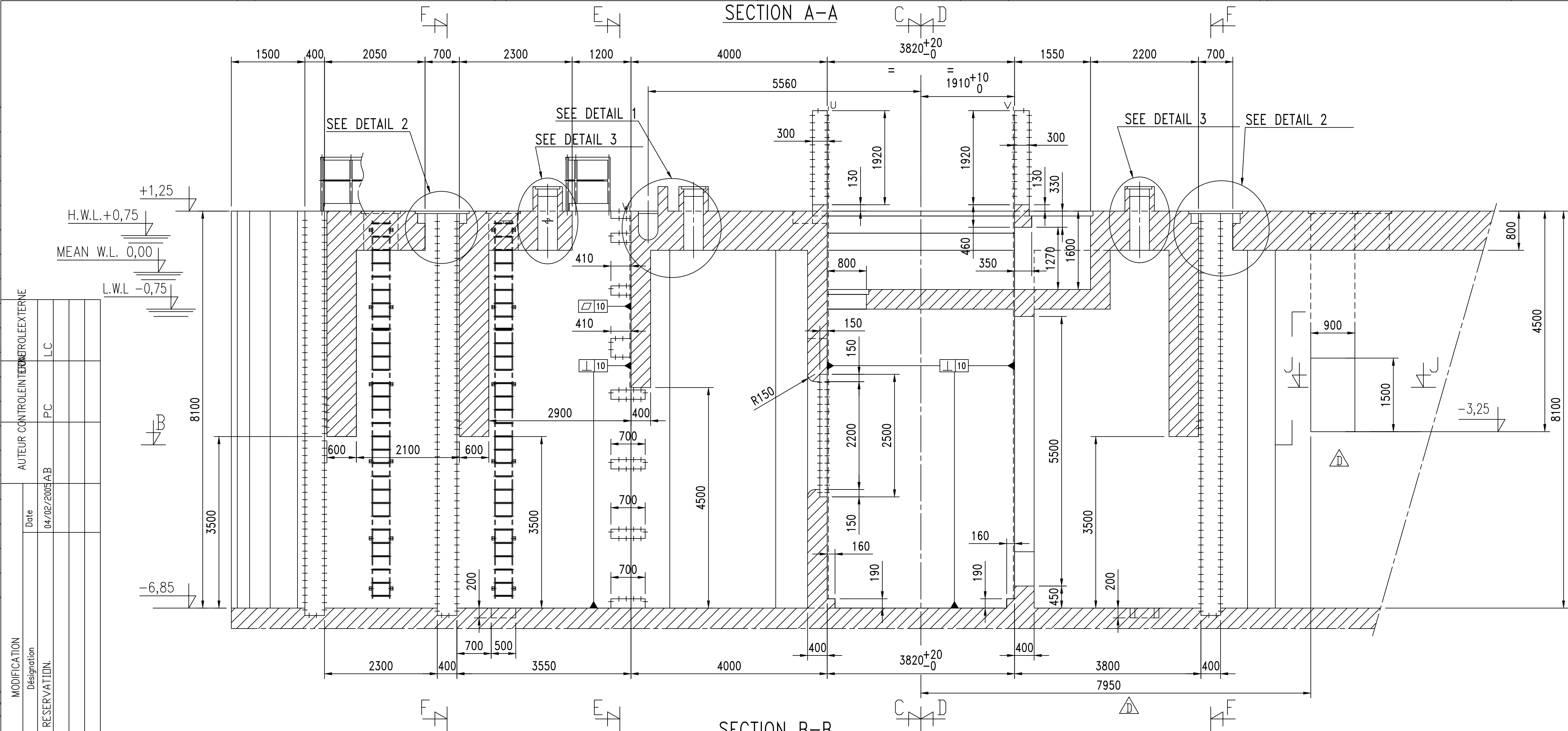
NOTE: HANDRAILS / LADDERS BY OTHERS

FILTERING SYSTEM DESIGN SPECIFICATION	
-NUMBER OF LINES :	2
-SEAWATER	
-NOMINAL CAPACITY PER LINE :	28500 m3/h
-OPERATING DECK LEVEL :	GROUND LEVEL +1.25 M
-CHANNEL BOTTOM LEVEL :	GROUND LEVEL -6.85 M
-HIGH WATER LEVEL :	GROUND LEVEL +0.75 M
-LOW WATER LEVEL :	GROUND LEVEL -0.75 M

DEMANDER EN CAS DE DOUTE / IF IN DOUBT ASK

GRILLE DE MODIFICATIONS/MODIFICATION TABLE				
Indice :	Date	Auteur/Author	Vérif.	Approb.
Rev. : C	04/02/2005	AB	PC	LC
Désignation : UP DATED SENSORS RESERVATIONS				
14, boulevard Ornano 75018 PARIS Tél.: (33)1.42.57.14.35 Fax: (33)1.42.64.74.62 E-mail: beaudrey@beaudrey.fr				
CODE PLAN	ECHELLE/SCALE	DATE	DESSINE/DRAWN	
IFCA420	1/50	22/04/04	PJ	D102393

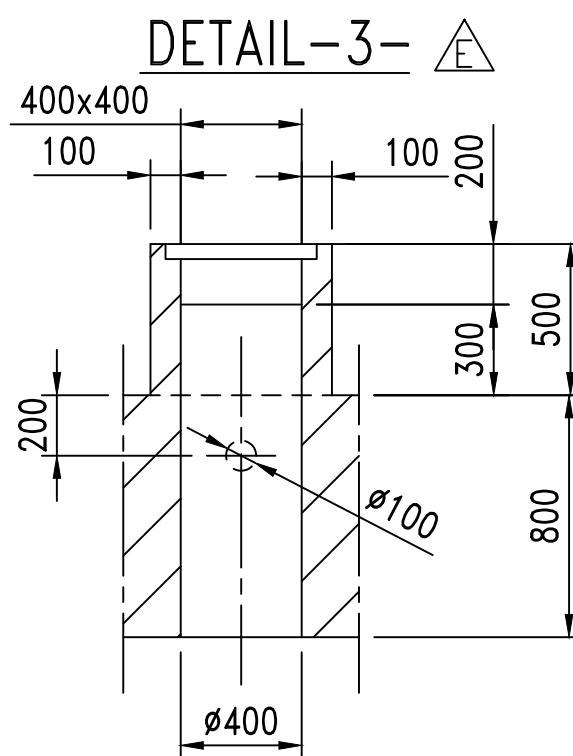
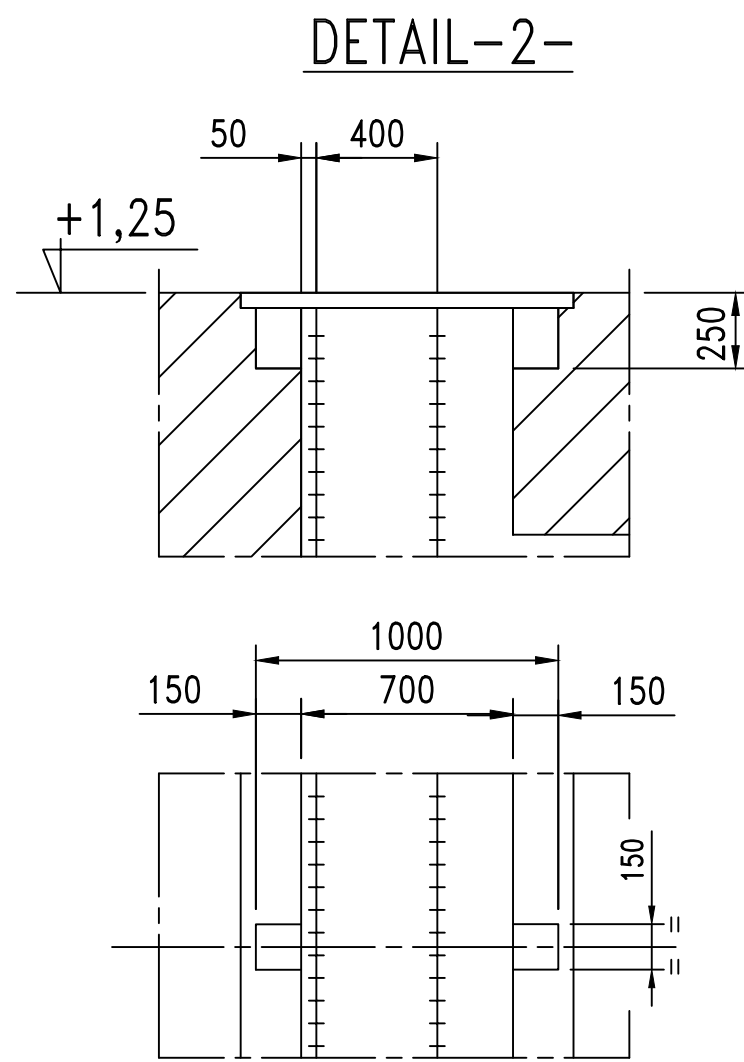
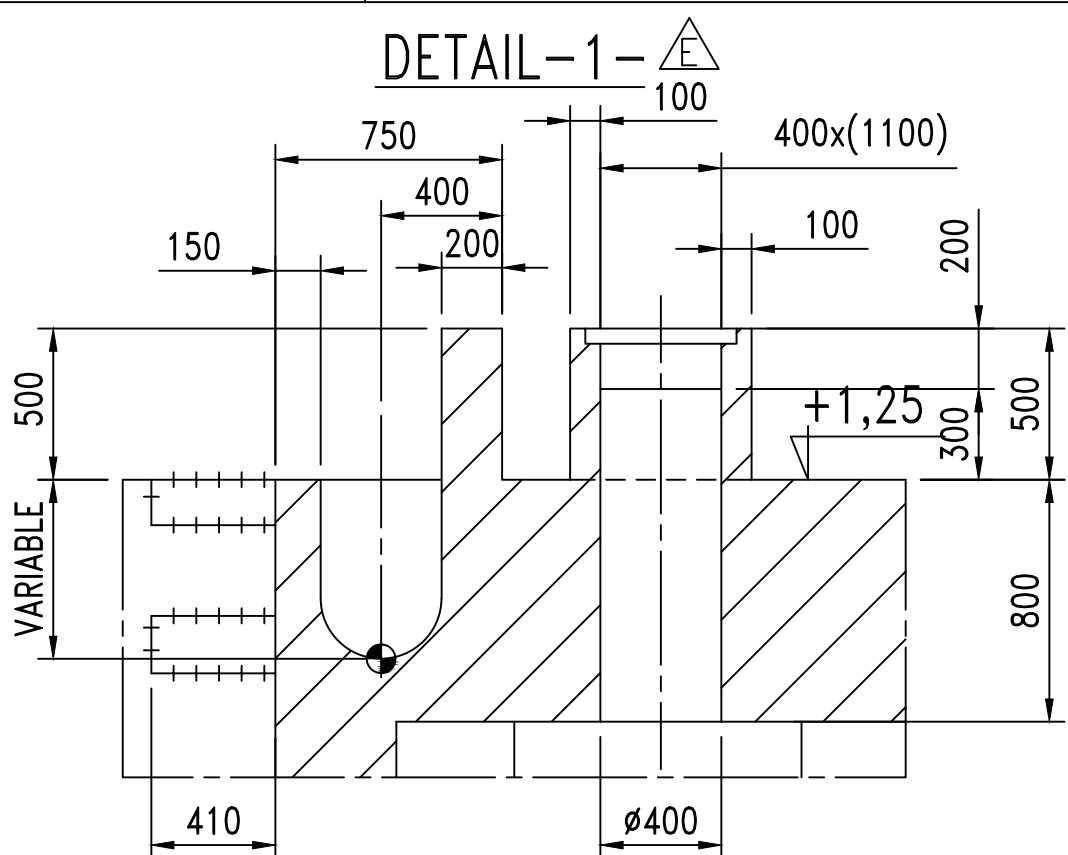
				PUBLIC POWER CORPORATION		LAVRION V CC PF	
				DMKT 11 21 302			
				METKA		LAVRION GENERAL ARRANGEMENT SECTION B-B / C-C 3 / 3	
				METKA DWG.No.		DIN	
				KKS DWG.No. 5-GA-GDA-BEA-008		SCALE 1/50	
				EA DWG.No.		SHEET 1 OF 1	



DEMANDER EN CAS DE DOUTE / IF IN DOUBT ASK

Ce plan est notre propriété. Il ne peut être ni reproduit, ni communiqué à des tiers sans l'autorisation écrite de notre société.
This document is E.BEAUDREY & CO property. It cannot be used, reproduced,transmitted and/or disclosed without prior written permission.

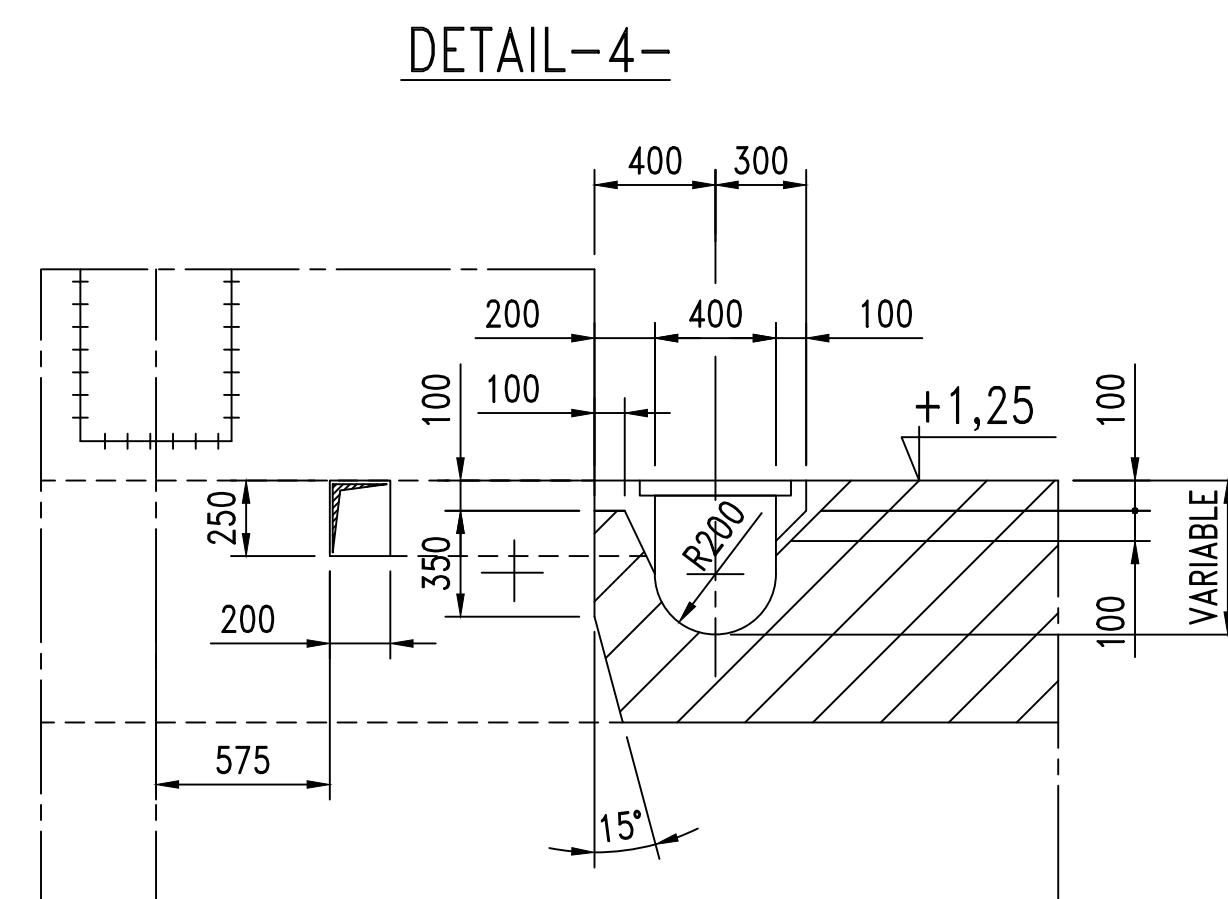
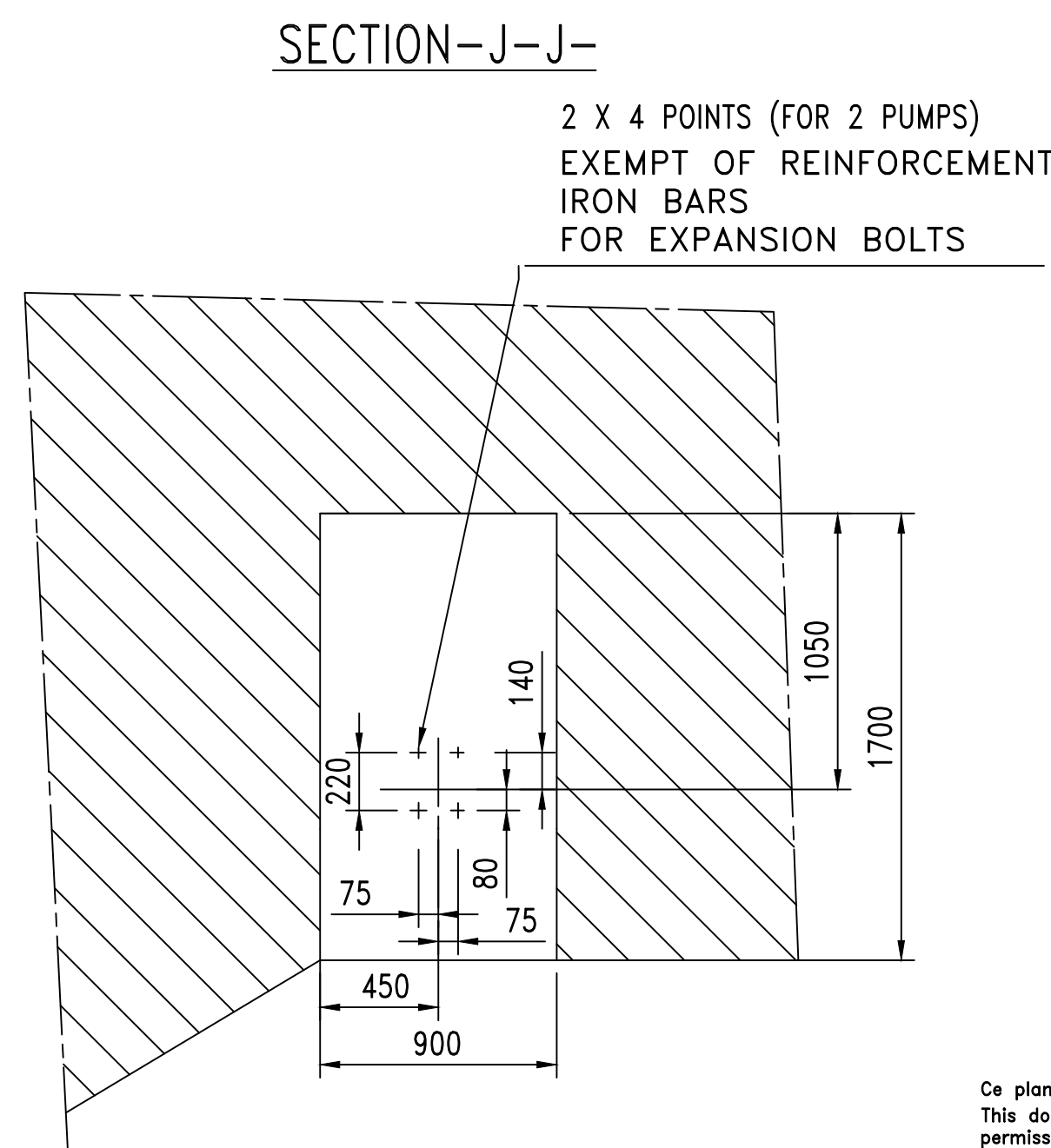
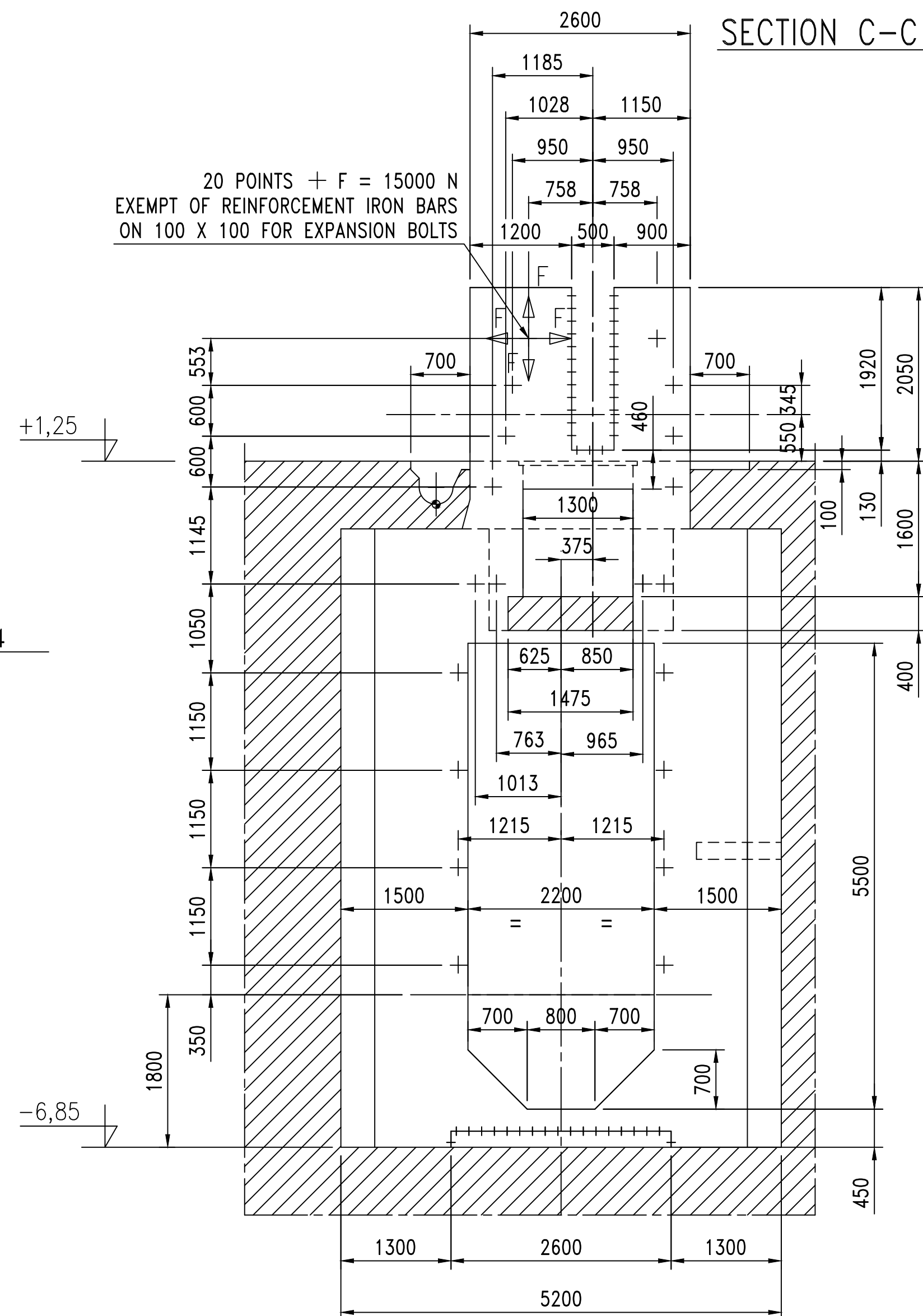
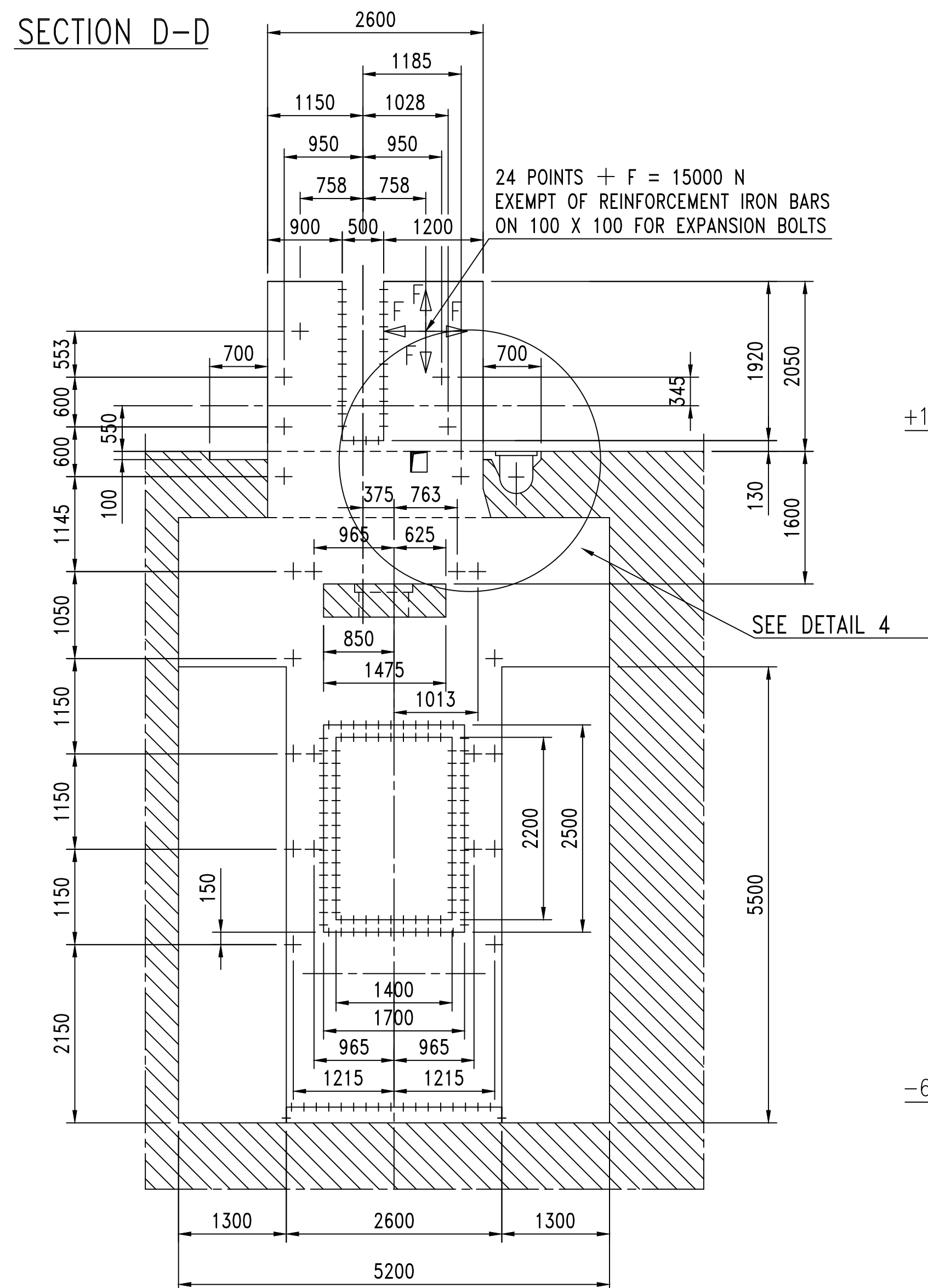
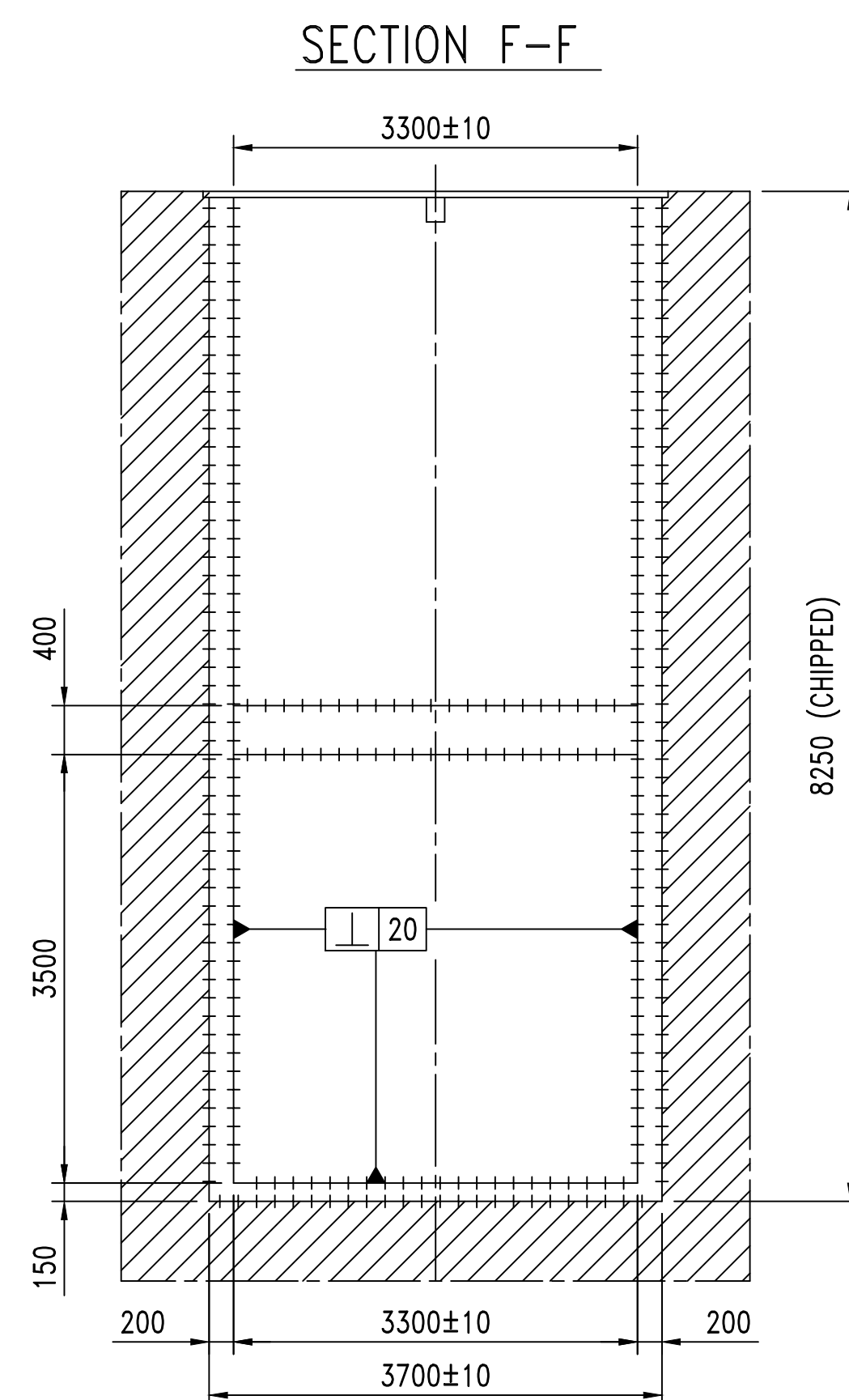
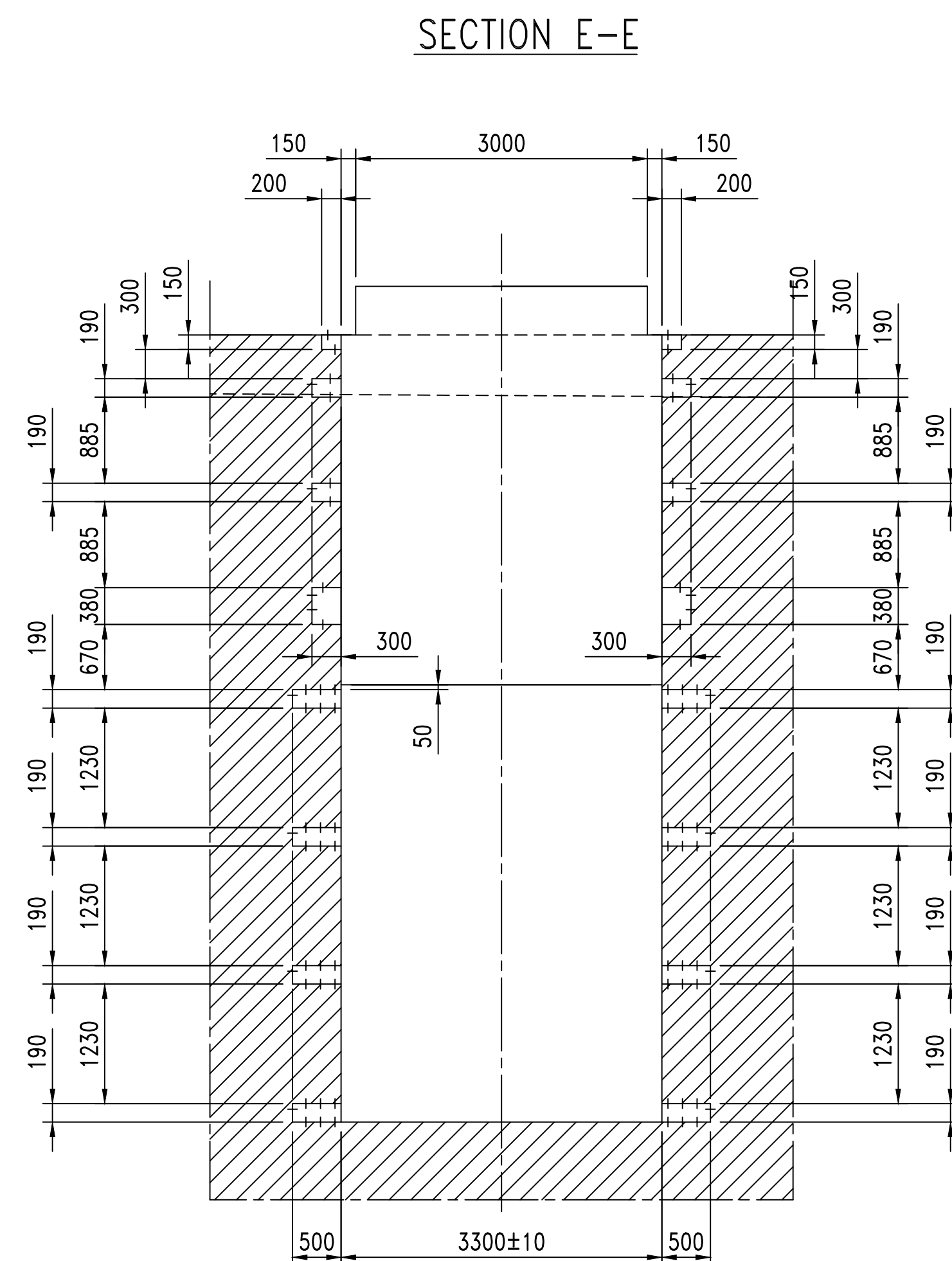
GRILLE DE MODIFICATIONS/MODIFICATION TABLE				
Indice :	Date	Auteur/Author	Vérif.	Approb.
Rev. : E	04/02/2005	AB	PC	LC
Désignation : UP DATED SENSORS RESERVATION.				
14, boulevard Ornano 75018 PARIS Tél.: (33)1.42.57.14.35 Fax: (33)1.42.64.74.62 E-mail: beaudrey@beaudrey.fr				
CODE PLAN	ECHELLE/SCALE	DATE	DESSINE/DRAWN	
GFC420	1/100 1/50-1/25	10/05/2004	PJ	D102425



MODIFICATION		AUTEUR CONTROL INTERPRETER	
Designation	Date	Designation	Date
A Emission	12/05/2004	E UP DATED SENSORS RESERVATION.	04/02/2005
B UP DATED ACCORDING TO CUSTOMER'S COMMENT	15/07/2004	AB	PC
C UP DATED ACCORDING TO COMMENT (LEVELS)	18/08/2004	GT	AB
D UP DATED ACCORDING TO HYD TESTS.	10/11/2004	JM	PC

PUBLIC POWER CORPORATION		LAVRION V CC PF	
DMKT 11 21 302		LAVRION	
METKA		SCREENING EQUIPMENT CONCRETE WORK	
METKA DWG. No.		DIN	
KKS DWG. No. 5-GA-CDA-BEA-001		SCALE 1/100-50-25	
EA DWG. No.		SHEET 1 OF 1	

MODIFICATION		AUTEUR		CONTRÔLE		EXTERNE	
ind.	Désignation	Date					
A	Emission	12/05/2004	P J	PC	LC		
B	UP DATED ACCORDING TO CUSTOMER'S COMMENT	15/07/2004	GT	PC	LC		
C	UP DATED ACCORDING TO COMMENT (LEVELS)	18/08/2004	AB	LC			
D	UP DATED ACCORDING TO HYD TESTS COMMENTS	10/11/2004	JM	PC	LC		



DEMANDER EN CAS DE DOUTE / IF IN DOUBT ASK

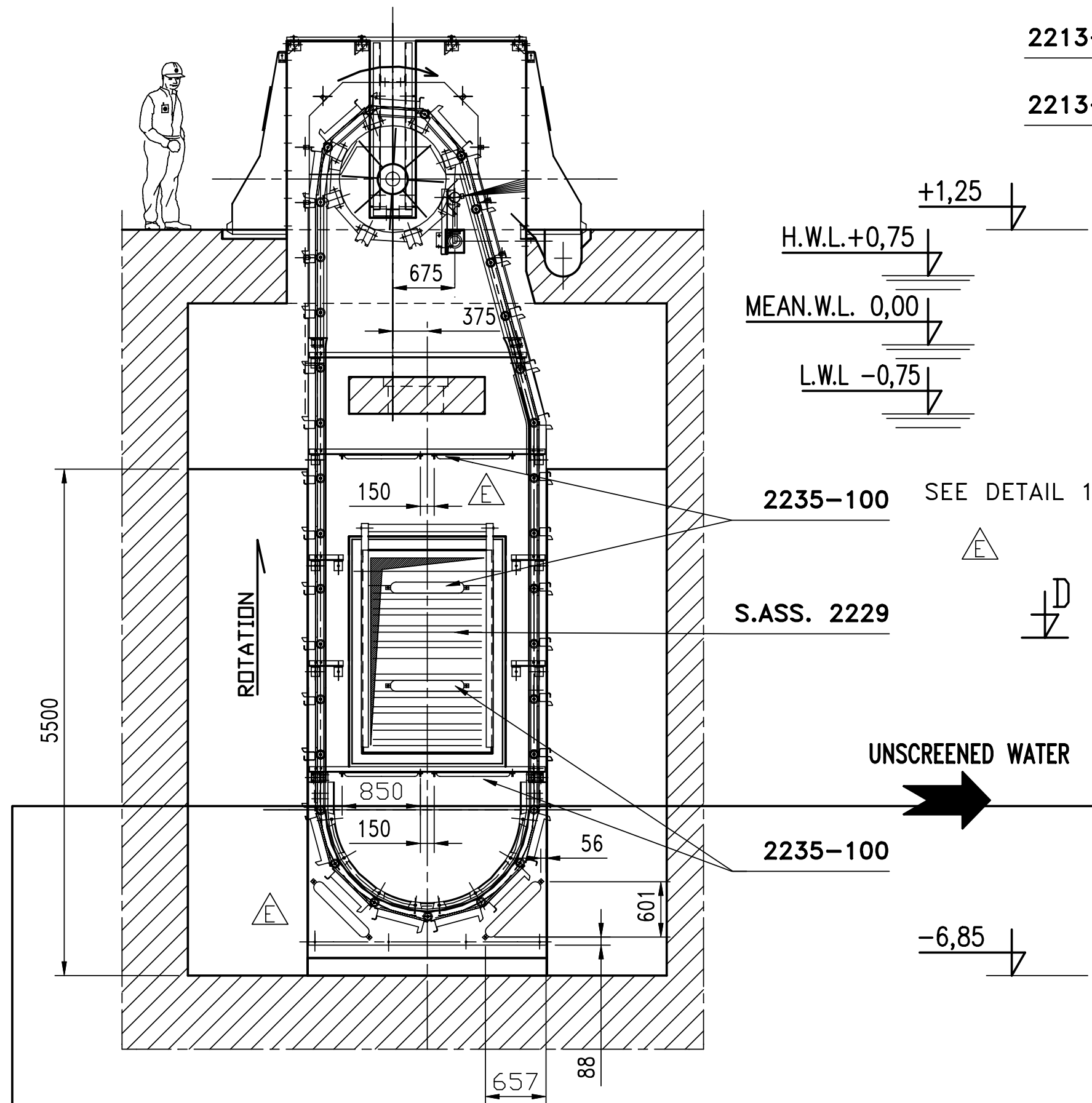
Ce plan est notre propriété. Il ne peut être ni reproduit, ni communiqué à des tiers sans l'autorisation écrite de notre société.
This document is E.BEAUDREY & CO property. It cannot be used, reproduced, transmitted and/or disclosed without prior written permission.

