DATA SHEET FOR CATALYST INJECTION PACKAGE (Y-111)

PROJECT: PP-PE PILOT PLANT	CLIENT: شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی
TITLE: DATA SHEET FOR CATALYST INJECTION PACKAGE (Y-111)	

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Rev	Date	Prepared By	Checked By	Approved By	Status
5					
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1					
0	2022-01-09	K. A	M.N	AA.SH	IFA

Document Revision

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1. SCOPE OF SUPPLY

Vendor shall supply a package system for catalyst feeding according to the following specification. The equipment shall be installed in Arak, Iran.

Scope of the supply includes all necessary components for correct running and operating.

2. PROCESS DESCRIPTION

Package is represented on DWG: 100-PID-A1-PR-0011.

The package is composed by:

- P111, P112
- V 111, V112 A/B, V113, V114, V115
- Local instrumentation connected to DCS
- Safety devices

The package is used to feed continuously small amount of high pressure oil to catalyst dosing syringes V112 A/B. This will allow to transfer the same amount (in volume) of catalytic mud (mixture of Vaseline oil & grease) toward the polymerization process.

The package can be split in 4 main sections:

1. Low pressure oil feeding toward P112
2. P112 oil suction
3. P112 high pressure oil delivery
4. Oil collection (back flow) from V112A/B syringes

General Notes:
Package should provide of the safety devices reported on 100-PID-A1-PR-0011:
PSV1101, PSV1102, PSV1103, SDV1101, SDV1102, RD1101 and RD 1102.

Compressed nitrogen cylinder is not included in the package supply.

SECTION 1

V111 vessel is intended as suction capacity for P111 pump and as return vessel for the oil service circuit. Vessel pressure is atmospheric and temperature as to be maintained constant during all the year by means of insulation.

P111 pump sucks oil from V111; delivery pressure has to be 10 barg with an oil flow rate of 20 Kg/h. (Note: P111 pump can also be immersion type, installed inside V111 vessel).
P111 delivery pressure is maintained constant by means of PIC1101 that re-circulate the excess oil flow toward V111. PIC valve has to be calculated in order to handle all the maximum pump flow.

FIC1101 control oil flow to P112 pump. Instrument the full scale has to be 20 Kg/h.

Oil is fed inside the P112 pump body in a central position, passing through the 5 ways valve (#3 valve on P&ID). This oil flow shifts the piston toward the final travel position.

The oil amount present in the opposite side of the body pump, can flow down through the 5 ways valve (#3 valve on P&ID) and return to V111.

When the final piston travel position has been reached, a pneumatic system inverts the oil flow inside the central pump body section, causing the inversion of the piston travel.
The pneumatic system is present also in the other pump side.

This system ensures the possibility to feed the oil constantly to P122 pump and as a consequence the catalyst to the process.

SECTION 2

The oil present inside V114 vessel, installed at higher position than the pump, is sucked inside one of the smaller P112 pump body "chambers" by means of the vacuum effect generated by the piston travel.

2

V114 vessel has to be nitrogen pressurized at a pressure (measured by PI-1103) slightly lower (~1barg) than the one measured by PI 1102 / PI 1153. This is required in order to minimize the pressurization "dead time" during the piston travel direction inversion. The pure nitrogen fed to V114 is taken from a pressurized cylinder and pressure is self-controlled by PCV1161.

Oil enters into the smaller P112 pump body "chambers" flowing through the valves (On/Off full bore valve) installed in the lower and terminal part of said chambers.

When the minimum oil level inside V114 is reached (detected by LAL 1101/LI1151), refill from V115 is necessary. This can happen because the different height within the vessels, once the vessel gas phases have been balanced opening the bypass valve.

SECTION 3

The oil present inside the smaller P112 pump "chambers", pushed by the piston, leave the "chambers" through the valves (On/Off full bore valve) installed in the lower and terminal part of said chambers.

The pushing pressure is driven by the process pressure and increased by the head losses due to the high viscosity of the "grease-oil catalytic mud" and by the surface ratio of the syringes piston.

The maximum pressure that can be achieved can be calculated by knowing the service oil pressure and the P112 internal piston surface ratio.

The pressurized oil delivered by P112 pump, is directly fed inside V112 A/B syringes (containing the catalystic mud) by means of tubing.

SECTION 4

V115 vessel is intended as collecting point for the oil coming back from V112A/B syringes and pressure (by nitrogen) of 1 barg.

When one of the two fix syringes V112A/B is filled with catalytic mud (using the movable syringe V113), the oil present in the empty syringe is transferred to V115 vessel.

The syringe filling velocity (max 5cm/min), is controlled by the nitrogen flow fed to V113 and regulated by PCV1162.

V115 level increase cause the pressure increase inside the vessel: one has to purge (manually) the excess of oil till normal condition is reached again.

If a high level is reached in V115, oil has to be transferred to V114 (different height within the vessels is causing the flow, once the vessel gas phases have been balanced opening the bypass valve) in order to establish the normal operating condition.

IS1101 avoid V115 oil filling in case that the pressure is higher than 1 barg.

3. DESIGN DATA

3.1. P 111

Design pressure (barg)	10
Design temperature (°C)	100
Normal pressure (barg)	2
Normal temperature (°C)	25-30

3.2. P 112

Side Ø 180mm	
Design pressure (barg)	10
Design temperature (°C)	100
Normal pressure (barg)	2
Normal temperature (°C)	25-30
Side Ø 18mm	
Design pressure (barg)	90
Design temperature (°C)	100
Normal pressure (barg)	50-70
Normal temperature (°C)	25-30

3.3. V 111

Design pressure (barg)	10
Design temperature (°C)	100
Normal pressure (barg)	Atm
Normal temperature (°C)	30
Capacity (m^3)	0.2

3.4. V 112A/B

See detail drawing and preliminary data sheet at Attachment 100-DWG-A1-PR-V112A/B in table 1.

3.5. V 113

See detail drawing and preliminary data sheet at Attachment 100-DWG-A1-PR-V113 in table 1.

3.6. V 114

See detail drawing and preliminary data sheet at Attachment No. 1 and 3.

3.7. V 115

See detail drawing and preliminary data sheet at Attachment No. 2 and 4.

3.8. Other data

The package will be installed outdoor.
All the process and utility connection shall be concordats by supplier and purchaser

4. ELECTRICAL REQUIREMENTS

To be defined during basic engineering according to the hazardous area classification and the local codes.

5. INSTRUMENTAL REQUIREMENTS

Vendor shall supply all the instrumentation and interlocks required according to his experience and purchase indication.

Among all, the package shall exchange with DCS of the plant the following signals:

- EA P111, electrical alarm
- HS 1101, signals input/output commands
- FIC 1101, flow control instrumentation loop
- LAL 1101, LAL 1103, LAL 1104, LAH 1102, level alarm
- TA 1101, Temperature alarm
- PIC 1101, PI 1102, PI 1103, PSH 1104 pressure control instrumentation loop

The package Y111 is a component of the plant and therefore it is managed by connection to DCS systems.

Vendor shall install or suggest further interlock systems that could be useful for startup, normal operation, shut down and emergency.

All equipment and instrumentation shall be checked during basic and detail engineering, in accordance with the hazardous area classification and local codes.

6. RELEVANT UTILITIES

6.1. Electric Power

Electric Power main feeder:		110 V, 50 Hz, 3 ph, 3 wire
Electric power for motor		
Above 150 kW	A.C.	6000 V, 50 Hz, 3 ph, 3 wire
0.2 kW to 150 kW	A.C.	400 V, 50 Hz, 3 ph, 3 wire
Below 0.2 kW	A.C.	230 V, 50 Hz, single-phase, 2 wire
Instrumentation:	A.C.	110 V, 1 ph, 2 wire
	D.C.	24 V

General Note:
All Electrical Equipment must be explosion proof with the degree of protection ExdIIBT4 IP55 at least.

6.2. Instrument Air

Normal temperature (°C)	AMBIENT
Design temperature (°C)	100
Normal pressure (barg)	6,6
Design pressure (barg)	10
Dew point (°C)	-40

6.3. Spare parts

Vendor shall supply spare parts according to his experience and purchase indication.

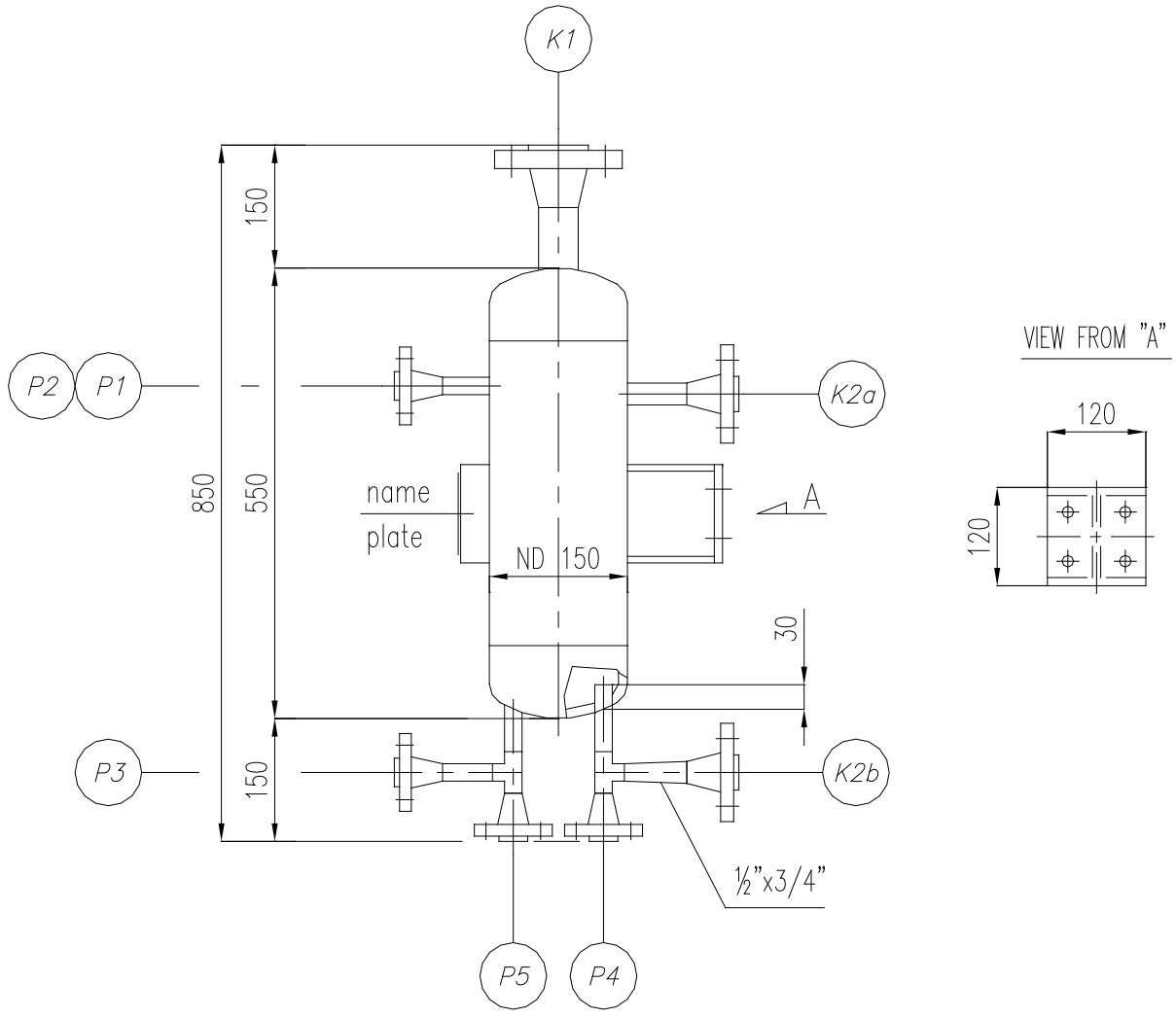
7. GENERAL NOTES

All data are preliminary and shall be confirmed during detailed engineering.