GRILLE DE MODIFICATIONS/MODIFICATION TABLE				
Indice : D	Date	Auteur/Author	Vérif.	Approb.
Rev. :	10/11/2004	JM	PC	LC
Désignation : UP DATED ACCORDING TO HYD TESTS COMMENTS				
E. BEAUDREY et Cie			14, boulevard Armands 75018 PARIS Tél.: (33).1.42.57.14.35 Fax: (33).1.42.64.74.62 E-mail: beaudrey@beaudrey.fr	
CODE PLAN	ECHELLE/SCALE	DATE	DESSINE/DRAWN	D102426
GFC4A20	1/50-1/25	10/05/2004	PJ	

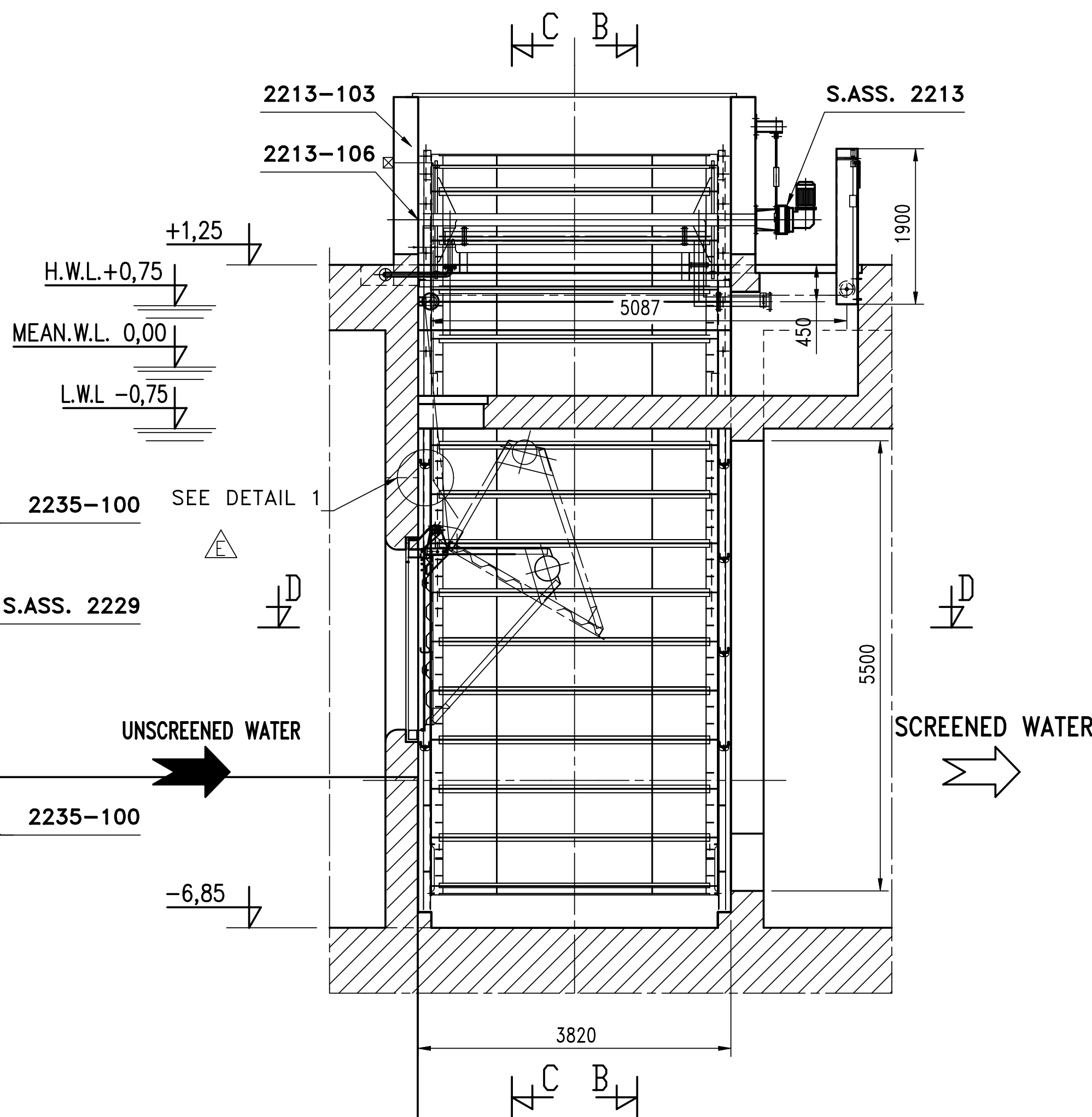
A						 PUBLIC POWER CORPORATION 	LAVRION V CC PF DMKT 11 21 302
B	28/12/14	JM	PC	LC	MP DATED ACCORDING TO CUSTOMER'S COMMENT		
C	18/09/14	GT	AB	LC	MP DATED ACCORDING TO COMMENT (LEVEL 1)		
D	15/07/14	GT	PC	LC	MP DATED ACCORDING TO CUSTOMER'S COMMENT		
E	12/05/14	PJ	JC	LC	FIRST ISSUE		
LAVRION SCREENING EQUIPMENT CONCRETE WORK GENERAL ARRANGEMENT 2/3							
REV. DATE PREP. REVISED APPROVAL ISSUED FOR							
Contains information for the design of structures, systems and components. ☐ YES ☒ NO ☐							
VERIFICATION N/A ☐ OR VERIFIED BY NO ☐							
 EMPRESARIOS AGROPADOS							
							DIN
KKS DWG. No. 5-GA-CDA-BEA-002							SCALE 1/30=85
EA DWG. No.							SHEET OF1

MODIFICATION		Date	AUTEUR	CONTROLE INTERNE	CONTROLE EXTERNE	Date	AUTEUR	CONTROLE INTERNE	CONTROLE EXTERNE
Ind.	Désignation								
A	Emission	18/05/2004	P.J	PC	LC	12/07/2005	JM	AB	LC
B	UP DATED ACCORDING TO COMMENTS	15/07/2004	GT	PC	LC				
C	UP DATED ACCORDING TO COMMENTS (LEVELS)	18/08/2004	GT	AB	LC				
D	MODIFIED ACCORDING TO HYD. TESTS.	10/11/2004	JM	PC	LC				

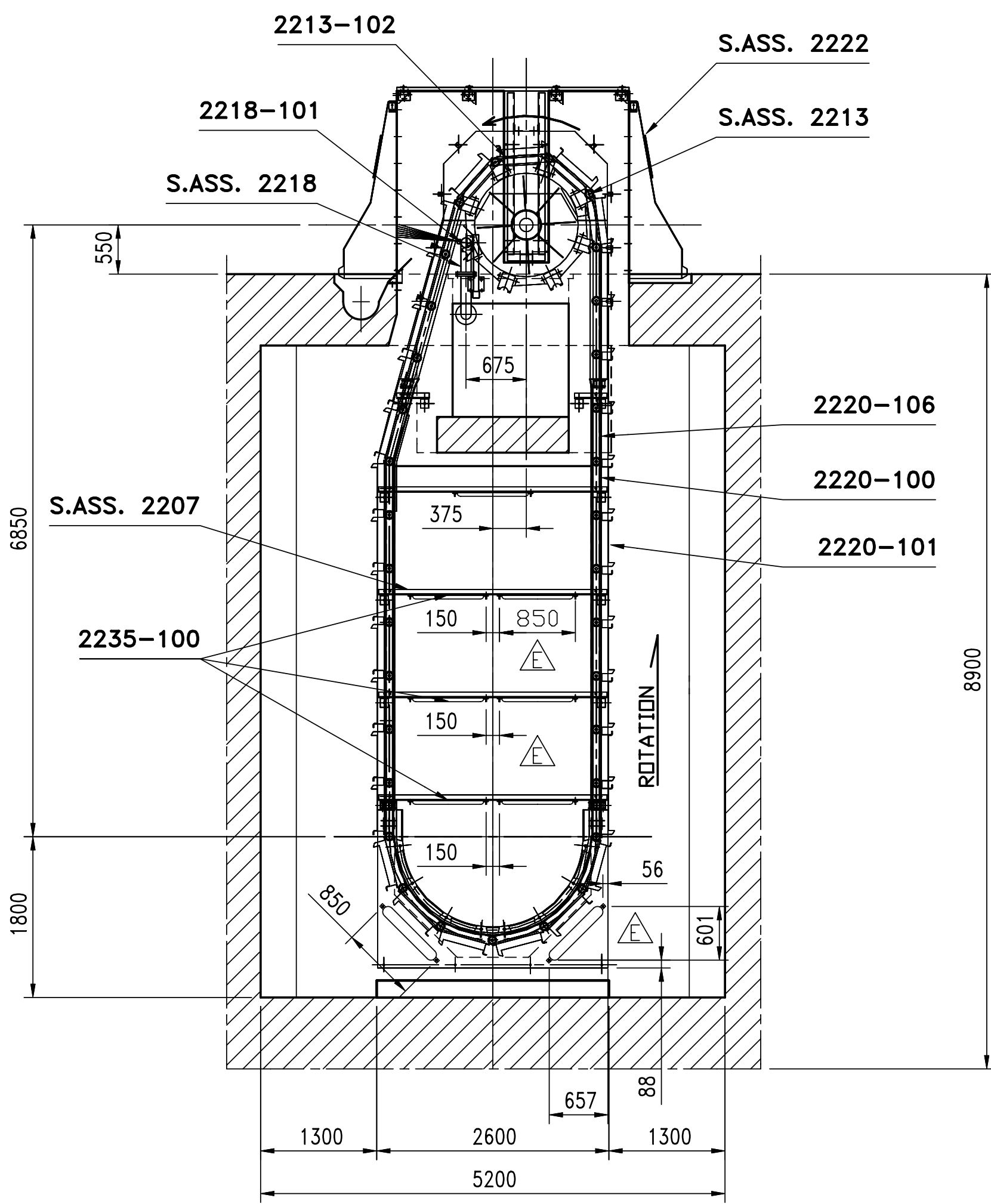
SECTION C-C



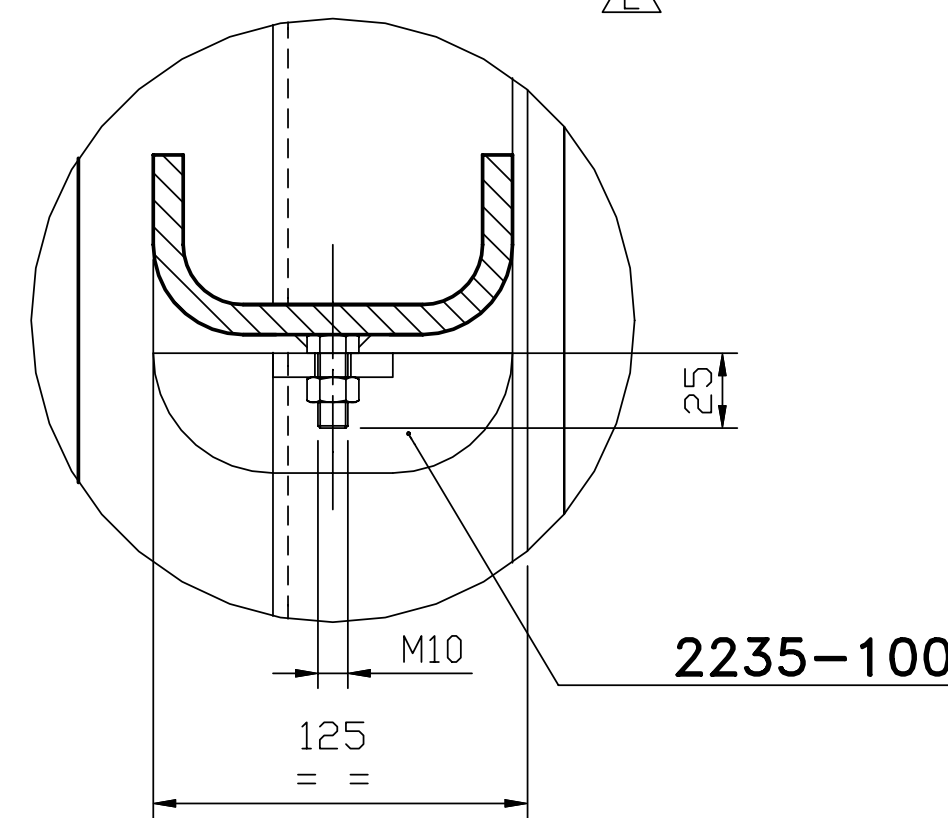
SECTION A-A



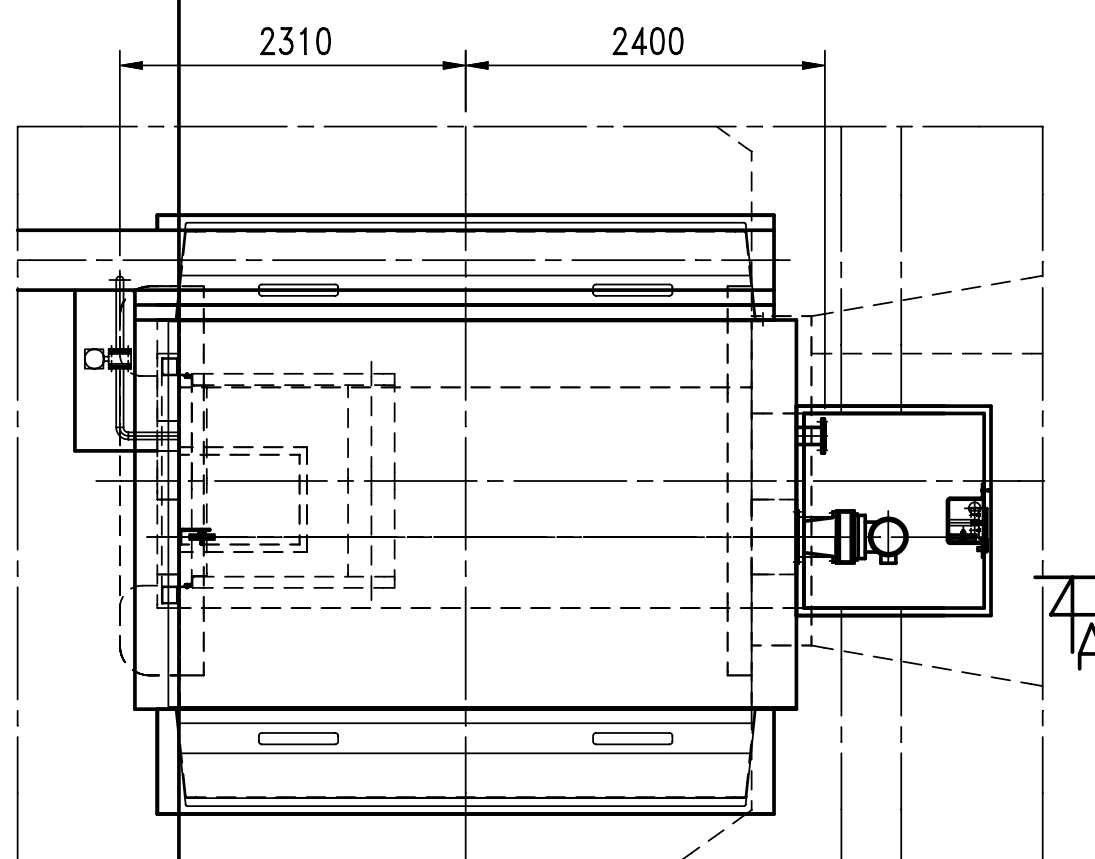
SECTION B-B



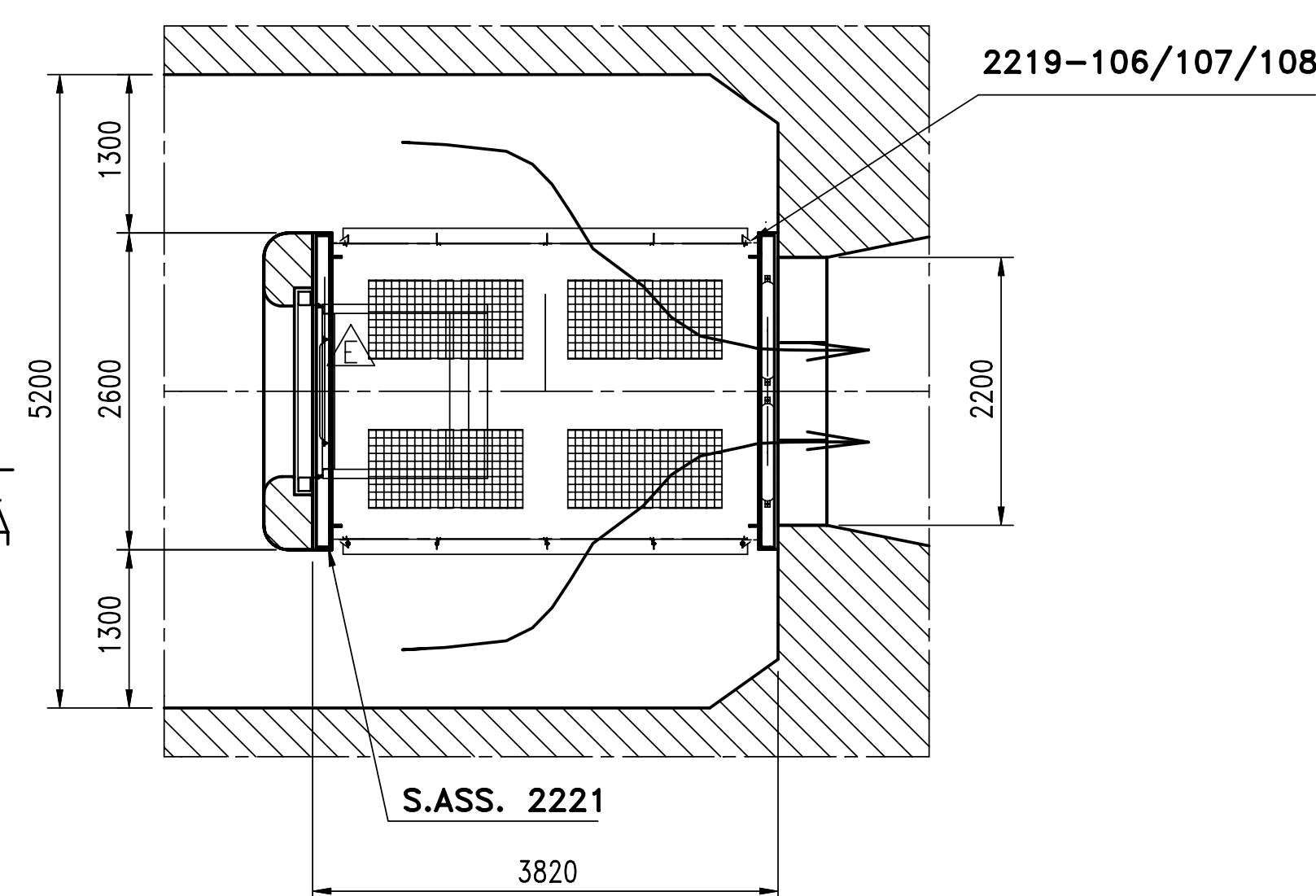
DETAIL 1



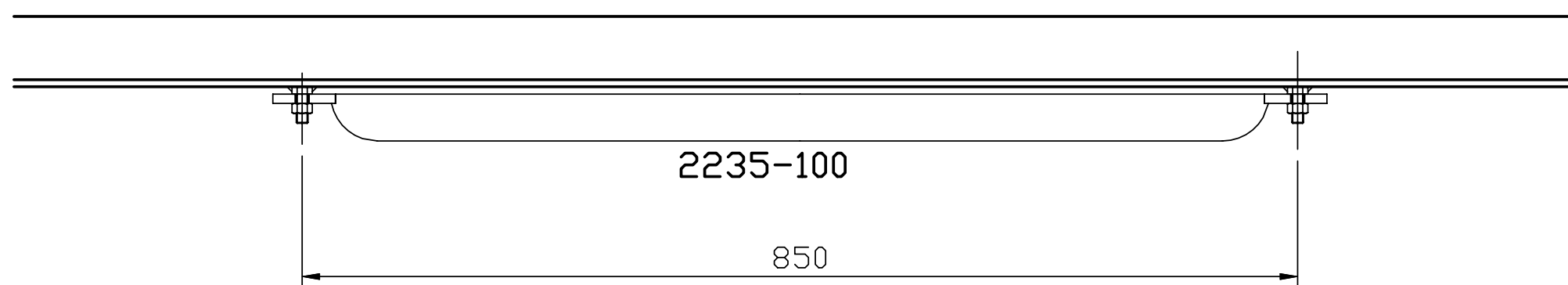
TOP VIEW



SECTION D-D



TYPICAL



DEMANDER EN CAS DE DOUTE / IF IN DOUBT ASK

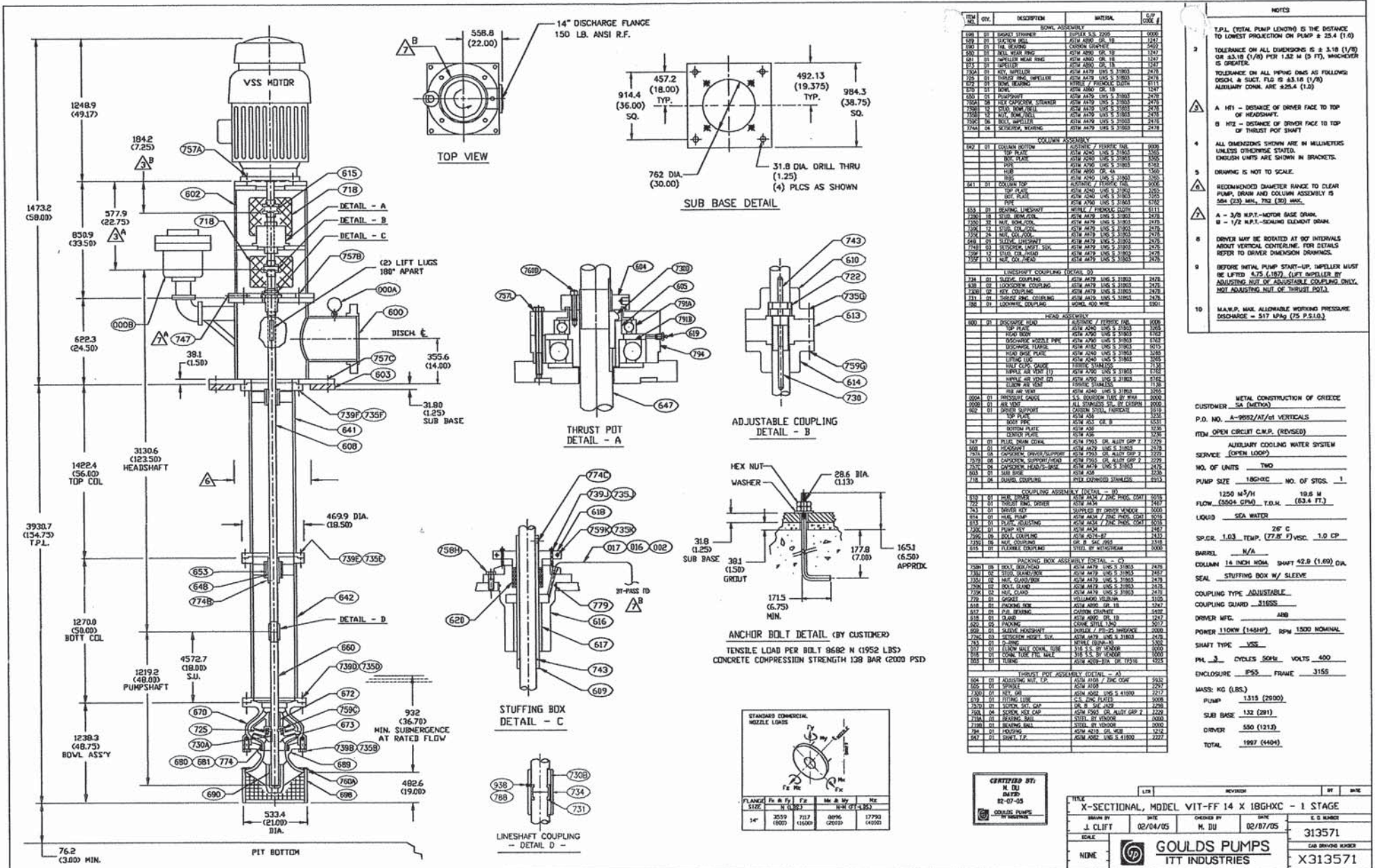
Ce plan est notre propriété. Il ne peut être ni reproduit, ni communiqué à des tiers sans l'autorisation écrite de notre société.
This document is E.BEAUDREY & CO property. It cannot be used, reproduced, transmitted and/or disclosed without prior written permission.

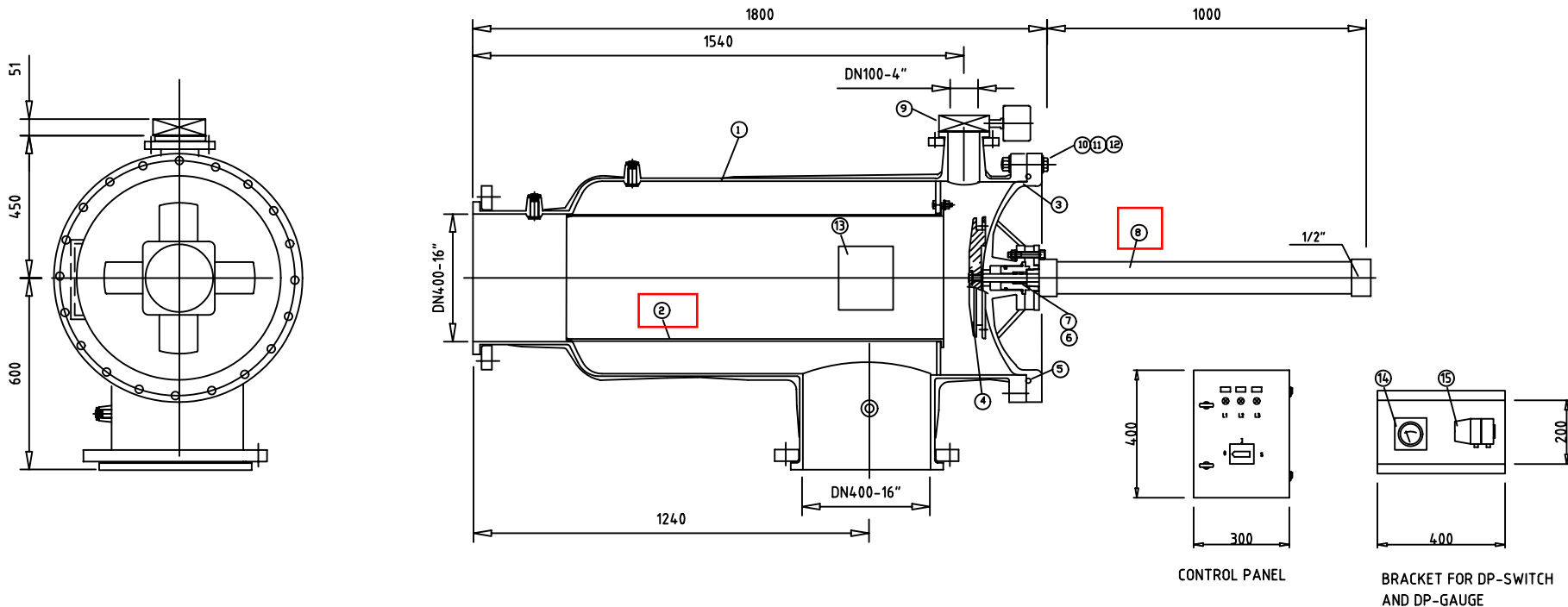
GRILLE DE MODIFICATIONS/MODIFICATION TABLE				
Indice :	Date	Auteur/Author	Vérif.	Approb.
Rev. : E	12/07/2005	JM	AB	LC
Désignation : UP DATED ACCORDING TO COMMENTS (ANODES)				
E. BEAUDREY et Cie				
14, boulevard Ornano 75018 PARIS				
Tél.: (33).1.42.57.14.35 Fax: (33).1.42.64.74.62				
E-mail: beaudrey@beaudrey.fr				
CODE PLAN	ECHELLE/SCALE	DATE	DESSINE/DRAWN	
IFCA420	1/50 - 2/5	12/05/2004	PJ	D102430

E		12/07/05	JM	AB	LC	UP DATED ACCORDING TO CUSTOMER COMMENT
D		08/11/04	JM	PC	LC	UP DATED ACCORDING TO CUSTOMER COMMENT
C		18/08/04	GT	AB	LC	UP DATED ACCORDING TO CUSTOMER COMMENT
B		15/07/04	GT	PC	LC	UP DATED ACCORDING TO CUSTOMER COMMENT
A		18/05/04	PJ	PC	LC	FIRST ISSUE
REV.	DATE	PREP.	REVISED	APPROV.	ISSUED FOR	
CORRELATIVE INFORMATION FOR THE DESIGN OF STRUCTURES, SYSTEMS AND COMPONENTS: YES ☒ NO ☐						
VERIFICATION: N/A ☐ JUD/SUP. ☐ VERIFIER N/A ☐ NO ☐						
DOCUMENT PREPARED WITH CAD DO NOT MODIFY MANUALLY						
PUBLIC POWER CORPORATION		LAVRION V CC PF				
DMKT 11 21 302						
METKA		LAVRION				
		BAND SCREEN				
		GENERAL ARRANGEMENT				
METKA DWG. No.		DIN				
KKS DWG. No. 5-GA-GDA-BEA-003		SCALE 1/50-10				
EA DWG. No.		SHEET 1 OF 1				



Σχέδιο Αντλίας Ανοιχτού Ψυκτικού Κυκλώματος Μον. V





MATERIALS:

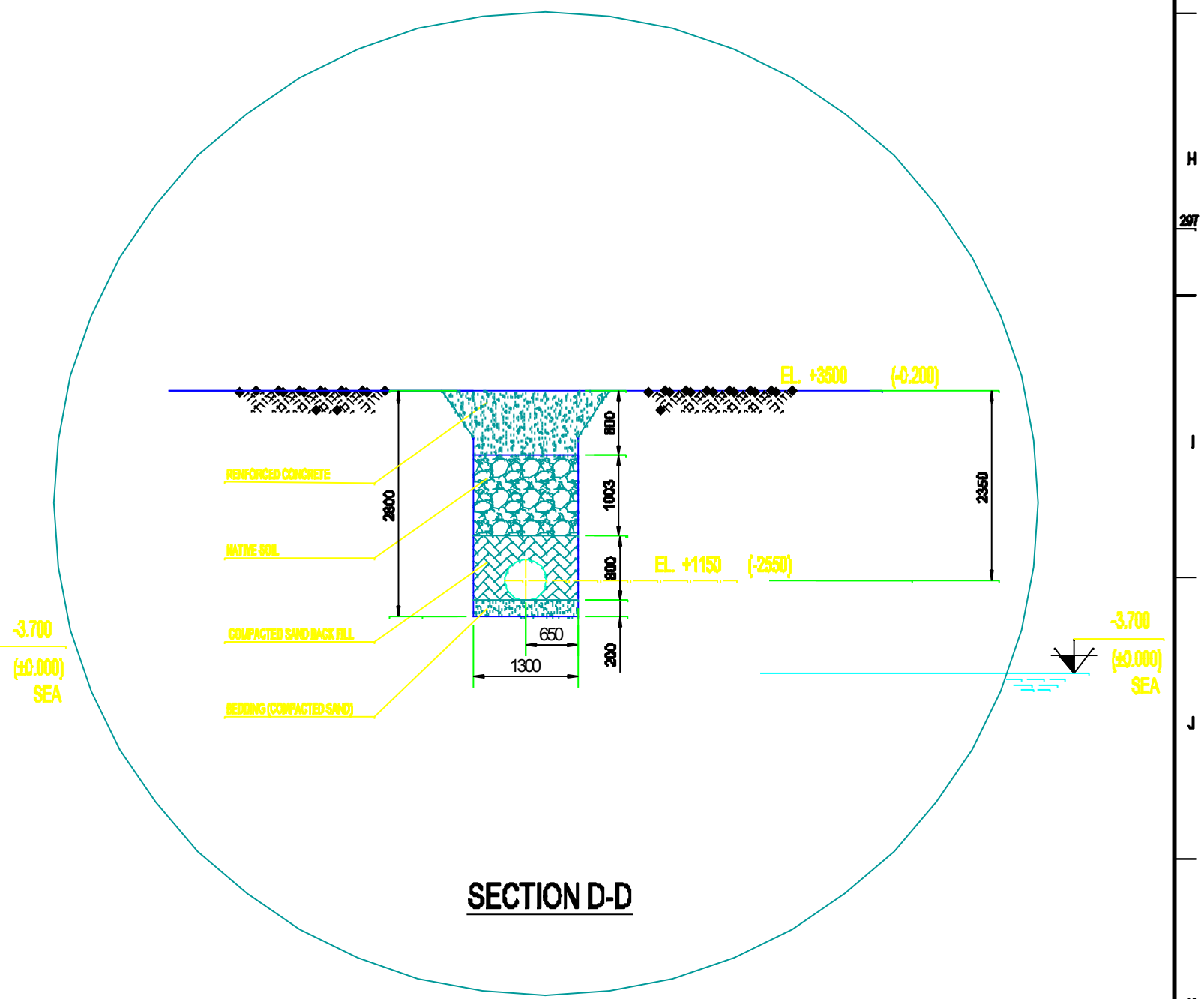
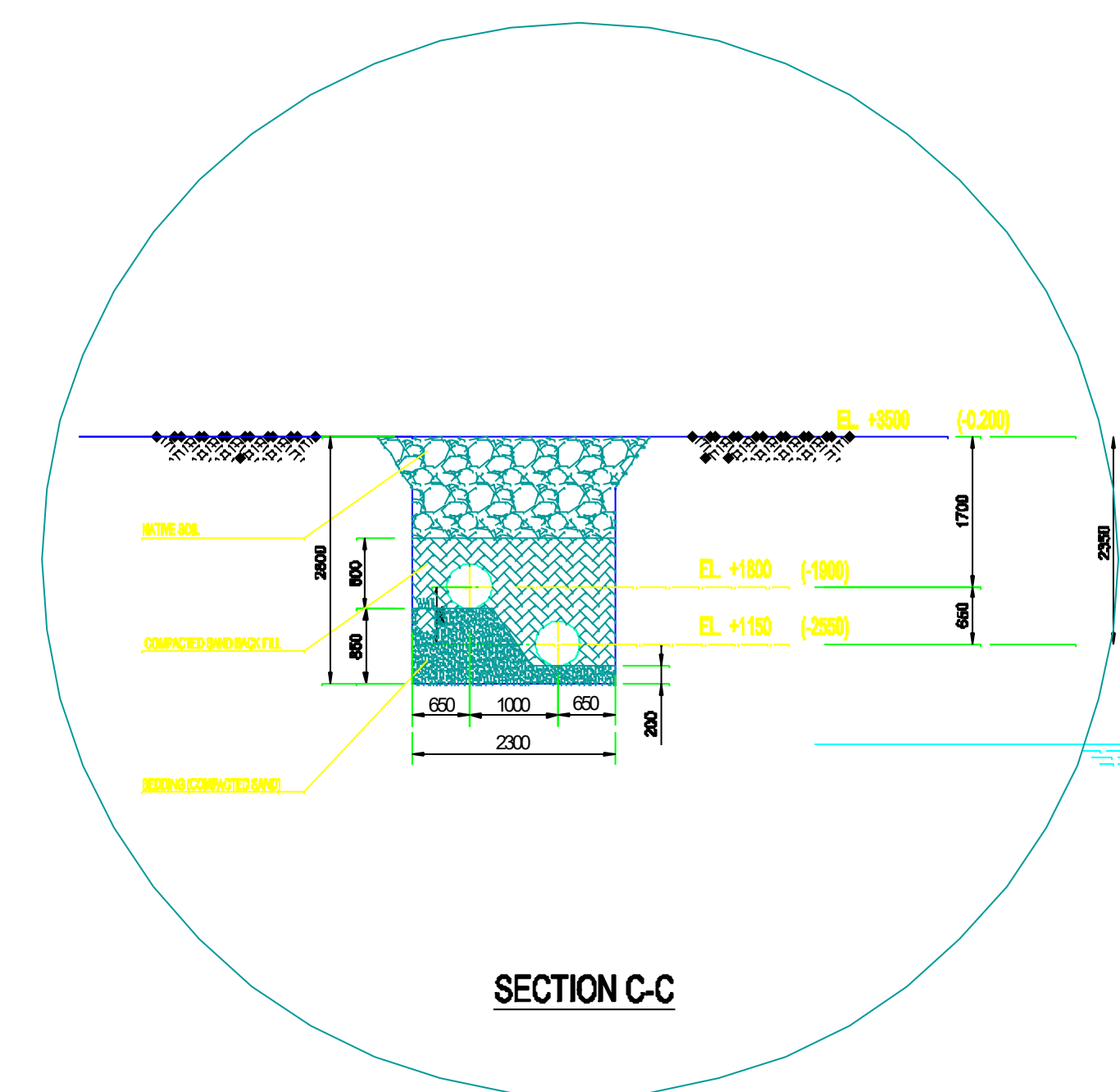
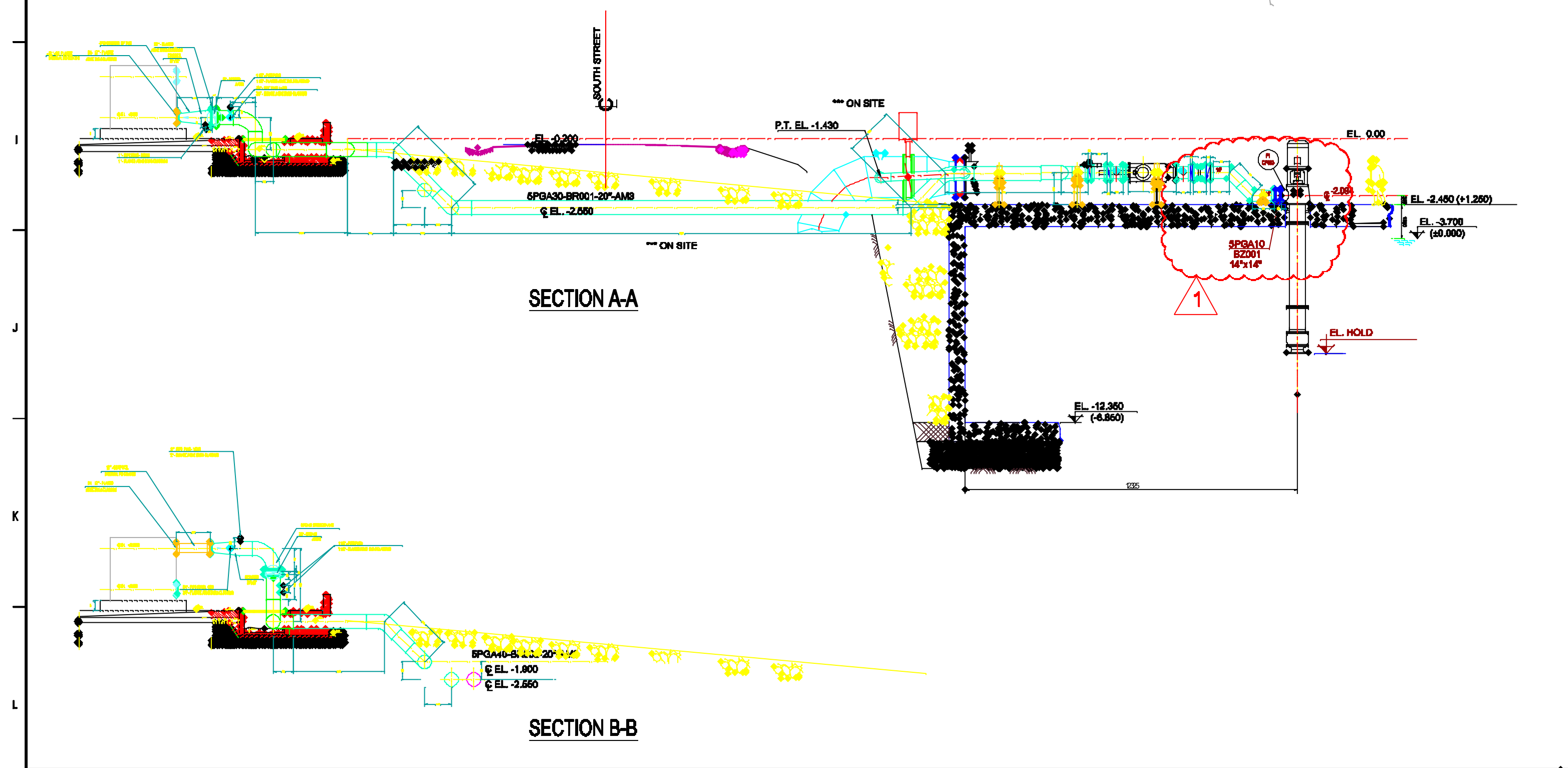
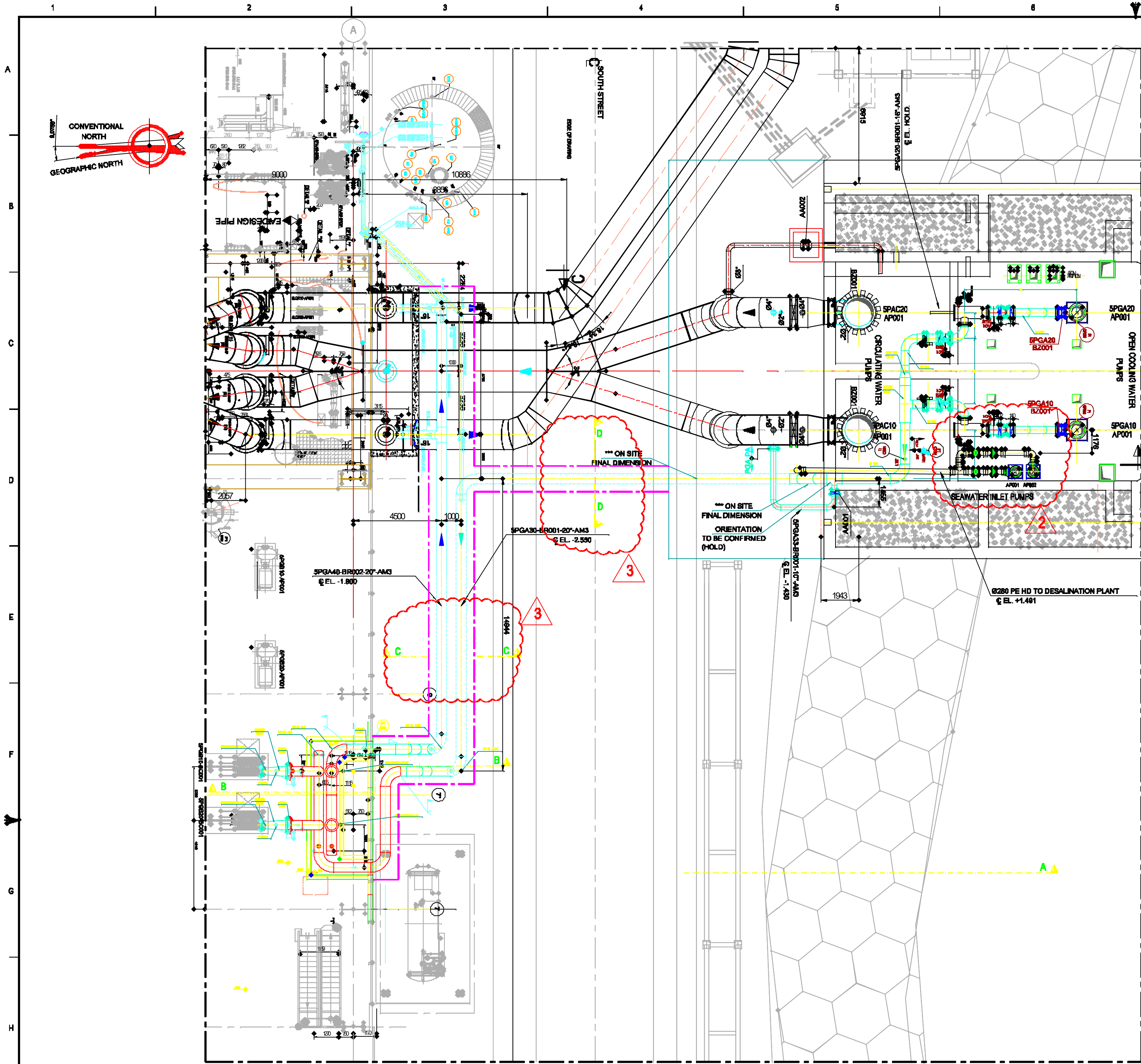
BODY	GRP
ENDCOVER	GRP
PAINTING	500 MICRON BLUE POLYESTER PAINT
BASKET	316L
BASKET PERFORATION	0,2 MM WEDGE WIRE

DESIGN PRESSURE	6 Bar g
TEST PRESSURE	9 Bar g
DESIGN TEMPERATURE	60 °C
MEDIUM	SEA WATER
WEIGHT TOTAL EMPTY	300 Kgs
WEIGHT ENDCOVER	52 Kgs
VOLUME	450 Lit

MAX FLOW RATE	2088 m3/h
FLUSHING FLOW RATE	241 m3/h

FLANGE CONNECTIONS	ANSI 150#
INLET	16"
OUTLET	16"
FLUSHING OUTLET	4"

15	1	DP-SWITCH		
14	1	DP-GAUGE		
13	1	NAME PLATE BRACKET	GRP	150x200
12	40	WASHER	HOT DIP GALV	28x52x4
11	20	NUT M6M	HOT DIP GALV	M27
10	20	SCREW M6S	HOT DIP GALV	M27x140
9	1	FLUSHING VALVE		3003 DN 100
8	1	PNEUMATIC CYLINDER	AISI 316 / AL	C4 100-900
7	2	BACKUP RING	PVC	
6	2	U-SEALING	PUR	UN 25x40x10
5	1	GASKET		8.4x2060
4	1	DISC	POM	BSG 400-004
3	1	END COVER	GRP	BSG 400-005
2	1	BASKET	AISI 316L	BSx 000-01-1
1	1	FILTER BODY	GRP	BSG 400-x02-x
Part	Quantity	Description	Materials	Dimensions
Drawn MS	Designed JO	Scale --	Date 050505	Project Standard
		LAVRION V PROJECT		Ver
		BERNOULLI FILTER		Drawing no.
		BSG 400		B050328GA



- NOTES
- NOTE 1: PIPELINE BY METKA
- NOTE 2: PIPELINE & FITTINGS & FLANGES ETC BY SUBOR
- NOTE 3: MAIN ROUTING DESIGNED BY METKA
SUBOR COUPLINGS DESIGNED BY SUBOR
- NOTE 4: COUPLING OR LAMINATION ON SITE
- NOTE 5: PIPING SPECIFICATION SEE ATTACHED PDF

ITEMS 5PGA10 AND 5PGA20 RUBBER EXPASION JOINTS ARE NOT 16"X14" BUT ARE 14" WITH L=250MM

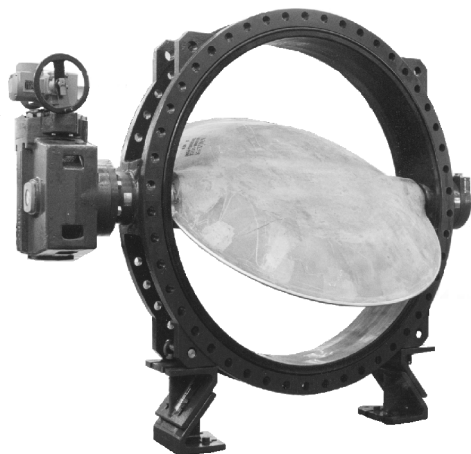
THEREFORE ITEM THAT IS CONNECTING TO THESE JOINTS MUST REDUCE FROM 16" PIPE TO 14" FLANGE

ITEM 1 AND ITEM 8 ON SBS00001_A SHEET 1

REV	DATE	PREP.	REVISED	APPROV.	ISSUED FOR
1	12/12/2023	YOM		YOM	AS NOTED
2	12/12/2023	YOM		YOM	GRF PRESSURE SUPPORTS
3	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
4	12/12/2023	YOM		YOM	CONCRETE TIEBARS
5	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
6	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
7	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
8	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
9	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
10	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
11	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
12	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
13	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
14	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
15	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
16	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
17	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
18	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
19	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS
20	12/12/2023	YOM		YOM	GRF PRESSURE TIEBARS

PUBLIC POWER CORPORATION		LAVRION V CC PP	
METKA		DMKT 11 21 302	
METKA		COOLING WATER SYSTEM	
METKA		GRP PIPING	
METKA		METKA DWG.No. MET-PYPGA-001	
METKA		DIN 40	
METKA		K03 DWG.No.	
METKA		SCALE 1:100	
METKA		SHEET 1 OF 1	

**MAINTENANCE
MAINTENANCE
MANTENIMIENTO**



DN 1050 - 3200

CONSTITUTIVE PARTS OF VALVE
PIECES CONSTITUTIVES DU ROBINET
PIEZAS QUE COMPONEN LA VÁLVULA

PARTS LIST OF VALVE
NOMENCLATURE DU ROBINET
NOMENCLATURA DE LA VÁLVULA

LIST OF TOOLS USED FOR DISMANTLING AND MOUNTING OF VALVE
LISTE DES OUTILLAGES NÉCESSAIRES AU MONTAGE / DÉMONTAGE
LISTA DE LAS HERRAMIENTAS NECESARIAS PARA EL DESMONTAJE Y MONTAJE DE LA VALVULA

DISMANTLING THE VALVE FROM PIPING
EXTRACTION DU ROBINET DE LA TUYAUTERIE
EXTRACCIÓN DE LA VÁLVULA

VALVE / ACTUATOR UNCOUPLING
DESACCOUPEMENT ROBINET / ACTIONNEUR
DESMONTAJE DE LA VÁLVULA DEL ACCIONADOR

VALVE DISMANTLING
DEMONTAGE DU ROBINET
DESMONTAJE DE LA VÁLVULA

VALVE MOUNTING
MONTAGE DU ROBINET
MONTAJE DE LA VÁLVULA

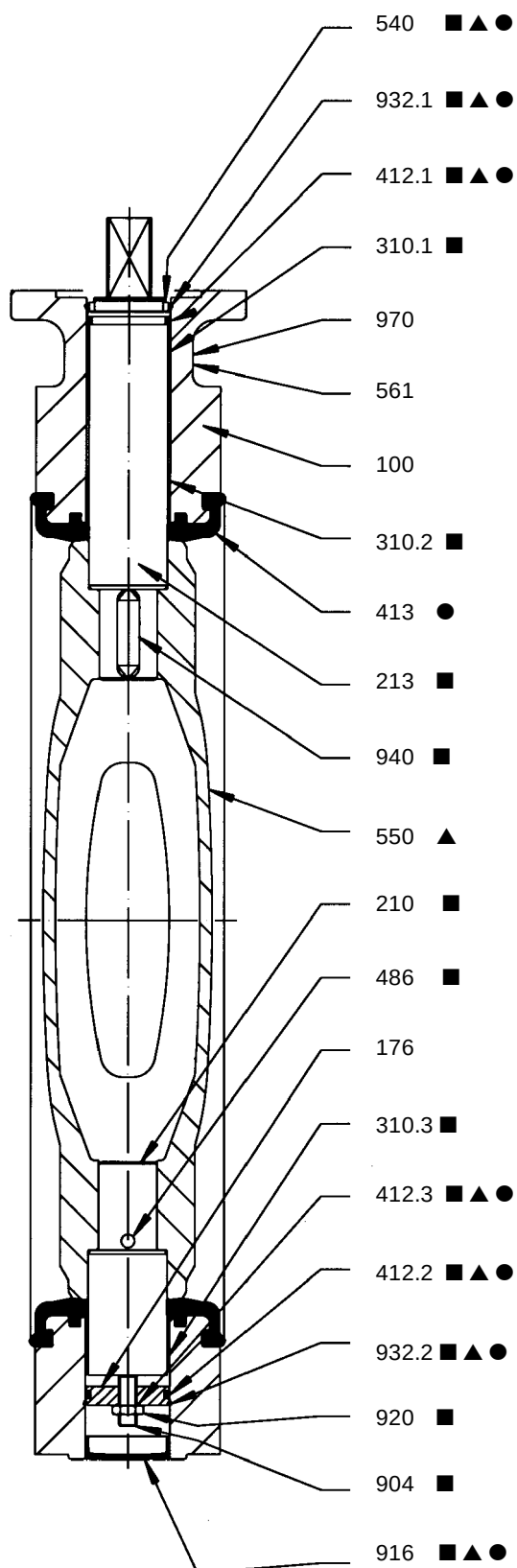
TROUBLE SHOOTING
INCIDENTS DE FONCTIONNEMENT
INCIDENCIAS DE FUNCIONAMIENTO



CONSTITUTIVE PARTS OF VALVE
PIECES CONSTITUTIVES DU ROBINET
PIEZAS QUE COMPONEN LA VÁLVULA

DN 1050 - 1200

PS 10 bar

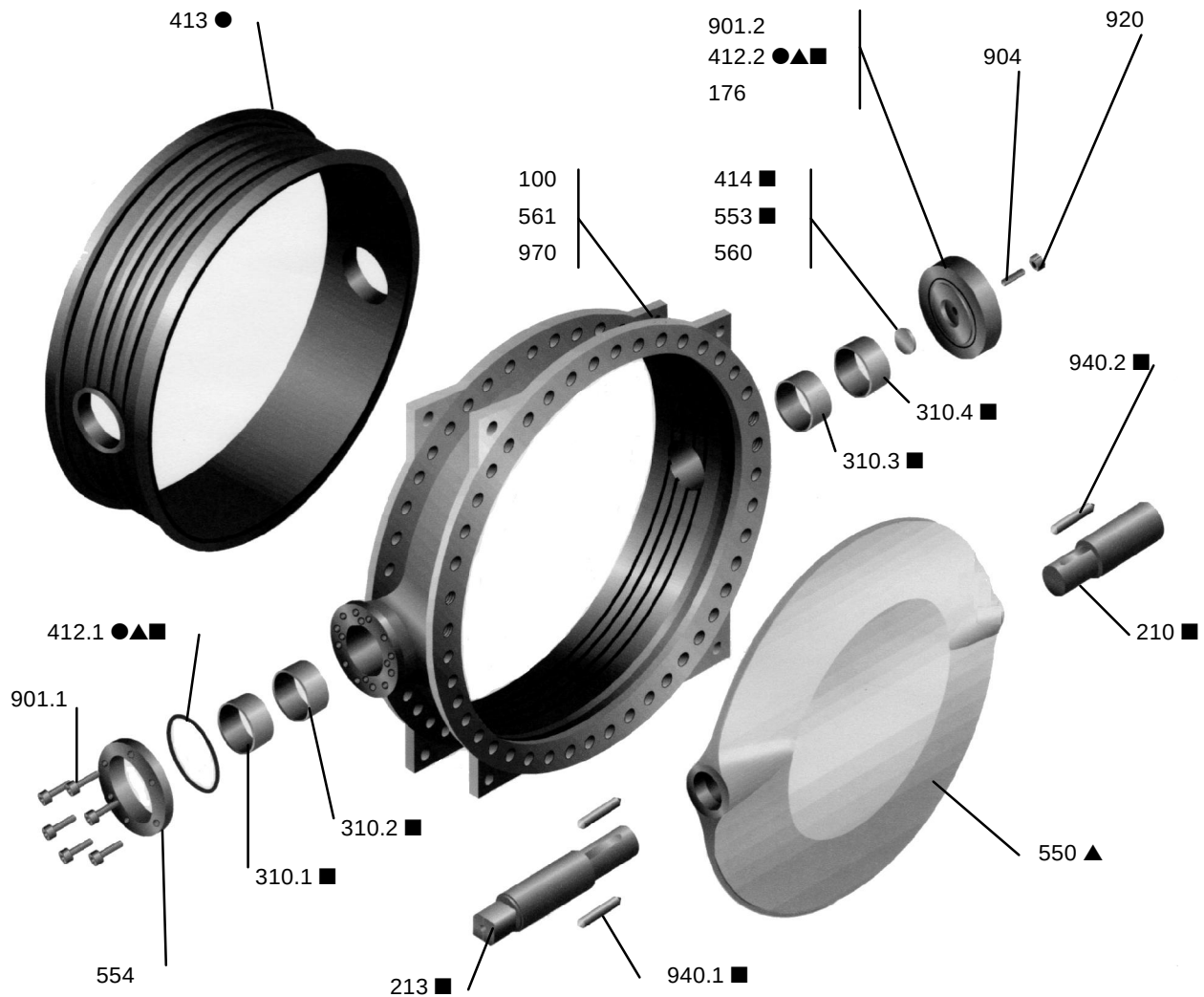


- Spare parts included in the liner kit
kit de rechange manchette
 Kit de repuesto anillo
- ▲ Spare parts included in the disc kit
Kit de rechange obturateur
 Kit de repuesto mariposa
- Shaft spare included in the shaft kit
Kit de rechange arbre
 Kit de repuesto eje

CONSTITUTIVE PARTS OF VALVE
PIECES CONSTITUTIVES DU ROBINET
PIEZAS QUE COMPONEN LA VÁLVULA

DN 1600 - 3000
DN 1350 - 2500
DN 1100 - 2200
DN 1100 - 2000
DN 1100 - 1800

PS 6 bar
PS 10 bar
PS 16 bar
PS 20 bar
PS 25 bar



- Spare parts included in the liner kit
kit de rechange manchette
Kit de repuesto anillo
- ▲ Spare parts included in the disc kit
Kit de rechange obturateur
Kit de repuesto mariposa
- Shaft spare included in the shaft kit
Kit de rechange arbre
Kit de repuesto eje

PARTS LIST OF VALVE
NOMENCLATURE DU ROBINET
NOMENCLATURA DE LA VÁLVULA

Repère	DN	Designation	Désignation	Designación
100	(1) (2)	Body	<i>Corps</i>	Cuerpo
176	(1) (2)	Bottom	<i>Fond</i>	Fondo
210	(1) (2)	Shaft	<i>Axe</i>	Eje inferior
213	(1) (2)	Operating shaft	<i>Arbre de manoeuvre</i>	Eje superior
310.1	(1) (2)	Bearing	<i>Palier lisse</i>	Cojinete liso
310.2	(1) (2)	Bearing	<i>Palier lisse</i>	Cojinete liso
310.3	(1) (2)	Bearing	<i>Palier lisse</i>	Cojinete liso
310.4	(2)	Bearing	<i>Palier lisse</i>	Cojinete liso
412.1	(1) (2)	O-Ring	<i>Joint torique</i>	Junta tórica
412.2	(1) (2)	O-Ring	<i>Joint torique</i>	Junta tórica
412.3	(1)	O-Ring	<i>Joint torique</i>	Junta tórica
413	(1) (2)	Liner	<i>Manchette</i>	Anillo
414	(2)	Disc thrust plate	<i>Grain d'appui</i>	Disco de apoyo
486	(1)	Ball	<i>Bille</i>	Bola
540	(1)	Split bush	<i>Douille</i>	Disco de apoyo
550	(1) (2)	Disc	<i>Obturateur</i>	Mariposa
553	(2)	Thrust	<i>Rondelle de butée</i>	Tope
554	(2)	Tightening ring	<i>Rondelle supérieure</i>	Anillo de estanquidad
560	(2)	Pin	<i>Goupille</i>	Pasador
561	(1) (2)	Grooved nail	<i>Clou cannelé</i>	Remache redondo estriado
901.1	(2)	Hexagon-head screw	<i>Vis</i>	Tornillo exagonal
901.2	(2)	Hexagon-head screw	<i>Vis</i>	Tornillo exagonal
904	(1) (2)	Adjusting screw	<i>Vis de réglage</i>	Varilla roscada
916	(1)	Plug	<i>Bouchon</i>	Tapón
920	(1) (2)	Hexagonal nut	<i>Ecrou hexagonal</i>	Tuerca exagonal
932.1	(1)	Spring retaining ring	<i>Jonc</i>	Anillo de retención
932.2	(1)	Spring retaining ring	<i>Jonc</i>	Anillo de retención
940	(1)	Key	<i>Clavette</i>	Chaveta
940.1	(2)	Key	<i>Clavette</i>	Chaveta
940.2	(2)	Key	<i>Clavette</i>	Chaveta
970	(1) (2)	Identity plate	<i>Plaque d'identité</i>	Placa de identidad

(1) DN 1050 - 1200 PS 10 bar

(2) DN 1600 - 3000 PS 6 bar
 DN 1350 - 2500 PS 10 bar
 DN 1100 - 2200 PS 16 bar
 DN 1100 - 2000 PS 20 bar
 DN 1100 - 1800 PS 25 bar

SIZES RANGE AND SPECIFIC SPARE KITS

GAMME DES DIAMETRES ET KITS DE RECHANGE SPECIFIQUES

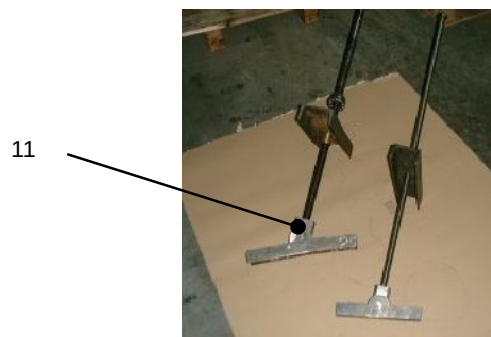
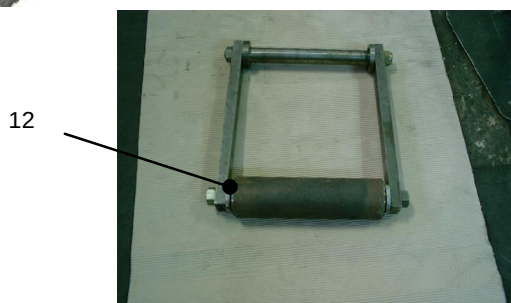
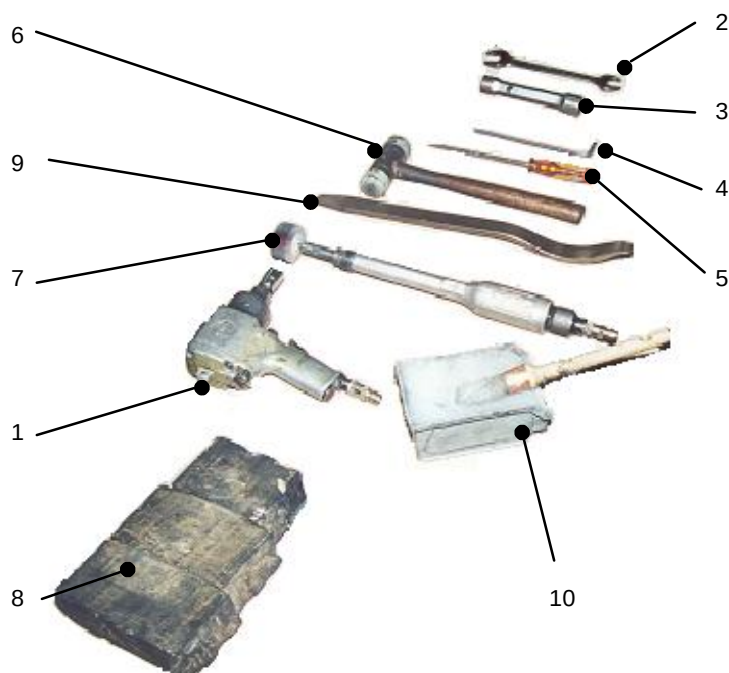
GAMA DE DIAMETROS Y KITS DE REPUESTOS SPECIFICOS

DN		PS	● LINER KIT KIT MANCHETTE KIT ANILLO	■ SHAFT KIT KIT ARBRE KIT EJE	▲ DISC KIT KIT OBTURATEUR KIT MARIPOSA
mm	inch pouce inch	bar			
1050	42	10	42 381 914	42 381 917	42 381 920
1100	44	10	42 381 915	42 381 918	42 381 921
1100	44	16-20-25	to define - à définir - a definir		
1200	48	10	42 381 916	42 381 919	42 381 922
1200	48	16-20-25	to define à définir a definir		
1300	52	16-20-25			
1350	54	10-16			
1400	56	10-16-20			
1400	56	25			
1500	60	10-16			
1500	60	20-25			
1600		6-10-16			
1600		25			
	66	6-10-16			
1800		6-10			
1800		16-25			
	72	6-10			
	72	16			
	78	6-10			
	78	16			
2000		6			
2000		10-16			
	84	6			
	84	10-16			
2200		6			
2200		10			
	90	6-10			
2400	96	6-10			
	102	6			
2600		6			
	108	6			
2800		6			
	114	6			
3000	120	6			

LIST OF TOOLS USED FOR DISMANTLING AND MOUNTING OF VALVE

LISTE DES OUTILLAGES NÉCESSAIRES AU MONTAGE ET DÉMONTAGE

LISTA DE LAS HERRAMIENTAS NECESARIAS PARA EL DESMONTAJE Y MONTAJE DE LA VÁLVULA



1	Pneumatic screwing machine	<i>Visseuse pneumatique</i>	Destornillador neumático
2	Open ended spanner	<i>Clé plate</i>	Llave fija
3	Ring spanner	<i>Clé six pans</i>	Llave hexagonal
4	Box spanner	<i>Clé à pipe</i>	Llave
5	Screwdriver	<i>Tournevis</i>	Destornillador
6	Hammer	<i>Massette</i>	Mazo
7	Pneumatic polisher	<i>Polisseuse pneumatique</i>	Pulidora neumática
8	Wedge	<i>Cale</i>	Cuna
9	Crow bar	<i>Pied de biche</i>	Palanqueta
10	Grease silicon	<i>Graisse silicone</i>	Grasa de silicona
11	Positioning tool of the disc	<i>Outillage de positionnement de l'obturateur</i>	Herramienta para asegurar el montaje de la mariposa
12	Roolling tool	<i>Outillage de roulage</i>	Herramienta de rodar
13	Extraction tool of the shaft	<i>Outillage d'extraction de l'axe</i>	Herramienta de extracción del eje

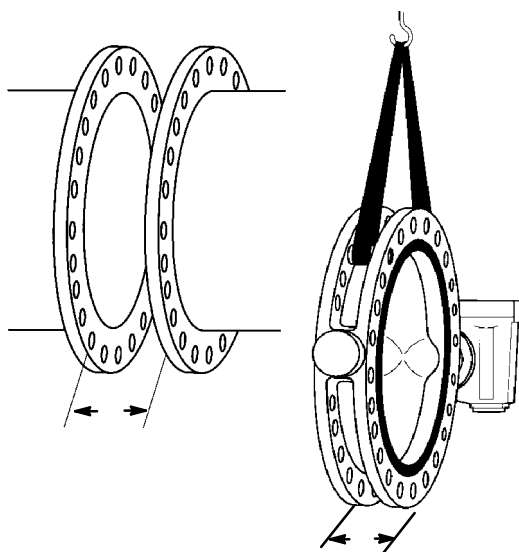
Consumables
 Consommables
 Consumibles

Use only the silicon grease enclosed with the kit. The use of mechanical grease is strictly prohibited
 Ne jamais utiliser de la graisse mécanique, utiliser la graisse silicone jointe avec le kit
 No deben utilizar grasa mecánica, utilizar la grasa de silicona suministrada con el kit

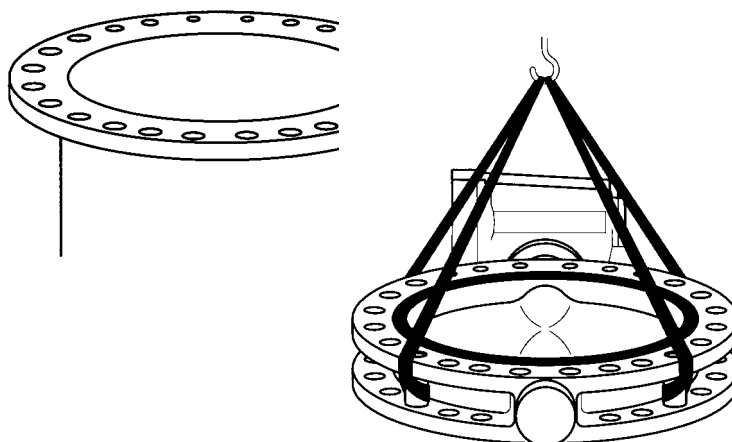
DISMANTLING THE VALVE FROM PIPING EXTRACTION DU ROBINET DE LA TUYAUTERIE EXTRACCIÓN DE LA VÁLVULA

- Turn valve to 5° before full closing.
- Disconnect the electrical or pneumatical supplies of actuator if necessary.
- Dismantle the valve from piping with its actuator.
- *Manoeuvrer le robinet en position 5° avant la fermeture.*
- *Débrancher les alimentations électriques et pneumatiques de l'actionneur si elles existent.*
- *Débrider le robinet et l'extraire de la tuyauterie avec son actionneur.*
- Maniobrar la válvula en posición 5° antes del cierre,
- Desconectar las alimentaciones eléctricas y neumáticas del accionador (si dispone de ellas),
- Desembridar la válvula y extraela de la tubería con el accionador.

Vertical mounting Montage vertical Montaje vertical



Horizontal mounting Montage horizontal Montaje horizontal



VALVE / ACTUATOR UNCOUPLING DESACCOUPLEMENT ROBINET / ACTIONNEUR DESMONTAJE DE LA VÁLVULA DEL ACCIONADOR

- Identify the mounting position of the actuator on to the valve (N or M position),
- Desaccouple the actuator and keep carefully all the parts of the connection.
- *Repérer la position de montage de l'actionneur sur le robinet (Position N ou M).*
- *Désaccoupler l'actionneur et conserver soigneusement toutes les pièces d'adaptation.*
- Marcar la posición del montaje del accionador sobre la válvula (posición N o M),
- Desmontar el accionador y conservar cuidadosamente todas las piezas de adaptación.