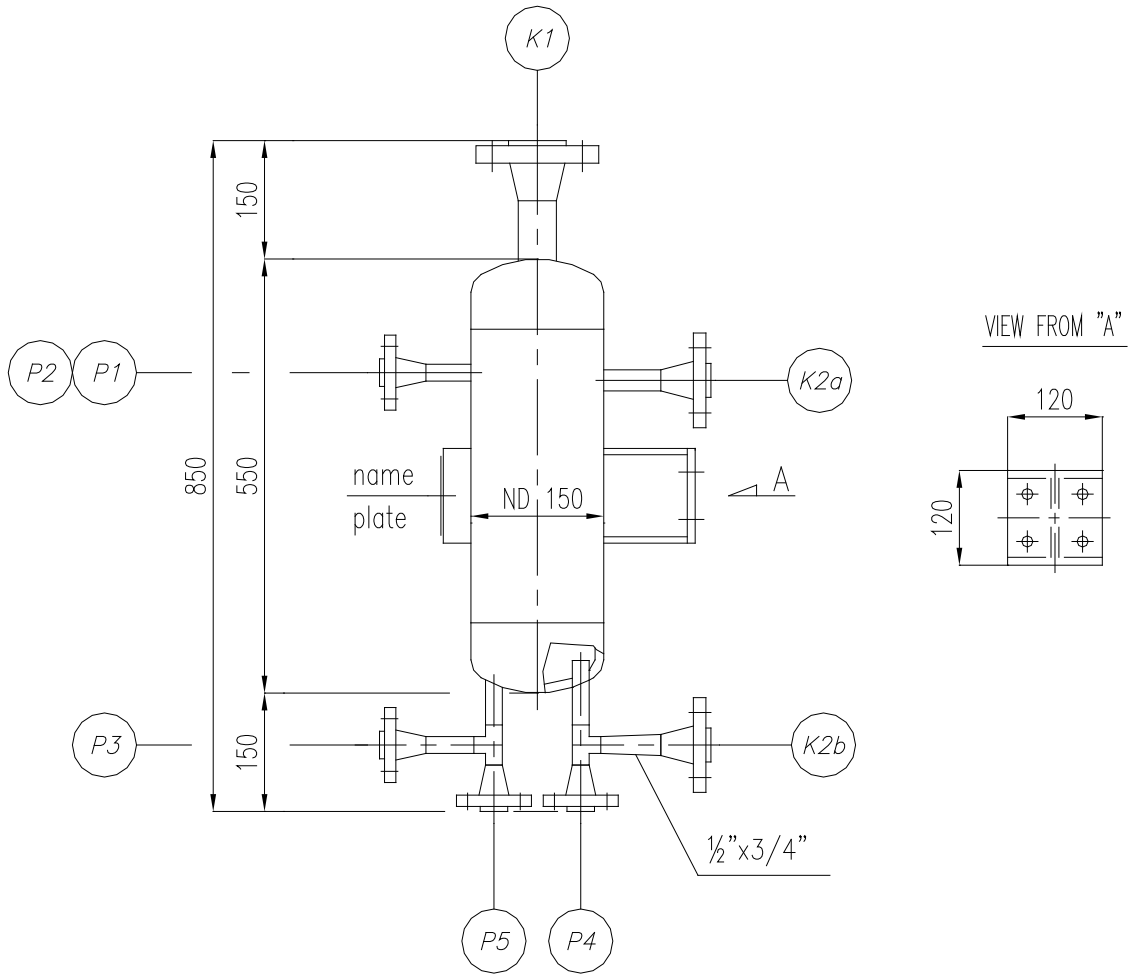
Vendor shall check piping and arrangement of equipment.

Vendor shall propose any modification that he may have according to his experience, in order to improve reliability, efficiency, operability, safety and economics of the package.

Attachment 1: Detail Drawing of V-114



Attachment 2: Detail Drawing of V-115



Attachment 3: Preliminary Data Sheet for V-114

	Data Sheet Vessel Technical Abbreviation: V	Project: PP-PE PILOT PLANT Company: R&T ARAK CENTER Location: ARAK	Country: IRAN Document n°: 312059 Sheet: 001

Type: Vertical Vessel Manufacturer: Belongs to.:
Item No.: V-114 No. required: 1 P&ID-No.: 100-PID-A1-PR-0011
Description: Y-111 Source oil drum Area: 100
Service/mode of operation: ■continuous ☐ discontinuous

General Data

Shell diameter : ND 150	Nominal volume: 8 liters	Height (cyl.): 450 mm		
Internals:	☐no	■ yes, - Type: pipe ND15		
Other features:	☐ no	☐ yes, - Type:		
Location:	☐indoors	■ outdoors		
Supports:				
Others:				

Operating Conditions

	Vessel	Jacket	Internal Coil
Volume litres	8		
Medium/physical properties			
Max. operating temperature °C	Ambient		
Operating pressure barg	40 - 65		
Physical state (g/l/s)	l		
Density kg/m³	850		
pH-value min/max.			
Operating volume litres			
Errosive/Corrosive due to			
Concentration %			
Min./max. level during operation mm		/	/

Design Data

Design code: Inspection by: Design code section:

	Vessel	Jacket	Internal Coil
Volume (total) liters	8.5		
Design over pressure (minimum) barg	75		
Testing over-pressure/medium barg			
Design temperature (minimum) °C	-30 +120		
Corrosion allowance mm			
Welding radiography %	100		
Pressure/vacuum test; type bar	By code		
Nominal volume liters	8		
Surface coating			

	Data Sheet Vessel Technical Abbreviation: V	Project: PP-PE PILOT PLANT Company: R&T ARAK CENTER Location: ARAK	Country: IRAN Document n° 312059 / Sheet 001

Type: **Vertical Vessel** Manufacturer: Belongs to.:
Item No.: **V-114** No. required: **1** P&ID-No.: **100-PID-A1-PR-0011**
Description: **Y-111 Source oil drum** Area: **100**
Service/mode of operation: ■continuous ☐ discontinuous

40	Surface finish/treatment				
41	Safety device				
42	Others: **ratio: L (cyl.)/D = ~3.7**				
43	Weld finish: ☐ no ■ yes, - Type:				
44	Thermal treatment: ☐no ☐yes		Loads/moments [N/m]:		
45	Empty weight [kN]:	Max. weight [kN]:	Assembly weight [kN]:		
46	Insulation: ☐no	■ yes, - Type: **E.T.(1)**	Thickness [mm]:		
47	Seismic factor: ☐ none	☐ factor:	Wind load [N/m²]:		
48	1) Electrical tracing and insulation				
49	–				

Material of Construction

		Standard/certificate	Standard/certificate	Standard/certificate
51				
52		**Vessel**		**Internal Coil**
53	Process Side (main)	**S.S.**		
54	Heads			
55	Flange			
56	Tubes/flanges			
57	Screws/nuts			
58	Gaskets			
59	Internals			
60	Manhole			
61	Welding efficency			
62	Supports			
63	Lugs/insulation			
64	Transport lugs			
65	Grounding device			
66	Tray/type			

Details concerning transport, scope of supplies & services

69	Transport volume [m³]:	transport weight [kN]:	Protective coating: ☐ no	☐yes, - Type:
70	Registration:		Date of delivery:	Place of delivery:
71	site of inspection:			
72	Quality Control :			
73	Language of documentation: ■ english	☐german		
74	Drawings:			

	Data Sheet Vessel Technical Abbreviation: V	Project: PP-PE PILOT PLANT Company: R&T ARAK CENTER Location: ARAK	Country: IRAN Document n° 312059 / Sheet 001

Type: **Vertical Vessel** Manufacturer: Belongs to.:
Item No.: **V-114** No. required: **1** P&ID-No.: **100-PID-A1-PR-0011**
Description: **Y-111 Source oil drum** Area: **100**
Service/mode of operation: ■continuous ☐ discontinuous

Nozzle Details

	Designation	DN	PN	Facing	Flange	Standard	Length	Comments
K1	Level alarm	1½″	600#	RF(*)	WN	ANSI		
P1	Oil inlet	½″	600#	RF(*)	WN	ANSI	200	
P2	Vent/balance	½″	600#	RF(*)	WN	ANSI	200	
K2a	Level	¾″	600#	RF(*)	WN	ANSI	220	
P3	Oil outlet	½″	600#	RF(*)	WN	ANSI	200	
P4	Drain	½″	600#	RF(*)	WN	ANSI		With pipe inlet
P5	Oil inlet	½″	600#	RF(*)	WN	ANSI		
K2b	Level	¾″	600#	RF(*)	WN	ANSI	220	

*)Finishing of the gasket contacting face: smooth finish Ra=3.2µm (125µinch)

Attachment 4: Preliminary Data Sheet For V-115

	Data Sheet Vessel Technical Abbreviation: V	Project: PP-PE PILOT PLANT Company: R&T ARAK CENTER Location: ARAK	Country: IRAN Document n°: 312060 / Sheet: 001

Type: Vertical Vessel Manufacturer: Belongs to.:
Item No.: V-115 No. required: 1 P&ID-No.: 100-PID-A1-PR-0011
Description: Y-111 Return oil drum Area: 100
Service/mode of operation: ■ continuous ☐discontinuous

General Data

Shell diameter : ND 150 Nominal volume: 8 liters Height (cyl.): 450 mm
Internals: ☐no ■ yes, - Type: pipe ND15
Other features: ☐ no ☐ yes, - Type:
Location: ☐ indoors ■ outdoors
Supports:
Others:

Operating Conditions

	Vessel	Jacket	Internal Coil
Volume litres	8		
Medium/physical properties			
Max. operating temperature °C	Ambient		
Operating pressure barg	40 - 65		
Physical state (g/l/s)	l		
Density kg/m³	850		
pH-value min/max.			
Operating volume litres			
Errosive/Corrosive due to			
Concentration %			
Min./max. level during operation mm		/	/

Design Data

Design code: Inspection by: Design code section:

	Vessel	Jacket	Internal Coil
Volume (total) liters	8.5		
Design over pressure (minimum) barg	75		
Testing over-pressure/medium barg			
Design temperature (minimum) °C	-30 +120		
Corrosion allowance mm			
Welding radiography %	100		
Pressure/vacuum test; type bar	By code		
Nominal volume liters	8		
Surface coating			

	Data Sheet Vessel Technical Abbreviation: V	Project: PP-PE PILOT PLANT	Country: IRAN	
		Company: R&T ARAK CENTER	Document n°	Sheet
		Location: ARAK	312060	001

Type: **Vertical Vessel** Manufacturer: Belongs to.:
Item No.: **V-115** No. required: **1** P&ID-No.: **100-PID-A1-PR-0011**
Description: **Y-111 Return oil drum** Area: **100**
Service/mode of operation: ■ continuous ☐discontinuous

40	Surface finish/treatment				
41	Safety device				
42	Others: **ratio: L (cyl.)/D = ~3.7**				
43	Weld finish: ☐no ■yes, - Type:				
44	Thermal treatment: ☐ no ☐ yes		Loads/moments [N/m]:		
45	Empty weight [kN]:	Max. weight [kN]:	Assembly weight [kN]:		
46	Insulation: ☐no ■ yes, - Type: **E.T.(1)**		Thickness [mm]:		
47	Seismic factor: ☐ none ☐factor:		Wind load [N/m²]:		
48	1) Electrical tracing and insulation				
49	- All data have to be checked during detail engineering				

Material of Construction

		Standard/certificate	Standard/certificate	Standard/certificate
52		**Vessel**		**Internal Coil**
53	Process Side (main)	**S.S.**		
54	Heads			
55	Flange			
56	Tubes/flanges			
57	Screws/nuts			
58	Gaskets			
59	Internals			
60	Manhole			
61	Welding efficency			
62	Supports			
63	Lugs/insulation			
64	Transport lugs			
65	Grounding device			
66	Tray/type			

Details concerning transport, scope of supplies & services

69	Transport volume [m³]:	transport weight [kN]:	Protective coating: ☐ no	☐yes, - Type:
70	Registration:		Date of delivery:	Place of delivery:
71	site of inspection:			
72	Quality Control :			
73	Language of documentation: ■ english	☐german		
74	Drawings:			

Data Sheet
Vessel

Technical Abbreviation: **V**

Project:	**PP-PE PILOT PLANT**	Country:	**IRAN**
Company:	**R&T ARAK CENTER**	Document n°	Sheet
Location:	**ARAK**	312060	001

Type: **Vertical Vessel** Manufacturer: Belongs to.:
Item No.: **V-115** No. required: **1** P&ID-No.: **100-PID-A1-PR-0011**
Description: **Y-111 Return oil drum** Area: **100**
Service/mode of operation: ■ continuous ☐discontinuous

Nozzle Detail

	Designation	DN	PN	Facing	Flange	Standard	Length	Comments
K1	Level alarm	1½″	600#	RF(*)	WN	ANSI		
P1	Vent/balance	½″	600#	RF(*)	WN	ANSI	200	
P2	Nitrogen inlet	½″	600#	RF(*)	WN	ANSI	200	
K2a	Level indication	¾″	600#	RF(*)	WN	ANSI	220	
P3	Oil inlet	½″	600#	RF(*)	WN	ANSI	200	
P4	Drain	½″	600#	RF(*)	WN	ANSI		With pipe inlet
P5	Oil outlet	½″	600#	RF(*)	WN	ANSI		
K2b	Level indication	¾″	600#	RF(*)	WN	ANSI	220	

*)Finishing of the gasket contacting face: smooth finish Ra=3.2µm (125µinch)
-Internal finishing: smooth finish Ra=0.4µm (16µinch)

Table of connections

LOADS ON THE NOZZLES A N	T N	M Nm	POS.	QUAN	DN	ANSI PN	SERVICE	FLANGES AND FACE TYPES	TRONC. øe x Sp	P. RINF. øe x Sp	Sporg. Asse	NOTE
50	50	20	A	1	1/4"	3000#	–	MANICOTTO	ø19x4.25±0.5	–	75.15	THREAD. NPT
50	50	20	B	1	1/4"	3000#	–	MANICOTTO	ø19x4.25±0.5	–	75.15	THREAD. NPT
–	–	–	C	1	3/8"	–	–	–	ø16.66x6.3±0.5	–	54.5	THREAD. GAS
–	–	–	D	1	3/8"	–	–	–	ø16.66x6.3±0.5	–	54.5	THREAD. GAS
–	–	–	E	1	3/8"	–	–	–	ø16.66x5.3±0.5	–	–	THREAD. GAS

SALDATURE

POSITION	TYPE	PREPARATION OF THE FLAPS	WELDING PROCESS ACCORDING TO RACC. "S"	ELECTRODES	QUALIFICATIONS WELDERS	MEMBERSHIP	EFFICENCY MODULE	NON-DESTRUCTIVE TESTS	INTERPASS HEAT TREATMENT	HEELS	ANY QUALIFICATION OF THE WELDING PROCESS	CLASS ACCEPTABILITY DEFECTIVE	NOTE
S5	SAC8.1/SAC8	A DIS.	1° TIG+M.A.ELETT. 141+11	22.9.3 LR SANDVIK	EN 287	2b	–	L.P. 100%	150	–	EN 288	EN 25817 LIV. B	–
S4	SAC8.1/SAC8.1	A DIS.	1° TIG+M.A.ELETT. 141+11	KOY 66A AVESTA 832 MVR	EN 287	2b	–	L.P. 100%	NO	–	EN 288	EN 25817 LIV. B	–
S3	SAC8.1/SAC8.1	A DIS.	1° TIG+M.A.ELETT. 141+11	KOY 66A AVESTA 832 MVR	EN 287	2b	–	L.P. 100%	NO	–	EN 288	EN 25817 LIV. B	–
S2	SAC8.1/SAC8	A DIS.	MAN. ARCO ELETT. 111	22.9.3 LR SANDVIK	EN 287	2b	–	L.P. 100%	150	–	EN 288	EN 25817 LIV. B	–
S1	SAC8/SAC8	A DIS.	MAN. ARCO ELETT. 111	22.9.3 LR SANDVIK	EN 287	2b	–	L.P. 100%	150	–	EN 288	EN 25817 LIV. B	–