VALVE DISMANTLING**DEMONTAGE DU ROBINET****DESMONTAJE DE LA VÁLVULA**

- Heighten valve on supports or any other adapt for dismantling the whole parts and in particular the disc.
Disc slinging
Elévation du robinet sur des plots ou tout autre moyen approprié afin de démonter toutes les pièces et en particulier l'obturbateur.
Elingage de l'obturbateur
Colocar la válvula sobre un soporte u otro medio apropiado para desmontar todas las piezas y en particular la mariposa.
Eslingado de la mariposa

**Bottom 176 dismantling***Démontage du fond 176***Desmontaje del fondo 176**

- Put out the plug 916 and unscrew the hexagonal nut 920 and the adjusting screw 904
Enlever le bouchon 916 et dévisser l'écrou hexagonal 920 et la vis de réglage 904
Sacar el tapón 916 y destornillar la tuerca exagonal 920 y la varilla roscada 904
- Put out the spring retaining ring 932.2
Enlever le jonc 932.2
Sacar el anillo de retención 932.2

DN 1050 - 1200 PS 10 bar



DN 1600 - 3000 PS 6 bar
 DN 1350 - 2500 PS 10 bar
 DN 1100 - 2200 PS 16 bar
 DN 1100 - 2000 PS 20 bar
 DN 1100 - 1800 PS 25 bar

- Partially unscrew the hexagonal nut 920 and the screw 904
Dévisser partiellement l'écrou hexagonal 920 et la vis 904
Desatornillar parcialmente la tuerca 920 y el tornillo 904
- Remove the plug 176 by removing the screws 901.1
Enlever le bouchon 916 en dévissant les vis 901.1
Sacar el tapón 916 desatornillando los tornillos 901.1

Operating shaft 213 dismantling*Démontage de l'arbre de manoeuvre 213***Desmontaje del eje superior 213**

DN 1050 - 1200 PS 10 bar

- Split bush 540 and retaining ring 932.1 dismantling
Démontage de la douille 540 et du jonc 932.1
Desmontaje del disco de apoyo 540 y del anillo de retención

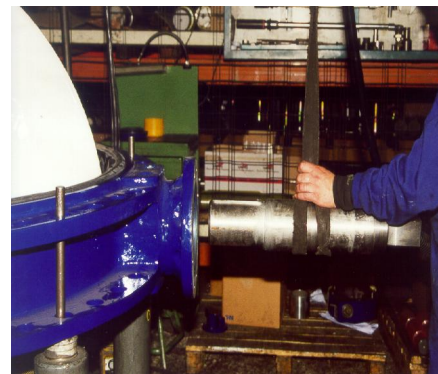
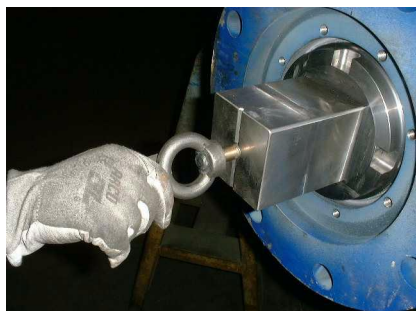
DN 1600 - 3000 PS 6 bar
 DN 1350 - 2500 PS 10 bar
 DN 1100 - 2200 PS 16 bar
 DN 1100 - 2000 PS 20 bar
 DN 1100 - 1800 PS 25 bar

- Tightening ring 554 dismantling
Démontage de la rondelle supérieure 554
Desmontaje del anillo de estanquidad 554



Operating shaft 213 dismantling
Démontage de l'arbre de manoeuvre 213
Desmontaje del eje superior 213

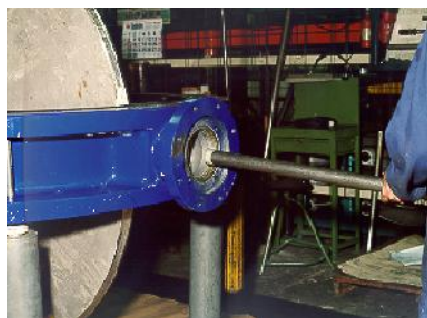
All DN, all PS / Tous DN, tous PS / Todos DN, todos PS



Shaft 210 dismantling
Démontage de l'axe 210
Desmontaje del eje inferior 210

- Tightening ring 554 side, introduce an iron rod $\varnothing$ 30 mm to eject the shaft 210
Côté rondelle supérieure 554, introduire une barre de fer $\varnothing$ 30 mm pour éjecter l'axe 210
 Lado del anillo de estanquidad 554, introducir una barra de hierro $\varnothing$ 30 mm para expulsar el eje inferior 210

DN 1050 - 1200 PS 10 bar :



DN 1600 - 3000 PS 6 bar
 DN 1350 - 2500 PS 10 bar
 DN 1100 - 2200 PS 16 bar
 DN 1100 - 2000 PS 20 bar
 DN 1100 - 1800 PS 25 bar

- Shaft 210 extraction using the Nr.13 extraction tool of the shaft
Extraction de l'axe 210 à l'aide de l'outilage Nr. 13 d'extraction de l'axe 210
 Extracción del eje inferior 210 utilizando la herramienta N° 13 de extracción del eje 210



Disc 550 dismantling
Démontage de l'obturateur 550
Desmontaje de la mariposa 550

All DN, all PS / Tous DN, tous PS / Todos DN, todos PS



Liner 413 dismantling
Démontage de la manchette 413
Desmontaje del anillo 413

All DN, all PS / Tous DN, tous PS / Todos DN, todos PS



Plain bearings 310.* dismantling
*Démontage des paliers lisses 310.**
Desmontaje de los cojinetes lisos 310.*

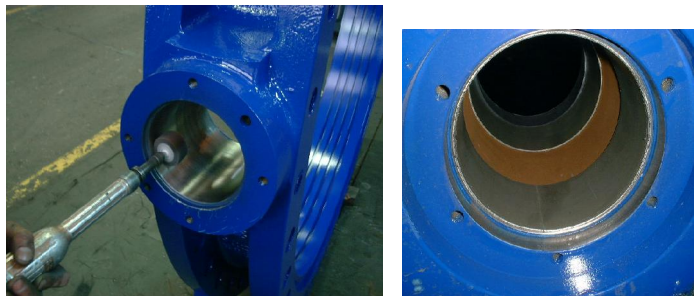
All DN, all PS / Tous DN, tous PS / Todos DN, todos PS

VALVE MOUNTING **MONTAGE DU ROBINET** **MONTAJE DE LA VÁLVULA**

Bearings 310.* mounting *Montage des paliers lisses 310.** **Montaje de los cojinetes lisos 310.***

All DN, all PS / Tous DN, tous PS / Todos DN, todos PS

- Cleaning of the location of bearings 310.*
*Nettoyage du logement des paliers lisses 310.**
 Pulido del alojamiento de los cojinetes lisos 310.*

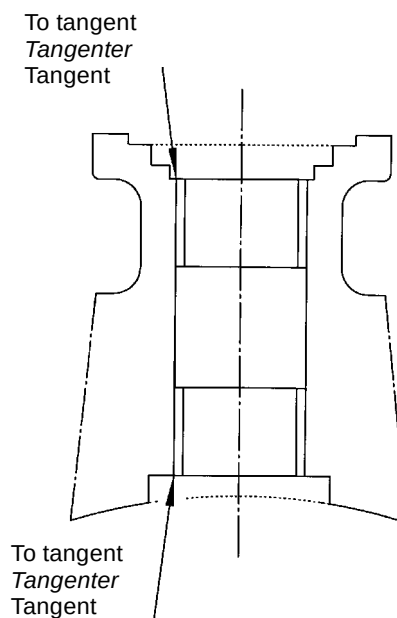
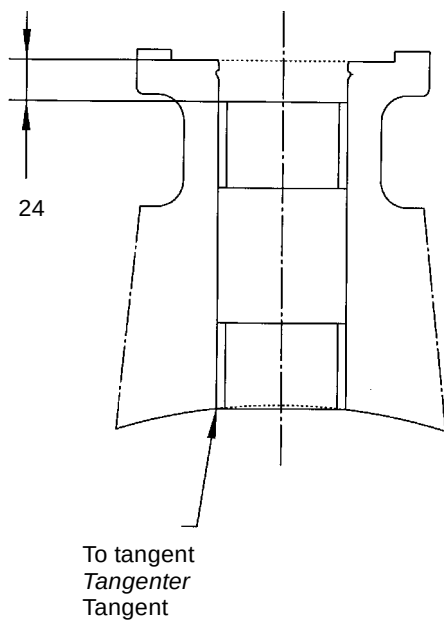


- Mounting of bearings 310.*
*Montage des paliers lisses 310.**
 Montaje de los cojinetes lisos 310.*



DN 1050 - 1200 PS 10 bar :

DN 1600 - 3000	PS 6 bar
DN 1350 - 2500	PS 10 bar
DN 1100 - 2200	PS 16 bar
DN 1100 - 2000	PS 20 bar
DN 1100 - 1800	PS 25 bar



Liner 413 mounting
Montage de la manchette 413
Montaje del anillo 413

All DN, all PS / Tous DN, tous PS / Todos DN, todos PS

- Put silicon grease in the body 100 groove input
Graisser l'entrée des gorges dans le corps 100
Untar ligeramente la entrada de la cajera del cuerpo 100



- Preparation of the liner 413 for the mounting
Préparation de la manchette 413 pour le montage
Preparación del anillo 413 para montaje



- Place the false shafts to avoid the ovalization of the shaft passages
Insérer les faux axes afin d'éviter l'ovalisation des passages d'axes
Presentación de los falsos ejes para evitar la ovalización de los pasos de eje



- Mounting of the liner 413 on the two passages of shaft
Montage de la manchette 413 sur les deux passages d'axes
Montaje del anillo 413 sobre los dos pasos de eje



Liner 413 mounting
Montage de la manchette 413
Montaje del anillo 413

All DN, all PS / Tous DN, tous PS / Todos DN, todos PS

- Place the body 100 with the liner 413
Use the rolling tool Nr. 12 for a good positioning of the liner into the body
Levage et pose du corps 100 avec la manchette 413
Utiliser l'outillage de roulage Nr. 12 pour positionner correctement la manchette 413 dans le corps 100
Colocar el cuerpo 100 con el anillo 413
Utilizar la herramienta N° 12 de rodar para ajustar el anillo 413 al cuerpo 100



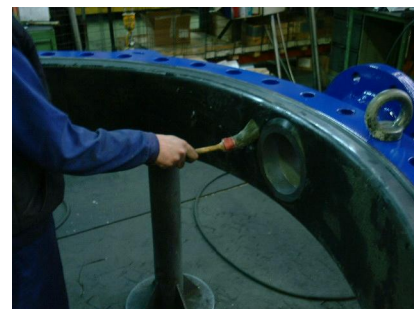
Disc 550 mounting
Montage de l'obturateur 550
Montaje de la mariposa 550

All DN, all PS / Tous DN, tous PS / Todos DN, todos PS

- Put the body + liner on supports or any other adapt for mounting the whole parts and in particular the disc
Poser le corps + manchette sur des plots ou tout autre moyen approprié afin de mettre en place toutes les pièces et en particulier l'obturateur
Posicionar el cuerpo + el anillo sobre un soporte, u otro medio apropiado, con el fin de colocar todas las piezas y en particular la mariposa



- Put silicon grease on the liner 413
Enduire la manchette 413 de graisse silicone
Untar ligeramente el anillo 413 de grasa



Disc 550 mounting
Montage de l'obturateur 550
Montaje de la mariposa 550

All DN, all PS / Tous DN, tous PS / Todos DN, todos PS

- Bottom side: use of a false shaft and the positioning tool Nr .11 of the disc to ensure the correct alignment of the disc hole with the body hole
- Côté fond : utilisation d'un faux axe et de l'outil de positionnement Nr 11 de l'obturateur pour assurer le bon alignement de l'alésage de l'obturateur avec celui du corps
- Lado de fondo: utilización de un falso eje y de la herramienta N° 11 para asegurar el correcto montaje de la mariposa, alineación adecuada del agujero de la mariposa con el del cuerpo



Operating shaft 213 mounting
Montage de l'arbre de manoeuvre 213
Montaje del eje superior 213

- | | | |
|----------------|-----------|--|
| DN 1050 - 1200 | PS 10 bar | - Mounting of the operating shaft 213 with its O-ring 412.1 and its 2 pins 940
<i>Montage de l'arbre 213 équipé de son joint torique 412.1 et de ses 2 clavettes 940</i>
Montaje del eje superior 213 con su junta tórica 412.1 y sus 2 chavetas 940 |
| DN 1600 - 3000 | PS 6 bar | - Mounting of the operating shaft 213 with its 2 pins 940.1
<i>Montage de l'arbre 213 équipé de ses 2 clavettes 940.1</i>
Montaje del eje superior 213 con sus 2 chavetas 940.1 |
| DN 1350 - 2500 | PS 10 bar | |
| DN 1100 - 2200 | PS 16 bar | |
| DN 1100 - 2000 | PS 20 bar | |
| DN 1100 - 1800 | PS 25 bar | |



Shaft 210 mounting
Montage de l'axe 210
Montaje del eje inferior 210

DN 1050 - 1200	PS 10 bar	- Put the ball 486 Montage de la bille 486 Montaje de la bola 486
----------------	-----------	---



DN 1600 - 3000	PS 6 bar	- Put the keys 940.2 Montage des clavettes 940.2 Montaje de las chavetas 940.2
DN 1350 - 2500	PS 10 bar	
DN 1100 - 2200	PS 16 bar	
DN 1100 - 2000	PS 20 bar	
DN 1100 - 1800	PS 25 bar	



Operating shaft 213 anti blow-out mounting
Montage de l'anti-éjection de l'arbre de manoeuvre 213
Montaje del anti-expulsión del eje superior 213

DN 1050 - 1200	PS 10 bar	- Put the spring retaining ring 932.1 and the split bush bush 540 Montage du jonc 932.1 et de la douille 540 Montaje del anillo de retención 932.1 y del disco de apoyo 540
----------------	-----------	---

DN 1600 - 3000	PS 6 bar	- Put the tightening ring 554 Montage de la rondelle supérieure 554 Montaje del anillo de estanquidad 554
DN 1350 - 2500	PS 10 bar	
DN 1100 - 2200	PS 16 bar	
DN 1100 - 2000	PS 20 bar	
DN 1100 - 1800	PS 25 bar	



Shaft 210 anti blow-out mounting
Montage de l'anti-éjection de l'axe 210
Montaje del anti-expulsión del eje inferior 210

DN 1050 - 1200 PS 10 bar :

- Mounting of the bottom 176 with the adjusting screw 904, the hexagonal nut 920 and the O-rings 412.2 and 412.3
 Mounting of the spring retaining ring 932.2

Montage du fond 176 équipé de la vis de réglage 904 avec l'écrou hexagonal 920 et des joints toriques 412.2 et 412.3
Montage du jonc 932.2

Montaje del tapón 176 con la varilla roscada 904, la tuerca hexagonal 920 y las juntas tóricas 412.2 y 412.3
 Montaje del anillo de retención 932.2



- | | | |
|----------------|-----------|---|
| DN 1600 - 3000 | PS 6 bar | - Mounting of the sub-unit disc : thrust plate 414, pin 560, thrust 553 and the bottom 176 |
| DN 1350 - 2500 | PS 10 bar | |
| DN 1100 - 2200 | PS 16 bar | <i>Montage du sous-ensemble : grain d'appui 414, goupille 560 et rondelle de butée 553 et du fond 176</i> |
| DN 1100 - 2000 | PS 20 bar | |
| DN 1100 - 1800 | PS 25 bar | Montaje del conjunto: disco de apoyo 414, pasador 560, tope 553 y del tapón 176 |

Adjusting screw 920 adjusting
Réglage de la vis de réglage 904
Reglaje de la varilla roscada 904

All DN, all PS / Tous DN, tous PS / Todos DN, todos PS

- Tight the adjusting screw 904 until contact
 Unscrew the adjusting screw 904 1/4 of turn
 Overtighten the hexagonal nut 920 on the plug 176 maintaining the adjusting screw 904
- *Visser la vis de réglage 904 jusqu'au contact*
Dévisser la vis de réglage 904 d'un 1/4 de tour
Procéder au blocage de l'écrou hexagonal 920 sur le fond 176 tout en maintenant la vis de réglage 904
- Apretar la varilla roscada 904 hasta el contacto
 Desatornillar la varilla roscada 904 de 1/4 de vuelta
 Proceder al bloqueo de la tuerca hexagonal 920 sobre el tapón manteniendo la varilla roscada 904

TROUBLE SHOOTING

	Downstream / upstream leakage	
	Shafts leakage	
	Flanges leakage	
	Over torque	
	No opening	
	No closing	
	Hard point	
	Fluttering	
	Foreign solid particle in the valve	Actuator on safety - Open the valve, without flow, take of the particle - inspect liner/disc - replace liner/disc
	Broken body	Defect due to water hammer Search the reasons. Replace / Repair the valve
	Broken disc, twist disc	Defect due to water hammer Search the reasons. Replace / Repair the valve
	Damaged disc Corroded disc	Disc : see wrong flanging diameters and replace with disc kit
	Adjusting screw 904	Adjusting screw 904 adjusting: see page 16
	Broken shaft, twist shaft	Analyse the defect / cause research / Replace shaft
	Worn liner	Replacement liner (liner kit)
	Loosening of liner Damaged liner	If the part of the liner which is lose is not damaged : remove valve / separate the pipe-line flanges / put the valve back in the pipe-line/ check operating tests.
	Wrong flanging	Check type and flange bolting torque
	Wrong diameter of flanging	Follow instructions given in KSB type series booklet
	Wrong face to face Non parallel flanges	Flanging has to be modify in accordance with KSB technical leaflet requirements.
	Flow conditions Wrong operating conditions	Check the technical offer towards service conditions
	Disc	Take the option "stabilizator" system
	Damaged actuator	Check sizing towards operating conditions (see KSB)

concerned

INCIDENTS DE FONCTIONNEMENT

	Fuite amont / aval	
	Fuite axes	
	Fuite brides	
	Surcouple	
	Non ouverture	
	Non fermeture	
	Point dur	
	Fluttering	
	Corps étranger	Actionneur en sécurité. Ouvrir le robinet, hors de débit/fluide, ôter le corps étranger - inspection manchette/obturateur - remplacement manchette/obturateur
	Corps cassé	Anomalie liée à la présence d'un fort coup de bélier. Recherche des causes. Remplacement / Réparation du robinet
	Obturateur cassé, tordu	Anomalie liée à la présence d'un fort coup de bélier. Recherche des causes. Remplacement / Réparation du robinet
	Obturateur endommagé Obturateur érodé, corrodé	Cas de l'obturateur : voir mauvais diamètre de bridage et remplacement avec kit obturateur approprié
	Vis de réglage 904	Réglage de la vis de réglage 904 : page 16
	Arbre cassé, tordu	Expertise robinet / analyse cause / Remplacement arbre
	Manchette usée	Remplacement manchette (kit de rechange manchette)
	Manchette déchaussée, endommagée	Si roulée, non endommagée : extraction du robinet / écartement des brides / remise en place (essais de manoeuvre)
	Mauvais bridage	Vérification du type et du couple de bridage
	Mauvais diamètre de bridage	Se mettre en conformité avec le livret technique / Changement des brides
	Face to face non conforme Brides non parallèles	Se mettre en conformité avec le livret technique / Changement des brides
	Conditions d'écoulement Conditions de service anormales Obturateur qui tape	Vérification des Préconisations Prendre l'option système "stabilizator"
	Actionneur endommagé	Vérification du dimensionnement par rapport aux conditions de service (voir KSB)

concerné

INCIDENCIAS DE FUNCIONAMIENTO

	Fuga aguas arriba / aguas abajo	
	Fuga al paso de ejes	
	Fuga en las bridas	
	Par demasiado alto	
	La válvula no abre	
	La válvula no cierra	
	Punto duro	
	Fluttering	
	Cuerpo extraño	Accionador en seguridad. Abrir la válvula, sin fluido, quitar el cuerpo extraño – inspección anillo/ mariposa – reemplazar anillo/mariposa
	Cuerpo roto	Anomalía producida por un fuerte golpe de ariete. Buscar las causas. Reemplazar/Reparar la válvula.
	Mariposa rota, torcida	Anomalía producida por un fuerte golpe de ariete. Buscar las causas. Reemplazar/Reparar la válvula.
	Mariposa averiada Mariposa corroída, atacada	En el caso de la mariposa : ver diámetro de bridaje defectuoso y reemplazar con el kit de la mariposa adecuada.
	Ajuste de la varilla roscada 904	Ver ajuste de la varilla roscada : ver página 16
	Eje roto, torcido	Examinar la válvula / analizar la causa / reemplazamiento del eje
	Anillo gastado (mantenimiento ...)	Reemplazar el anillo (kit de repuesto del anillo)
	Anillo dañado	Extraer la válvula, comprobar dimensiones de bridas, montaje y ensayos de maniobra.
	Bridaje defectuoso	Verificar el tipo y el par de apriete
	Diámetro de bridas erróneo	Modificarlo de acuerdo con la documentación técnica / cambiar las bridas
	Distancia brida-brida no adecuada Bridas no paralelas	Modificarlo de acuerdo con la documentación técnica / cambiar las bridas
	Condiciones de Servicio, fluido, velocidad anormales Mariposa	Verificar las condiciones de servicio de acuerdo con la válvula Tomar el sistema estabilizador option
	Accionado dañado	Verificar el tamaño del mismo con relación a las condiciones de servicio (ver KSB)


 concernedo



TRANSFER AND STORAGE UNPACKING INSTALLATION MAMMOUTH DN 1100 - 3200

1 - TRANSFER, MANUTENTION AND STORAGE OF PACKED EQUIPMENTS

- 1.1 - Crates handling precautions
- 1.2 - Symbols identification and instructions

2 - UNPACKING

- 2.1 - Crate opening
- 2.2 - Environment characteristics

3 - INSTALLATION

- 3.1 - Conditions installation
- 3.2 - Handling equipment
- 3.3 - Face to face flanging
- 3.4 - Position of valve and flanging
- 3.5 - Piping flanges characteristics

4 - PARTICULAR CASES

- 4.1 - Case of valve with supporting legs
- 4.2 - Case of extension neck
- 4.3 - Counterweight

AMRI is ISO 9001 approved

1 - TRANSFER AND STORAGE OF PACKED EQUIPMENT

1.1 - Crates handling precautions

In order to select the appropriate lifting equipment (crane, slings, hooks, etc.), take the valve gross weight mentioned on the crate into consideration.



1.2 - Symbols identification

The crate bears the appropriate ISO 7000 symbols (next page) which gives instructions to be observed during crates transfer and manutention (refer to table below).

Storage conditions depend on the type of packing used for the shipment of the equipment.

This code gives the packing type which is shown on the crate.

Codes KSB 2, 3 and 4 : equipment shall be unpacked as soon as arrived on site and stored as defined in the chapter 2.2

Codes KSB 2b, 3b and 4b : equipment protection by a thermo-weldable bag : crate shall be stored under a shelter to protect it against rain; protection is suitable for a storage duration of 3 months ; after this period of time, equipment shall be unpacked and stored as required in the chapter 2.2.

Codes KSB 2c, 2d, 3c, 4c and 4d : protection is suitable for a storage until the date given on the crate.

After this date, thermo-weldable bag shall be opened in order to check state of equipment (rusting, dampness, water ingress, etc ...).

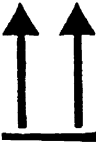
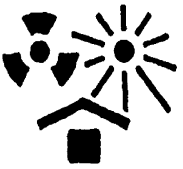
If equipment state is acceptable, a new period of storage may be obtained :

- by inserting a new set of desiccant bags,
- keeping the bag internal volume to a minimum,
- closing tightly the thermo-weldable bag ,
- noting on the crate the new date for end of storage validity.

If equipment state is not acceptable, it is recommended to unpack it, repair eventual damages and store it as required in chapter 2.2.

KSB code	Physical protection	Chemical protection	SEI code
1	Cardboard box or cardboard box pallet	Nothing	4
1b	Cardboard box or cardboard box pallet	Case with thermoretractable film	4b
1c	Cardboard box or cardboard box pallet	Case with thermowelding barrier + desiccant	4c
1d	Cardboard box or cardboard box pallet	Case with thermoretractable film + desiccant + thermowelding barrier	4bc
2	Crate and cardboard	Nothing	3.4
2b	Crate and cardboard	Case with thermoretractable film	3.4b
2c	Crate and cardboard	Case with thermowelding barrier + desiccant	3.4c
2d	Crate and cardboard	Case with thermoretractable film + desiccant + thermowelding barrier	3.4bc
3	Case	Nothing	4
3b	Case	Case with thermoretractable film	4b
3c	Case	Case with thermowelding barrier + desiccant	4c
3d	Case	Case with thermoretractable film + desiccant + thermowelding barrier	4bc
4	Plywood packing case	Nothing	4
4b	Plywood packing case	Case with thermoretractable film	4b
4c	Plywood packing case	Case with thermowelding barrier + desiccant	4c
4d	Plywood packing case	Case with thermoretractable film + desiccant + thermowelding barrier	4bc
5	Specific packaging (extension neck, particular stresses (with or without estimate))		

Graphic symbols

KEY	SYMBOL	FUNCTION	KEY	SYMBOL	FUNCTION
keep away from posture		indicates that the transport packaging must be kept in a dry environment	fragile handle with care		indicates : a) that the content of the transport packaging is fragile b) that it must be handled with care
centre of gravity		indicates the centre of gravity of the transport packaging	use no hooks		indicates that hooks may be used to lift the transport packaging
do not roll		indicates that the transport packaging must not be rolled	top		indicates correct upright position of transport packaging
no trolley this side		identifies locations on transport packaging where trolleys or trucks must not be placed	keep away from heat		indicates that the transport packaging must be kept away from heat
storage limits		indicates limited storage capability of transport packaging	keep away from heat and radioactivity		indicates that the content of the packaging may be damaged or rendered completely unusable by heat or penetrating radiation
clamp sides		shows where clamps should be placed for handling of transport packaging	sling here		shows where slings should be attached to lift the transport packaging
temperature limits		indicates temperature limits between which transport packaging must be kept			

Example



The equipment to be protected and packaged, of varying degrees of fragility, must fit into a general classification with allowance for the stresses of handling, transport and storage.

The major families are :

- 1 - Saddles and bases
- 2 - Bundles and palletization
- 3 - Packaging in crate
- 4 - Packaging in packing

Cases

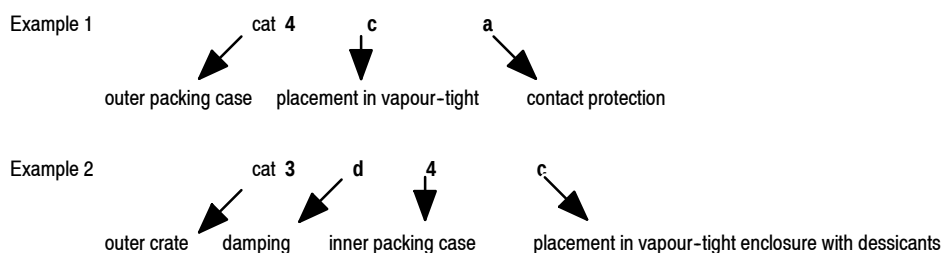
- 7 - Packaging of reels
- 8 - Packaging of hazardous substances

Principles of codification :

- The types of category are indicated by numerals.
- The types of protection are indicated by letters.

Summary table of packaging categories						
A- equipment concerned examples	Packaging category	B - Physico-chemical protection			C - Mechanical protection	
		a contact protection	b rain- tightness	c vapour tightness	immobilization	d suspension damping
Large fabricated vessels, columns, reactors, condensers, etc ...	1 - Saddles and bases 1 - a 1 - b	x	x		immobilization by inserts or rigid attachment	
Straight piping frame parts, shapes, etc ...	2 - Bundles 2 - a 2 - b	x	x			
Machine-welded assembly, small fabricated vessels, piping, etc ...	3 - Crates 3 - a 3 - b 3 - c	x if necessary if necessary	if necessary x x	x		
Electrical and mechanical equipment						
Glass, small frameworks, plastic parts	4 - Packaging cases 4 - a 4 - b 4 - c	x if necessary	 x if necessary			
General engineering parts						
Refractory materials						
Electrical, electronic, electro-mechanical equipment, control cabinet, etc ..						
Glass, electrical equipment, dataprocessing equipment, automation, etc	d - packaging for impact and vibration protection 3d 4d 3d3 4d3 4d4 3d4	Protection indices a, b, c may be added to these categories according to the constraints of the physico-chemical environment Types of material identical to categories 4			x x x x x x x	
Reels of cable	7 - Packaging of reels				Lagging	
Products subject to special regulations	8 - Packaging of hazardous materials	Air transport : OACI regulations - IATA code Sea transport : OMI regulations - IMDG code Land transport : CITMD and OCTI regulations - RID and ADR codes				

Key : x : mandatory



2 - UNPACKING

2.1 - Crates opening

After crates opening:

- check the state of equipment and repair if necessary,
- if equipment is coated only with primer painting, carry out immediately its final painting as required in painting specification,
- unpack carefully the complete crate content because some valve or actuator parts may have been packed separately (hand-wheel, bolting, actuator accessories, supporting legs, spare parts, etc.),
- read carefully special instructions that may be attached to the actuator or to the disc.

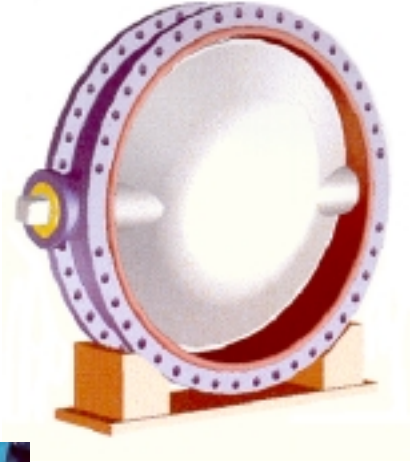
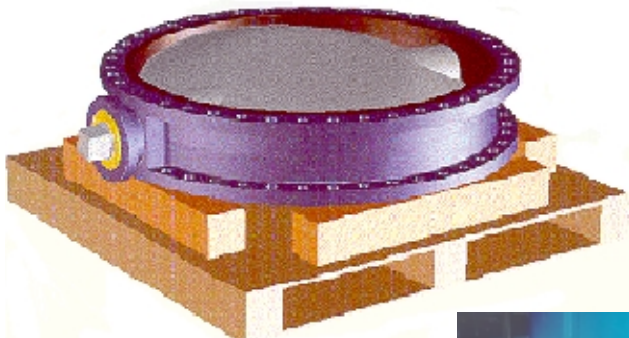
2.2 - Environmental characteristics

Butterfly valve is fitted with a rubber seat which is a very sensitive component. In order to avoid any damage to the seat :

- ambient temperature shall be between 5° C and 50° C,
- maximum recommended humidity is 65 %. Storage conditions shall avoid any condensation,
- ozone is noxious for rubber : keep valves away from any source of ozone (high voltage equipment and electric spark generator),
- ultra violet rays are also noxious for rubber : valves shall be protected from direct sun or strong artificial light.

Storage requirements

Pictures show how to store the valve in horizontal or vertical position; supporting blocks shall not be in contact with the valve rubber seat.



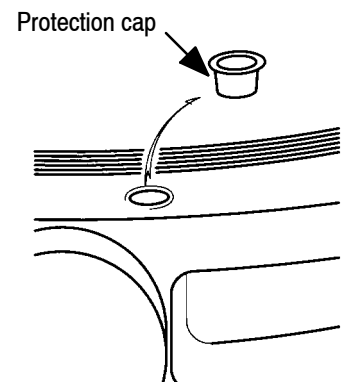
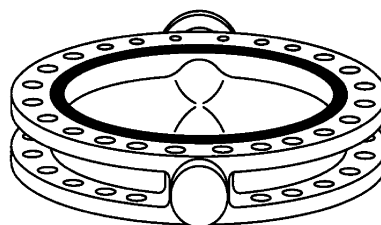
If valves electric actuator are fitted with heating resistance in the control box, connect it to an appropriate electric source in order to avoid condensation into the box.

If the warehouse does not offer sufficient cleanliness, protect the equipment from dust, sand and other harmful particles.

Equipment is delivered with the following protections:

- plugs electrical, pneumatic and hydraulic orifices on (connecting interfaces),
- protection caps : on each threaded hole on valves is plugged with protection cap which must be maintained until fitting onto pipes

Check that those protections are still present and replace them if missing.



3 - INSTALLATION

3.1 - INSTALLATION CONDITIONS

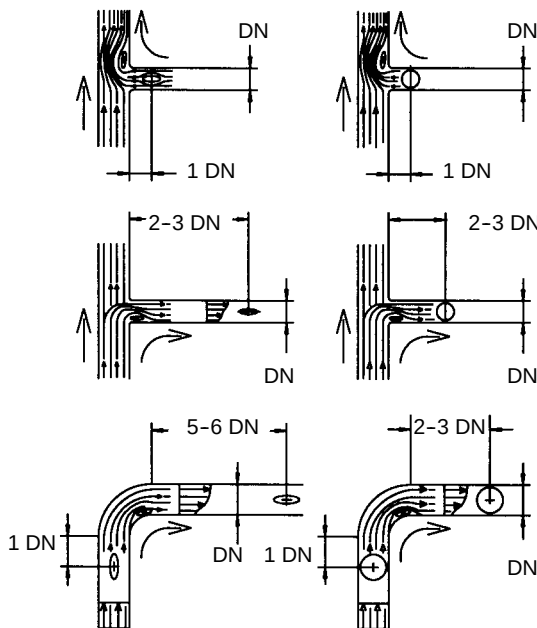
Before valve fitting onto the pipe, all requirements shall be met in order to insure proper installation and operation of valve.

In addition to those requirements, the following shall be checked :

- state of the valves shaft passages threaded holes (no rust, no dirt),
- pipe flange contact area : cleanliness and roughness (R_a less than 25μ).
- position of the two pipes flanges (parallelism, concentricity, alignment of bolt holes) in accordance with standard NF E 29-430.

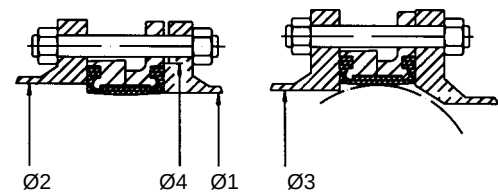
MAMMOUTH DN 1100 - 3200

INSTALLATION



Recommended minimum distances between the position of the valve and of the T-piece or the elbow.

FLANGING



- Connection with flat flanges or flanges with raised face.

Ø1 : optimal flange diameter on flange face.
 Ø2 : max. allowable diameter on flange face.
 Ø3 : allowed minimum diameter on flange face.
 Ø4 : allowed minimum diameter of raised face.

see the specific
overall dimensions
drawing realized
for the file

Disc axis in horizontal position : the lower part of the disc opens towards the downstream direction.

OPERATING INSTRUCTIONS

The liner is designed to ensure the tightness between the valve and the pipe's counter flange.

The valve fits tightly between flanges without any sealing.

BEFORE ASSEMBLY

- 1 - Verify that pipeline flanges are free from metallic chips and weld splatter.
- 2 - Verify that pipeline flanges are located on the same centreline and are parallel.
- 3 - Verify that inside diameter of pipeline flange is in accordance with the minimum and maximum diameters given by the manufacturer.
- 4 - Verify that nothing hinders the complete moving of the disc during opening or closing, in particular at the internal weld seams or at the pipe ends.
- 5 - Separate the pipeline flanges to allow valve insertion without damaging the elastomer liner of the valve.

INSTALLATION

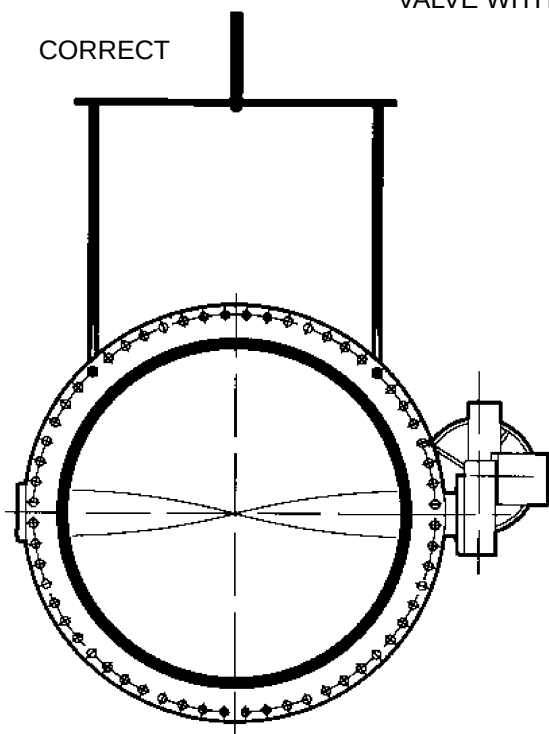
- 1 - Place the disc as spaced apart as possible from the closing position, but without that disc protrudes past the valve's body.
- 2 - Insert valve between pipeline flanges and center using several tie-rods.
- 3 - Screw up progressively the nuts until metal to metal contact is achieved between the valve body and pipeline flanges, by making sure the good centering of the body compared with the flange is maintained.
- 4 - Operate the valve several times to ensure no valve disc obstruction.
- 5 - Separate the pipeline flanges to allow valve insertion without damaging the elastomer liner of the valve.

Consult our leaflet for detailed information on the flanges dimensions and special advice of assembly.

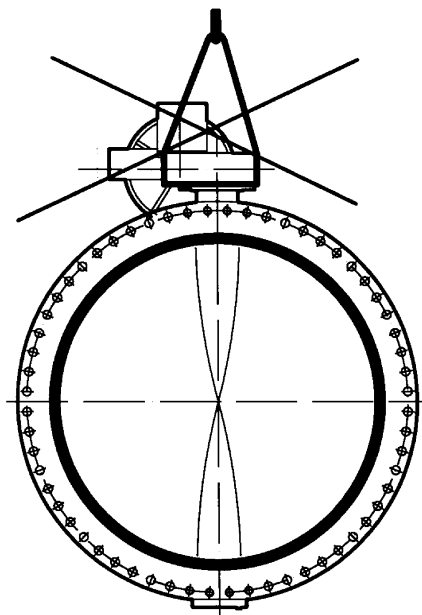
3.2 - Equipments handling

VALVE WITH MOTORIZATION

CORRECT

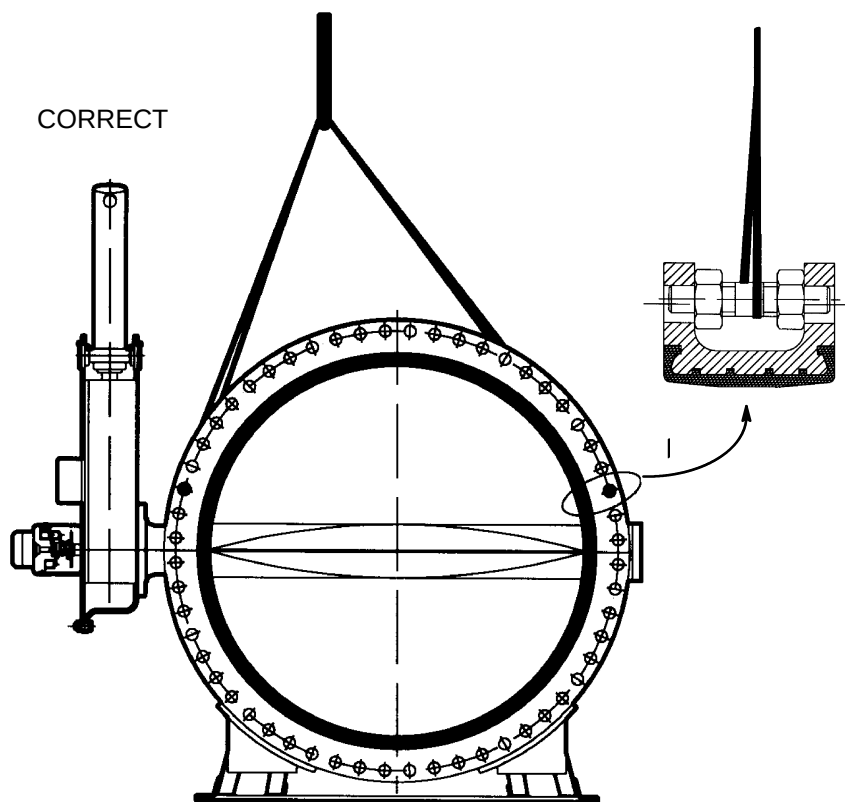


FORBIDDEN

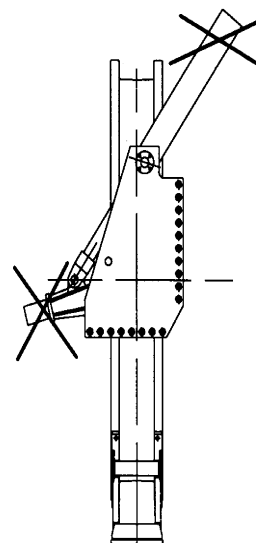


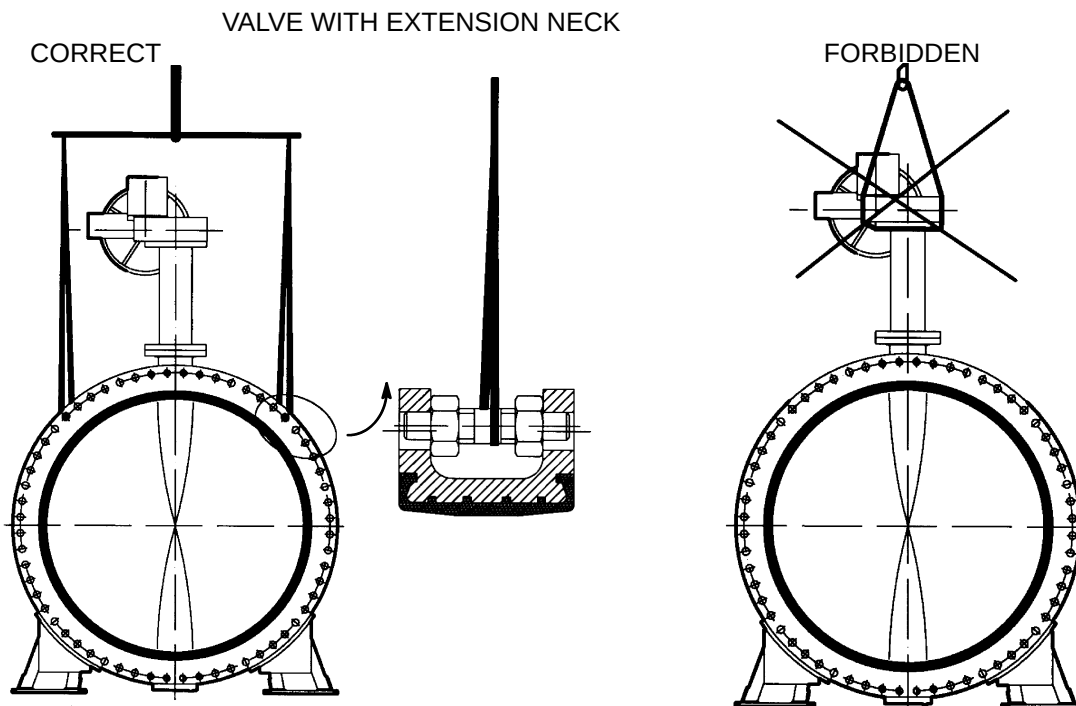
VALVE WITH COUNTERWEIGHT

CORRECT

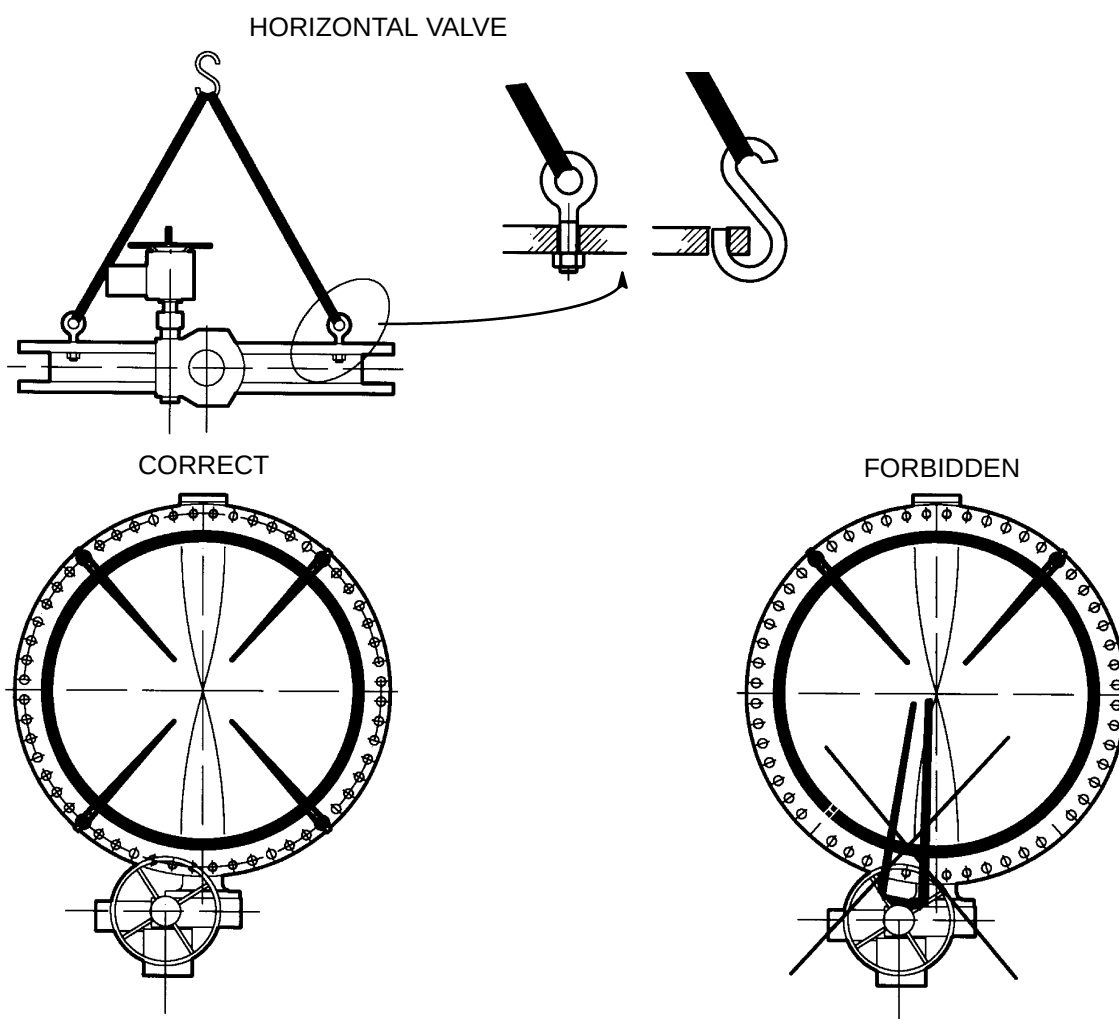


FORBIDDEN





To facilitate packing, it may happen that large extension neck and/or supporting leg are delivered separately. In this case, those devices shall be mounted onto the valve before fitting in accordance with relevant instructions on the specific technical file.

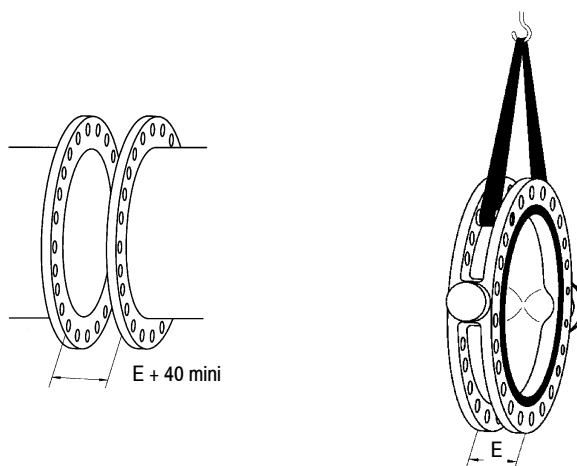


3.3 - Face to face flanging

Spread the two pipe flanges to obtain sufficient clearance between flange face and valve seat cheeks.

Minimum clearance is : $E + 40\text{mm}$

E : face to face valve
refer to the technical file



3.4 - Valve position

- Centre the valve with the pipe flanges and insert all bolting,
- open slightly the valve,
- tighten progressively and evenly the bolting until pipe flanges bear all around on the valve contact area,
- close the valve.

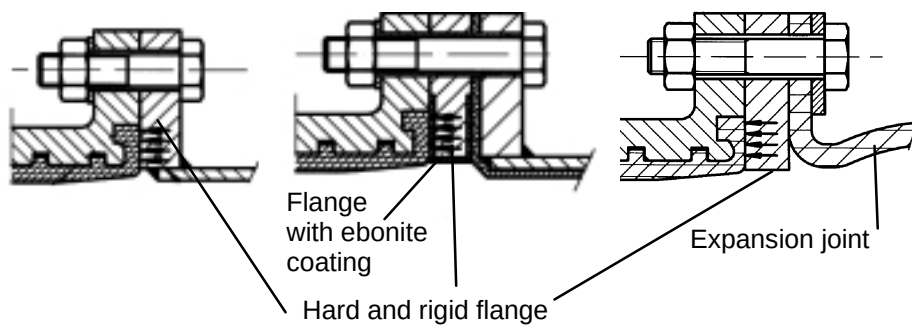
No welding shall be carried out in the immediate valve vicinity because high temperature and/or weld projections might seriously damage the valve rubber seat.

3.5 - Pipe flanges characteristics

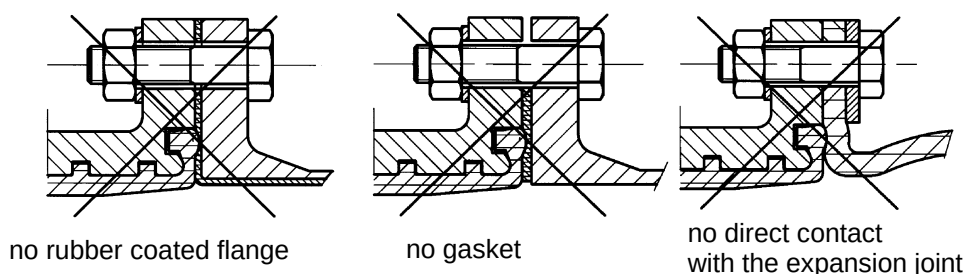
3.5.1 - Interface between valve and pipe flanges

Tightness between valve body and pipe flange is achieved by the compression of the seat cheeks.

CORRECT FITTING



FORBIDDEN FITTING

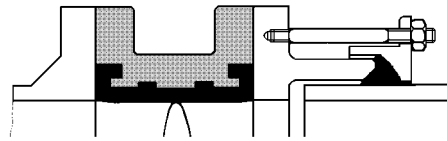


In case of coated pipe (hard rubber or Teflon for example), coating hardness and flanges detailed dimensions shall be given to AMRI-KSB for acceptance.

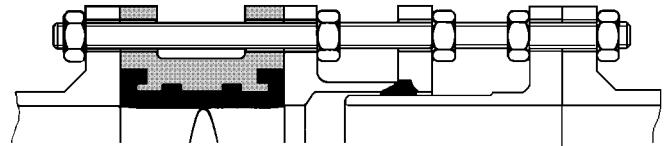
3.5.2 Arrangement for valve installation

Pipe arrangement should allow to spread the two pipe flange for installation and eventual further dismounting of the valve for repair purpose. Such arrangement may consist in sliding adaptor or in expansion joint.

Sliding adaptor (the downstream pipework is allowed to slide).

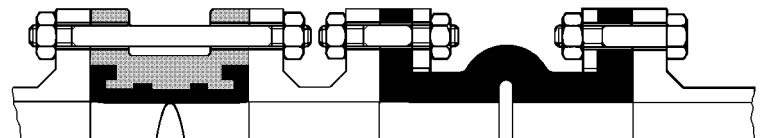


Fixed adaptor (the downstream pipework is solidly fixed, by means of the tie-bolts to the upstream pipework).



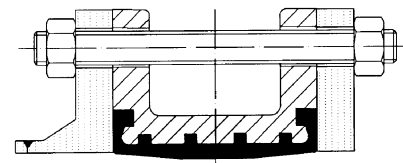
Supple joint (this allows for longitudinal and angular misalignments).

In no circumstances, this joint must be installed directly onto the valve.



3.5.3 - End of line service

Valve may be permanently used for end of line service under nominal pressure provided that it is fitted with a counter flange; internal diameter of counter flange shall meet the dimensions required in chapter 3.1.



4 - PARTICULAR CASES

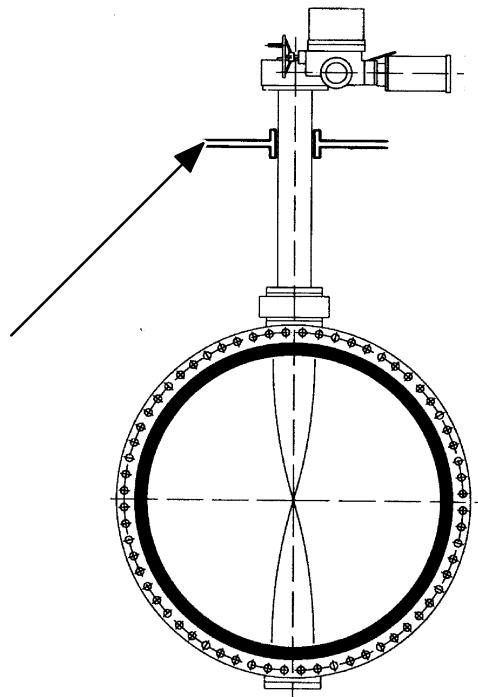
4.1 - Case of valve with supporting legs

If valve is supplied with supporting legs, the following should be taken into consideration :

- supporting legs are designed only to bear the valve weight,
- supporting legs shall't be fixed on the ground because there are not designed to withstand the horizontal and flexion loads due to pipe expansion and the weight of the whole piping.

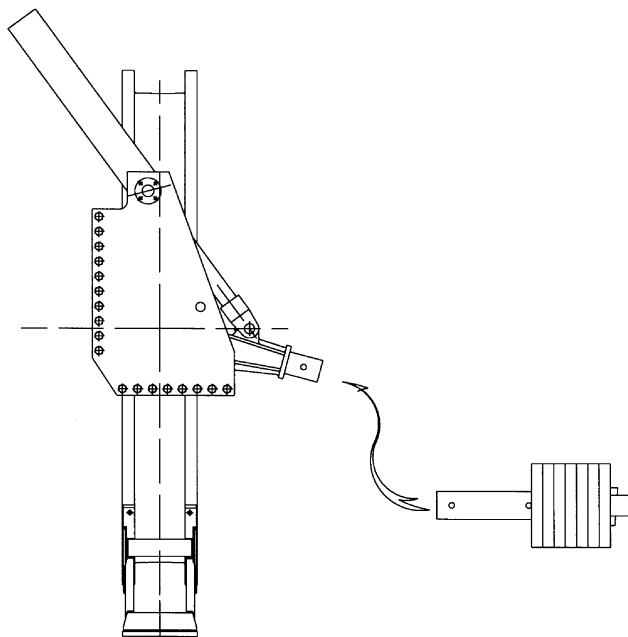
4.2 - Case of extension neck

When valve is fitted with large extension neck (length over 1 m.), extension neck shall be linked firmly to a rigid structure to damp all vibrations induced by the piping.

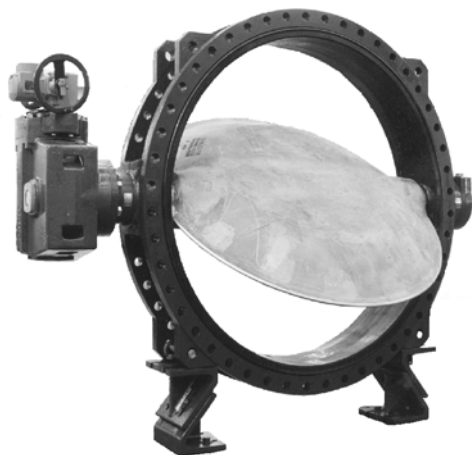


4.3 - Counterweight

See drawing to connect the counterweight with the lever.



Centred disc butterfly valve disc with AMRING® elastomer liner



DN 1050 to 4000

Allowable pressure PS up to 25 bar (375 psig)

Design according to EN 593 and ISO 10631

Applications

- Water treatment and supply, sea water desalination (multiflash, reverse osmosis processes),
- Cooling water systems and fire water systems,
- Shipbuilding, iron and steel industry and electric power stations (hydraulic, thermal or nuclear),
- Flow shut-off or regulation functions in all sectors of industry.

Working conditions

- Temperature: from -0°C minimum up to +65°C maximum. The working temperature depends on the media and the nature of elastomer used. Other temperatures can be proposed.
- Allowable pressure (PS): up to 25 bar at room temperature.

Materials

See page 2.

Design

- Flanged body with flat faces (Type 5) DN 1050-42" to 3000-120" (DN > 3000 please consult us)
- Body
 - PS 4 bar: DN 3800 to 4000
 - PS 6 bar: DN 1600 to 3700
 - PS 10 bar: DN 1050 to 2500
 - PS 16 bar: DN 1100 to 2200
 - PS 20 bar: DN 1100 to 2000
 - PS 25 bar: DN 1100 to 1800
- Valves can be installed with shafts in any position from horizontal to vertical (actuator on the top).
- Valves perfectly tight shut-off (no visible leakage at the naked eye) in either flow direction, in accordance with the following standards: EN 12266-1/leak level A and ISO 5208 category. A, and all other standard which allow a leakage rate (ANSI/FCI 70-2 class 6 for instance).

- Possible downstream dismantling and end of line.
- Body coated with polyurethane paint, thickness 80 µm, colour blue ref. RAL 5002.
- Disc DN 1050 to 1500: spheroidal graphite cast iron coated with epoxy paint, thickness 80 µm, colour brown ref. RAL 8012.
- Disc DN > 1500: spheroidal graphite cast iron coated with polyurethane paint, thickness 80 µm, colour grey white ref. RAL 7035.
- Connection according to standards page 12.
- Mounting plate meeting the ISO 5211 standards.
- Marking in accordance with EN 19.
- The valves meet the safety requirements of the pressure Equipments Directive 97/23/EC (PED) appendix 1 for fluids of the groups 1 and 2.

Standard variants

- Anti-fluttering
- Disc locking device
- Body supports
- Dismantling and dilatation joints
- Electric actuator ACTELEC, pneumatic actuator ACTAIR, hydraulic actuator ACTO
- ATEX version in accordance with 94/9/EC directive

Remarks

- Operating instructions 8449.8-10
- Actuator selection 8449.178-10

Data to be supplied when ordering

- MAMMOUTH valve in accordance with type series booklet 8612.12/5-10.
- Size.
- Working conditions: nature of fluid, pressure, flow, temperature.
- Connection.
- Actuation.



Materials

Body	KSB code
Spheroïdal graphite cast iron JS 1030 / ASTM A536 gr. 60.40.18	3g
Shafts	KSB code
Stainless steel 1.4029 / 1.4028 (13% Cr) Stainless steel ASTM A276 gr. 420	6k 6k
Disc	KSB code
Spheroïdal graphite cast iron JS 1030 / ASTM A536 gr. 60.40.18 Spheroïdal graphite cast iron JS 1030 / ASTM A536 gr. 60.40.18 ebonite Stainless steel Type 1.4408 / ASTM A351 gr. CF8M Aluminium-bronze ASTM B148 gr. C95800	3g 3p 6 2
AMRING® liner	KSB code
E.P.D.M High content nitrile	XC K

Other materials are possible, please consult us.

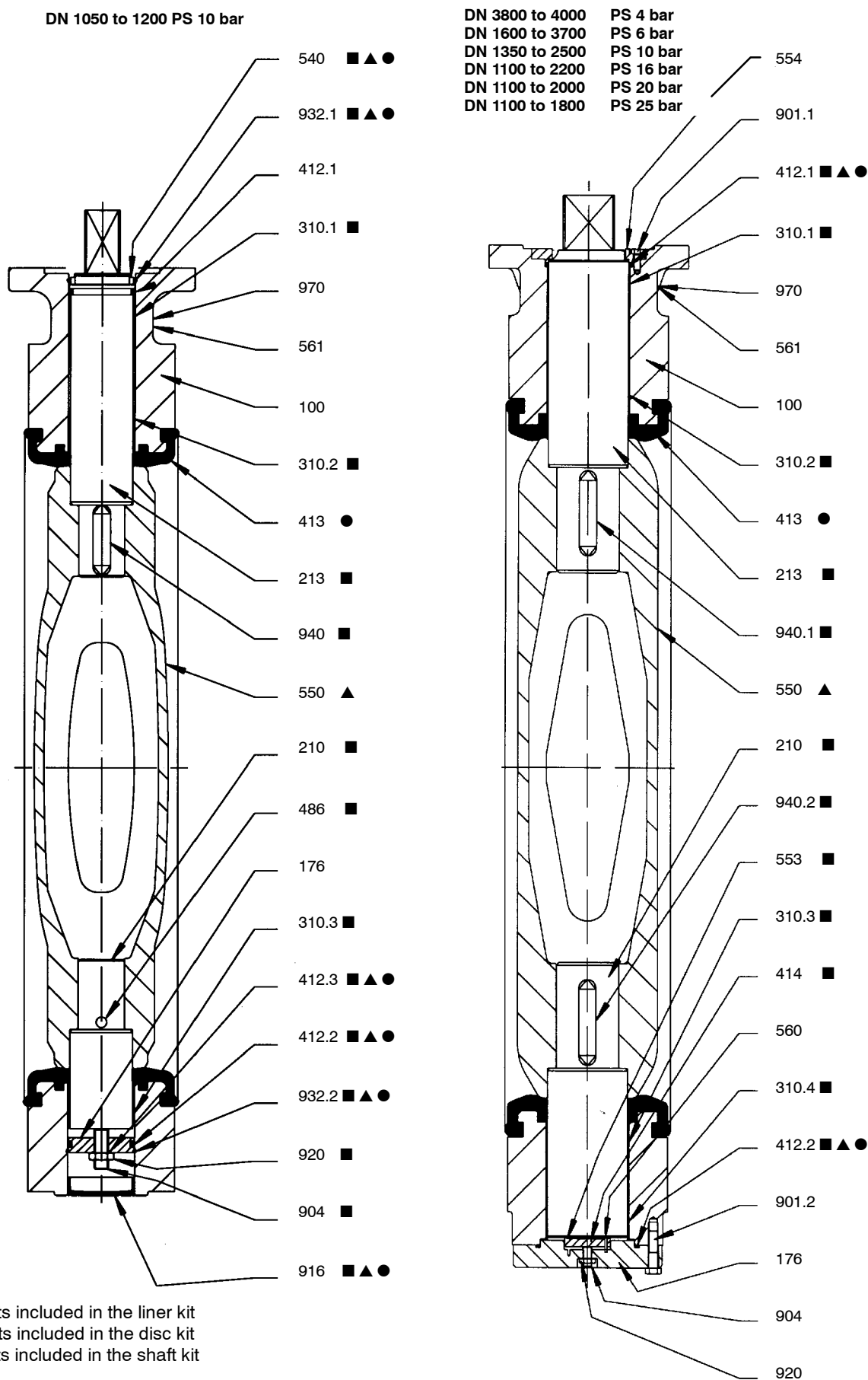
Vacuum limits

Liners are stucked in the following cases:

- DN 1050 to 1200 for pressure classes 6 bar and 10 bar, application lower to 0,3 bar absolut.
- All other DN and all other pressure classes for valves with face to face 280, in case of application lower than the atmospheric pressure.

For valves liner stucked, the maximum working pressure is equal to pressure class of the valve.

Construction



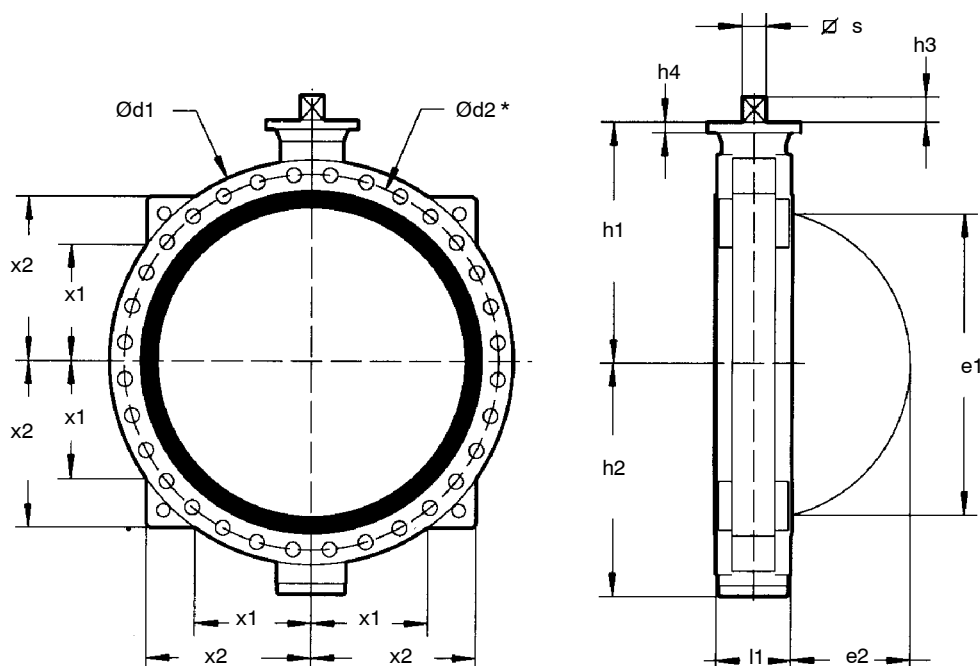
DN1050 to 1200 PS 10 bar

Item	Designation	Materials
100	Body	Spheroidal graphite cast iron
176	Bottom	Carbon steel
210	Shaft	Stainless steel
213	Operating shaft	Stainless steel
310.1	Plain bearing	PTFE filled on steel casing
310.2	Plain bearing	PTFE filled on steel casing
310.3	Plain bearing	PTFE filled on steel casing
412.1	O-ring	Nitrile
412.2	O-ring	Nitrile
412.3	O-ring	Nitrile
413	Liner	In accordance with fluid
486	Ball	Steel
540	Split bush	Acetal
550	Disc	In accordance with fluid
561	Grooved nail	Stainless steel
904	Adjusting screw	Steel
916	Plug	Polyethylene
920	Nut	Steel
932.1	Spring retaining ring	Steel
932.2	Spring retaining ring	Steel
940	Key	Steel
970	Identity plate	Stainless steel

DN 3800 to 4000 PS 4 bar
DN 1600 to 3700 PS 6 bar
DN 1350 to 2500 PS 10 bar
DN 1100 to 2200 PS 16 bar
DN 1100 to 2000 PS 20 bar
DN 1100 to 1800 PS 25 bar

Item	Designation	Materials
100	Body	Spheroidal graphite cast iron
176	Bottom	Carbon steel
210	Shaft	Stainless steel
213	Operating shaft	Stainless steel
310.1	Plain bearing	PTFE filled on steel casing
310.2	Plain bearing	PTFE filled on steel casing
310.3	Plain bearing	PTFE filled on steel casing
310.4	Plain bearing	PTFE filled on steel casing
412.1	O-ring	Nitrile
412.2	O-ring	Nitrile
413	Liner	In accordance with fluid
414	Disc thrust plate	Steel
550	Disc	In accordance with fluid
553	Lubricating thrust insert	PTFE filled on steel casing
554	Washer	Steel
560	Elastic pin	Steel
561	Grooved nail	Stainless steel
904	Adjusting screw	Steel
920	Nut	Steel
901.1	Screw	Stainless steel
901.2	Screw	Stainless steel
940.1	Key	Steel
940.2	Key	Steel
970	Identity plate	Stainless steel

Dimensions



DN	NPS	Pressure	Connection	$\varnothing d1$	Face to face	$h1$	$h2$	Mounting plate ISO 5211		Shaft output		Disc clearance		$x1$	$x2$	Weight daN
					$l1$			n	$h4$	s	$h3$	$e1$	$e2$			
	42"	10	AWWA cl. D	1 332	216	765	674	F25	30	60	80	1 006	405	383	545	850
1100		10	EN 1092 PN10	1 340	216	790	703	F25	30	60	80	1 057	430	386	548	900
	44"	10	AWWA cl. D	1 340	216	790	703	F25	30	60	80	1 057	430	403	566	960
1100		16	EN 1092 PN 16	1 355	280	867	843	F30	40	90	90	1 035	396	333	590	1 400
	44"	16	AWWA cl. E	1 405	280	867	843	F30	40	90	90	1 035	396	382	590	1 400
1100	44"	20	PN 20 / Cl. 150	1 405	280	867	843	F30	40	90	90	1 035	396	382	590	1 600
1100		25	EN 1092 PN 25	1 420	280	867	843	F30	40	90	90	1 035	396	395	590	1 878
1200		10	EN 1092 PN10	1 455	254	840	756	F25	30	60	80	1 152	461	428	588	1 090
	48"	10	AWWA cl. D	1 497	254	840	756	F25	30	60	80	1 152	461	444	602	1 150
1200		16	EN 1092 PN 16	1 485	280	917	893	F30	40	90	90	1 137	447	450	625	1 538
	48"	16	AWWA cl. E	1 511	280	917	893	F30	40	90	90	1 137	447	450	625	1 538
1200	48"	20	PN 20 / Cl. 150	1 511	280	917	893	F30	40	90	90	1 137	447	450	625	1 761
1200		25	EN 1092 PN 25	1 530	280	917	893	F30	40	90	90	1 137	447	450	625	2 031
1300		16	EN 1092 PN 16	1 585	280	967	943	F30	40	90	90	1 240	497	470	680	1 620
	52"	16	AWWA cl. E	1 626	280	967	943	F30	40	90	90	1 240	497	470	680	1 620
1300	52"	20	PN 20 / Cl. 150	1 626	280	967	943	F30	40	90	90	1 240	497	470	680	1 915
1300		25	EN 1092 PN 25	1 645	280	967	943	F35	40	90	90	1 240	497	470	680	2 185
	54"	10	AWWA cl. D	1 683	280	992	968	F30	40	90	90	1 293	522	480	700	1 500
	54"	16	AWWA cl. E	1 683	280	992	968	F30	40	90	90	1 293	522	480	700	1 680
1350		20 - 25	Not standardized	Please consult us												
1400		10	EN 1092 PN10	1 675	280	1 017	993	F30	40	90	90	1 343	547	480	725	1 600
1400		16	EN 1092 PN 16	1 685	280	1 017	993	F30	40	90	90	1 343	547	480	725	1 744
1400	56"	20	PN 20 / Cl. 150	1 745	280	1 017	993	F35	40	90	90	1 343	547	480	725	2 068
1400		25	EN 1092 PN 25	1 755	400	1 055	1 018	F35	40	90	90	1 303	481	485	735	2 622
1500		10	EN 1092 PN10	1 785	280	1 067	1 043	F30	40	90	90	1 455	600	530	765	1 800
	60"	10	AWWA cl. D	1 854	280	1 067	1 043	F30	40	90	90	1 455	600	530	765	1 800
1500		16	EN 1092 PN 16	1 820	280	1 067	1 043	F30	40	90	90	1 455	600	530	765	1 950
	60"	16	AWWA cl. E	1 854	280	1 067	1 043	F30	40	90	90	1 455	600	530	765	1 950
1500	60"	20	PN 20 / Cl. 150	1 854	400	1 105	1 068	F35	40	90	90	1 407	531	520	775	3 085
1500		25	EN 1092 PN 25	1 865	400	1 105	1 068	F35	40	90	90	1 407	531	520	775	3 210

DN	NPS	Pressure	Connection	Ød1	Face to face	h1	h2	Mounting plate ISO 5211		Shaft output		Disc clearance		x1	x2	Weight daN
					l1			n	h4	s	h3	e1	e2			
1600		6	PN 6	1 830	280	1 115	1093	F30	40	90	90	1 540	644	560	790	2 160
1600		10	PN 10	1 915	280	1 115	1093	F30	40	90	90	1 540	644	560	790	2 440
1600		16	PN 16	1 930	280	1 115	1093	F35	40	90	90	1 540	644	560	790	2 658
1600		20	Not standardized	Please consult us												
1600		25	PN 25	1 975	400	1 155	1118	F40	45	110	110	1 512	582	565	810	3 320
	66"	6	AWWA cl. B	2 032	280	1 147	1123	F30	40	90	90	1 608	677	580	835	2 251
	66"	10	AWWA cl. D	2 032	280	1 147	1123	F30	40	90	90	1 608	677	580	835	2 531
	66"	16	AWWA cl. E	2 032	280	1 147	1123	F35	40	90	90	1 608	677	580	835	3 048
	66"	20 - 25	Not standardized	Please consult us												
1800		6	PN 6	2 045	280	1 217	1193	F30	40	90	90	1 748	747	620	860	2 281
1800		10	PN 10	2 115	280	1 217	1193	F35	40	90	90	1 748	747	620	860	2 716
1800		16	PN 16	2 130	400	1 255	1218	F35	40	90	90	1 718	682	650	890	3 295
1800		20	Not standardized	Please consult us												
1800		25	PN 25	2 195	400	1 255	1218	F40	45	110	110	1 718	682	650	890	3 895
	72"	6	AWWA cl. B	2 197	280	1 217	1193	F30	40	90	90	1 748	747	650	890	2 698
	72"	10	AWWA cl. D	2 197	280	1 217	1193	F35	40	90	90	1 748	747	650	890	2 956
	72"	16	AWWA cl. E	2 197	400	1 255	1218	F35	40	90	90	1 718	682	650	890	3 753
	72"	20 - 25	Not standardized	Please consult us												
	78"	6	AWWA cl. B	2 362	280	1 297	1273	F35	40	90	90	1 911	826	720	940	2 795
	78"	10	AWWA cl. D	2 362	280	1 297	1273	F35	40	90	90	1 911	826	720	950	3 073
	78"	16	AWWA cl. E	2 362	400	1 335	1298	F40	45	110	110	1 881	762	720	950	4 880
	78"	20	Not standardized	Please consult us												
2000		6	PN 6	2 265	280	1 319	1 295	F35	40	90	90	1 952	847	690	940	2 885
2000		10	PN 10	2 325	400	1 355	1 318	F40	45	110	110	1 922	780	710	940	3 956
2000		16	PN 16	2 345	400	1 355	1 318	F40	45	110	110	1 922	780	710	940	5 304
2000		20	Not standardized	Please consult us												
	84"	6	AWWA cl. B	2 534	280	1 372	1 348	F35	40	90	90	2 060	900	770	1 010	3 064
	84"	10	AWWA cl. D	2 534	400	1 410	1 373	F40	45	110	110	2 035	836	770	1 010	4 831
	84"	16	AWWA cl. E	2 534	400	1 410	1 373	F40	45	110	110	2 035	836	770	1 010	6 445
2200		6	PN 6	2 475	280	1 419	1 395	F35	40	90	90	2 154	948	750	980	3 245
2200		10	PN 10	2 550	400	1 460	1 423	F40	45	110	110	2 135	885	770	1 020	4 220
	90"	6	AWWA cl. B	2 705	400	1 505	1 468	F40	45	110	110	2 227	931	830	1 020	3 835
	90"	10	AWWA cl. D	2 705	400	1 505	1 468	F40	45	110	110	2 227	931	830	1 070	4 447
2400		6	PN 6	2 685	400	1 560	1 523	F40	45	110	110	2 338	986	830	1 070	4 140
2400		10	PN 10	2 760	400	1 560	1 523	F40	45	110	110	2 338	986	830	1 090	5 025
	96"	6	AWWA cl. B	2 877	400	1 560	1 523	F40	45	110	110	2 338	986	830	1 090	4 910
	96"	10	AWWA cl. D	2 877	400	1 560	1 523	F40	45	110	110	2 338	986	830	1 130	5 320
2500		6 - 10	Not standardized	Please consult us												
	102"	6	AWWA cl. B	3 048	400	1 660	1 623	F40	45	110	110	2 526	1 078	950	1 190	5 110
2600		6	PN 6	2 905	400	1 660	1 623	F40	45	110	110	2 526	1 078	900	1 140	4 980
	108"	6	AWWA cl. B	3 220	400	1 735	1 698	F48	45	140	140	2 641	1 136	1 020	1 250	5 710
2800		6	PN 6	3 115	400	1 760	1 723	F48	45	140	140	2 738	1 184	980	1 210	5 826
	114"	6	AWWA cl. B	3 391	400	1 810	1 773	F48	45	140	140	2 843	1 236	1 080	1 310	6 720
3000		6	PN 6	3 315	400	1 860	1 823	F48	45	140	140	2 945	1 286	1 050	1 280	6 670
	120"	6	AWWA cl. B	3 562	400	1 865	1 828	F48	45	140	140	2 950	1 291	1 130	1 370	7 698
3100 to 4000			Not standardized - Please, consult us													

Dimensions are given for information and can be modified.