NOTE

1	THE PROJECTION OF THE CONNECTIONS REFERS TO THE SEALING FACE OF THE FLANGES
2	FINISH SEALING SURFACE FLANGES NOZZLES: Ra <= 3.2 micron
3	FOR THE SHIPPING OF THE APP. PROTECT THE NOZZLES WITH SPECIAL WOODEN DISKS.
4	FINISH ACC. CARBON: BLASTING WITH 2 1/2 + A COAT OF INORGANIC GALVANIZING THICKNESS 75.
5	FINTERNAL BODY FINISH: POLISHING Ra = 0.2 micron
6	UNQUATED BEVELS : 0.5x45°
7	STAMP THE DIRECTION OF FLOW ON THE BODY
8	
9	
10	
11	

EQUIPMENT CATEGORIZATION	MAIN BODY LOWER CHAMBER	MAIN BODY UPPER CHAMBER	JACKET
FLUID GROUP	1	2	2
TABLE	3	4	4
CATEGORY	ART. 3.3	ART. 3.3	ART. 3.3
MODULE	NON APPLICABILE		

LOADS AND WEIGHTS

M – (daN.m)
T – (daN)
Q – (daN)

LOADS AT THE BASE		IN PROCESS	TEST	EMPTY
VERTICAL LOAD	daN	24.5	25	21.4
CUT	daN	–	–	
TIME	daNm	–	–	–
WEIGHT FROM THE SUPPLY	Kg			21.4
SCORRIM. SELLE mm				

STANDARDS ADDOPTED

ANCC VSR-M-S (LATEST EDDITION)
PROJECT SPECIFICATIONS :
SUPPLY SPECIFICATIONS :
RATING AND TESTS :
ARRANGEMENT DIMENSIONS AND ORIENTED. :
TOLERANCES :

			COAT	SHIRT
TREATMENT THERMAL PROVE AND MISCELLANEOUS	RELAXATION			
	PENETRANT LIQUIDS		VEDI TABELLA SALDATURE	VEDI TABELLA SALDATURE
	ULTRASOUND		–	–
	DESIGNAZ. COIBENT. (ME U 150 ESCL. AND SUPPLIED.)			
	FINISH INTERNAL		VEDI NOTE	VEDI NOTE
	FINISH EXTERNAL		VEDI NOTE	VEDI NOTE
	OVALIZZAZ. MAX : APPIATTIM.	%	0.5	0.5
PROJECT AND OPERATING DATA	CATEG. ANCC/PERCENT. RADIOGRAF.		2b	2b
	ISPESL & PED TESTING		NO	NO
	CONTAINER CATEGORY ACCORDING TO PED		Art. 3.3	Art. 3.3
	FLUID CATEGORY ACCORDING TO PED		1	2
	PROJECT PRESSURE	bar	90	6
	OPERATING PRESSURE	bar	–	–
	HYDRAULIC TEST PRESSURE (IN WORKSHOP)	bar	138.7	9.09
	PROJECT TEMPERATURE	°C	-20 / +100	-20 / +100
	OPERATING TEMPERATURE	°C	–	–
	FLUID NATURE		CATALYST+ OIL +GREASE (LOWER CHAMBER) OIL (UPPER CHAMBER)	GLYCOL + WATER
	FLUID PHYSICAL STATE		LIQUID (LOWER CHAMBER) / LIQUID (UPPER CHAMBER)	LIQUID
	FLUID SPECIFIC WEIGHT	Kg / dm3	800	1000
	FLUID TOXICITY		–	
	FALMMABILITY		–	
	CAPACITY	lt.	2.2	1.35
	OVER THICKNESS OF CORROSION	mm	0	0
	N° STEPS			
	OVERPRESS. DUE TO BATT. LIQUID IN OPERATION/P. IDR.	bar	0 / 0	0 / 0
	IDR. EXCHANGE SURFACE	m2		
PARTS OF THE APPLIANCE			COAT	SHIRT

DRAWING ATTACHMENTS

- IT IS DECLARED THAT THE PROJECT AS A WHOLE AND ITS PARTICULAR CONSTRUCTION IS IN COMPLIANCE WITH THE PROVISIONS OF THE COLLECTION "S..
- THICKNESS CALCULATED TAKING INTO ACCOUNT OF THE ADDITIONAL STRESSES PROVIDED FOR BY ARTICLE 1 OF D.M. DEL 21/11/72

POS.	N° PIECE	TYPE OF SEMIL.	DESCRIPTION AND DIMENSIONS IN m/m	MATERIAL DESIGNATION	SIMBOL COLLAUD. MATER.	NOTES ACCORDING TO THE "VSR" COLLECTION	Kg
29							
28							
27							
26							
25	1	SHEET METAL	PLATE	ASTM A 240 Tp.304	c		–
24	1	SHEET METAL	LICENSE PLATE	ASTM A 240 Tp.304	c		0.6
23	12+12	–	TYPE M14x50 / DADI	ASTM A 193 Gr. B8/194 8	b		0.3
22	6	–	VITI T.C.C.E.I M8x20 UNI5931	ASTM A 193 Gr. B8	c	comm.	0.05
21	2	–	LUBRIFLON GUIDE BAND 225	PTFE LOADED 25% CARB.	c	comm.	–
20	1	–	SCREW FOR M5 LEVEL	AISI 304	c		–
19	2	–	GUARNIZ. OR 176	VITON	c	øi73.03 d=3.53	–
18	1	–	LIP SEAL UM 2412	VITON	c		–
17	1	SHEET METAL	SEAL FIXING RING	ASTM A 240 Tp.304	c		0.15
16	1	LAMIERA	CLOSURE sp.3	ASTM A 240 Tp. 304	c		0.05
15	1	TUBO	TUBE ø21.3x2	ASTM A 312 tp. 304	c		0.47
14	1	LAMIN.	FLANGE ø54 sp.15	ASTM A 240 Tp. 304	c		0.2
13	1	LAMIN.	ASTA ø12	AISI 316	c		0.42
12	2	–	LIP SEALS UM 80 60	VITON	c		–
11	4	–	VITI T.S.P.E.I M6x14 UNI5933	ASTM A 193 Gr.B8	c	comm.	0.01
10	1	LAMIN.	PISTONE ø80 L=73	ASTM A 182 F 304	c		2.2
9	2	FORGED	SEALS FIXING RING	ASTM A 240 Tp. 304	c		0.16
8	3	FORGED	THREAD CONNECTION G3/8"	ASTM A 193 Gr. B8	b		0.18
7	2	FORGED	SLEEVE DN1/4" ANSI3000 #	ASTM A 403 WP304	b		0.15
6	2	LAMIERA	AN. OF CLOSING CAM. sp.10±0.25	ASTM A 240 Tp. 304	b		0.4
5	1	TUBO	SHIRT ø114.3x3.05±0.35	ASTM A 312 Tp. 304	b		3.8
4	1	LAMIERA	TOP COVER ø140 sp.35	SAF 2205	b		1.9
3	1	LAMIERA	LOWER COVER ø140 sp.35	SAF 2205	b		2.2
2	2	LAMIERA	FLANGE ø140 sp.15	SAF 2205	b		2.0
1	1	TUBO	MANTLE ø88.9x4.45±0.05	SAF 2205	b	88.9x5.49 TUBE	6.1

MATERIAL TESTING SYMBOLISM

a	ISPESL. TESTED MATERIALS CERTIFICATE 3.1.A.
b	MATERIALS NOT TESTED ISPESL WITH CERTIFICATE 3.1.B.
c	MATERIALS WITH CERTIFICATE 2.2

MATERIALS

B

U.E.	DRAWING N.	SH N.
FE	312129	001
U.D.	PLANT	CT
IR	PP-PE	V
	CREATION DATE	SCL
	07.10.04	

00 Process design issue 15.10.04

This drawing contains CONFIDENTIAL and PROPRIETARY information by BASELL Polyolefins. This information has not to be used, or disclosed to anyone outside of BASELL Polyolefins and its subsidiaries, except pursuant to a written agreement with BASELL Polyolefins.

Project: Spheripol Spherilene Pilot Plant

Title: CATALYST SYRINGES

DWG Issued by: BASELL Polyolefins Italia S.p.A. – Research Center "Giulio Natta" – P.le Donegani, 12 – 44100 Ferrara (Italy)

File name	Item	Company	Location	Country	Drawn	Checked	Approved
	V-112 A/B	R&T Center	ARAK	IRAN			G.L.B.

NO	REVISION	DATA	DISEGNATO	APPROVATO
00	VARIES DESIGN PRESSURE AS REQUIRED BY THE CUSTOMER	15.04.2004	B.G.	B.G.

MANUFACTURER

DATA OF THE CLIENT

TAG : V-112 A/B

SERVICE : CATALYST SYRINGES

SCALE: 1:1 2:1

DATE: 22.12.2003

DESIGNED BY:

NATIONAL PETROCHEMICAL COMPANY
PETROCHEMICAL RESEARCH & TECHNOLOGY CENTER (NPC-RT)

OBTAINED FROM DIS.	SERIAL NUMBER	N.F.
BUSINESS NAME	ESTABLISHMENT	DEPARTMENT
CLERK	OF ORDINE	N° DRAWING 203-870

LOAD ON NOZZLES			Table of connections									
A N	T N	M Nm	POS.	QUAN	DN	ANSI PN	SERVICE	FLANGES AND FACE TYPES	TRONC. øe x Sp	P. RINF. øe x Sp	Sporg. Asse	NOTE
–	–	–	P1	1	3/8"	–	–	–	ø16.66x6.3±0.5	–	–	THREAD. GAS
–	–	–	P2	1	1/4"	–	–	–	ø15x5±0.25	–	–	THREAD NPT
50	50	10	P3	1	1/4"	3000#			ø19x4.25±0.5	–	75	THREAD NPT
50	50	10	P4	1	1/4"	3000#			ø19x4.25±0.5	–	75	THREAD NPT

SALDATURE

POSITION	TYPE	PREPARATION OF THE FLAPS	WELDING PROCESS ACCORDING TO RACC. "S"	ELECTRODES	QUALIFICATIONS WELDERS	MEMBERSHIP	EFFICIENCY MODULE	NON-DESTRUCTIVE TESTS	INTERPASS HEAT TREATMENT	HEELS	ANY QUALIFICATION OF THE WELDING PROCESS	CLASS ACCEPTABILITY DEFECTIVE	NOTE
S6	SAC8/SAC8	A DIS.	1° TIG+M.A.ELETT. 141+11	22.9.3 LR SANDVIK	EN 287	2b	–	L.P. 100%	150	–	EN 288	LIV. B	
S5	SAC8/SAC8	A DIS.	MAN. ARCO ELETT. 111	22.9.3 LR SANDVIK	EN 287	2b	–	L.P. 100% R.T. 10%	150	–	EN 288	EN 25817 LIV. B	
S4	SAC8.1/SAC8.1	A DIS.	1° TIG+M. A. ELETT. 141 + 111	KOY 66A AVESTA 832 MVR	UNI EN 287	2b	–	L.T. 100%	NO	–	UNI EN 288	EN 25817 LIV. B	
S3	SAC8.1/SAC8	A DIS.	1° TIG+M.A.ELETT. 141+11	22.9.3 LR SANDVIK	EN 287	2b	–	L.P. 100%	150	–	EN 288	LIV. B	
S2	SAC8.1/SAC8	A DIS.	1° TIG+M. A. ELETT. 141 + 111	22.9.3 LR SANDVIK	EN 287	2b	–	L.P. 100%	150	–	EN 288	EN 25817 LIV. B	
S1	SAC8/SAC8	A DIS.	MAN. ARCO ELETT. 111	22.9.3 LR SANDVIK	EN 287	2b	–	L.P. 100%	150	–	EN 288	EN 25817 LIV. B	

NOTE

1	THE PROJECTION OF THE CONNECTIONS REFERS TO THE SEALING FACE OF THE FLANGES
2	FINISH SEALING SURFACE FLANGES NOZZLES: Ra <= 3.2 micron
3	FOR THE SHIPPING OF THE APP. PROTECT THE NOZZLES WITH SPECIAL WOODEN DISKS.
4	
5	FINTERNAL BODY FINISH: POLISHING Ra = 0.2 micron
6	UNQUATED BEVELS : 0.5x45°
7	DURING PROCESSING, TO REMOVE CHIPS, CARE THE PROCESSING TO AVOID DEFORMATION
8	THE RECTIFICATION OF THE INTERNAL CYLINDER MUST BE PERFORMED WITH THE EQUIPMENT COMPLETED, THAT IS WITH THE SHIRT AND FLANGES ALREADY WELDED TO THE BODY
9	MINIMUM THICKNESS AFTER FORMING= 2mm

EQUIPMENT CATEGORIZATION	MAIN BODY		JACKET
	LOWER CHAMBER	UPPER CHAMBER	
FLUID GROUP	1	2	1
TABLE	3	2	3
CATEGORY	ART. 3.3	ART. 3.3	ART. 3.3
MODULE	NON APPLICABILE		