* φ d2 : See bolting table

Hydraulic characteristics

DN	NPS	Flow coefficient valve in fully open position Kvo					
		4 bar	6 bar	10 bar	16 bar	20 bar	25 bar
	42"			122 500			
1100	44"			142 300	82 800	82 800	82 800
1200	48"			168 100	111 600	111 600	111 600
1300	52"				147 600	147 600	147 600
1350	54"			169 200	169 200	169 200	169 200
1400	56"			190 800	190 800	190 800	104 400
1500	60"			237 600	237 600	133 200	133 200
1600			295 200	295 200	295 200	169 200	169 200
	66"		327 600	327 600	327 600	190 800	190 800
1800	72"		428 400	428 400	259 200	259 200	259 200
	78"		550 800	550 800	338 400	338 400	
2000			594 000	367 200	367 200	367 200	
	84"		694 800	435 600	435 600		
2200			802 800	507 600			
	90"		543 600	543 600			
2400	96"		669 600	669 600			
2500			766 800	766 800			
2600	102"		878 400				
	108"		940 000				
2800	114"		1 198 800				
3000	120"		1 479 600				
3100 to 3700							
3800 to 4000		Not standardized	Please, consult us				

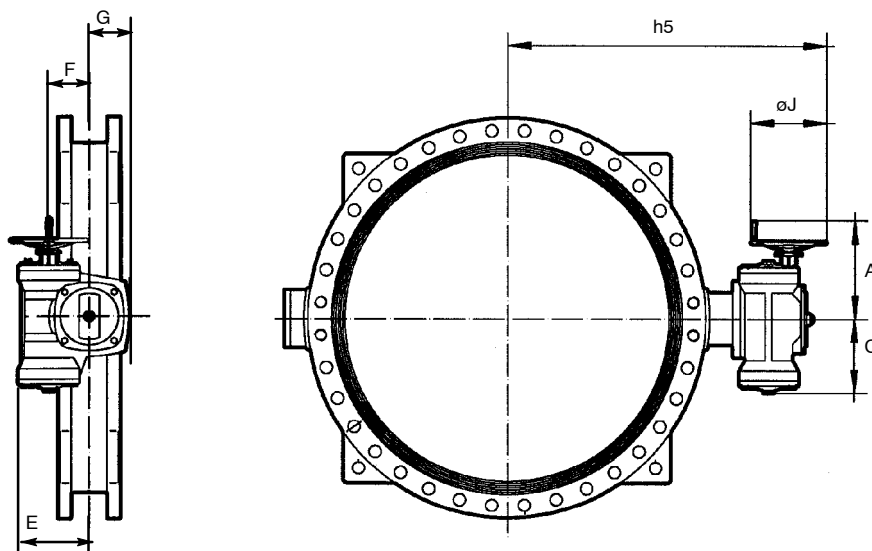
DN	NPS	Flow coefficient valve in fully open position Cvo					
		4 bar	6 bar	10 bar	16 bar	20 bar	25 bar
	42"			142 100			
1100	44"			165 070	96 050	96 050	96 050
1200	48"			195 000	129 500	129 500	129 500
1300	52"				171 250	171 250	171 250
1350	54"			196 300	196 300	196 300	196 300
1400	56"			221 330	221 350	221 350	121 150
1500	60"			275 620	275 650	154 550	154 550
1600			342 450	342 450	342 450	196 300	196 300
	66"		380 050	380 050	380 050	221 350	221 350
1800	72"		496 950	496 950	300 700	300 700	300 700
	78"		638 950	638 950	392 550	392 550	
2000			689 050	426 000	426 000	426 000	
	84"		806 000	505 300	505 300		
2200			931 250	588 850			
	90"		630 600	630 600			
2400	96"		776 750	776 750			
2500			889 500	889 500			
2600	102"		1 018 950				
	108"		1 100 000				
2800	114"		1 390 650				
3000	120"		1 716 350				
3100 to 3700							
3800 to 4000		Not standardized	Please, consult us				

Motorization

For large sizes valves, the torque depends on hydraulic characteristics.

The table below shows recommended actuators on lubricated media with a maximum fluid velocity of 2m/s (6.5ft/s). According to the working conditions and the hydraulic characteristics, higher fluid velocities can be allowed, therefore other actuator recommendations can be proposed : please consult us.

Manual control: Reducer



DN	NPS	Pressure	Reducer	A	C	E	F	G	øJ	h5	Weight kg*
1050	42"	10	MR 600	511	405	245	140	155	600	1174	105
1100	44"	10	MR 600	511	405	245	140	155	600	1199	105
1100	44"	16 and 20	MR 1200	661	555	318	180	180	800	1397	175
1100	44"	25	MR 1600	447	348	318	180	180	800	1264	183
1200	48"	10	MR 600	397	298	245	140	155	350	1174	105
1200	48"	16	MR 1200	661	555	318	180	180	800	1447	175
1200	48"	20 and 25	MR 1600	447	348	318	180	180	350	1314	183
1300	52"	16 and 20	MR 1600	447	348	318	180	180	350	1314	183
1300		25	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1483	308
1350	54"	10	MR 1200	661	555	318	250	268	800	1522	175
1350	54"	16	MR 1600	447	348	318	180	180	350	1389	183
1350		20	MR 1600	447	348	318	180	180	350	**	183
1350		25	GS250.3+GZ250.3	585	402	365	250	268	800 max.	**	308
1400	56"	10	MR 1200	661	555	318	180	180	800	1547	175
1400	56"	16	MR 1600	447	348	318	180	180	350	1414	183
1400		20 and 25	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1595	308
1500	60"	10	MR 1600	447	348	318	180	180	350	1464	183
1500	60"	16	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1607	308
1500	60"	20 and 25	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1645	

DN	NPS	Pressure	Reducer	A	C	E	F	G	øJ	h5	Weight kg
1600		6	MR 1200	661	555	318	180	180	350	1645	175
1600		10	MR 1600	447	348	318	180	180	800	1512	183
1600		16	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1655	308
1600		20	GS250.3+GZ250.3	585	402	365	250	268	800 max.	**	308
1600		25	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1695	308
	66"	6	MR 1200	661	555	318	180	180	350	1688	175
	66"	10	MR 1600	447	348	318	180	180	800	1463	183
	66"	16	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1697	308
	66"	20	GS250.3+GZ250.3	585	402	365	250	268	800 max.	**	308
	66"	25	GS315+GZ30	848	550	555	315	340	800 max.	**	630
1800	72"	6	MR 1600	447	348	318	180	180	800	1463	183
1800	72"	10	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1757	308
1800	72"	16	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1795	308
1800	72"	20	GS250.3+GZ250.3	585	402	365	250	268	800 max.	**	308
1800	72"	25	GS315+GZ30	848	550	555	315	340	800 max.	1807	630
	78"	6 and 10	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1837	308
	78"	16	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1875	308
	78"	20	GS315+GZ30	848	550	555	315	340	800 max.	**	630
2000		6	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1859	308
2000		10 and 16	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1895	308
2000		20	GS315+GZ30	848	550	555	315	340	800 max.	**	630
1800	72"	10	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1757	308
1800	72"	16	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1795	308
1800	72"	20	GS250.3+GZ250.3	585	402	365	250	268	800 max.	**	308
1800	72"	25	GS315+GZ30	848	550	555	315	340	800 max.	1807	630
	78"	6 and 10	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1837	308
	78"	16	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1875	308
	78"	20	GS315+GZ30	848	550	555	315	340	800 max.	**	630
2000		6	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1859	308
2000		10 and 16	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1895	308
2000		20	GS315+GZ30	848	550	555	315	340	800 max.	**	630
	84"	6	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1912	308
	84"	10	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1950	308
	84"	16	GS315+GZ30	848	550	555	315	340	800 max.	1962	630
2200		6	GS250.3+GZ250.3	585	402	365	250	268	800 max.	1959	308
2200		10	GS250.3+GZ250.3	585	402	365	250	268	800 max.	2000	308
	90	6 and 10	GS250.3+GZ250.3	585	402	365	250	268	800 max.	2045	308
2400	96	6	GS250.3+GZ250.3	585	402	365	250	268	800 max.	2100	308
2400	96	10	GS315 + GZ30	848	550	555	315	340	800 max.	2112	630
2500		6 and 10	GS315 + GZ30	848	550	555	315	340	800 max.	**	630
	102"	6	GS315 + GZ30	848	550	555	315	340	800 max.	2212	630
2600		6	GS315 + GZ30	848	550	555	315	340	800 max.	2212	630
	108"	6	GS315 + GZ30	848	550	555	315	340	800 max.	2287	630
2800		6	GS315 + GZ30	848	550	555	315	340	800 max.	2312	630
	114"	6	GS315 + GZ30	848	550	555	315	340	800 max.	2362	630
3000		6	GS315 + GZ30	848	550	555	315	340	800 max.	2412	630
	120	6	GS315 + GZ30	848	550	555	315	340	800 max.	2417	630
3100 to 4000		Not standardized - Please, consult us									

* Weight of gear box only

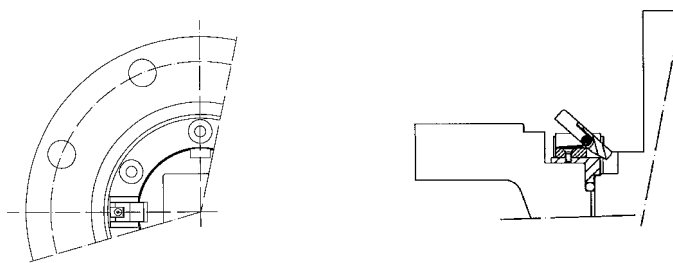
** Please consult us

Standard variants

Disc locking device

In 0° or 90° position when removing the actuator

Variant not allowable for DN 1050 to 1200 PN 10



Anti-fluttering device

For pump outlet valves

An anti-fluttering device is located on the lower shaft which prevents disc vibration when in the open position.

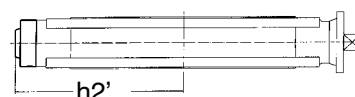
The valve equipped with an anti-fluttering device must be to have a disc locking device.

Variant not allowable for DN 1050 to 1200 PN 10.

For a valve face to face 280 : $h2' : h2 + 72$

For a valve face to face 400 : $h2' : h2 + 65.5$

$h2$: see dimensions table



Body support

Caution: Supporting legs must not be fixed to the ground.

They must remain free to move.

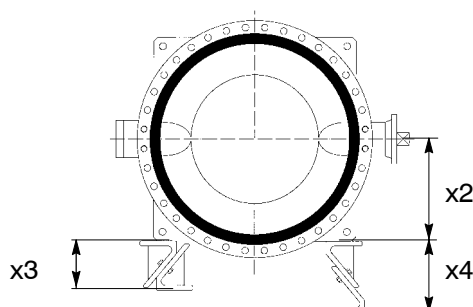
Valve face to face 216 and 254 : $x3 : 330$

$x4 : 450$

Valve face to face 280 and 400 : $x3 : 350$

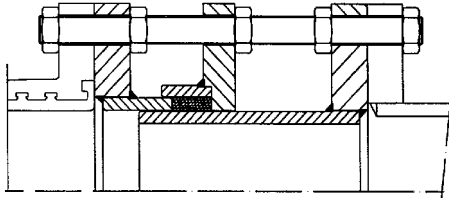
$x4 : 510$

$x2$: see dimensions table

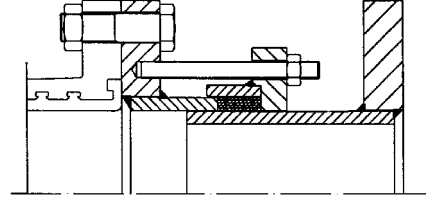


Standard variants

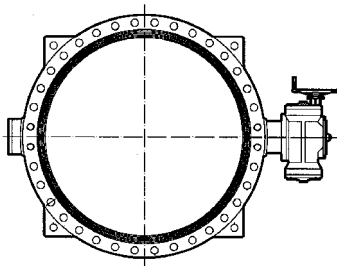
Dismantling joint (flanged)



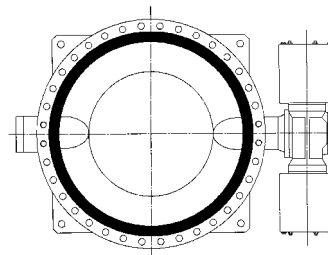
Dilatation joint



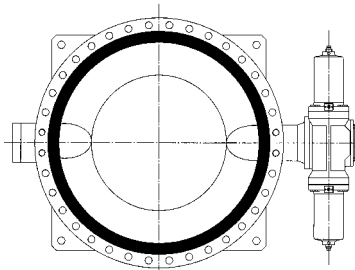
Electric actuator ACTELEC



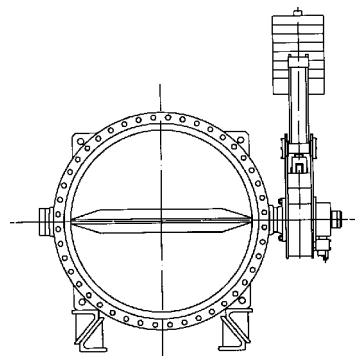
Pneumatic actuator ACTAIR



Hydraulic actuator ACTO



Counterweight



Connections

Unless as otherwise specified, the normal flange connection for a MAMMOUTH valve is the one corresponding to its maximum allowable pressure (PS).

Flange dimensions are in accordance with appropriate standards, mainly:

– ISO 7005 PN 6, 10, 16, 20 and 25 ; NF EN 1092-2 ; AWWA C207 cl.B, D and E edition 94 ; ASME B16-47 series A Class 150

On request, other connections are possible.

End of line and downstream dismantling

Use as end of line and downstream dismantling of the standard valves at room temperature for DN and the differential pressure (ΔPS) defined hereafter:

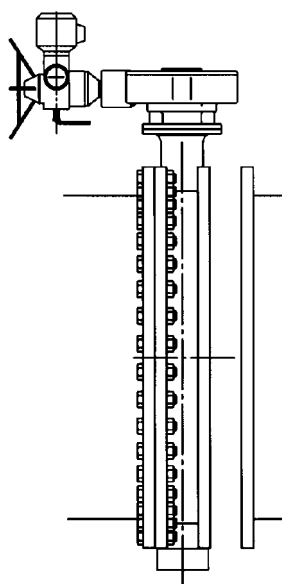
Gas or liquids		Liquids*	
hazardous**	non hazardous**	hazardous**	non hazardous**
All DN : not allowed	on request	All DN $\Delta PS = 0.7$ PS limited to 10 bar max. ΔPS higher: on request	All DN $\Delta PS = 0.7$ PS limited to 10 bar max. ΔPS higher: on request

* Liquids having a vapour pressure at the maximum allowable temperature of not more than 0,5 bar above normal atmospheric pressure 1013 mbar.

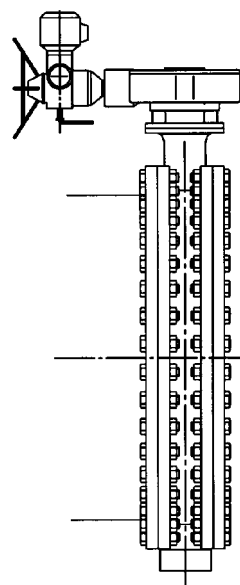
** Fluids hazardous and not hazardous according to PED.

Nota : A valve fitted at the end of a pipe with a blind flange downstream is not to be considered as an end of pipe service.

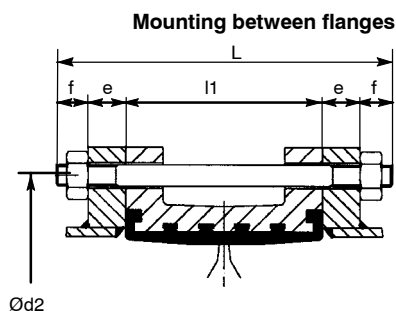
Downstream dismantling



End of line mounting

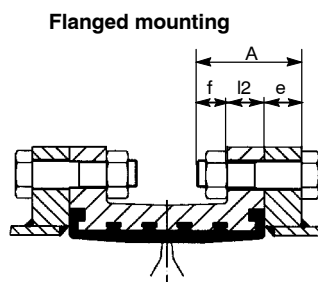


Bolting



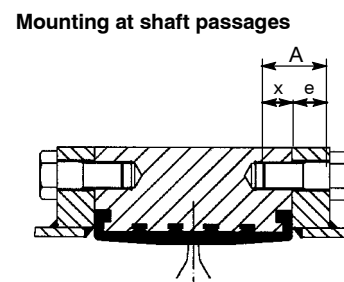
$$L = l_1 + 2e + 2f$$

- L : Mini length of tie-rods
 l_1 : Face to face of the valve
 e : Flange thickness
 (customer specification)
 f : Nut thickness
 + overlenght of the tie-rod



$$A = e + l_2 + f$$

- Mini length of screws
 l_2 : Thickness of the valve
 e : Flange thickness
 (customer specification)
 f : Nut thickness
 + overlenght of the screw



$$A = e + x$$

- A : Mini length of screws
 x : Maxi implantation of screws
 Threaded length $B > A - e$
 e : Flange thickness
 (customer specification)

NB: We do not supply the bolting.

mm

DN	NPS	Pressure	Connection	Screws dia.	d2 dia.	f	Mounting between flanges	Flanged mounting		Screws at shaft passages	
							Nb	Nb *	l2	Nb *	x
	42"	10	AWWA C207	1.5 in.	1 257	45	32	32	42	4	33
1100		10	PN 10	M33	1 270	45	28	28	43	4	40
	44"	10	AWWA C207	1.5 in.	1 314	45	36	36	43	4	38
1100		16	PN 16	M39	1 270	45	24	24	60	8	45
	44"	16	AWWA cl. E	1.5 in.	1 314	45	32	32	69	8	45
1100	44"	20	PN 20 / Cl. 150	M39 / 1.5 in.	1 314	45	32	32	69	8	45
1100		25	PN 25	M52	1 310	65	24	24	69	8	45
1200		10	PN 10	M36	1 380	45	28	28	60	4	54
	48"	10	AWWA C207	1.5 in.	1 422	45	40	40	45	4	45
1200		16	PN 16	M45	1 390	50	40	40	69	4	45
	48"	16	AWWA cl. E	1.5 in.	1 422	45	36	36	69	8	45
1200	48"	20	PN 20 / Cl. 150	M39 / 1.5 in.	1 422	45	36	36	69	8	45
		25	PN 25	M52	1 420	65	28	28	69	4	45
1300		16	PN 16	M45	1 490	50	28	28	60	4	45
	52"	16	AWWA cl. E	1.75 in.	1 537	50	36	36	74	8	45
1300	52"	20	PN 20 / Cl. 150	M45 / 1.75 in.	1 537	50	36	36	74	8	45
1300		25	PN 25	M56	1 530	60	28	28	74	4	45
	54"	10	AWWA cl. D	1.75 in.	1 593,8	50	36	36	60	8	45
	54"	16	AWWA cl. E	1.75 in.	1 593,8	50	36	36	76	8	45
1350		20 - 25	Not standardized	Please consult us							
1400		16	PN 16	M45	1 590	50	32	32	60	4	45
1400	56"	20	PN 20 / Cl. 150	M45 / 1.75 in.	1 651	50	40	40	78	8	45
1400		25	PN 25	M56	1 640	60	28	28	74	8	55
1500		10	PN 10	M39	1 700	45	32	32	60	4	45
1500		16	PN 16	M52	1 710	65	32	32	63	4	45
	60"	16	AWWA cl. E	1.75 in.	1 759	50	44	44	80	8	45
1500	60"	20	PN 20 / Cl. 150	M45 / 1.75 in.	1 759	50	44	44	80	8	55
1500		25	PN 25	M56	1 750	60	32	32	80	4	55

mm

DN	NPS	Pressure	Connection	Screws dia.	d2 dia.	f	Mounting between flanges	Flanged mounting		Screws at shaft passages *	
1600		6	PN 6	M33	1 760	40	36	36	60	4	45
1600		10	PN 10	M45	1 820	50	36	36	60	4	45
1600		16	PN 16	M52	1 820	65	36	36	65	4	45
1600		20	Not standardized	Please consult us							
1600		25	PN 25	M56	1 860	60	32	32	81	8	55
	66"	6	AWWA cl. B	1.75 in.	1 930.4	50	44	44	65	8	45
	66"	10	AWWA cl. D	1.75 in.	1 930.4	50	44	44	65	8	45
	66"	16	AWWA cl. E	1.75 in.	1 930.4	50	44	44	85	8	45
	66"	20 - 25	Not standardized	Please consult us							
1800		6	PN 6	M36	1 970	45	40	40	60	4	45
1800		10	PN 10	M45	2 020	50	40	40	66	4	45
1800		16	PN 16	M52	2 020	60	36	36	70	8	55
1800		20	Not standardized	Please consult us							
1800		25	PN 25	M64	2 070	70	36	36	89	8	55
	72"	6	AWWA cl. B	1.75 in.	2 095.5	50	52	52	66	8	45
	72"	10	AWWA cl. D	1.75 in.	2 095.5	50	52	52	66	8	45
	72"	16	AWWA cl. E	1.75 in.	2 095.5	50	52	52	89	8	55
	72"	20 - 25	Not standardized	Please consult us							
	78"	6	AWWA cl. B	2 in.	2 260.6	55	56	56	70	8	45
	78"	10	AWWA cl. D	2 in.	2 260.6	55	56	56	70	8	45
	78"	16	AWWA cl. E	2 in.	2 260.6	55	56	56	98	8	55
	78"	20	Not standardized	Please consult us							
2000		6	PN 6	M39	2 180	45	44	44	60	4	45
2000		10	PN 10	M45	2 230	50	40	40	70	8	55
2000		16	PN 16	M56	2 230	60	40	40	75	8	55
2000		20	Not standardized	Please consult us							
	84"	6	AWWA Cl. B	2 in.	2 525.7	55	56	56	60	8	45
	84"	10	AWWA Cl. D	2 in.	2 525.7	55	56	56	75	8	55
	84"	16	AWWA Cl. E	2 in.	2 525.7	55	56	56	98	8	55
2200		6	PN 6	M39	2 390	45	48	48	70	4	45
2200		10	PN 10	M52	2 440	60	44	44	70	8	55
	90"	6	AWWA cl. B	2.25 in.	2 590.8	62	60	60	70	8	55
	90"	10	AWWA cl. D	2.25 in.	2 590.8	62	60	60	80	8	55
2400		6	PN 6	M39	2 600	45	48	48	70	8	55
2400		10	PN 10	M52	2 650	60	48	48	70	8	55
	96"	6	AWWA cl. B	2.25 in.	2 755.9	62	60	60	70	8	55
	96"	10	AWWA cl. D	2.25 in.	2 755.9	62	60	60	82.5	8	55
2500		6 - 10	Not standardized	Please consult us							
	102"	6	AWWA cl. B	2.5 in.	2 908.3	70	64	64	70	8	55
2600		6	PN 6	M45	2 810	50	52	52	70	8	55
	108"	6	AWWA cl. B	2.5 in.	3 067	70	64	64	70	8	55
2800		6	PN 6	M45	3 020	50	56	56	70	8	55
	114"	6	AWWA cl. B	2.75 in.	3 219.5	75	68	68	70	8	55
3000		6	PN 6	M45	3 220	50	60	60	80	8	55
	120"	6	AWWA cl. B	2.75 in.	3 317.9	75	68	68	80	8	55
3100 to 4000			Not standardized - Please, consult us								

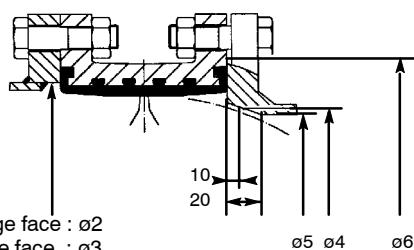
* Quantity of screws by face

Flanging dimensions

MAMMOUTH valves are designed to be installed between any type of flange (without any flange gasket) and standard connection currently used.

The elastomer liner ensures complete tightness at the flanges.

It is necessary to verify the general compatibility of the connection by checking against the dimensions shown in the table below.



Max dia. tolerated on the supporting area of the flange face : $\varnothing 2$

Min dia. tolerated on the supporting area of the flange face : $\varnothing 3$

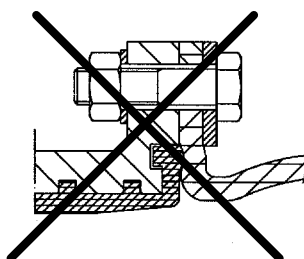
* Face to face I1 : see dimensions table

DN		Max dia. tolerated ø2		Min dia. tolerated ø3		Min dia.10 mm from face of flange ø4		Min dia. 20 mm from face of flange ø5		Min. dia. tolerated of shoulder of raised face flange
		face to face l1 *		face to face l1 *		face to face l1 *		face to face l1 *		
		216	254	216	254	216	254	216	254	ø6
	42"	1067		1010		1006		1001		1135
1100	44"	1117		1063		1058		1053		1187
1200	48"		1222		1158		1152		1147	1307
DN		face to face l1 *		face to face l1 *		face to face l1 *		face to face l1 *		ø6
NPS		280	400	280	400	280	480	280	400	
1100	44"	1130		1053		1045		1039		1220
1200	48"	1226		1152		1148		1143		1320
1300	52"	1330		1259		1252		1247		1420
1350	54"	1380		1310		1303		1298		1470
1400	56"	1430	1430	1361	1320	1354	1312	1349	1305	1530
1500	60"	1530	1530	1463	1424	1459	1416	1454	1410	1630
1600		1625		1560		1556		1552		1730
	66"	1690		1626		1623		1619		1810
1800	72"	1830	1830	1768	1734	1765	1730	1761	1722	1930
	78"	1990	1990	1930	1898	1926	1894	1923	1889	2090
2000		2034	2034	1974	1943	1971	1935	1968	1931	2130
	84"	2140	2140	2081	2051	2078	2047	2075	2043	2240
2200		2234	2234	2176	2147	2173	2149	2171	2145	2340
	90"		2330		2244	2224	2240	2221	2235	2430
2400	96"		2440		2356		2355		2351	2540
2500			2540		2456		2456		2453	2640
2600	102"		2640		2564		2555		2552	2740
	108"		2740		2665		2658		2654	2890
2800			2840		2766		2760		2756	2940
	114"		2940		2867		2860		2856	3040
3000			3040		2968		2962		2959	3140
	120"		3060		2988		2972		2967	3160
3100 to 4000		Not standardized – Please, consult us								

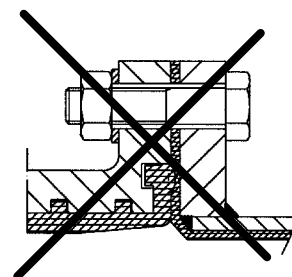
NB:

Direct fitting on rubber coated flange and with dilatation joint is not authorized.

Please, consult us.



Dilatation joint



Rubber coated flange

Product features - to our customers' benefit

Disc position index

Disc locking device (in option)

Preserved external internal tightness when the actuator is taken off

Mounting plate according to ISO 5211 standard

Bearing in reinforced PTFE on steel support

Shaft passage tightness
Perfect tightness at shaft passage obtained by the compression of the liner collar on the disc spherical

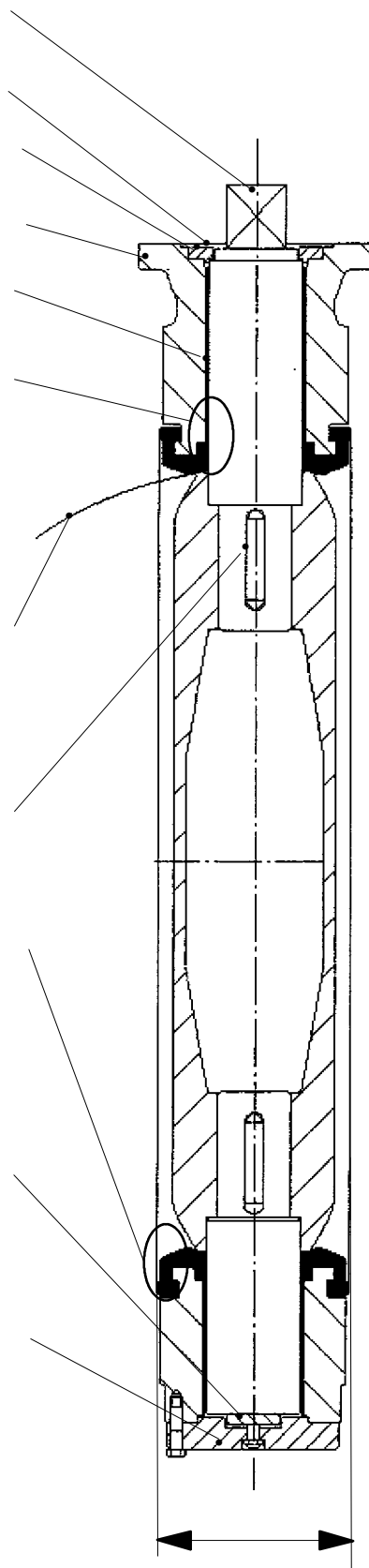
Downstream/upstream tightness
Disc machined spherical for ensuring a perfect tightness downstream/upstream

Driving shaft/disc by keys:
without contact with the fluid

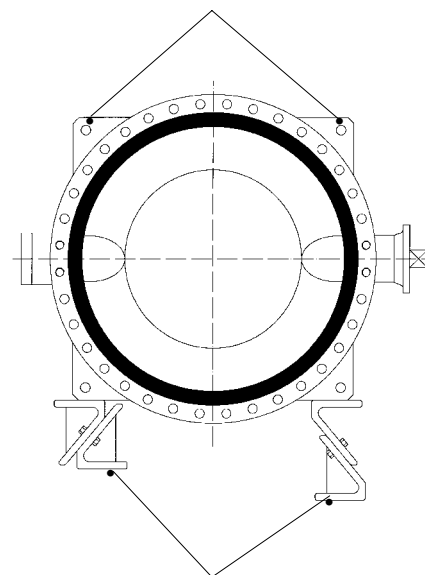
Flanges tightness:
Special design to obtain a totale tightness at flanges by compression

Lubricating thrust insert for supporting the weight of the disc in case of installation in vertical axis

Anti-Fluttering device (in option)



Lugs for slinging



Body support (in option)

Face to face according to ISO 5752 and EN 558 standards for DN ≤ 1200

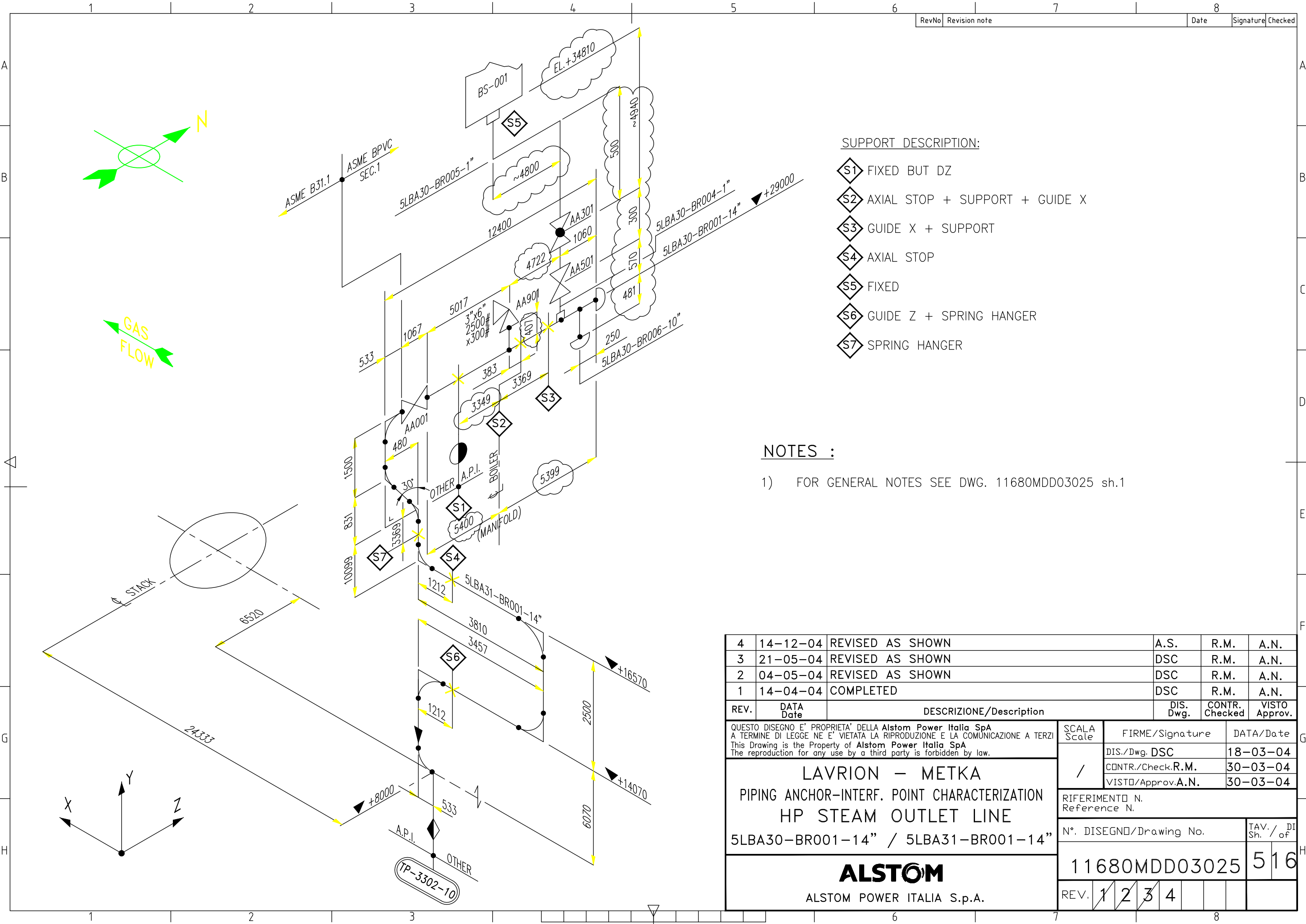
This leaflet is not contractual
and may be amended without notice.

27.10.05

8612.12/5-10

MODIFICATION		AUTOCORRECTION INTERNE		MODIFICATION		AUTOCORRECTION EXTERNE	
Ind.	Designation	Date	Ind.	Designation	Date	Ind.	Designation
A	Emission	19/05/2004	PJ	PC	LC		
B	UP DATED ACCORDING TO CUSTOMER'S COMMENT	15/07/2004	GT	PC	LC		
C	MODIFIED TITLE BLOCK	23/09/2004	PJ	PC	LC		
D	MODIFIED ACCORDING TO HYD. TESTS.	10/11/2004	JM	PC	LC		

			
		PI	PI



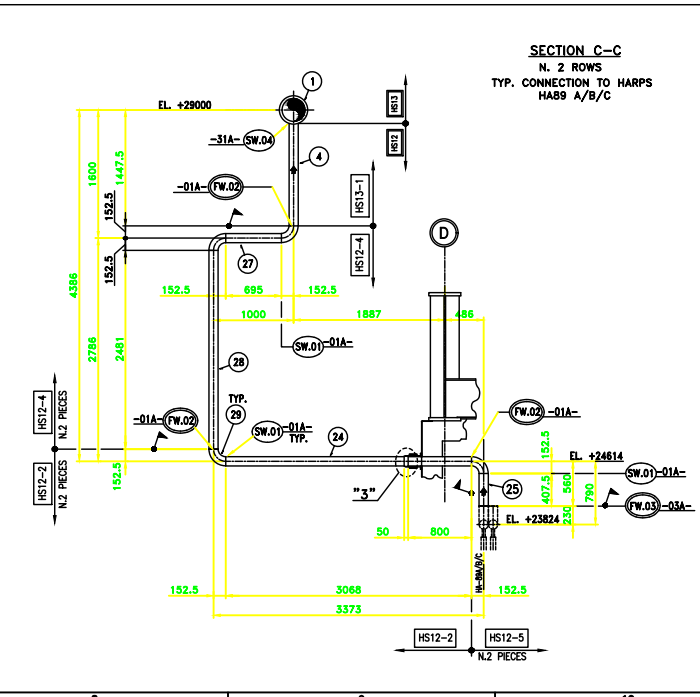
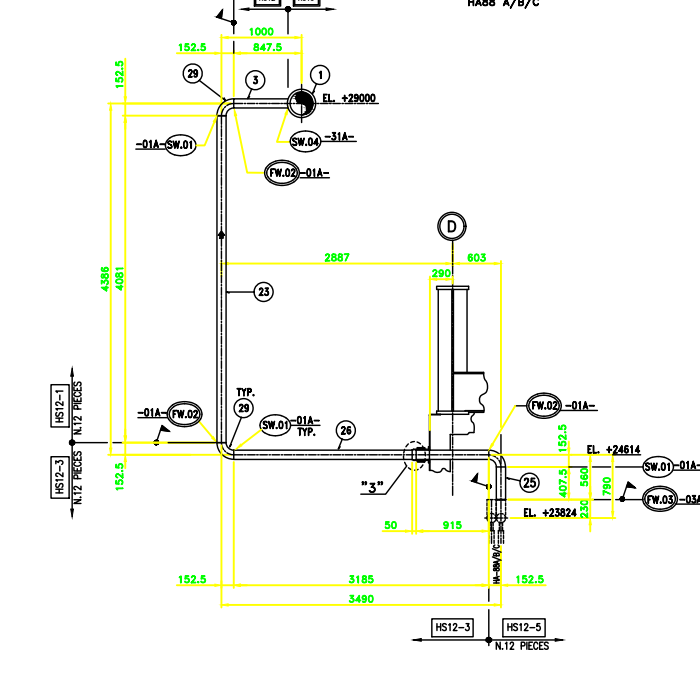
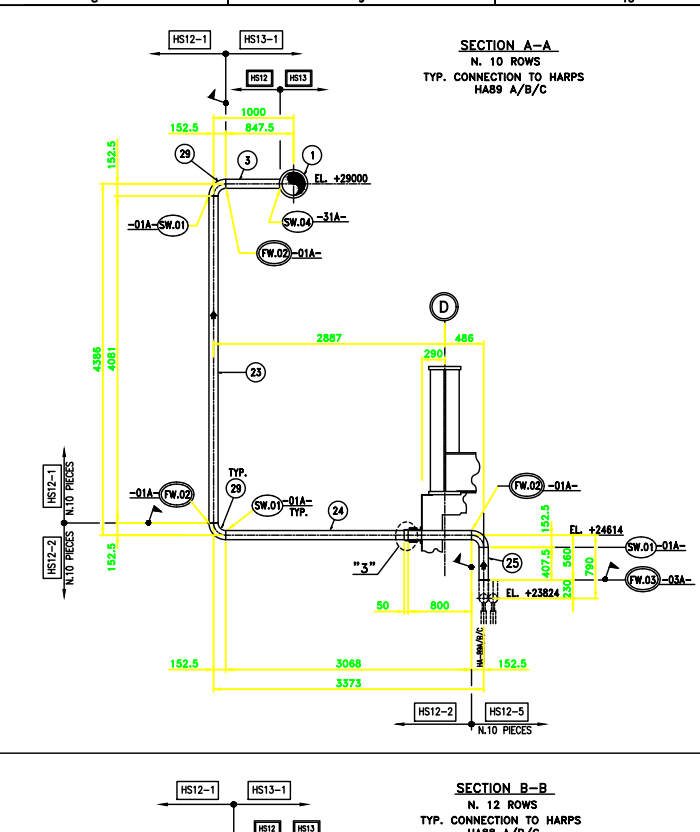
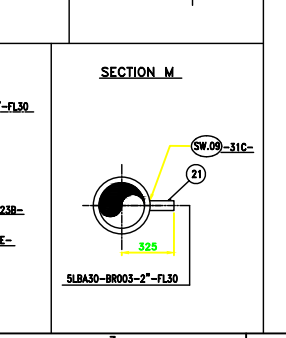
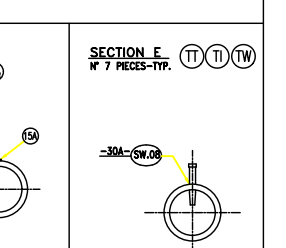
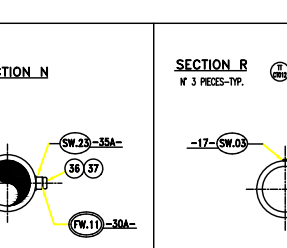
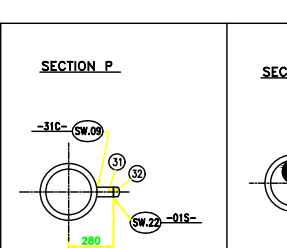
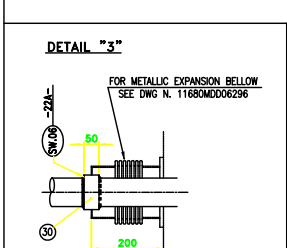
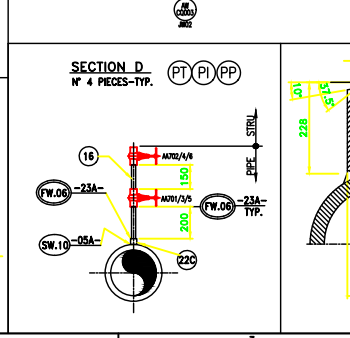
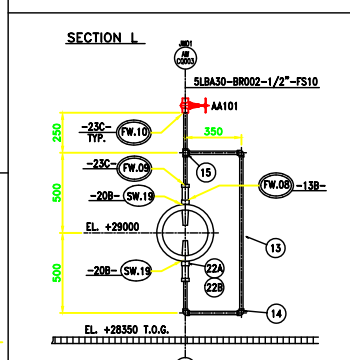
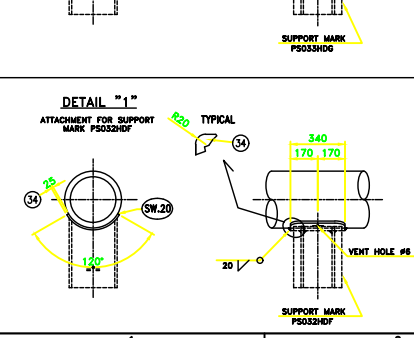
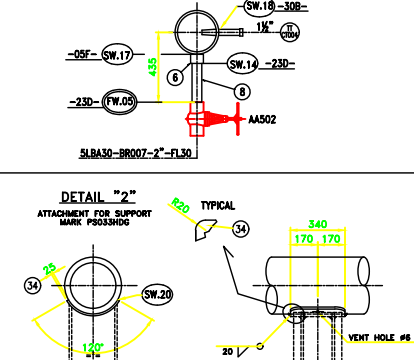
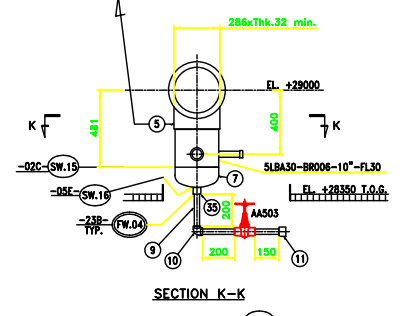
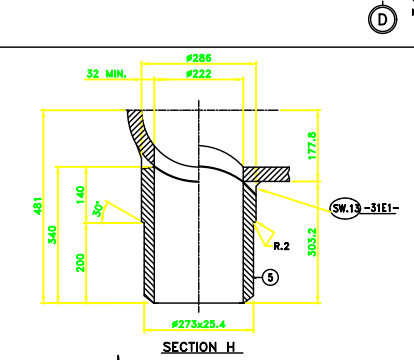
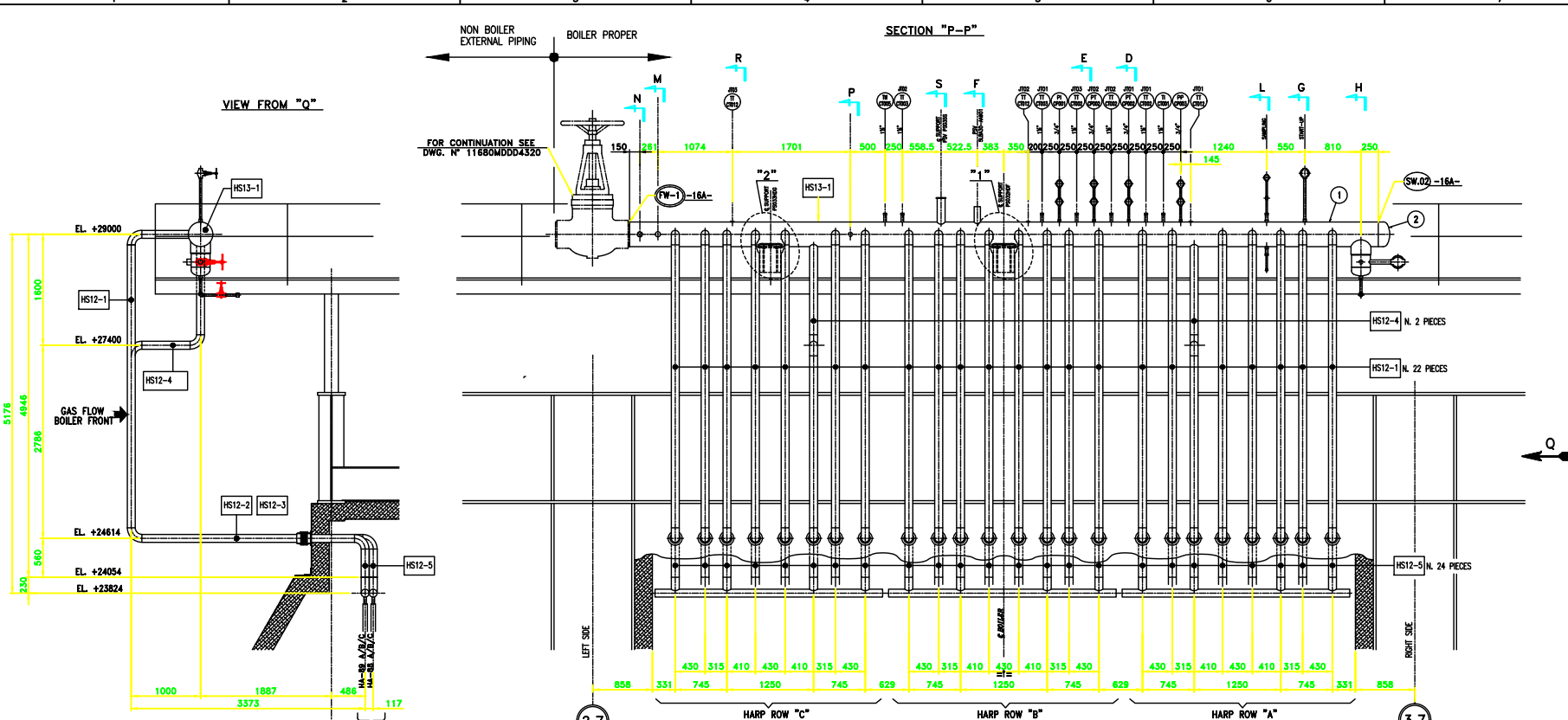
SUPPORT DESCRIPTION:

- S1 FIXED BUT DZ
- S2 AXIAL STOP + SUPPORT + GUIDE X
- S3 GUIDE X + SUPPORT
- S4 AXIAL STOP
- S5 FIXED
- S6 GUIDE Z + SPRING HANGER
- S7 SPRING HANGER

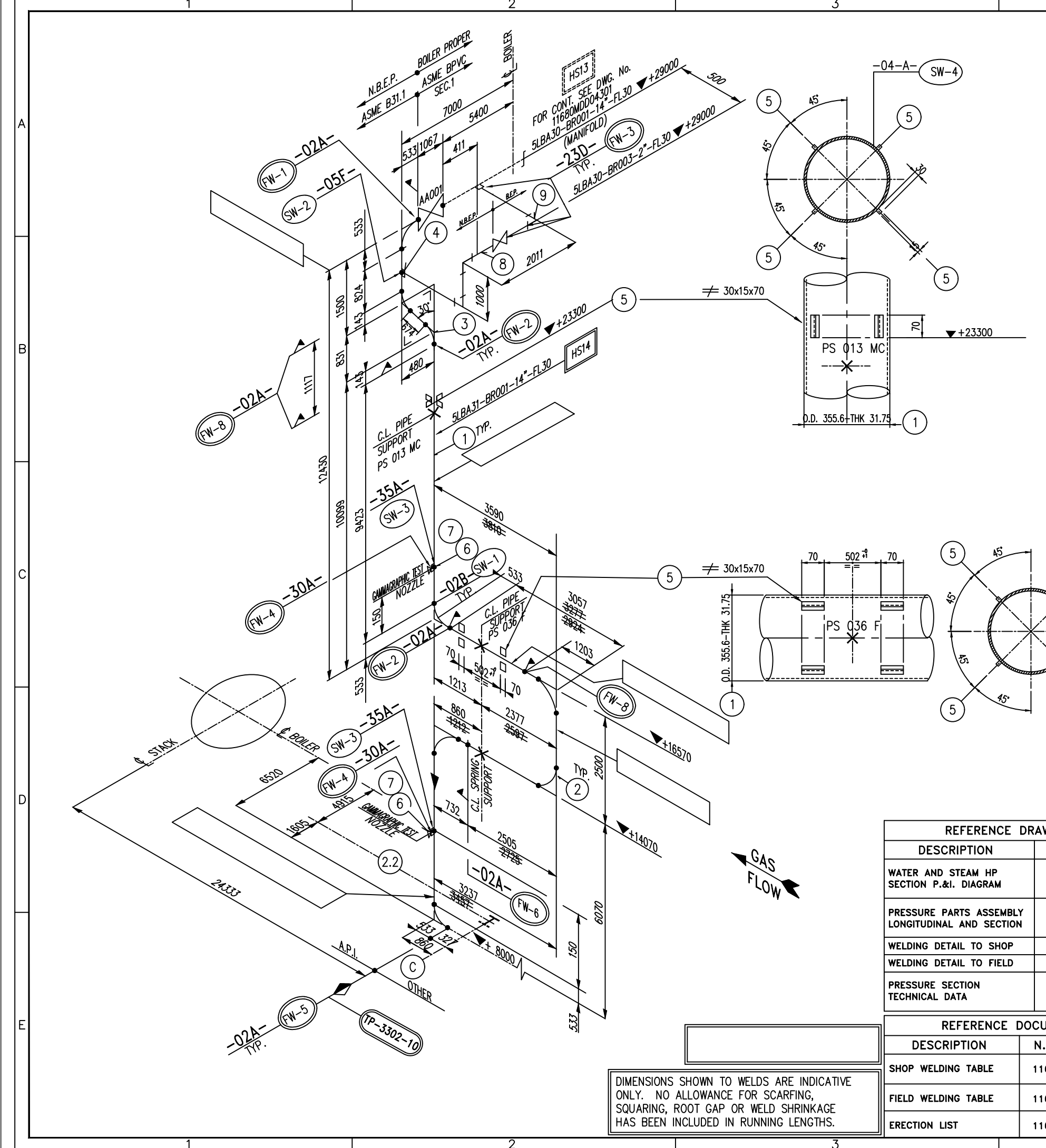
NOTES :

1) FOR GENERAL NOTES SEE DWG. 11680MDD03025 sh.1

4	14-12-04	REVISED AS SHOWN	A.S.	R.M.	A.N.
3	21-05-04	REVISED AS SHOWN	DSC	R.M.	A.N.
2	04-05-04	REVISED AS SHOWN	DSC	R.M.	A.N.
1	14-04-04	COMPLETED	DSC	R.M.	A.N.
REV.	DATA Date	DESCRIZIONE/Description	DIS. Dwg.	CONTR. Checked	VISTO Approv.
QUESTO DISEGNO E' PROPRIETA' DELLA Alstom Power Italia SpA A TERMINE DI LEGGE NE E' VIETATA LA RIPRODUZIONE E LA COMUNICAZIONE A TERZI This Drawing is the Property of Alstom Power Italia SpA The reproduction for any use by a third party is forbidden by law.			SCALA Scale	FIRME/Signature	DATA/Date
LAVRION - METKA PIPING ANCHOR-INTERF. POINT CHARACTERIZATION HP STEAM OUTLET LINE 5LBA30-BR001-14" / 5LBA31-BR001-14"			/ 	DIS./Dwg. DSC	18-03-04
				CONTR./Check. R.M.	30-03-04
				VISTO/Approv. A.N.	30-03-04
ALSTOM ALSTOM POWER ITALIA S.p.A.			RIFERIMENTO N. Reference N.		
			N°. DISEGNO/Drawing No.		TAV. / DI Sh. / of
			11680MDD03025		516
			REV.	1	2
				3	4



SHOP FABRICATED MATERIAL									
IDENTIF. COMPOUN. (NOTE 3)	EXCERION MARK (NOTE 3)	ITEM	COMPONENT DESCRIPTION	Q.TY	O.D. (mm)	THK (mm)	LENGTH (mm)	ASME MATERIAL	WEIGHT (kg)
HS13	HS1-1	1	PIPE	1	Ø355.6	35.71	10000	SA 335 Gr.P91	3040
		2	CAP 1	Ø355.6	27.79	—	SA 234 Gr.WP91	43	
		3	PIPE	22	Ø114.3	13.49	Ø73	SA 335 Gr.P91	501
		4	PIPE	2	Ø113	13.49	1273	SA 335 Gr.P91	86.8
		5	FORGING NOZZLE	1	286	32	340	SA 182 Gr.F91	2.9
		6	HWF COUPLING SW	1	Ø273	6000	—	SA 182 Gr.F91	2.9
		7	CAP 1	1	Ø273	25.4	—	SA 234 Gr.WP91	20
		8	PIPE	1	Ø603.2	8.74	340	SA 335 Gr.P91	0.2
		15A	PLATE	3	3	50	SA 387 Gr.F1	2.2	
		20	FORGING NOZZLE	1	Ø169	46	228	SA 182 Gr.F91	2.8
		21	PIPE	1	Ø603.2	8.74	150	SA 335 Gr.P91	1.6
		22A	HWF COUPLING NPT	2	Ø1½	6000	—	SA 182 Gr.F91	1.2
		23B	ROUND END PLUG	2	Ø1½	6000	NPT-M	SA 182 Gr.F91	0.5
		22C	HWF COUPLING SW	4	Ø3/4"	6000	—	SA 182 Gr.F91	1.8
		31	PIPE	1	Ø603.2	8.74	105	SA 335 Gr.P91	1.1
		32	CAP-BW	1	Ø603.2	8.74	—	SA 234 Gr.WP91	0.5
		34	PLATE	2	400	25	340	SA 387 Gr.F1	5.4
		35	HWF COUPLING SW	1	Ø273	6000	—	SA 182 Gr.F91	2.7
		36	HWF COUPLING NPT	1	Ø1½	6000	—	SA 182 Gr.F91	1.7
		37	ROUND END PLUG	1	Ø1½	6000	NPT-M	SA 182 Gr.F91	0.25
38	PIPE	1	Ø114.3	13.49	350	SA 335 Gr.P91	11		
39	PLATE	1	140	10	140	S 275 JR	2		
HS12-1	HS12-2	23	PIPE	22	Ø114.3	13.49	4081	SA 335 Gr.P91	3010
		29	ELBOW 90° BW LR	12	Ø114.3	13.49	—	SA 234 Gr.WP91	185.25
		24	PIPE	12	Ø114.3	13.49	3068	SA 335 Gr.P91	1234
		29	ELBOW 90° BW LR	12	Ø114.3	13.49	—	SA 234 Gr.WP91	185.25
		30	PLATE	12	50	6	380	SA 387 Gr.F1	10.7
		26	PIPE	12	Ø114.3	13.49	3185	SA 335 Gr.P91	1281
HS12-3	HS12-4	29	ELBOW 90° BW LR	12	Ø114.3	13.49	—	SA 234 Gr.WP91	181
		30	PLATE	12	50	6	380	SA 387 Gr.F1	10.7
		27	PIPE	2	Ø114.3	13.49	668	SA 335 Gr.P91	48
		28	PIPE	2	Ø114.3	13.49	2481	SA 335 Gr.P91	166
		29	ELBOW 90° BW LR	4	Ø114.3	13.49	—	SA 234 Gr.WP91	33.7
		25	PIPE	24	Ø114.3	13.49	408	SA 335 Gr.P91	328
HS12-5	HS12-6	29	ELBOW 90° BW LR	4	Ø114.3	13.49	—	SA 234 Gr.WP91	20.2



SHOP FABRICATED MATERIAL										
IDENTIF. COMPON. (NOTE 3)	LINE No.	SPOOL ERECTION MARK	ITEM	COMPONENT DESCRIPTION	Q.TY	O.D. DIM. (mm)	THK (mm)	LENGHT (mm)	ASME MATERIAL	WEIGHT (Kg)
HS 14	5LBA31-BR001 14"-FL30	5LBA31-4320/A N. 1 PIECE	1	PIPE	1	355.6	31.75 ±12.5%	1498	SA 335 Gr.P91	366
			2	ELBOW L.R. AT 90°	1	355.6	31.75 ±12.5%	-	SA 234 Gr.WP91	227
			3	ELBOW L.R. AT 30°	2	355.6	31.75 ±12.5%	-	SA 234 Gr.WP91	137
			4	HALF COUPLING SW	1	2"	6000# ±12.5%	-	SA 182 Gr.F91	1
			5	PLATE 30x15	4	-	-	70	SA 387 Gr.91 Cl.2	1
		5LBA31-4320/B N. 1 PIECE	1	PIPE	1	355.6	31.75 ±12.5%	9423	SA 335 Gr.P91	2302
			2	ELBOW L.R. AT 90°	1	355.6	31.75 ±12.5%	-	SA 234 Gr.WP91	227
			6	HALF COUPLING NPT	1	1.1/2"	6000#	-	SA 182 Gr.F91	1
			7	ROUND HEAD PLUG NPT	4	1.1/2"	6000#	-	SA 182 Gr.F91	1
		5LBA31-4320/C N. 1 PIECE	1	PIPE	1	355.6	31.75	4076	SA 335 Gr.P91	1032
			2	ELBOW L.R. AT 90°	2	355.6	31.75 ±12.5%	-	SA 234 Gr.WP91	454.5
			3	PLATE 30x15	8	-	-	70	SA 387 Gr.91 Cl.2	1
		5LBA31-4320/C1 N. 1 PIECE	1	PIPE	1	355.6	31.75	5203	SA 335 Gr.P91	1318
			2	ELBOW L.R. AT 90°	2	355.6	31.75 ±12.5%	-	SA 234 Gr.WP91	454.5
			6	HALF COUPLING NPT	1	1.1/2"	6000#	-	SA 182 Gr.F91	1
			7	ROUND HEAD PLUG NPT	4	1.1/2"	6000#	-	SA 182 Gr.F91	1
		5LBA31-4320/C2 N. 1 PIECE	1	PIPE	1	355.6	31.75	1321	SA 335 Gr.P91	335
			5	PLATE 30x15	8	-	-	70	SA 387 Gr.91 Cl.2	1

SITE FABRICATED MATERIAL							
LINE No.	ITEM	COMPONENT DESCRIPTION	Q.TY	O.D. DIM. (mm)	THK (mm)	LENGHT (mm)	ASME MATERIAL
5LBA31-BR003 2"-FL30	8	PIPE	1	60.3	8.74 ±12.5%	4000	SA 335 Gr.P91
	9	ELBOW 90°-SW	3	2"	6000#	-	SA 182 F91
TOTAL WEIGHT							50

TP-3302-10 PHYSICAL BATTERY LIMITS-SEE DWG 11680MDD03020

OTHERS Alstom Power Italia S.p.A.

NOTES:

- 1) ASME B31.1, ED.2001 + ADD. 2002 AND DIRECTIVE 97/23/EC (P.E.D.)
- 2) ALL DIMENSIONS ARE IN mm, UNLESS WHERE OTHERWISE INDICATED
- 3) () DENOTE ITEM NUMBER
- 4) XXXXXX-YYYY/Z = SPOOL MK. No.
- 5) ▲ SHOWS FIELD WELDS
- 6) SW... DENOTES SHOP WELDING NUMBER
- 7) FW... DENOTES FIELD WELDING NUMBER
- 8) ALL TOLERANCES, EXCEPT WHERE OTHERWISE INDICATED, ARE ACCORDING TO UNI EN 22768.1/M
- 9) PIPE MATERIAL PROCUREMENT AND FABRICATION SHALL BE IN FULL ACCORDANCE TO API M.R. 11680MDRO2600
- 10) -05- DENOTE DETAIL OF WELD ACCORDING DWG. 11680MDD04311 AND DWG. 11680MDD04312
- 11) -05- DENOTE DETAIL OF WELD ACCORDING DWG. 11680MDD04311 AND DWG. 11680MDD04312

REFERENCE DRAWING	
DESCRIPTION	N. DRAWINGS
WATER AND STEAM HP SECTION P.&I. DIAGRAM	11680BTD03302
PRESSURE PARTS ASSEMBLY LONGITUDINAL AND SECTION	11680MDD03030 11680MDD03035
WELDING DETAIL TO SHOP	11680MDD04311
WELDING DETAIL TO FIELD	11680MDD04312
PRESSURE SECTION TECHNICAL DATA	11680MDD03042

REFERENCE DOCUMENTS	
DESCRIPTION	N. DOCUMENTS
SHOP WELDING TABLE	11680MDW02600
FIELD WELDING TABLE	11680MDW03800
ERECTION LIST	11680MDE02600

Rev. 1 and above are RELEASED for ERECTION

KKS DWG.No. 5-HA-000-API-157

4	22-09-05	REVISED FOR LABELLING "AS BUILT" ONLY. NO OTHER CHANGES	A.S.	A.R.	A.N.
3	06-06-05	REVISED (SEE CLOUD) AS PER SITE NCR 58	A.S.	A.R.	A.N.
2	04-02-05	ADDED SPOOL MK 5LBA31-4320/C1	A.S.	A.R.	A.N.
1	20-10-04	REVISED WHERE INDICATED	L.R.	A.R.	A.N.
REV.	DATA Date	DESCRIZIONE/Description	DIS. Dwg.	CONTR. Checked	VISTO Approv.

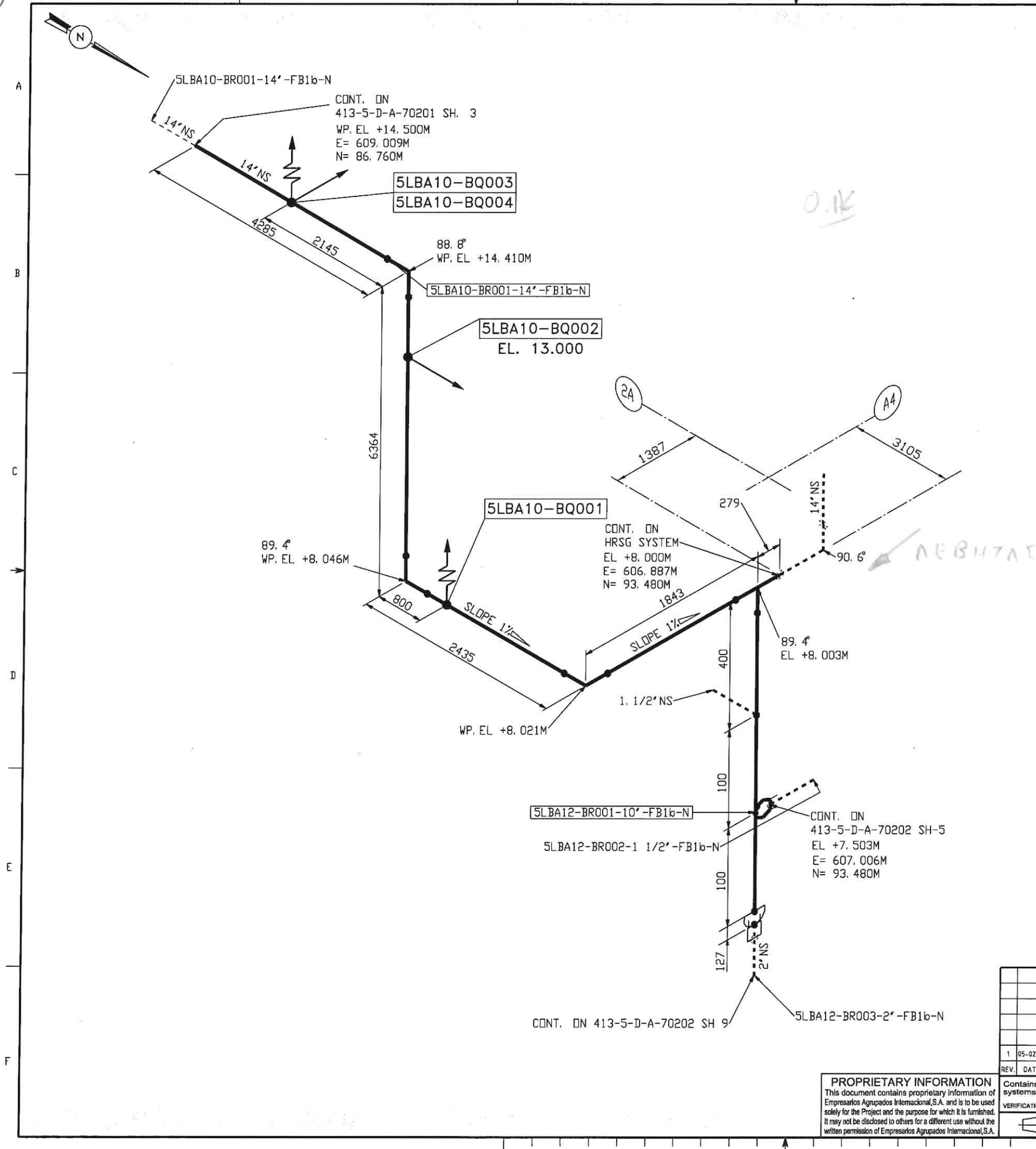
QUESTO DISEGNO E' PROPRIETA' DELLA ALSTOM Power Italia S.p.A. A TERMINE DI LEGGE NE E' VIETATA LA RIPRODUZIONE E LA COMUNICAZIONE A TERZI. This drawing is the Property of ALSTOM Power Italia S.p.A. The reproduction for any use by a third party is forbidden by law.

SCALA Scale	FIRME/Signature	DATA/Date
1:25	DIS./Dwg. T.S.I.	10/09/04
	CONTR./Check. A.R.	10/09/04
	VISTO/Approv. A.N.	15/09/04
RIFERIMENTO N. Reference N.		
N° DISEGNO/Drawing No.		
11680MDD04320		
REV. 1/2/3/4		

LAVRION - METKA
MAIN STEAM LINE
FROM VALVE TO B.L.
5LBA31-BR001-14"-FL30
ALSTOM
ALSTOM Power Italia S.p.A.

DIMENSIONS SHOWN TO WELDS ARE INDICATIVE ONLY. NO ALLOWANCE FOR SCARFING, SQUARING, ROOT GAP OR WELD SHRINKAGE HAS BEEN INCLUDED IN RUNNING LENGTHS.

413-5-D-A-70201-002-01



TYPE OF SUPPORTS				
HANGER	RIGID	GUIDE	STOP	ANCHOR

REFERENCE DRAWINGS		
PIPING COMPOSITE	P & ID N°	PIPING ISOMETRIC
413-5-D-M-60151 SH3	413-5-DT-M-10200 SH1	413-5-D-J-70201-002-01
413-5-D-M-60152 SH3		

LIST OF SUPPORTS		
SUPPORT MARK	REV.	OBSERVATIONS
5LBA10-BQ001	1	
5LBA10-BQ002	1	
5LBA10-BQ003	1	WELDED ELEMENTS
5LBA10-BQ004	1	WELDED ELEMENTS

LINES No. = 5LBA12-BR001-10'-FB1b-N
5LBA10-BR001-14'-FB1b-N

PUBLIC POWER CORPORATION LAVRION V CC PP
DMKT 11 21 302

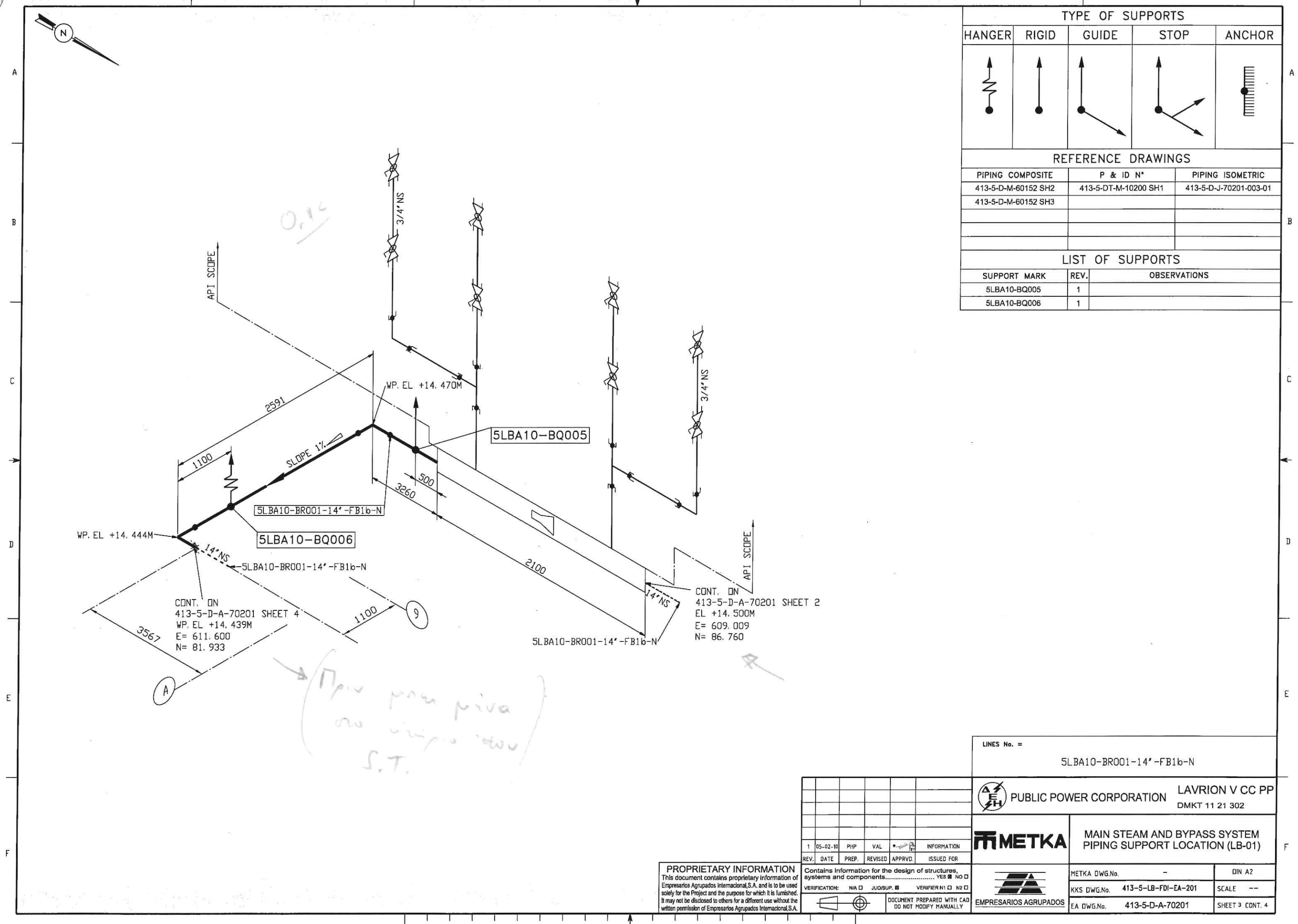
METKA MAIN STEAM AND BYPASS SYSTEM
PIPING SUPPORT LOCATION (LB-01)

1	05-02-10	PHP	VAL		INFORMATION
REV.	DATE	PREP.	REVISED	APPRVD.	ISSUED FOR

VERIFICATION:	N/A	JOOR/SUP.	VERIFIER N1	N2
DOCUMENT PREPARED WITH CAD DO NOT MODIFY MANUALLY				

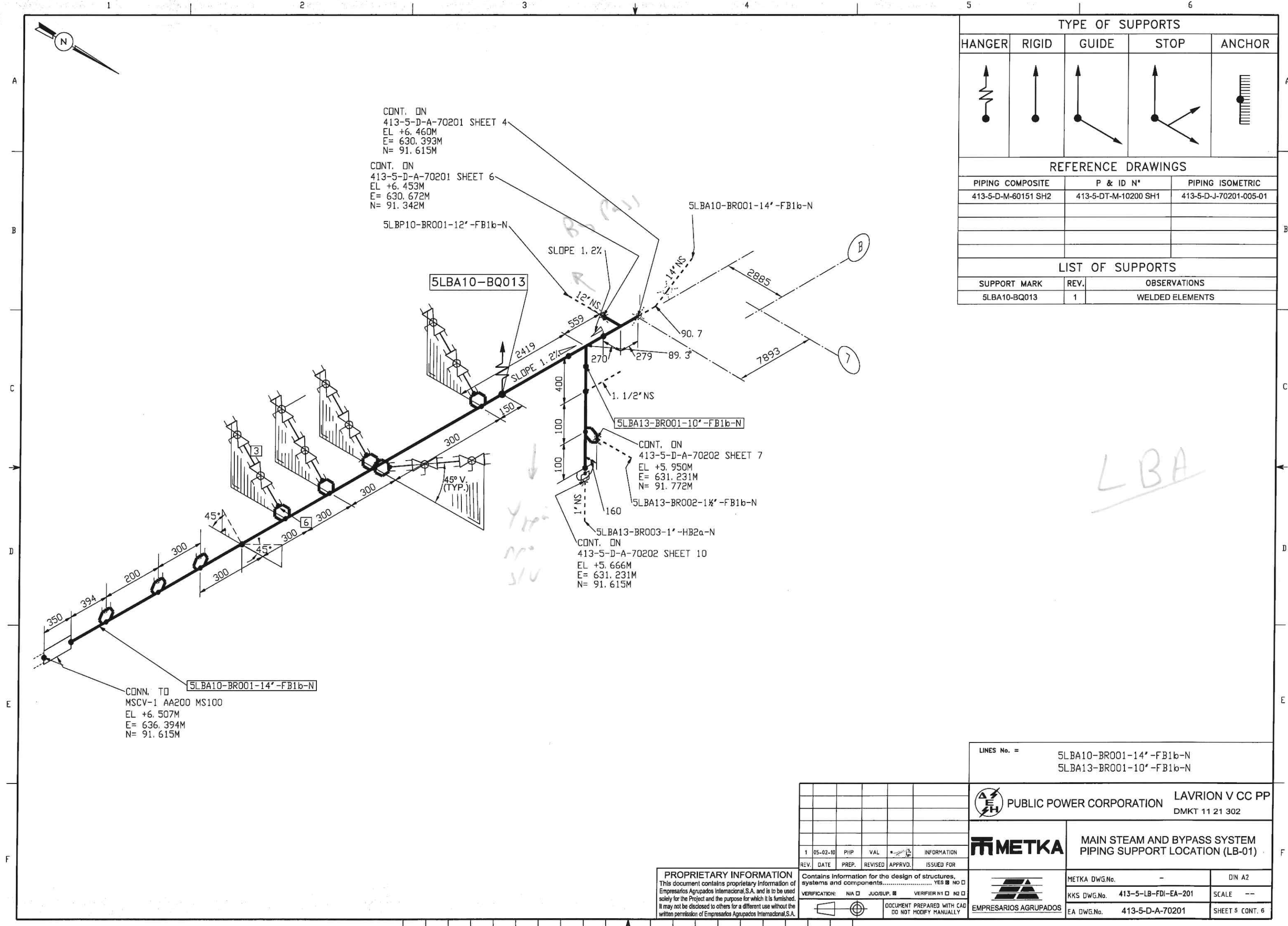
METKA DWG.No.	-	DIN A2
KKS DWG.No.	413-5-LB-FDI-EA-201	SCALE --
EA DWG.No.	413-5-D-A-70201	SHEET 2 CONT. 3

PROPRIETARY INFORMATION
This document contains proprietary information of
Empresarios Agrupados Internacional S.A. and is to be used
solely for the Project and the purpose for which it is furnished.
It may not be disclosed to others for a different use without the
written permission of Empresarios Agrupados Internacional S.A.