LOADS AND WEIGHTS

M – (daN.m)
T – (daN)
Q – (daN)

LOADS AT THE BASE		IN PROCESS	TEST	EMPTY
VERTICAL LOAD	daN	15.5	16.7	13.5
CUT	daN	–	–	
TIME	daNm	–	–	–
WEIGHT FROM THE SUPPLY	Kg			13.5
SCORRIM. SELLE mm				

STANDARDS ADDOPTED

ANCC VSR-M-S (LATEST EDDITION)
PROJECT SPECIFICATIONS :
SUPPLY SPECIFICATIONS :
RATING AND TESTS :
ARRANGEMENT DIMENSIONS AND ORIENTED. :
TOLERANCES :

TREATMENT THERMAL PROVE AND MISCELLANEOUS	RELAXATION		
	PENETRANT LIQUIDS	VEDI TABELLA SALDATURE	VEDI TABELLA SALDATURE
	ULTRASOUND	–	–
	DESIGNAZ. COIBENT. (ME U 150 ESCL. AND SUPPLIED.)		
	FINISH INTERNAL	VEDI NOTE	VEDI NOTE
	FINISH EXTERNAL	VEDI NOTE	VEDI NOTE
	OVALIZZAZ. MAX : APPIATTIM. %	0.5	0.5
PROJECT AND OPERATING DATA	CATEG. ANCC/PERCENT. RADIOGRAF.	2b	2b
	ISPESL & PED TESTING	NO	NO
	CONTAINER CATEGORY ACCORDING TO PED	ART. 3.3	ART. 3.3
	FLUID CATEGORY ACCORDING TO PED	1 (CAMERA LOWER) / 2 (CAMERA UPPER)	1
	PROJECT PRESSURE bar	15	6
	OPERATING PRESSURE bar	–	–
	HYDRAULIC TEST PRESSURE (IN WORKSHOP) bar	23.12	9.09
	PROJECT TEMPERATURE °C	-10 / +100	-10 / +100
	OPERATING TEMPERATURE °C	–	–
	FLUID NATURE	CATALYST+OIL+GREASE (LOWER CHAMBER) NITROGEN (UPPER CHAMBER)	ETHYLENE GLYCOL
	FLUID PHYSICAL STATE	LIQUIDO (CAMERA LOWER.) + GAS (CAMERA UPPER.)	LIQUID
	FLUID SPECIFIC WEIGHT Kg / dm3	900	800
	FLUID TOXICITY	–	
	FLUID FALMMABILITY	–	
	CAPACITY lt.	2.2 (UTILE)	1
	OVER THICKNESS OF CORROSION mm	0	0
	N° STEPS		
	OVERPRESS. DUE TO BATT. LIQUID IN OPERATION/P. IDR. bar	0 / 0	0/ 0
	IDR. EXCHANGE SURFACE m2		
PARTS OF THE APPLIANCE		COAT	SHIRT

DRAWING ATTACHMENTS

- IT IS DECLARED THAT THE PROJECT AS A WHOLE AND ITS PARTICULAR CONSTRUCTION IS IN COMPLIANCE WITH THE PROVISIONS OF THE COLLECTION 'S..
- THICKNESS CALCULATED TAKING INTO ACCOUNT OF THE ADDITIONAL STRESSES PROVIDED FOR BY ARTICLE 1 OF D.M. DEL 21/11/72

POS.	N° PIECE	TYPE OF SEMIL	DESCRIPTION AND DIMENSIONS IN m/m	MATERIAL DESIGNATION	SYMBOL COLLAUD. MATER.	NOTES ACCORDING TO THE "VSR" COLLECTION	Kg
24							
23							
22							
21							
20							
19							
18							
17	1	FORGED	THREAD CONNECTION G3/8"A	ASTM A 182 F 304	b		0.06
16	1		LICENCE OLATE	ASTM A 240 Tp. 304	c		0.20
15	2	TUBO	HANDLE ø13.7x2.24	ASTM A 312 Tp. 304	c		0.98
14	16+8/16+8	–	THE RODS M10x45 / DADI	SAF 2205	b	comm.	0.40
13	2	–	LUBRIFLON GUIDE BAND 225	PTFE Caricato 25% CARB.	c	comm.	–
12	2	–	GUARNIZ. OR 121	VITON	c	øi26.64 d=2.62	–
11	2	–	GUARNIZ. OR 239	VITON	c	øi91.7 d=3.53	–
10	2	–	LIP SEALS UM 80 60	VITON	c		–
9	6	–	T.S.P.E.I SCREWS M5x15 UNI6109	INOX 304	c	comm.	0.02
8	1	LAMIN.	PISTON ø80 L=58	ASTM A 182 F 304	c		0.98
7	2	FORGED	SEALS FIXING RINGS	ASTM A 240 Tp. 304	c		0.38
6	1	FORGED	THREAD CONNECTION G 1/4"	ASTM A 182 F 304	b	FILL. NPT	0.05
5	2	FORGED	SLEEVE DN1/4" ANSI3000 #	ASTM A 403 WP304	b	FILL. NPT	0.10
4	1	SHEET METAL	CAMICIA øe106 sp. 2.5±0.25	ASTM A 240 Tp. 304	b	V.NOTA 9	3.0
3	2	SHEET METAL	COVER ø140 sp.14	SAF 2205	b		3.0
2	2	SHEET METAL	FLANGE ø140 sp.15	SAF 2205	b		1.9
1	1	TUBO	COVER øi80 sp.3±0.05	SAF 2205	b	da TUBO ø88.9x5.49	3.2

MATERIAL TESTING SYMBOLISM

a	ISPESL. TESTED MATERIALS CERTIFICATE 3.1.A.
b	MATERIALS NOT TESTED ISPESL WITH CERTIFICATE 3.1.B.
c	MATERIALS WITH CERTIFICATE 2.2

MATERIALS

B

N°	REVISIONE	DATA	DISEGNATO	APPROVATO
00	Process design issue	15.10.04		
00	MODIFICATO POSIZIONE (2-4-5-6-14) COME RICHIESTO DA CLIENTE	16.04.2004	B.G.	B.G.

U.E. FE
DRAWING N. 312130
SH N. 001
U.D. IR
PLANT PP-PE
CT V
CREATION DATE 07.10.04
SCL.

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Project: Spheripol Spherilene Pilot Plant
Title: MOBILE CATALYST SYRINGE

File name	ITEM	Company	Location	Country	Drawn	Checked	Approved
	V-113	R&T Center	ARAK	IRAN			G.L.B.

MANUFACTURER

TAG : V-113

SCALA: 1:1 2:1

DATA: 22.12.2003

SERVICE : MOBILE CATALYST SYRINGE

DESIGNED BY:
NATIONAL PETROCHEMICAL COMPANY
PETROCHEMICAL RESEARCH & TECHNOLOGY CENTER (ARAK)

OBTAINED FROM DIS.
SERIAL NUMBER N.F.
BUSINESS NAME
ESTABLISHMENT
DEPARTMENT
CLERK
OF ORDINE
N° DRAWING 203-860

PROJECT: PP-PE PILOT PLANT

TITLE: Control Valve Data Sheet

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0009
Owner Job No: | Sheet No: 3 of 163

General Data	1	Tag No.				FV-1101		
	2	P&ID No.	Piping Size	Piping Class		011	1/2"	1CS2
	3	Fluid		State		OIL		LIQUID
	4	Pressure rating		Piping material		300#		SS
	5	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-28)°C / 44°C	0.82 Bara	86%
	6	Area Classification		Area		ZONE 1		100
Flow Rate	7	Max.Continuous		Unit		20		Kg/h
	8	Min.Continuous		Unit		2		Kg/h
	9	Max.In Transients		Unit		24		Kg/h
	10	Allow. with closed valve		Unit		0		Kg/h
Press	11	Norm . Op. upstr. Press		Unit		8		barg
	12	Dp. At max. flowrate		Unit		1		bar
	13	Max. Dp with closed valve		Unit		20		bar
Temperature	14	Norm . upstr. Temp		Unit		AMB		◦C
	15	Max . upstr. Temp		Unit		100		◦C
Sp. Gr.	16	Gases vapours		Unit				kg/m3
	17	Liquids		Unit		850		kg/m3
	18	Mol.weight		Unit				Kg/Kmol
Visc.	19	Op. visc. (when>5mpa's)				25 (40°)		
	20	Solid in suspension						
Cv	21	Min/Norm/Max		Required		VTA		VTA
Body	22	Body type		Body material		Globe		SS-304
	23	Size Body		Port		1/2"		Single
	24	Design Pressure		Min. Bar a	Max. Bar a		30	Barg
	25	Design Temperature		Min. °C	Max. °C		+100	◦C
	26	Valve end con. & rating		Seat leakage class		Flange 300#		ANSI IV
	27	Packing mat.		Lubricator		PTFE		VTA
	28	Flow direction				FTO		
	29	Bonnet type				Standard		
Trim	30	Plug type		Plug material		Contoured		SS - 316
	31	Seat Material		Cage/Guide Material		SS - 316		NA
	32	Characteristics				Equal Percentage		
Actuator	33	Type / Direction of action				Diaphragm/Reverse		
	34	Fail Position				CLOSE		
	35	Spring range				VTA		
	36	On-Off/Modulating		Single/Double Acting		Modulating		Single
Positioner	37	Type				Electro Pneumatic		
	38	Input signal		Out put signal		4-20 mA+HART		VTA
	39	Air supply		Action dir.		3.5 barg		Direct
	40	Protection		Certificate		IP 65		EExib-IIB T3
Solenoid Valve	41	Type				NA		
	42	Tag No.				NA		
	43	Supply Voltage		Consumption		NA		NA
	44	Protection		Certificate		NA		NA
Accessories	45	Pressure gauge and filter				YES		
	46	Manual Control Wheel				NA		
	47	Cable Gland		Size/Qty		NA		1/2"NPT/1
	48	Electrical Conection				Gland M20		
	49	Tubing & Conection				SS Tube 1/4"		
	50	Switch	Protection	Certificate		NA	NA	NA

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	6/12/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: Control Valve Data Sheet

شرکت ملی صنایع پتروشیمی

شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0009

Owner Job No: | Sheet No: 97 of 163

General Data	1	Tag No.				PV-1101		
	2	P&ID No.	Piping Size	Piping Class		011	1/2"	1CS2
	3	Fluid		State		OIL		LIQUID
	4	Pressure rating		Piping material		300#		SS
	5	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-28)°C / 44°C	0.82 Bara	86%
	6	Area Classification		Area		ZONE 1		100
Flow Rate	7	Max.Continuous		Unit		10		Kg/h
	8	Min.Continuous		Unit		1		Kg/h
	9	Max.In Transients		Unit		12		Kg/h
	10	Allow. with closed valve		Unit		0		Kg/h
Press	11	Norm . Op. upstr. Press		Unit		10		barg
	12	Dp. At max. flowrate		Unit		2		bar
	13	Max. Dp with closed valve		Unit		20		bar
Temperature	14	Norm . upstr. Temp		Unit		AMB		◦C
	15	Max . upstr. Temp		Unit		100		◦C
Sp. Gr.	16	Gases vapours		Unit				Kg/m3
	17	Liquids		Unit		850		Kg/m3
	18	Mol.weight		Unit				Kg/Kmol
Visc.	19	Op. visc. (when>5mpa's)				25 (40 °)		
	20	Solid in suspension						
Cv	21	Min/Norm/Max		Required		VTA		VTA
Body	22	Body type		Body material		Globe		SS-304
	23	Size Body		Port		1/2"		Single
	24	Design Pressure		Min. Bar a	Max. Bar a		30	Barg
	25	Design Temperature		Min. °C	Max. °C		+100	◦C
	26	Valve end con. & rating		Seat leakage class		Flange 300#		ANSI IV
	27	Packing mat.		Lubricator		PTFE		VTA
	28	Flow direction				FTO		
	29	Bonnet type				Standard		
Trim	30	Plug type		Plug material		Contoured		SS - 316
	31	Seat Material		Cage/Guide Material		SS - 316		NA
	32	Characteristics				Equal Percentage		
Actuator	33	Type / Direction of action				Diaphragm/Direct		
	34	Fail Position				OPEN		
	35	Spring range				VTA		
	36	On-Off/Modulating		Single/Double Acting		Modulating		Single
Positioner	37	Type				Electro Pneumatic		
	38	Input signal		Out put signal		4-20 mA+HART		VTA
	39	Air supply		Action dir.		3.5 barg		Direct
	40	Protection		Certificate		IP 65		EExib-IIB T3
Solenoid Valve	41	Type				NA		
	42	Tag No.				NA		
	43	Supply Voltage		Consumption		NA		NA
	44	Protection		Certificate		NA		NA
Accessories	45	Pressure gauge and filter				YES		
	46	Manual Control Wheel				NA		
	47	Cable Gland		Size/Qty		NA		1/2"NPT/1
	48	Electrical Conection				Gland M20		
	49	Tubing & Conection				SS Tube 1/4"		
	50	Switch	Protection	Certificate		NA	NA	NA

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	1/8/2022	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: ON/OFF Valve Data Sheet