413-5-D-A-70201-005-01

4



TYPE OF SUPPORTS				
HANGER	RIGID	GUIDE	STOP	ANCHOR

REFERENCE DRAWINGS		
PIPING COMPOSITE	P & ID N°	PIPING ISOMETRIC
413-5-D-M-60151 SH2	413-5-DT-M-10200 SH1	413-5-D-J-70201-005-01

LIST OF SUPPORTS		
SUPPORT MARK	REV.	OBSERVATIONS
5LBA10-BQ013	1	WELDED ELEMENTS

LBA

LINES No. = 5LBA10-BR001-14'-FB1b-N
5LBA13-BR001-10'-FB1b-N

PUBLIC POWER CORPORATION LAVRION V CC PP
DMKT 11 21 302

METKA MAIN STEAM AND BYPASS SYSTEM
PIPING SUPPORT LOCATION (LB-01)

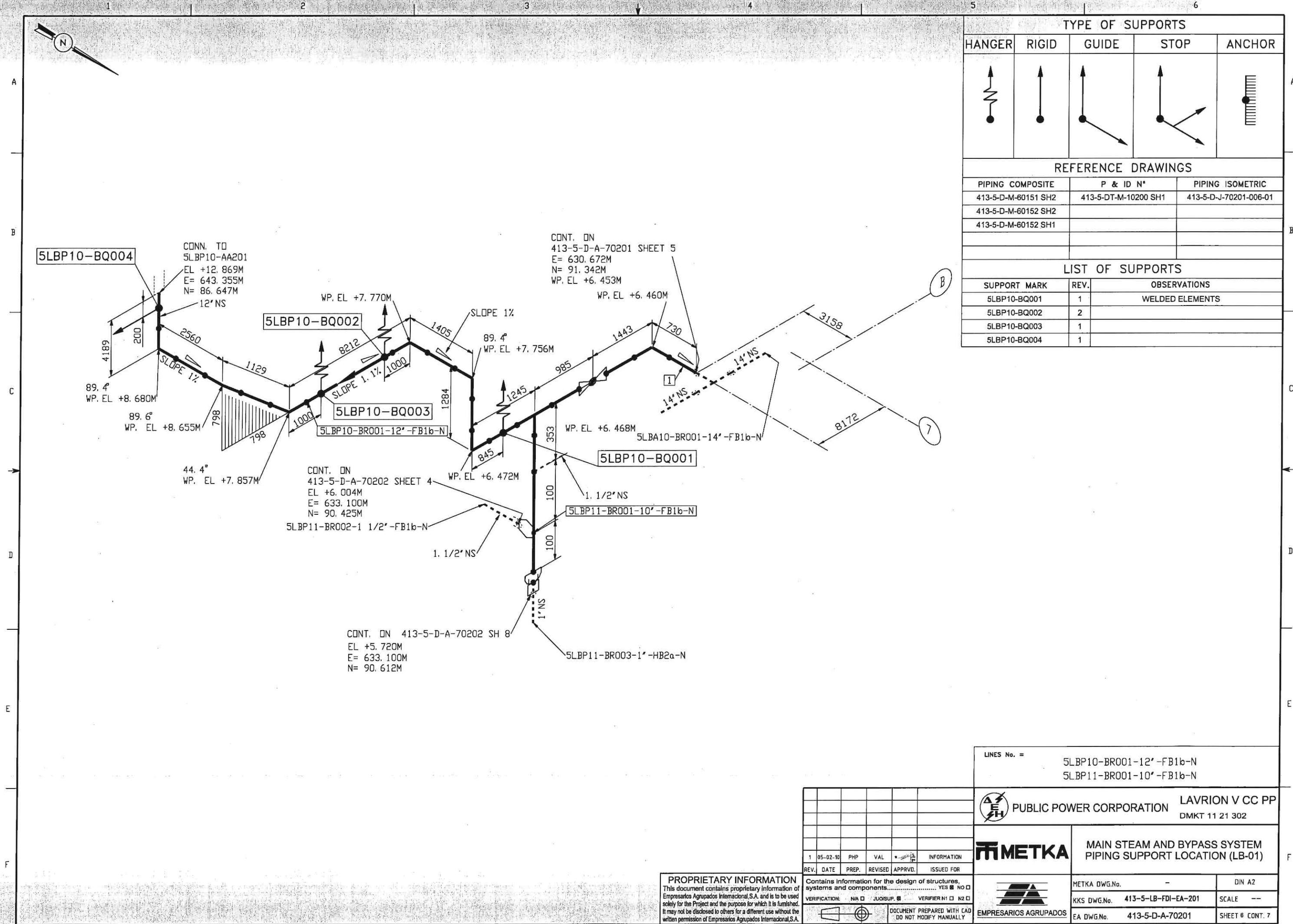
1	05-02-10	PHP	VAL	INFORMATION
REV.	DATE	PREP.	REVISED	APPRVD.
VERIFICATION:	N/A	JOORUP.	VERIFIER N1	N2

PROPRIETARY INFORMATION
This document contains proprietary information of Empresarios Agrupados Internacional S.A. and is to be used solely for the Project and the purpose for which it is furnished. It may not be disclosed to others for a different use without the written permission of Empresarios Agrupados Internacional S.A.

Contains information for the design of structures, systems and components. YES ☒ NO ☐
DOCUMENT PREPARED WITH CAD
DO NOT MODIFY MANUALLY

METKA DWG.No.	-	DIN A2
KKS DWG.No.	413-5-LB-FDI-EA-201	SCALE --
EA DWG.No.	413-5-D-A-70201	SHEET 5 CONT. 6

413-5-D-A-70201-006-01



TYPE OF SUPPORTS				
HANGER	RIGID	GUIDE	STOP	ANCHOR

REFERENCE DRAWINGS		
PIPING COMPOSITE	P & ID N°	PIPING ISOMETRIC
413-5-D-M-60151 SH2	413-5-DT-M-10200 SH1	413-5-D-J-70201-006-01
413-5-D-M-60152 SH2		
413-5-D-M-60152 SH1		

LIST OF SUPPORTS		
SUPPORT MARK	REV.	OBSERVATIONS
5LBP10-BQ001	1	WELDED ELEMENTS
5LBP10-BQ002	2	
5LBP10-BQ003	1	
5LBP10-BQ004	1	

LINES No. =
5LBP10-BR001-12'-FB1b-N
5LBP11-BR001-10'-FB1b-N

PUBLIC POWER CORPORATION
LAVRION V CC PP
DMKT 11 21 302

**MAIN STEAM AND BYPASS SYSTEM
PIPING SUPPORT LOCATION (LB-01)**

EMPRESARIOS AGRUPADOS

METKA DWG.No. -
KKS DWG.No. 413-5-LB-FDI-EA-201
EA DWG.No. 413-5-D-A-70201

DIN A2
SCALE --
SHEET 6 CONT. 7

PROPRIETARY INFORMATION
This document contains proprietary information of
Empresarios Agrupados Internacional S.A. and is to be used
solely for the Project and the purpose for which it is furnished.
It may not be disclosed to others for a different use without the
written permission of Empresarios Agrupados Internacional S.A.

Contains information for the design of structures,
systems and components..... YES ☒ NO ☐

VERIFICATION: N/A ☐ JUSUP ☒ VERIFIER N1 ☐ N2 ☐

DOCUMENT PREPARED WITH CAD
DO NOT MODIFY MANUALLY

1	05-02-10	PHP	VAL		INFORMATION
REV.	DATE	PREP.	REVISED	APPRVD.	ISSUED FOR

 ALSTOM Power Italia SpA		LAVRION V CC PP PUBLIC POWER CORPORATION					PIPING SUPPORTS									
		PIPING SUPPORTS SUMMARY					Dwg. N. 11680MDD03880									
							rev. 7									
SUPPORT NAME	SHEET	LINE NUMBER	POS. ON SK./DWG. N.11680MDD	WELDED	ALLOY	DEVICE	REVISIONS									
							0	1	2	3	4	5	6	7		NOTE
COVER SHEET	1	-	-	-	-	-	0									
GENERAL NOTES	2	-	-	-	-	-	0									
GENERAL NOTES	3	-	-	-	-	-	0									
GENERAL NOTES	4	-	-	-	-	-	0									
FREE	5	-	-	-	-	-	0									
FREE	6	-	-	-	-	-	0									
FREE	7	-	-	-	-	-	0									
FREE	8	-	-	-	-	-	0									
FREE	9	-	-	-	-	-	0									
FREE	10	-	-	-	-	-	0									
FREE	11	-	-	-	-	-	0									
FREE	12	-	-	-	-	-	0									
FREE	13	-	-	-	-	-	0									
FREE	14	-	-	-	-	-	0									
FREE	15	-	-	-	-	-	0									
FREE	16	-	-	-	-	-	0									
FREE	17	-	-	-	-	-	0									
FREE	18	-	-	-	-	-	0									
FREE	19	-	-	-	-	-	0									
FREE	20	-	-	-	-	-	0									
FREE	21	-	-	-	-	-	0									
FREE	22	-	-	-	-	-	0									
FREE	23	-	-	-	-	-	0									
FREE	24	-	-	-	-	-	0									
FREE	25	-	-	-	-	-	0									
FREE	26	-	-	-	-	-	0									
FREE	27	-	-	-	-	-	0									
FREE	28	-	-	-	-	-	0									
FREE	29	-	-	-	-	-	0									
FREE	30	-	-	-	-	-	0									
FREE	31	-	-	-	-	-	0									
FREE	32	-	-	-	-	-	0									
FREE	33	-	-	-	-	-	0									
FREE	34	-	-	-	-	-	0									
FREE	35	-	-	-	-	-	0									
FREE	36	-	-	-	-	-	0									
FREE	37	-	-	-	-	-	0									
FREE	38	-	-	-	-	-	0									
FREE	39	-	-	-	-	-	0									
PS-001MC	40	5HAJ21-BR001-28"	04505/03803			SC001	0		1	2						
PS-002MC	41	5HAJ21-BR001-28"	04505/03803			SC002	0		1	2						
PS-003MCG	42	5HAH34-BR001-16"	04500/03803		G22	SC003	0	1	2	3						Sh.1 of 3
PS-003MCG	43	5HAH34-BR001-16"	04500/03803		G22	SC003	0	1	2	3						Sh.2 of 3
PS-003MCG	44	5HAH34-BR001-16"	04500/03803		G22	SC003	0	1	2	3						Sh.3 of 3
PS-004MCG	45	5HAH34-BR002-16"	04500/03803		G22	SC004	0		1	2						Sh.1 of 3
PS-004MCG	46	5HAH34-BR002-16"	04500/03803		G22	SC004	0		1	2						Sh.2 of 3

 ALSTOM Power Italia SpA		LAVRION V CC PP PUBLIC POWER CORPORATION					PIPING SUPPORTS												
		PIPING SUPPORTS SUMMARY					Dwg. N. 11680MDD03880 rev. 7												
SUPPORT NAME	SHEET	LINE NUMBER	POS. ON SK./DWG. N.11680MDD	WELDED	ALLOY	DEVICE	REVISIONS												NOTE
							0	1	2	3	4	5	6	7					
PS-004MCG	47	5HAH34-BR002-16"	04500/03803		G22	SC004	0		1	2								Sh.3 of 3	
PS-005MC	48	5HAC35-BR003-8"	05303/03804			SC005	0			1									
PS-006MV	49	5HAC30-BR002-8"	05303/03804			SV001	0					1							
PS-007MV	50	5HAC30-BR003-4"	05303/03804			SV002	0					1							
PS-008MC	51	5HAE24-BR001-10"	02640/03803			SC006	0			1									
PS-009MCG	52	5HAE24-BR001-10"	02640/03805			SC007	0							1					
PS-010MC	53	5HAJ26-BR001-28"	04350/03805			SC008	0			1									
PS-011MCF	54	5LBD30-BR001-20"	04340/03804			SC009	0			1									
PS-012MC	55	5LBD30-BR001-20"	04340/03805			SC010	0			1									
PS-013MC	56	5LBA31-BR001-14"	04320/03805			SC011	0			1									
PS-014MCG	57	5LBA31-BR001-14"	04320/03805			SC012	0	1		2									
PS-015MCG	58	5HAJ26-BR001-28"	04324/03802		G22	SC013	0			1									
PS-016MCG	59	5HAJ26-BR001-28"	04324/03802		G22	SC015	0			1									
PS-017MCF	60	5HAJ26-BR001-28"	04324/03802		G22	SC014	0			1									
PS-018MVF	61	5HAH25-BR001-24"	04357/03802			SV003	0			1									
PS-019MVG	62	5HAH25-BR001-24"	04357/03802			SV004	0			1									
PS-020MVF	63	5HAH25-BR001-24"	04357/03802			SV005	0		1	2									
PS-021MVG	64	5HAH21-BR001-10"	04330/03802			SV006	0			1							Sh.1 of 2		
PS-021MVG	65	5HAH21-BR001-10"	04330/03802			SV006	0			1				2			Sh.2 of 2		
PS-022MV	66	5HAH21-BR002-10"	04330/03802			SV007	0			1									
PS-023MV	67	5HAC11-BR004-10"	05325/03802			SV008	0			1									
PS-024MV	68	5HAH21-BR001-10"	04330/03805			SV009	0												
PS-025MV	69	5HAH21-BR001-10"	04330/03805			SV010	0							1					
PS-026MV	70	5HAH21-BR001-10"	04330/03805			SV011	0												
PS-027MVG	71	5HAH21-BR008-8"	03805			SV012	0												
PS-028MV	72	5HAC12-BR001-6"	05355/03805			SV013	0												
PS-029MC	73	5HAG10-BR003-2"1/2	04361/03803			SC016	0	1		2									
PS-030MC	74	5HAG10-BR001-2"1/2	04361/03803			SC017	0	1	2	3									
PS-031MC	75	5HAF10-BR002-2"	03803			SC018	0		1	2									
PS-032HDF	76	5LBA30-BR001-14"	04301/03805		G22		0												
PS-033HDG	77	5LBA30-BR001-14"	04301/03805		G22		0												
PS-034HDG	78	5LBA30-BR001-14"	04301/03805		G22		0												
PS-035S	79	5LBA30-BR901-10"	04327/03802		G11		0												
PS-036F	80	5LBA31-BR001-14"	04320/03805				0		1								Sh.1 of 2		
PS-036F	81	5LBA31-BR001-14"	04320/03805				0		1								Sh.2 of 2		
PS-037F	82	5HAH34-BR002-16"	04500/03806		G22		0	1	2										
PS-038G	83	RS9-24"	04323/03803		G22		0												
PS-039G	84	RS6-24"	04321/03803		G22		0												
PS-040F	85	5HAJ23-BR001-28"	04505/03803		G22		0		1										
PS-041S	86	5HAJ26-BR901-18"	04364/03803		G11		0												
PS-042S	87	5HAJ26-BR001-28"	04350/03805		G22		0		1								Sh.1 of 3		
PS-042S	88	5HAJ26-BR001-28"	04350/03805		G22		0		1								Sh.2 of 3		
PS-042S	89	5HAJ26-BR001-28"	04350/03805		G22		0		1								Sh.3 of 3		
PS-043S	90	5HAJ26-BR001-28"	04350/03805				0												
PS-044G	91	5HAJ26-BR001-28"	04350/03805		G22		0												
PS-045F	92	5HAJ26-BR001-28"	04350/03805		G22		0		1										

 ALSTOM Power Italia SpA		LAVRION V CC PP PUBLIC POWER CORPORATION					PIPING SUPPORTS													
		PIPING SUPPORTS SUMMARY					Dwg. N. 11680MDD03880													
		rev. 7																		
SUPPORT NAME	SHEET	LINE NUMBER	POS. ON SK./DWG. N.11680MDD	WELDED	ALLOY	DEVICE	REVISIONS												NOTE	
							0	1	2	3	4	5	6	7						
PS-046F	93	5HAH25-BR902-16"	04363/03802				0													
PS-047FG	94	5HAH21-BR001-10"	02431/03805				0													
PS-048F	95	5HAC37-BR001-10"	05305/03805				0													
PS-049F	96	5HAC11-BR001-10"	05322/03805				0													
PS-050S	97	5LBD30-BR901-12"	04326/03804				0													
PS-051S	98	5HAH21-BR901-8"	04337/03802				0													
PS-052SF	99	5HAH25-BR001-24"	04352/03805				0													
PS-053S	100	5HAH25-BR901-16"	04363/03802				0													
PS-054SG	101	5HAE24-BR001-10"	02640/03805				0								1					
PS-055SG	102	5HAN20-BR001-6"	04347/03805				0		1											
PS-056A	103	5HAF10-BR001-2"	03804				0		1						1					
PS-057G	104	5HAF10-BR002-2"					0		DELETED											
PS-058G	105	5HAG10-BR001-2"1/2	04361/03803				0	1	2											
PS-059G	106	5HAG10-BR001-2"1/3					0		DELETED											
PS-060F	107	5HAC30-BR002-8"	05303/03803				0		1											
PS-061G	108	HW5-8"	02442/03803				0													
PS-062S	109	5HAE10-BR002-10"	05345/03805				0													
PS-063G	110	5HAE10-BR002-10"	05345/03805				0													
PS-064SGF	111	5HAC20-BR001-4"	05308/03803				0													
PS-065S	112	5HAC20-BR001-4"	05308/03803				0		1											
PS-066G	113	5HAC20-BR001-4"	05308/03803				0					1								
PS-067G	114	5HAC20-BR001-4"	05308/03803				0					1								
PS-068SG	115	5HAC22-BR001-4"	05320/03805				0													
PS-069SG	116	5HAC22-BR001-3"	05323/03805				0													
PS-070G	117	5HAC23-BR001-3"	05324/03805				0													
PS-071A	118	5HAC23-BR001-3"	05324/03805				0													
PS-072G	119	5HAC23-BR001-3"	05324/03805				0													
PS-073G	120	5HAC23-BR001-3"	05324/03805				0													
PS-074G	121	5HAC23-BR001-3"	05324/03805				0													
PS-075G	122	5HAC23-BR001-3"	05324/03804				0													
PS-076SG	123	5HAC23-BR001-3"	05324/03804				0													
PS-077A	124	5HAC23-BR001-3"	05324/03804				0													
PS-078G	125	5HAE24-BR001-10"	02640/03805				0													
PS-079G	126	5HAE24-BR001-10"	02640/03804				0													
PS-080S	127	5HAC23-BR001-3"	02640/03804				0													
PS-081G	128	5HAE24-BR001-10"	02640/03803				0								1					
PS-082G	129	5LBD30-BR001-20"	04340/03803				0								1					
PS-083G	130	5HAH25-BR001-24"	04352/03805				0													
PS-084G	131	5HAH25-BR001-24"	04352/03805				0													
PS-085S	132	5HAH25-BR001-24"	04352/03805				0													
PS-086G	133	5HAH25-BR001-24"	04352/03805				0													
PS-087G	134	5HAH25-BR001-24"	04352/03805				0													
PS-088G	135	5HAH21-BR001-10"	04430/03805				0													
PS-089SG	136	5HAH21-BR001-10"	04430/03805				0		1											
PS-090G	137	5HAH21-BR001-10"	04430/03805				0													
PS-091MV	138	5HAC14-BR004-6"	05358/03803			SV015	0													

 ALSTOM Power Italia SpA		LAVRION V CC PP PUBLIC POWER CORPORATION					PIPING SUPPORTS												
		PIPING SUPPORTS SUMMARY					Dwg. N. 11680MDD03880												rev. 7
SUPPORT NAME	SHEET	LINE NUMBER	POS. ON SK./DWG. N.11680MDD	WELDED	ALLOY	DEVICE	REVISIONS												NOTE
							0	1	2	3	4	5	6	7					
PS-092MV	139	5HAC14-BR005-6"	05356/03803			SV014	0												
PS-093G	140	LS1-4"	02645/03805				0												
PS-094G	141	LS1-4"	02645/03805				0												
PS-095A	142	HAE10/20/30/40-BR010-	05351/03805				0												
PS-096A	143	5HAE10-BR001-6"	05350/03805				0												
PS-097SG	144	5HAN10-BR902-3"	04410/03803				0												
PS-098SFG	145	5HAN10-BR902-3"	04410/03803				0												
PS-099SFG	146	5HAC10-BR002-10"	05313/03804				0												
PS-100F	147	5HAC10-BR002-10"	05313/03803				0												
PS-101SG	148	5HAN10-BR901-6"	04409/03803				0		1										
PS-102S	149	5HAC14-BR001-6"	05356/03806				0		1										
PS-103S	150	5HAC13-BR001-6"	05356/03806				0		1										
PS-104S	151	5HAC23-BR001-3"	05324/03804				0												
PS-105H	152	5HAH21-BR001-10"	04330/03802			SA002	0	1								2			
PS-106G	153	5HAE10-40-BR010-3"/6"	05347/03805				0												
PS-107G	154	5HAE10-40-BR010-3"/6"	05347/03805				0										1		
PS-108G	155	5HAE30-BR010-6"	05346/03805				0												
PS-109G	156	5HAE40-BR010-6"	05347/03805				0												
PS-110G	157	5HAN10-BR001-24"	02812/03804				0												
PS-111G	158	5HAE10-BR001-6"	05350/03805				0	1											
PS-112S	159	5HAE10-BR001-6"	05350/03805				0												
PS-113G	160	5HAE10-BR001-6"	05350/03805				0												
PS-114G	161	HW15-10"	05305/03805				0												
PS-115G	162	HW15-10"	05305/03805				0												
PS-116G	163	5HAC37-BR001-10"	05315/03805				0												
PS-117S	164	5HAC37-BR001-10"	05315/03805				0												
PS-118G	165	5HAN20-BR001-6"	04347/03805				0												
PS-119A	166	5LBA30-BR901-10"	04327/03802				0	1											
PS-120A	167	5HAJ26-BR901-18"	04364/03802				0	1											
PS-121A	168	5HAH25-BR901-16"	04363/03802				0	1											
PS-122A	169	5HAH25-BR902-16"	04363/03802				0	1											
PS-123A	170	5HAH21-BR901-8"	04337/03802				0	1											
PS-124G	171	5HAH21-BR901-8"	04337/03802				0	1											
PS-125G	172	5HAN20-BR001-6"	04347/03805				0	1											
PS-126A	173	5HAE30-BR902-10"	02811/03802				0	1								2			
PS-127A	174	5HAE30-BR901-10"	02810/03802				0	1								2			
PS-128S	175	5HAE20-BR901-8"	02805/03802				0		1								2		
PS-129A	176	5HAE20-BR901-8"	02805/03802				0	1										2	
PS-130A	177	5HAE20-BR902-10"	02806/03802				0	1											2
PS-131A	178	5HAE10-BR901-12"	02800/03802				0	1											
PS-132A	179	5HAE10-BR903-12"	02801/03802				0	1											
PS-133A	180	5HAE10-BR902-12"	02801/03802				0	1											
PS-134A	181	5HAN20-BR901-6"	04362/03805				0	1											
PS-135G	182	5HAH20-BR901-8"	04337/03802				0	1											
PS-136G	183	5HAN20-BR901-6"	04362/03805				0	1											
PS-137G	184	5HAN20-BR901-6"	04362/03805				0	1											

 ALSTOM Power Italia SpA		LAVRION V CC PP PUBLIC POWER CORPORATION					PIPING SUPPORTS										
		PIPING SUPPORTS SUMMARY					Dwg. N. 11680MDD03880 rev. 7										
SUPPORT NAME	SHEET	LINE NUMBER	POS. ON SK./DWG. N.11680MDD	WELDED	ALLOY	DEVICE	REVISIONS										NOTE
							0	1	2	3	4	5	6	7			
PS-138G	185	5HAN20-BR901-6"	04362/03804				0	1	2								
PS-139A	186	5LBD30-BR901-12"	04326/03805				0	1									
PS-140G	187	5LBD30-BR901-12"	04326/03805				0	1									
PS-141G	188	5LBD30-BR901-12"	04326/03805				0	1									
PS-142S	189	5HAE30-BR901-10"	02810/03802				0		1								
PS-143S	190	5HAE30-BR902-10"	02811/03802				0		1								
PS-144S	191	5HAE20-BR902-10"	02806/03802				0		1					2			
PS-145S	192	5HAE10-BR901-12"	02800/03802				0		1								
PS-146S	193	5HAE10-BR902-12"	02801/03802				0		1								
PS-147S	194	5HAE10-BR903-12"	02801/03802				0		1								
PS-148SG	195	5HAC10-BR001-10"	05313/03805					0									
PS-149SG	196	5HAC10-BR001-10"	05313/03805					0									
PS-150G	197	5HAC10-BR001-10"	05313/03803					0									
PS-151SG	198	5HAC10-BR001-10"	05313/03805					0									
PS-152SG	199	5HAC11-BR001-10"	05325/03805					0									
PS-153SG	200	5HAC11-BR002-6"	05327/03805					0									
PS-154S	201	5HAC11-BR002-6"	05327/03805					0									
PS-155SG	202	5HAC10-BR001-10"	05313/03805					0						1			
PS-156SG	203	5HAC10-BR001-10"	05313/03805					0						1			
PS-157S	204	5HAC12-BR001-6"	05355/03805					0									
PS-158G	205	5HAC12-BR001-6"	05355/03805					0									
PS-159G	206	5HAC12-BR001-6"	05355/03805					0									
PS-160G	207	5HAC12-BR001-6"	05355/03804					0									
PS-161G	208	5HAC12-BR001-6"	05355/03803					0									
PS-162SG	209	5HAN10-BR901-6"	04409/03803					0									
PS-163SG	210	5HAN10-BR901-6"	04409/03803					0									
PS-164S	211	5HAN10-BR901-6"	04409/03803					0									
PS-165S	212	5HAN10-BR901-6"	04409/03803					0									
PS-166S	213	5HAN10-BR901-6"	04409/03803					0	1								
PS-167S	214	5HAN10-BR902-3"	04410/03803					0	1								
PS-168SG	215	5HAN10-BR902-3"	04410/03803					0									
PS-169S	216	5HAN10-BR902-3"	04410/03803					0									
PS-170S	217	5HAN10-BR902-3"	04410/03803					0									
PS-171G	218	5HAC10-BR002-10"	05313/03803					0									
PS-172S	219	5HAC12-BR001-6"	05355/03803					0	1								
PS-173S	220	5HAC14-BR004-6"	05358/03803					0	1								
PS-174SG	221	5HAC12-BR001-6"	05355/03803					0									
PS-175SG	222	5HAC14-BR004-6"	05358/03803					0									
PS-176SG	223	5HAC14-BR004-6"	05358/03804					0	1								
PS-177S	224	5HAC14-BR002-6"	05357/03804					0	1								
PS-178S	225	5HAC13-BR002-6"	05357/03804					0	1								
PS-179SG	226	5HAC12-BR001-6"	05355/03803					0									
PS-180SG	227	5HAC14-BR004-6"	05358/03803					0									
PS-181H	228	5HAC10-BR002-10"	05313/03803			SA001		0	1	2							Sh.1 of 3
PS-181H	229	5HAC10-BR002-10"	05313/03803			SA001		0	1	2							Sh.2 of 3
PS-181H	230	5HAC10-BR002-10"	05313/03803			SA001		0	1	2							Sh.3 of 3

 ALSTOM Power Italia SpA		LAVRION V CC PP PUBLIC POWER CORPORATION					PIPING SUPPORTS																	
		PIPING SUPPORTS SUMMARY					Dwg. N. 11680MDD03880															rev. 7		
SUPPORT NAME	SHEET	LINE NUMBER	POS. ON SK./DWG. N.11680MDD	WELDED	ALLOY	DEVICE	REVISIONS												NOTE					
							0	1	2	3	4	5	6	7										
PS-182SG	231	5HAN10-BR006-6"	04405/03804							1														
PS-183S	232	5HAN10-BR006-6"	04405/03804							1														
PS-184S	233	5HAN10-BR006-6"	04405/03804							1														
PS-185S	234	5HAN10-BR006-6"	04405/03804							1														
PS-186SG	235	5HAN10-BR006-6"	04405/03804							1														
PS-187S	236	5HAN10-BR005-6"	04406/03804							1														
PS-188S	237	5HAN10-BR004-4"	04408/03804							1														
PS-189S	238	5HAN10-BR005-6"	04406/03804							1														
PS-190S	239	5HAN10-BR004-4"	04408/03804							1														
PS-191SFG	240	5HAN10-BR005-6"	04406/03804							1														
PS-192SFG	241	5HAN10-BR004-4"	04408/03804							1														
PS-193SG	242	5HAN10-BR005-6"	04406/03804							1														
PS-194SGF	243	5HAN10-BR004-4"	04408/03804							1														
PS-195SG	244	5HAN10-BR005-6"	04406/03804							1														
PS-196SG	245	5HAN10-BR004-4"	04408/03804							1														
PS-197SG	246	5HAN10-BR004-4"	04408/03804							1														
PS-198MC	247	5HAF10-BR001-2"	03803			SC019				1	2													
PS-199SGF	248	5HAN11-BR001-6"	04412/03804							1	2													
PS-200SG	249	5HAN11-BR001-6"	04412/03804							1	2													
PS-201S	250	5HAJ23-BR003-2"	03803							0														
PS-202S	251	5HAH34-BR004-2"	03803							0														
PS-203S	252	5HAJ23-BR003-2"	03803							0														
PS-204S	253	5HAH35-BR002-2"	03803							0														
PS-205S	254	5HAH35-BR002-2"	03803							0														
PS-206S	255	5HAH31-BR002-2"	03803							0														
PS-207S	256	5HAH31-BR002-2"	03803							0														
PS-208S	257	5HAH35-BR002-2"	03803							0														
PS-209S	258	5HAJ24-BR002-2"	03803							0														
PS-210S	259	5HAJ24-BR002-2"	03803							0														
PS-211S	260	5LDB30-BR004-1"	03805							0														
PS-212G	261	5LDB30-BR004-1"	03805							0														
PS-213G	262	5LDB30-BR004-1"	03805							0														
PS-214FG	263	5LDB30-BR004-1"	03805							0														
PS-215SG	264	5LDB30-BR004-1"	03805							0														
PS-216SG	265	5LDB30-BR004-1"	03805							0														
PS-217G	266	5LDB30-BR004-1"	03805							0														
PS-218G	267	5LDB30-BR004-1"	03805							0														
PS-219G	268	5HAC34-BR005-2"	03803							1														
PS-220S	269	5HAC34-BR004-2"	03803							0														

 ALSTOM Power Italia SpA				LAVRION V CC PP PUBLIC POWER CORPORATION		SPRING SUPPORTS									
						Dwg. N. 11680MDD03881 rev. 1									
				Ref. to Dwg. 11680MDD03880		Dwg. 11680MDD03881		SPRING SUPPORTS SUMMARY LIST		SHEET 3 OF 38					
LINE NUMBER		POS. ON SK./DWG. N.11680MDD								REVISIONS					
				SUPPORT NAME	Sheet N.	DEVICE	Sheet N.	0	1						
-	-	COVER SHEET	1	-	-	0									
-	-	GENERAL NOTES	2	-	-	0									
PS-001MC	40	SC001	3	5HAJ21-BR001-28"	04505/03803	0									
PS-002MC	41	SC002	4	5HAJ21-BR001-28"	04505/03803	0									
PS-003MCG	42	SC003	5	5HAH34-BR001-16"	04500/03803	0									
PS-004MCG	45	SC004	6	5HAH34-BR002-16"	04500/03803	0									
PS-005MC	48	SC005	7	5HAC35-BR003-8"	05303/03804	0									
PS-006MV	49	SV001	8	5HAC30-BR002-8"	05303/03804	0									
PS-007MV	50	SV002	9	5HAC30-BR003-4"	05303/03804	0									
PS-008MC	51	SC006	10	5HAE24-BR001-10"	02640/03803	0									
PS-009MCG	52	SC007	11	5HAE24-BR001-10"	02640/03805	0									
PS-010MC	53	SC008	12	5HAJ26-BR001-28"	04350/03805	0									
PS-011MCF	54	SC009	13	5LBD30-BR001-20"	04340/03804	0									
PS-012MC	55	SC010	14	5LBD30-BR001-20"	04340/03805	0									
PS-013MC	56	SC011	15	5LBA31-BR001-14"	04320/03805	0									
PS-014MCG	57	SC012	16	5LBA31-BR001-14"	04320/03805	0									
PS-015MCG	58	SC013	17	5HAJ26-BR001-28"	04324/03802	0									
PS-016MCG	59	SC015	18	5HAJ26-BR001-28"	04324/03802	0									
PS-017MCF	60	SC014	19	5HAJ26-BR001-28"	04324/03802	0									
PS-018MVG	61	SV003	20	5HAH25-BR001-24"	04357/03802	0									
PS-019MVG	62	SV004	21	5HAH25-BR001-24"	04357/03802	0									
PS-020MVF	63	SV005	22	5HAH25-BR001-24"	04357/03802	0									
PS-021MVG	64	SV006	23	5HAH21-BR001-10"	04330/03802	0									
PS-022MV	66	SV007	24	5HAH21-BR002-10"	04330/03802	0									
PS-023MV	67	SV008	25	5HAC11-BR004-10"	05325/03802	0									
PS-024MV	68	SV009	26	5HAH21-BR001-10"	04330/03805	0									
PS-025MV	69	SV010	27	5HAH21-BR001-10"	04330/03805	0									
PS-026MV	70	SV011	28	5HAH21-BR001-10"	04330/03805	0									
PS-027MVG	71	SV012	29	5HAH21-BR008-8"	03805	0									
PS-028MV	72	SV013	30	5HAC12-BR001-6"	05355/03805	0									
PS-029MC	73	SC016	31	5HAG10-BR003-2"1/2	04361/03803	0									
PS-030MC	74	SC017	32	5HAG10-BR001-2"1/2	04361/03803	0									
PS-031MC	75	SC018	33	5HAF10-BR002-2"	03803	0									
PS-091MV	138	SV015	34	5HAC14-BR004-6"	05358/03803	0									
PS-092MV	139	SV014	35	5HAC14-BR005-6"	05356/03803	0									
PS-105H	152	SA002	36	5HAH21-BR001-10"	04330/03802	0									
PS-181H	229	SA001	37	5HAC10-BR002-10"	05313/03803	0									
PS-198MC	247	SC019	38	5HAF10-BR001-2"	03803	0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									
						0									