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No:				Doc. No: 900-DAS-A4-IN-0002			
Owner Job No:				Sheet No: 16 of 167			
General Data	1	Tag No.		UV-1101			
	2	P&ID / Line NO. / Piping Size / Piping Class		0011	V-115	1/2"	1FS4
	3	Fluid	State	OIL		LIQUID	
	4	Pressure rating	Piping material	#600		S.S	
	5	Amb.Temp / Amb Press	Amb.Rel.Humidity Max	(-20)°C / 50°C	0.82 Bara	86%	
	6	Area Classification	Area	ZONE 1			
Flow Rate	7	Max.Continuous	Unit	200		Kg/h	
	8	Min.Continuous	Unit	50		Kg/h	
	9	Max.In Transients	Unit	250		Kg/h	
	10	Allow. with closed valve	Unit	0		Kg/h	
Press	11	Norm . Op. upstr. Press	Unit	ATM		barg	
	12	Dp. At max. flowrate	Unit			bar	
	13	Max. Dp with closed valve	Unit	65		bar	
Temperature	14	Norm . upstr. Temp	Unit	25		◦C	
	15	Max . upstr. Temp	Unit	35		◦C	
Sp. Gr.	16	Gases vapours	Unit			Kg/m3	
	17	Liquids	Unit	850		Kg/m3	
	18	Mol.weight	Unit			Kg/Kmol	
Visc.	19	Op. visc. (when>5mpa's)					
	20	Solid in suspension					
Cv	21	Min/Norm/Max	Required	VTA		VTA	
Body	22	Body type	Body material	Super thin Ball valve		SS - 316	
	23	Size Body	Port	1/2"		single	
	24	Design Pressure	Min. Bar a / Max. Bar a			Barg	
	25	Design Temperature	Min. °C / Max. °C			◦C	
	26	Valve end con. & rating	Seat leakage class	Flange 600#		ANSI IV	
	27	Packing mat.	Lubricator	PTFE		VTA	
	28	Flow direction					
	29	Bonnet type		Standard			
Trim	30	Plug type	Plug material	Ball		SS - 316	
	31	Seat Material	Cage/Guide Material	SS - 316		NA	
	32	Characteristics		NA			
Actuator	33	Type / Direction of action		Cylinder&Piston			
	34	Fail Position		Close			
	35	Spring range		VTA			
	36	On-Off/Modulating	Single/Double Acting	On/Off		Single Acting	
Positioner	37	Type		NA			
	38	Input signal	Out put signal	NA		NA	
	39	Air supply	Action dir.	NA		NA	
	40	Protection	Certificate	NA		NA	
Solenoid Valve	41	Type	QTY	3-Way		1	
	42	Tag No.		UY-1101			
	43	Supply Voltage	Consumption	24VDC		VTA (Ex-ib)	
	44	Protection	Certificate	IP 65		EExib-IIB T3	
Accessories	45	Pressure gauge and filter		yes			
	46	Manual Control Wheel		NA			
	47	Cable Gland	Size/Qty	NA			
	48	Electrical Conection		M20			
	49	Tubing & Conection		NA			
	50	Switch / Protection / Certificate		CLOSE & OPEN SWITCH	IP 65	EExib-IIB T3	

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	1/9/2022	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: ON/OFF Valve Data Sheet

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0002
Owner Job No: | Sheet No: 17 of 167

General Data	1	Tag No.		UV-1102	
	2	P&ID / Line NO. / Piping Size / Piping Class		0011 / 1101 / 3/8"	TUBING
	3	Fluid	State	CAT	
	4	Pressure rating	Piping material		S.S
	5	Amb.Temp / Amb Press	Amb.Rel.Humidity Max	(-20)°C / 50°C / 0.82 Bara	86%
	6	Area Classification	Area	ZONE 1	
Flow Rate	7	Max.Continuous	Unit	200	Kg/h
	8	Min.Continuous	Unit	50	Kg/h
	9	Max.In Transients	Unit	250	Kg/h
	10	Allow. with closed valve	Unit	0	Kg/h
Press	11	Norm . Op. upstr. Press	Unit	30	barg
	12	Dp. At max. flowrate	Unit	29	bar
	13	Max. Dp with closed valve	Unit	30	bar
Temperature	14	Norm . upstr. Temp	Unit	15	◦C
	15	Max . upstr. Temp	Unit	50	◦C
Sp. Gr.	16	Gases vapours	Unit		Kg/m3
	17	Liquids	Unit	930	Kg/m3
	18	Mol.weight	Unit		Kg/Kmol
Visc.	19	Op. visc. (when>5mpa's)			
	20	Solid in suspension			
Cv	21	Min/Norm/Max	Required	VTA	VTA
Body	22	Body type	Body material	Tubing full bore valve	SS-316
	23	Size Body	Port	3/8"	Double
	24	Design Pressure	Min. Bar a / Max. Bar a		Barg
	25	Design Temperature	Min. °C / Max. °C		◦C
	26	Valve end con. & rating	Seat leakage class	tubing	ANSI IV
	27	Packing mat.	Lubricator	PTFE	VTA
	28	Flow direction			
	29	Bonnet type		Standard	
Trim	30	Plug type	Plug material	Ball	SS - 316
	31	Seat Material	Cage/Guide Material	SS - 316	NA
	32	Characteristics		Full bore	
Actuator	33	Type / Direction of action		Cylinder&Piston	
	34	Fail Position		Close	
	35	Spring range		NA	
	36	On-Off/Modulating	Single/Double Acting	On/Off	Double Acting
Positioner	37	Type		NA	
	38	Input signal	Out put signal	NA	NA
	39	Air supply	Action dir.	NA	NA
	40	Protection	Certificate	NA	NA
Solenoid Valve	41	Type	QTY	4-Way	1
	42	Tag No.		UY-1102	
	43	Supply Voltage	Consumption	24VDC	VTA (Ex-ib)
	44	Protection	Certificate	IP 65	EExib-IIB T3
Accessories	45	Pressure gauge and filter		YES	
	46	Manual Control Wheel		NA	
	47	Cable Gland	Size/Qty	NA	
	48	Electrical Conection		M20	
	49	Tubing & Conection		SS Tube 1/4"	
	50	Switch	Protection / Certificate	CLOSE & OPEN SWITCH	IP 65 / EExib-IIB T3

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	1/9/2022	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: ON/OFF Valve Data Sheet

شرکت ملی صنایع پتروشیمی

شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0002

Owner Job No: | Sheet No: 16 of 167

General Data	1	Tag No.				UV-1103		
	2	P&ID	Line NO.	Piping Size	Piping Class	0011	V-115&V-114	1/2"	1FS4
	3	Fluid			State	N2		Gas	
	4	Pressure rating			Piping material	#600		S.S	
	5	Amb.Temp		Amb Press	Amb.Rel.Humidity Max	(-20)°C / 50°C	0.82 Bara		86%
	6	Area Classification			Area	ZONE 1			
Flow Rate	7	Max.Continuous			Unit	500		Kg/h	
	8	Min.Continuous			Unit	50		Kg/h	
	9	Max.In Transients			Unit	800		Kg/h	
	10	Allow. with closed valve			Unit	0		Kg/h	
Press	11	Norm . Op. upstr. Press			Unit	30		barg	
	12	Dp. At max. flowrate			Unit	30		bar	
	13	Max. Dp with closed valve			Unit	65		bar	
Temperature	14	Norm . upstr. Temp			Unit	25		◦C	
	15	Max . upstr. Temp			Unit	35		◦C	
Sp. Gr.	16	Gases vapours			Unit	1.2		Kg/m3	
	17	Liquids			Unit			Kg/m3	
	18	Mol.weight			Unit	28		Kg/Kmol	
Visc.	19	Op. visc. (when>5mpa's)							
	20	Solid in suspension							
Cv	21	Min/Norm/Max			Required	VTA		VTA	
Body	22	Body type			Body material	Super thin Ball valve		SS - 316	
	23	Size Body			Port	1/2"		single	
	24	Design Pressure			Min. Bar a / Max. Bar a			Barg	
	25	Design Temperature			Min. °C / Max. °C			◦C	
	26	Valve end con. & rating			Seat leakage class	Flange 600#		ANSI IV	
	27	Packing mat.			Lubricator	PTFE		VTA	
	28	Flow direction							
	29	Bonnet type				Standard			
Trim	30	Plug type			Plug material	Ball		SS - 316	
	31	Seat Material			Cage/Guide Material	SS - 316		NA	
	32	Characteristics				NA			
Actuator	33	Type / Direction of action				Cylinder&Piston			
	34	Fail Position				Close			
	35	Spring range				VTA			
	36	On-Off/Modulating			Single/Double Acting	On/Off		Single Acting	
Positioner	37	Type				NA			
	38	Input signal			Out put signal	NA		NA	
	39	Air supply			Action dir.	NA		NA	
	40	Protection			Certificate	NA		NA	
Solenoid Valve	41	Type			QTY	3-Way		1	
	42	Tag No.				UY-1103			
	43	Supply Voltage			Consumption	24VDC		VTA (Ex-ib)	
	44	Protection			Certificate	IP 65		EExib-IIB T3	
Accessories	45	Pressure gauge and filter				YES			
	46	Manual Control Wheel				NA			
	47	Cable Gland			Size/Qty	NA			
	48	Electrical Conection				M20			
	49	Tubing & Conection				NA			
	50	Switch	Protection	Certificate		CLOSE & OPEN SWITCH	IP 65	EExib-IIB T3	

No.	Rev	Date	Status	Prepared	Checked	Approved
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PROJECT: PP-PE PILOT PLANT

TITLE: ON/OFF Valve Data Sheet

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0002
Owner Job No: | Sheet No: 16 of 167

General Data	1	Tag No.				UV-1104		
	2	P&ID	Line NO.	Piping Size	Piping Class	0011	V-115&V-115	1/2"	1FS4
	3	Fluid			State	OIL		LIQUID	
	4	Pressure rating			Piping material	#600		S.S	
	5	Amb.Temp		Amb Press	Amb.Rel.Humidity Max	(-20)°C / 50°C	0.82 Bara	86%	
	6	Area Classification			Area	ZONE 1			
Flow Rate	7	Max.Continuous			Unit	400		Kg/h	
	8	Min.Continuous			Unit	50		Kg/h	
	9	Max.In Transients			Unit	600		Kg/h	
	10	Allow. with closed valve			Unit	0		Kg/h	
Press	11	Norm . Op. upstr. Press			Unit	30		barg	
	12	Dp. At max. flowrate			Unit	30		bar	
	13	Max. Dp with closed valve			Unit	65		bar	
Temperature	14	Norm . upstr. Temp			Unit	25		◦C	
	15	Max . upstr. Temp			Unit	35		◦C	
Sp. Gr.	16	Gases vapours			Unit			Kg/m3	
	17	Liquids			Unit	850		Kg/m3	
	18	Mol.weight			Unit			Kg/Kmol	
Visc.	19	Op. visc. (when>5mpa's)							
	20	Solid in suspension							
Cv	21	Min/Norm/Max			Required	VTA		VTA	
Body	22	Body type			Body material	Super thin Ball valve		SS - 316	
	23	Size Body			Port	1/2"		single	
	24	Design Pressure			Min. Bar a / Max. Bar a			Barg	
	25	Design Temperature			Min. °C / Max. °C			◦C	
	26	Valve end con. & rating			Seat leakage class	Flange 600#		ANSI IV	
	27	Packing mat.			Lubricator	PTFE		VTA	
	28	Flow direction							
	29	Bonnet type				Standard			
Trim	30	Plug type			Plug material	Ball		SS - 316	
	31	Seat Material			Cage/Guide Material	SS - 316		NA	
	32	Characteristics				NA			
Actuator	33	Type / Direction of action				Cylinder&Piston			
	34	Fail Position				Close			
	35	Spring range				VTA			
	36	On-Off/Modulating			Single/Double Acting	On/Off		Single Acting	
Positioner	37	Type				NA			
	38	Input signal			Out put signal	NA		NA	
	39	Air supply			Action dir.	NA		NA	
	40	Protection			Certificate	NA		NA	
Solenoid Valve	41	Type			QTY	3-Way		1	
	42	Tag No.				UY-1104			
	43	Supply Voltage			Consumption	24VDC		VTA (Ex-ib)	
	44	Protection			Certificate	IP 65		EExib-IIB T3	
Accessories	45	Pressure gauge and filter				yes			
	46	Manual Control Wheel				NA			
	47	Cable Gland			Size/Qty	NA			
	48	Electrical Conection				M20			
	49	Tubing & Conection				NA			
	50	Switch	Protection	Certificate		CLOSE & OPEN SWITCH	IP 65	EExib-IIB T3	

No.	Rev	Date	Status	Prepared	Checked	Approved
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PROJECT: PP-PE PILOT PLANT

TITLE: ON/OFF Valve Data Sheet

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No:			
		Owner Job No:			Sheet of			
General Data	1	Item			**UV-1105**			
	2	Sevice			P-112 To V-112A Or V-112B			
	3	Location			Catalyst Injection Unit			
	4	P&ID NO.						
	5	Fluid			OIL			
	6	State			Liquid			
	7	Line NO.	Piping Size	Piping Class	1106	1/4"	Tubing	
	8	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%	
	9	Area Classification		Area	ZONE 1			
Flow Rate	10	Max. continuous		Unit	250		Kg/h	
	11	Min.Continuous		Unit	30		Kg/h	
	12	Full scale		Unit	300		Kg/h	
Pressure	13	Normal Pressure		Unit	30		barg	
	14	Normal DP		Unit	29.5		bar	
	15	Max Pressure		Unit	65		barg	
Temperature	16	Normal Temp.		Unit	25		◦C	
	17	Max . Temp.		Unit	-40 +70		◦C	
Sp. Gr.	18	Gases vapours		Unit			Kg/m3	
	19	Liquids		Unit	870		Kg/m3	
	20	Mol.weight		Unit			Kg/Kmol	
Visc.	21	Viscosity at op cond		Unit				
	22	Solid in suspension						
Cv	23	Min/Norm/Max		Required	VTA		VTA	
Body	24	Valve Type		Body material	3 WAY valve		ASTM A 182 gr.F 304	
	25	Valve Size		Port	1/4"		Double	
	26	Design Pressure		Min. Bar a / Max. Bar a	10	70	Barg	
	27	Design Temperature		Min. °C / Max. °C	-40	+70	◦C	
	28	Valve end con. & rating		.	Tubing NPT 1/4"			
	29	Packing mat.		Lubricator	PTFE		VTA	
	30	Flow direction						
	31	Bonnet type			Standard			
	32	SEAT Leakage Class ANSI			V			
Trim	33	Type		Plug material	3 WAY valve		SS - 316	
	34	Seat Material		Cage/Guide Material	SS - 316		NA	
	35	Characteristics			3 WAY valve Full bore			
Actuator	36	Type			Pneumatic			
	37	Acition			Double Acting			
	38	Air supply press.			5			
	39	On Air Failure			LAST POSITION			
	40	On Power Failure			LAST POSITION			
	41	Notes						
Positioner	42	Type			NA			
	43	Input signal		Out put signal	NA		NA	
	44	Air supply		Action dir.	NA		NA	
	45	Protection		Certificate	NA		NA	
Solenoid Valve	46	Type		QTY	5-Way		1	
	47	Tag No.			UY-1105			
	48	Supply Voltage		Consumption	24VDC		VTA (Ex-ia)	
	49	Protection		Certificate	IP 65		EExia-IIC T4	
Accessories	50	Pressure gauge and filter			YES			
	51	Manual Control Wheel			NO			
	52	Cable Gland		Size/Qty	NA			
	53	Electrical Conection			M20			
	54	Tubing & Conection			SS Tube 1/4"			
	55	Switch	Protection	Certificate	Open&Closed Namur	IP 65	EExia-IIC T4	

1	**0**	**2021-12-18**	**IFA**	**K.A**	**M.N**	**AA.SH**
No.	**Rev**	**Date**	**Status**	**Prepared**	**Checked**	**Approved**

PROJECT: PP-PE PILOT PLANT

TITLE: ON/OFF Valve Data Sheet

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No:
Owner Job No: | Sheet of

General Data	1	Item				**UV-1106**		
	2	Sevice				V-112A Or V-112B To V-115		
	3	Location				Catalyst Injection Unit		
	4	P&ID NO.						
	5	Fluid				OIL		
	6	State				Liquid		
	7	Line NO.	Piping Size	Piping Class		1106	1/4"	Tubing
	8	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-28)°C / 44°C	0.82 Bara	86%
	9	Area Classification		Area		ZONE 1		
Flow Rate	10	Max. continuous		Unit		250		Kg/h
	11	Min.Continuous		Unit		30		Kg/h
	12	Full scale		Unit		300		Kg/h
Pressure	13	Normal Pressure		Unit		30		barg
	14	Normal DP		Unit		29.5		bar
	15	Max Pressure		Unit		65		barg
Temperature	16	Normal Temp.		Unit		25		◦C
	17	Max . Temp.		Unit		-40 +70		◦C
Sp. Gr.	18	Gases vapours		Unit				Kg/m3
	19	Liquids		Unit		870		Kg/m3
	20	Mol.weight		Unit				Kg/Kmol
Visc.	21	Viscosity at op cond		Unit				
	22	Solid in suspension						
Cv	23	Min/Norm/Max		Required		VTA		VTA
Body	24	Valve Type		Body material		3 WAY valve		ASTM A 182 gr.F 304
	25	Valve Size		Port		1/4"		NPT
	26	Design Pressure		Min. Bar a	Max. Bar a	10	70	Barg
	27	Design Temperature		Min. °C	Max. °C	-40	+70	◦C
	28	Valve end con. & rating		.		Tubing NPT 1/4"		
	29	Packing mat.		Lubricator		PTFE		VTA
	30	Flow direction						
	31	Bonnet type				Standard		
	32	SEAT Leakage Class ANSI				V		
Trim	33	Type		Plug material		3 WAY valve		SS - 316
	34	Seat Material		Cage/Guide Material		SS - 316		NA
	35	Characteristics				3 WAY valve Full bore		
Actuator	36	Type				Pneumatic		
	37	Acition				Double Acting		
	38	Air supply press.				5		
	39	On Air Failure				LAST POSITION		
	40	On Power Failure				LAST POSITION		
	41	Notes						
Positioner	42	Type				NA		
	43	Input signal		Out put signal		NA		NA
	44	Air supply		Action dir.		NA		NA
	45	Protection		Certificate		NA		NA
Solenoid Valve	46	Type		QTY		5-Way		1
	47	Tag No.				UY-1106		
	48	Supply Voltage		Consumption		24VDC		VTA (Ex-ia)
	49	Protection		Certificate		IP 65		EExia-IIC T4
Accessories	50	Pressure gauge and filter				YES		
	51	Manual Control Wheel				NO		
	52	Cable Gland		Size/Qty		NA		
	53	Electrical Conection				M20		
	54	Tubing & Conection				SS Tube 1/4"		
	55	Switch	Protection	Certificate		Open&Closed Namur	IP 65	EExia-IIC T4

No.	Rev	Date	Status	Prepared	Checked	Approved
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PROJECT: PP-PE PILOT PLANT

TITLE: ON/OFF Valve Data Sheet

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No:			
		Owner Job No:			Sheet of			
General Data	1	Item			**UV-1107**			
	2	Sevice			V-112A Or V-112B To Precontacts			
	3	Location			Catalyst Injection Unit			
	4	P&ID NO.						
	5	Fluid			Mud Catalyst			
	6	State			Liquid			
	7	Line NO.	Piping Size	Piping Class	1102	3/8"	Tubing	
	8	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%	
	9	Area Classification		Area	ZONE 1			
Flow Rate	10	Max. continuous		Unit	10		Kg/h	
	11	Min.Continuous		Unit	1		Kg/h	
	12	Full scale		Unit	30		Kg/h	
Pressure	13	Normal Pressure		Unit	34		barg	
	14	Normal DP		Unit	2		bar	
	15	Max Pressure		Unit	65		barg	
Temperature	16	Normal Temp.		Unit	10		◦C	
	17	Max . Temp.		Unit	-40 +70		◦C	
Sp. Gr.	18	Gases vapours		Unit			Kg/m3	
	19	Liquids		Unit	930		Kg/m3	
	20	Mol.weight		Unit			Kg/Kmol	
Visc.	21	Viscosity at op cond		Unit				
	22	Solid in suspension						
Cv	23	Min/Norm/Max		Required	VTA		VTA	
Body	24	Valve Type		Body material	3 WAY valve		ASTM A 182 gr.F 304	
	25	Valve Size		Port	3/8"		NPT	
	26	Design Pressure		Min. Bar a / Max. Bar a	10	70	Barg	
	27	Design Temperature		Min. °C / Max. °C	-40	+70	◦C	
	28	Valve end con. & rating		.	Tubing NPT 3/8"			
	29	Packing mat.		Lubricator	PTFE		VTA	
	30	Flow direction						
	31	Bonnet type			Standard			
	32	SEAT Leakage Class ANSI			V			
Trim	33	Type		Plug material	3 WAY valve		SS - 316	
	34	Seat Material		Cage/Guide Material	SS - 316		NA	
	35	Characteristics			3 WAY valve Full bore			
Actuator	36	Type			Pneumatic			
	37	Acition			Double Acting			
	38	Air supply press.			5			
	39	On Air Failure			LAST POSITION			
	40	On Power Failure			LAST POSITION			
	41	Notes						
Positioner	42	Type			NA			
	43	Input signal		Out put signal	NA		NA	
	44	Air supply		Action dir.	NA		NA	
	45	Protection		Certificate	NA		NA	
Solenoid Valve	46	Type		QTY	5-Way		1	
	47	Tag No.			UY-1106			
	48	Supply Voltage		Consumption	24VDC		VTA (Ex-ia)	
	49	Protection		Certificate	IP 65		EExia-IIC T4	
Accessories	50	Pressure gauge and filter			YES			
	51	Manual Control Wheel			NO			
	52	Cable Gland		Size/Qty	NA			
	53	Electrical Conection			M20			
	54	Tubing & Conection			SS Tube 1/4"			
	55	Switch	Protection	Certificate	Open&Closed Namur	IP 65	EExia-IIC T4	

No.	Rev	Date	Status	Prepared	Checked	Approved
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PROJECT: PP-PE PILOT PLANT

TITLE: ON/OFF Valve Data Sheet

شرکت ملی صنایع پتروشیمی

شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No:

Owner Job No: | Sheet No: of

General Data	1	Tag No.				UV-1108		
	2	P&ID	Line NO.	Piping Size	Piping Class	0011	1102	3/8"	Tubing
	3	Fluid			State	Mud Catalyst		LIQUID+Soild	
	4	Pressure rating			Piping material	#3000		S.S	
	5	Amb.Temp		Amb Press	Amb.Rel.Humidity Max	(-20)°C / 50°C	0.82 Bara	86%	
	6	Area Classification			Area	ZONE 1			
Flow Rate	7	Max.Continuous			Unit	10		Kg/h	
	8	Min.Continuous			Unit	1		Kg/h	
	9	Max.In Transients			Unit	30		Kg/h	
	10	Allow. with closed valve			Unit	0		Kg/h	
Press	11	Norm . Op. upstr. Press			Unit	34		barg	
	12	Dp. At max. flowrate			Unit	4		bar	
	13	Max. Dp with closed valve			Unit	65		bar	
Temperature	14	Norm . upstr. Temp			Unit	15		◦C	
	15	Max . upstr. Temp			Unit	35		◦C	
Sp. Gr.	16	Gases vapours			Unit			Kg/m3	
	17	Liquids			Unit	930		Kg/m3	
	18	Mol.weight			Unit			Kg/Kmol	
Visc.	19	Op. visc. (when>5mpa's)							
	20	Solid in suspension							
Cv	21	Min/Norm/Max			Required	VTA		VTA	
Body	22	Body type			Body material	Tubing Full Bore Ball Valve		SS - 316	
	23	Size Body			Port	3/8"		single	
	24	Design Pressure			Min. Bar a / Max. Bar a	1	65	Barg	
	25	Design Temperature			Min. °C / Max. °C	-40	+70	◦C	
	26	Valve end con. & rating			Seat leakage class	Tube NPT		ANSI IV	
	27	Packing mat.			Lubricator	PTFE		VTA	
	28	Flow direction							
	29	Bonnet type				Standard			
Trim	30	Plug type			Plug material	Ball		SS - 316	
	31	Seat Material			Cage/Guide Material	SS - 316		NA	
	32	Characteristics				Full Bore			
Actuator	33	Type / Direction of action				Cylinder&Piston			
	34	Fail Position				Close			
	35	Spring range				VTA			
	36	On-Off/Modulating			Single/Double Acting	On/Off		Single Acting	
Positioner	37	Type				NA			
	38	Input signal			Out put signal	NA		NA	
	39	Air supply			Action dir.	NA		NA	
	40	Protection			Certificate	NA		NA	
Solenoid Valve	41	Type			QTY	4-Way		1	
	42	Tag No.				UY-1108			
	43	Supply Voltage			Consumption	24VDC		VTA (Ex-ib)	
	44	Protection			Certificate	IP 65		EExib-IIB T3	
Accessories	45	Pressure gauge and filter				yes			
	46	Manual Control Wheel				NA			
	47	Cable Gland			Size/Qty	NA			
	48	Electrical Conection				M20			
	49	Tubing & Conection				NA			
	50	Switch	Protection	Certificate		CLOSE & OPEN SWITCH	IP 65	EExib-IIB T3	

No.	Rev	Date	Status	Prepared	Checked	Approved
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PROJECT: PP-PE PILOT PLANT

TITLE: LEVEL SWITCH DATA SHEET

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No:
Owner Job No: | Sheet No: of

General Data	1	Tag No.			LSH-1102		
	2	Service			V-115 High Level		
	3	P&ID No.		Area	0011		100
	4	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	5	Vessel		Material	V-115 (K1)		S.S
	6	Type of connections			Flange (1 1/2" #600 RF)		
	7	Upper fluid			N2		
	8	Upper fluid Sp . Gr.		Unit	1		Kg/m3
PROCESS CONDITION	9	Lower fluid			OIL		
	10	Lower fluid Sp . Gr.		Unit	860		Kg/m3
	11	Normal Temperature		Unit	25		°c
	12	Max Temperature		Unit	70		°c
	13	Normal Pressure		Unit	30		barg
	14	Max Pressure		Unit	65		barg
	15	Suspend solids			NO		
	16	Liable to solidify or crystallize			NO		
	17	Condence . Temp .at op . Press.		Unit			
	18	Fluid, if any, available for scrubbing					
	19	Measurement range		Unit	SWITCH		mm
	20	Recomm	Instrument type		Diapason Switch		
	21		Body shape (see shape)		Flange		
	22		Center line connections		(1)		
	23		Primary element material		S.S 316		
	24	Installation			DCS		
	25	Inndic / recorder installation			ON(2)		
Instrument	26	Function			LEVEL-SWITCH		
	27	TYPE			DIAPASON SWITCH		
	28	TOTAL LENGTH (PROB LENGTH)			250 mm		
	29	MEASURING RANGE			ON-OFF		
	31	SCALE		PRECISION (mm)	NA		NA
	32	PROCESS CONNECTION SIZE			1 1/2" , TOP , #600 RF		
	33	WETTED PARTS MATERIAL			316 SS		
switch	34	Type			INDUCTIVE NAMUR		
	35	Differential			FIXED		
	36	Switch operating			LOW LIMIT		
	37	EXPLOSION PROTECTION			EEXib IIB T3		
	38	CABLE GLAND		SIZE	NA		
	39	Electrical Connection			Gland M20		
	40	INGRESS PROTECTION			IP65		
	41	Others			NO		

Notes:
(1) Must be Installed at 150mm over Lower/Upper T.L.
(2) Normal indication

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	1/8/2022	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: LEVEL SWITCH DATA SHEET

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No:
Owner Job No: | Sheet No: of

General Data	1	Tag No.			LSL-1101		
	2	Service			V-114 Low Level		
	3	P&ID No.		Area	0011		100
	4	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	5	Vessel		Material	V-114 (K1)		S.S
	6	Type of connections			Flange (1 1/2" #600 RF)		
	7	Upper fluid			N2		
	8	Upper fluid Sp . Gr.		Unit	1		Kg/m3
PROCESS CONDITION	9	Lower fluid			OIL		
	10	Lower fluid Sp . Gr.		Unit	860		Kg/m3
	11	Normal Temperature		Unit	25		°c
	12	Max Temperature		Unit	70		°c
	13	Normal Pressure		Unit	30		barg
	14	Max Pressure		Unit	65		barg
	15	Suspend solids			NO		
	16	Liable to solidify or crystallize			NO		
	17	Condence . Temp .at op . Press.		Unit			
	18	Fluid, if any, available for scrubbing					
	19	Measurement range		Unit	SWITCH		mm
	20	Recomm	Instrument type		Diapason Switch		
	21		Body shape (see shape)		Flange		
	22		Center line connections		(1)		
	23		Primary element material		S.S 316		
	24	Installation			DCS		
	25	Inndic / recorder installation			ON(2)		
Instrument	26	Function			LEVEL-SWITCH		
	27	TYPE			DIAPASON SWITCH		
	28	TOTAL LENGTH (PROB LENGTH)			500 mm		
	29	MEASURING RANGE			ON-OFF		
	31	SCALE		PRECISION (mm)	NA		NA
	32	PROCESS CONNECTION SIZE			1 1/2" , TOP , #600 RF		
	33	WETTED PARTS MATERIAL			316 SS		
switch	34	Type			INDUCTIVE NAMUR		
	35	Differential			FIXED		
	36	Switch operating			LOW LIMIT		
	37	EXPLOSION PROTECTION			EEXib IIB T3		
	38	CABLE GLAND		SIZE	NA		
	39	Electrical Connection			Gland M20		
	40	INGRESS PROTECTION			IP65		
	41	Others			NO		

Notes:
(1) Must be Installed at 150mm over Lower/Upper T.L.
(2) Normal indication

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	1/8/2022	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: LEVEL SWITCH DATA SHEET

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No:
Owner Job No: | Sheet No: of

General Data	1	Tag No.			LSL-1103		
	2	Service			V-112A Low Level		
	3	P&ID No.		Area	0011		100
	4	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	5	Vessel		Material	V-112 A		
	6	Type of connections			See Vessel Sketch		
	7	Upper fluid					
	8	Upper fluid Sp . Gr.		Unit			Kg/m3
PROCESS CONDITION	9	Lower fluid					
	10	Lower fluid Sp . Gr.		Unit			Kg/m3
	11	Normal Temperature		Unit			°c
	12	Max Temperature		Unit			°c
	13	Normal Pressure		Unit			barg
	14	Max Pressure		Unit			barg
	15	Suspend solids					
	16	Liable to solidify or crystallize					
	17	Condence . Temp .at op . Press.		Unit			
	18	Fluid, if any, available for scrubbing					
	19	Measurement range		Unit	Switch		mm
	20	Recomm	Instrument type		MICRO SWITCH		
	21		Body shape (see shape)		See Vessel Sketch		
	22		Center line connections				
	23		Primary element material				
	24	Installation					
	25	Inndic / recorder installation					
Instrument	26	Function			LEVEL-SWITCH		
	27	TYPE			VTA		
	28	MEASURING RANGE			ON-OFF		
	30	SCALE		PRECISION (mm)	NA		NA
	31	PROCESS CONNECTION SIZE					
	37	WETTED PARTS MATERIAL					
switch	42	Type			MICRO SWITCH (SPDT)		
	43	Differential			FIXED		
	44	Switch operating			LOW LIMIT		
	45	EXPLOSION PROTECTION			EEXib IIB T3		
	46	CABLE GLAND	Electrical Connection		NA		M20
	47	INGRESS PROTECTION			IP65		
	48	Others			NO		

General Notes:

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	1/8/2022	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: LEVEL SWITCH DATA SHEET

شرکت ملی صنایع پتروشیمی

شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No:		
		Owner Job No:			Sheet No: of		
General Data	1	Tag No.			LSL-1104		
	2	Service			V-112B Low Level		
	3	P&ID No.		Area	0011	100	
	4	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	5	Vessel		Material	V-112 B		
	6	Type of connections			See Vessel Sketch		
	7	Upper fluid					
	8	Upper fluid Sp . Gr.		Unit		Kg/m3	
PROCESS CONDITION	9	Lower fluid					
	10	Lower fluid Sp . Gr.		Unit		Kg/m3	
	11	Normal Temperature		Unit		ºc	
	12	Max Temperature		Unit		ºc	
	13	Normal Pressure		Unit		barg	
	14	Max Pressure		Unit		barg	
	15	Suspend solids					
	16	Liable to solidify or crystallize					
	17	Condence . Temp .at op . Press.		Unit			
	18	Fluid, if any, available for scrubbing					
	19	Measurement range		Unit	Switch	mm	
	20	Recomm	Instrument type		MICRO SWITCH		
	21		Body shape (see shape)		See Vessel Sketch		
	22		Center line connections				
	23		Primary element material				
	24	Installation					
	25	Inndic / recorder installation					
Instrument	26	Function			LEVEL-SWITCH		
	27	TYPE			VTA		
	28	MEASURING RANGE			ON-OFF		
	30	SCALE		PRECISION (mm)	NA	NA	
	31	PROCESS CONNECTION SIZE					
	37	WETTED PARTS MATERIAL					
switch	42	Type			MICRO SWITCH (SPDT)		
	43	Differential			FIXED		
	44	Switch operating			LOW LIMIT		
	45	EXPLOSION PROTECTION			EEXib IIB T3		
	46	CABLE GLAND	Electrical Connection		NA	M20	
	47	INGRESS PROTECTION			IP65		
	48	Others			NO		

General Notes:

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	1/8/2022	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

شرکت ملی صنایع پتروشیمی

شرکت پژوهش و فناوری پتروشیمی

TITLE: PRESSURE SWITCH DATA SHEET

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0010

Owner Job No: | Sheet No: 2 of 19

General Data	1	Tag No.			PSH-1104		
	2	Tap Nº .			P1		
	3	P&ID No.	Piping Size	Piping Class	0011	1/2"	1FS4
	4	Fluid		State	NITROGEN	GAS	
	5	Service			PRESS V 115		
	6	Pressure rating		Piping material	600#	S.S	
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	8	Area Classification		Area	ZONE 1	100	
PROCESS CONDITION	9	Normal Temperature		Unit	AMB	ºc	
	10	Max Temperature		Unit	(-30)+120	ºc	
	11	Normal Pressure		Unit	1 - 3	barg	
	12	Max Pressure		Unit	100	barg	
	13	Solid in suspension					
	14	Op. visc. (when>10 mpa's)					
	15	Liable to solidify or crystallize					
	16	Fluid, if any, available for purge					
	17	Sensing element material					
	18	Tracing					
	19	Jacketing					
	20	Measurement range		Unit	0.2(1)	barg	
	21	Installation			DCS		
Instrument	26	Function			PRESSURE-SWITCH		
	27	TYPE			VAPOUR PRESSURE TYPE		
	28	MEASURING RANGE			ON-OFF		
	31	PROCESS CONNECTION SIZE			1/2" NPT		
	37	WETTED PARTS MATERIAL			316 SS		
switch	42	Type			NAMUR		
	43	Differential			FIXED		
	44	Switch operating			HIGH LIMIT		
	45	EXPLOSION PROTECTION			EEXib IIB T3		
	46	CABLE GLAND	SIZE		YES	M20	
	47	INGRESS PROTECTION			IP65		
	48	Others			2-VALVE MANIFOLD		

Notes: (1) Set of switch

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/13/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: LEVEL GAUGE DATA SHEET

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0011
Owner Job No: | Sheet No 3 of 28

General Data	1	Tag No.			LI -1151	
	2	Service			LEVEL V 114	
	3	P&ID No.		Area	011	100
	4	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara / 86%
	5	Vessel		Material	V 114	S.S
	6	Type of connections			3/4" #600 (K2 a/b)	
	7	Upper fluid			NITROGEN	
	8	Upper fluid Sp . Gr.		Unit	1.2	Kg/m3
PROCESS CONDITION	9	Lower fluid			OIL	
	10	Lower fluid Sp . Gr.		Unit	850	Kg/m3
	11	Normal Temperature		Unit	AMB	°c
	12	Max Temperature		Unit	-30 +120	°c
	13	Normal Pressure		Unit	40 - 70	barg
	14	Max Pressure		Unit	100	barg
	15	Suspend solids				
	16	Liable to solidify or crystallize				
	17	Condence . Temp .at op . Press.		Unit		
	18	Fluid, if any, available for scrubbing				
	19	Measurement range		Unit	500	mm
	20	Recomm	Instrument type		REFLECTION	
	21		Body shape (see shape)		"D"	
	22		Center line connections			
	23		Primary element material			
	24	Installation			LOCAL	
	25	Inndic / recorder installation				
Instrument	26	Function			LEVEL INDICATOR	
	27	TYPE (REQUIRED)			MAGNETIC FLOAT TYPE	
	28	MEASURING RANGE			0 - 100 %	
	30	SCALE		PRECISION (mm)	MFR-STD	<= 15
	31	PROCESS CONNECTION SIZE, UPPER			3/4" , SIDE , #600 RF	
	32	PROCESS CONNECTION SIZE, LOWER			3/4" , SIDE , #600 RF	
	33	VENT & DRAIN CONNECTION			SEE GENERAL NOTE 2 , 3	
	34	CHAMBER CONNECTION (bottom &Top)			MFR-STD	
	35	CHAMBER MATERIAL			316 S.S.	
	36	FLOAT MATERIAL			316 L	
	37	WETTED PARTS TO NACE			NO	
Gauge Cocks	38	TYPE			NA	
	39	CONNECTION :	Vessel	Gauge	NA	NA
	40	CONNECTION :	Vent	Drain	NA	NA
	41	MATERIAL :	Body	Trim	NA	NA
switch	42	Type		Qty	NA	NA
	43	FUNCTION			NA	
	44	RATING			NA	
	45	EXPLOSION PROTECTION			NA	
	46	CABLE GLAND	SIZE	Qty	NA	NA
	47	INGRESS PROTECTION			NA	
	48	Others			NO	

General Notes:

* : Vendor to advise

1. LEVEL GAUGES SHALL BE SUITABLE FOR FLUID MENTIONED IN SERVICE CONDITION AND ENVIRONMENTAL CONDITIONS.
2. DRAIN CONNECTION SHALL BE EQUIPED WITH 1/2" BALL VALVE , 300# WITH S.S. BODY & TRIM.
3. VENT CONNECTION SHALL BE 1/2" ANSI 300# RF FLANGED AND WITH BLIND FLANGE.

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/13/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: LEVEL GAUGE DATA SHEET

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0011
Owner Job No: | Sheet No 4 of 28

General Data	1	Tag No.			LI - 1152	
	2	Service			LEVEL V 115	
	3	P&ID No.		Area	011	100
	4	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara / 86%
	5	Vessel		Material	V 115	S.S
	6	Type of connections			1/2" #600 (K2 a/b)	
	7	Upper fluid			NITROGEN	
	8	Upper fluid Sp . Gr.		Unit	1.2	Kg/m3
PROCESS CONDITION	9	Lower fluid			OIL	
	10	Lower fluid Sp . Gr.		Unit	850	Kg/m3
	11	Normal Temperature		Unit	AMB	°c
	12	Max Temperature		Unit	-30 +120	°c
	13	Normal Pressure		Unit	40 - 70	barg
	14	Max Pressure		Unit	100	barg
	15	Suspend solids				
	16	Liable to solidify or crystallize				
	17	Condence . Temp .at op . Press.		Unit		
	18	Fluid, if any, available for scrubbing				
	19	Measurement range		Unit	500	mm
	20	Recomm	Instrument type		REFLECTION	
	21		Body shape (see shape)		"D"	
	22		Center line connections			
	23		Primary element material			
	24	Installation			LOCAL	
	25	Inndic / recorder installation				
Instrument	26	Function			LEVEL INDICATOR	
	27	TYPE (REQUIRED)			MAGNETIC FLOAT TYPE	
	28	MEASURING RANGE			0 - 100 %	
	30	SCALE		PRECISION (mm)	MFR-STD	<= 15
	31	PROCESS CONNECTION SIZE, UPPER			3/4" , SIDE , #600 RF	
	32	PROCESS CONNECTION SIZE, LOWER			3/4" , SIDE , #600 RF	
	33	VENT & DRAIN CONNECTION			SEE GENERAL NOTE 2 , 3	
	34	CHAMBER CONNECTION (bottom &Top)			MFR-STD	
	35	CHAMBER MATERIAL			316 S.S.	
	36	FLOAT MATERIAL			316 L	
	37	WETTED PARTS TO NACE			NO	
Gauge Cocks	38	TYPE			NA	
	39	CONNECTION :	Vessel	Gauge	NA	NA
	40	CONNECTION :	Vent	Drain	NA	NA
	41	MATERIAL :	Body	Trim	NA	NA
switch	42	Type		Qty	NA	NA
	43	FUNCTION			NA	
	44	RATING			NA	
	45	EXPLOSION PROTECTION			NA	
	46	CABLE GLAND	SIZE	Qty	NA	NA
	47	INGRESS PROTECTION			NA	
	48	Others			NO	

General Notes:

* : Vendor to advise

1. LEVEL GAUGES SHALL BE SUITABLE FOR FLUID MENTIONED IN SERVICE CONDITION AND ENVIRONMENTAL CONDITIONS.
2. DRAIN CONNECTION SHALL BE EQUIPED WITH 1/2" BALL VALVE , 300# WITH S.S. BODY & TRIM.
3. VENT CONNECTION SHALL BE 1/2" ANSI 300# RF FLANGED AND WITH BLIND FLANGE.

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/13/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: LEVEL GAUGE DATA SHEET

شرکت ملی صنایع پتروشیمی
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Contractor Job No: | Doc. No: 900-DAS-A4-IN-0011
Owner Job No: | Sheet No 5 of 28

General Data	1	Tag No.				LI - 1153	
	2	Service				V 112A / V 112B	
	3	P&ID No.		Area		011	100
	4	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-28)°C / 44°C	0.82 Bara	86%
	5	Vessel		Material			
	6	Type of connections					
	7	Upper fluid					
	8	Upper fluid Sp . Gr.		Unit			Kg/m3
PROCESS CONDITION	9	Lower fluid					
	10	Lower fluid Sp . Gr.		Unit			Kg/m3
	11	Normal Temperature		Unit			°c
	12	Max Temperature		Unit			°c
	13	Normal Pressure		Unit			barg
	14	Max Pressure		Unit			barg
	15	Suspend solids					
	16	Liable to solidify or crystallize					
	17	Condence . Temp .at op . Press.			Unit		
	18	Fluid, if any, available for scrubbing					
	19	Measurement range		Unit		SEE VESEL DESIGN	mm
	20	Recomm	Instrument type			MECHANICAL	
	21		Body shape (see shape)				
	22		Center line connections				
	23		Primary element material				
	24	Installation				LOCAL	
	25	Inndic / recorder installation					
Instrument	26	Function				LEVEL INDICATOR	
	27	TYPE (REQUIRED)				FLOAT TYPE	
	28	MEASURING RANGE				0 - 100 %	
	30	SCALE		PRECISION (mm)		MFR-STD	<= 15
	31	PROCESS CONNECTION SIZE, UPPER				SEE VESEL DESIGN	
	32	PROCESS CONNECTION SIZE, LOWER				SEE VESEL DESIGN	
	33	VENT & DRAIN CONNECTION				NA	
	34	CHAMBER CONNECTION (bottom &Top)				MFR-STD	
	35	CHAMBER MATERIAL				316 S.S.	
	36	FLOAT MATERIAL				316 L	
	37	WETTED PARTS TO NACE				NO	
Gauge Cocks	38	TYPE				NA	
	39	CONNECTION :	Vessel		Gauge	NA	NA
	40	CONNECTION :	Vent		Drain	NA	NA
	41	MATERIAL :	Body		Trim	NA	NA
switch	42	Type		Qty		NA	NA
	43	FUNCTION				NA	
	44	RATING				NA	
	45	EXPLOSION PROTECTION				NA	
	46	CABLE GLAND	SIZE		Qty	NA	NA
	47	INGRESS PROTECTION				NA	
	48	Others				NO	

General Notes:

* : Vendor to advise

1. LEVEL GAUGES SHALL BE SUITABLE FOR FLUID MENTIONED IN SERVICE CONDITION AND ENVIRONMENTAL CONDITIONS.

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/13/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: LEVEL GAUGE DATA SHEET

شرکت ملی صنایع پتروشیمی
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Contractor Job No: | Doc. No: 900-DAS-A4-IN-0011
Owner Job No: | Sheet No 6 of 28

General Data	1	Tag No.				LI -1154	
	2	Service				V 112A / V 112B	
	3	P&ID No.		Area		011	100
	4	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-28)°C / 44°C	0.82 Bara	86%
	5	Vessel		Material			
	6	Type of connections					
	7	Upper fluid					
	8	Upper fluid Sp . Gr.		Unit			Kg/m3
PROCESS CONDITION	9	Lower fluid					
	10	Lower fluid Sp . Gr.		Unit			Kg/m3
	11	Normal Temperature		Unit			°c
	12	Max Temperature		Unit			°c
	13	Normal Pressure		Unit			barg
	14	Max Pressure		Unit			barg
	15	Suspend solids					
	16	Liable to solidify or crystallize					
	17	Condence . Temp .at op . Press.			Unit		
	18	Fluid, if any, available for scrubbing					
	19	Measurement range		Unit		SEE VESEL DESIGN	mm
	20	Recomm	Instrument type			MECHANICAL	
	21		Body shape (see shape)				
	22		Center line connections				
	23		Primary element material				
	24	Installation				LOCAL	
	25	Inndic / recorder installation					
Instrument	26	Function				LEVEL INDICATOR	
	27	TYPE (REQUIRED)				FLOAT TYPE	
	28	MEASURING RANGE				0 - 100 %	
	30	SCALE		PRECISION (mm)		MFR-STD	<= 15
	31	PROCESS CONNECTION SIZE, UPPER				SEE VESEL DESIGN	
	32	PROCESS CONNECTION SIZE, LOWER				SEE VESEL DESIGN	
	33	VENT & DRAIN CONNECTION				SEE GENERAL NOTE 2 , 3	
	34	CHAMBER CONNECTION (bottom &Top)				MFR-STD	
	35	CHAMBER MATERIAL				316 S.S.	
	36	FLOAT MATERIAL				316 L	
	37	WETTED PARTS TO NACE				NO	
Gauge Cocks	38	TYPE				NA	
	39	CONNECTION :	Vessel		Gauge	NA	NA
	40	CONNECTION :	Vent		Drain	NA	NA
	41	MATERIAL :	Body		Trim	NA	NA
switch	42	Type		Qty		NA	NA
	43	FUNCTION				NA	
	44	RATING				NA	
	45	EXPLOSION PROTECTION				NA	
	46	CABLE GLAND	SIZE		Qty	NA	NA
	47	INGRESS PROTECTION				NA	
	48	Others				NO	

General Notes:

* : Vendor to advise

1. LEVEL GAUGES SHALL BE SUITABLE FOR FLUID MENTIONED IN SERVICE CONDITION AND ENVIRONMENTAL CONDITIONS.

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	1/10/2022	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: LEVEL GAUGE DATA SHEET

شرکت ملی صنایع پتروشیمی
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Contractor Job No: | Doc. No: 900-DAS-A4-IN-0011
Owner Job No: | Sheet No 7 of 28

General Data	1	Tag No.				LI -1155	
	2	Service				V 111	
	3	P&ID No.		Area		011	100
	4	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-28)°C / 44°C	0.82 Bara	86%
	5	Vessel		Material		V 111	S.S
	6	Type of connections					
	7	Upper fluid				AIR	
	8	Upper fluid Sp . Gr.		Unit		1	Kg/m3
PROCESS CONDITION	9	Lower fluid				OIL	
	10	Lower fluid Sp . Gr.		Unit		900	Kg/m3
	11	Normal Temperature		Unit		AMB	°c
	12	Max Temperature		Unit		+100	°c
	13	Normal Pressure		Unit		0.1	barg
	14	Max Pressure		Unit		1	barg
	15	Suspend solids				NO	
	16	Liable to solidify or crystallize				NO	
	17	Condence . Temp .at op . Press.			Unit		
	18	Fluid, if any, available for scrubbing					
	19	Measurement range		Unit		1000(To be Checked By Vendor)	mm
	20	Recomm	Instrument type			TRANSPARENCY	
	21		Body shape (see shape)			"D"	
	22		Center line connections				
	23		Primary element material				
	24	Installation				LOCAL	
	25	Inndic / recorder installation					
Instrument	26	Function				LEVEL INDICATOR	
	27	TYPE (REQUIRED)				MAGNETIC FLOAT TYPE	
	28	MEASURING RANGE				0 - 100 %	
	30	SCALE		PRECISION (mm)		MFR-STD	<= 15
	31	PROCESS CONNECTION SIZE, UPPER				3/4" , SIDE , #150 RF	
	32	PROCESS CONNECTION SIZE, LOWER				3/4" , SIDE , #150 RF	
	33	VENT & DRAIN CONNECTION				SEE GENERAL NOTE 2 , 3	
	34	CHAMBER CONNECTION (bottom &Top)				MFR-STD	
	35	CHAMBER MATERIAL				316 S.S.	
	36	FLOAT MATERIAL				316 L	
	37	WETTED PARTS TO NACE				NO	
Gauge Cocks	38	TYPE				NA	
	39	CONNECTION :	Vessel		Gauge	NA	NA
	40	CONNECTION :	Vent		Drain	NA	NA
	41	MATERIAL :	Body		Trim	NA	NA
switch	42	Type		Qty		NA	NA
	43	FUNCTION				NA	
	44	RATING				NA	
	45	EXPLOSION PROTECTION				NA	
	46	CABLE GLAND	SIZE		Qty	NA	NA
	47	INGRESS PROTECTION				NA	
	48	Others				NO	

Notes:
(1) Shall be defined by detail engineering on package vendor indication

General Notes:

* : Vendor to advise

1. LEVEL GAUGES SHALL BE SUITABLE FOR FLUID MENTIONED IN SERVICE CONDITION AND ENVIRONMENTAL CONDITIONS.
2. DRAIN CONNECTION SHALL BE EQUIPED WITH 1/2" BALL VALVE , 150# WITH S.S. BODY & TRIM.
3. VENT CONNECTION SHALL BE 1/2" ANSI 150# RF FLANGED AND WITH BLIND FLANGE.

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/13/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: PRESSURE GAUGE DATA SHEET

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No: 900-DAS-A4-IN-0010		
		Owner Job No:			Sheet No: 42 of 183		
General Data	1	Tag No.			PI - 1151		
	2	Tap Nº .			P1		
	3	P&ID No.	Piping Size	Piping Class	011	1/2"	1FS4
	4	Fluid	State		NITROGEN	GAS	
	5	Service			PRESS . V 114		
	6	Pressure rating	Piping material		600#	SS	
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	8	Area Classification	Area		ZONE 1	100	
PROCESS CONDITION	9	Normal Temperature	Unit		AMB (1)	°c	
	10	Max Temperature	Unit		-30 +120	°c	
	11	Normal Pressure	Unit		25 - 40	barg	
	12	Max Pressure	Unit		100	barg	
	13	Solid in suspension					
	14	Op. visc. (when>10 mpa's)					
	15	Liable to solidify or crystallize					
	16	Fluid, if any, available for purge					
	17	Sensing element material					
	18	Tracing					
	19	Jacketing					
	20	Measurement range	Unit		0 - 100	barg	
	21	Installation			LOCAL		
Gauge	22	Function			Local Indication		
	23	TYPE			Bourdon Tube		
	24	Measurment			Pressure		
	25	Case Material			SS-304		
	26	Mounting			Direct		
	27	Dial			100 mm - white with black figurs		
	28	Wetted Part Material			SS-316		
	29	Ring Material			SS-304		
	30	Degree of Protection			IP 65		
	31	Process connection			1/2" NPT - M		
	32	Measurment to unit			Barg		
	33	Pointer Material			VTA		
	34	Movement Material			SS		
Accessories	35	Siphon			NO		
	36	Snubber					
	37	Oil Fill					
	38	Movement Damping					
	39	Diaphragm Seal			YES		
	40	Manifold			2-VALVE MANIFOLD		
	41	Others					

Notes: (1) Ambient temperature it is suppose -28 ÷ +44°C

1	**0**	**12/14/2021**	**IFA**	**K.A**	**M.N**	**AA.SH**
No.	**Rev**	**Date**	**Status**	**Prepared**	**Checked**	**Approved**

PROJECT: PP-PE PILOT PLANT

TITLE: PRESSURE GAUGE DATA SHEET

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No: 900-DAS-A4-IN-0010		
		Owner Job No:			Sheet No: 43 of 183		
General Data	1	Tag No.			PI - 1152		
	2	Tap Nº .			P1		
	3	P&ID No.	Piping Size	Piping Class	011	1/2"	1FS4
	4	Fluid	State		NITROGEN	GAS	
	5	Service			PRESS . V 115		
	6	Pressure rating	Piping material		600#	SS	
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	8	Area Classification	Area		ZONE 1	100	
PROCESS CONDITION	9	Normal Temperature	Unit		AMB (1)	ºc	
	10	Max Temperature	Unit		-30 +120	ºc	
	11	Normal Pressure	Unit		25-40	barg	
	12	Max Pressure	Unit		100	barg	
	13	Solid in suspension					
	14	Op. visc. (when>10 mpa's)					
	15	Liable to solidify or crystallize					
	16	Fluid, if any, available for purge					
	17	Sensing element material					
	18	Tracing					
	19	Jacketing					
	20	Measurement range	Unit		0 - 100	barg	
	21	Installation			LOCAL		
Gauge	22	Function			Local Indication		
	23	TYPE			Bourdon Tube		
	24	Measurment			Pressure		
	25	Case Material			SS-304		
	26	Mounting			Direct		
	27	Dial			100 mm - white with black figurs		
	28	Wetted Part Material			SS-316		
	29	Ring Material			SS-304		
	30	Degree of Protection			IP 65		
	31	Process connection			1/2" NPT - M		
	32	Measurment to unit			Barg		
	33	Pointer Material			VTA		
	34	Movement Material			SS		
Accessories	35	Siphon			NO		
	36	Snubber					
	37	Oil Fill					
	38	Movement Damping					
	39	Diaphragm Seal			YES		
	40	Manifold			2-VALVE MANIFOLD		
	41	Others					

Notes: (1) Ambient temperature it is suppose -28 ÷ +44°C

1	0	12/14/2021	IFA	K.A	M.N	AA.SH
No.	Rev	Date	Status	Prepared	Checked	Approved

PROJECT: PP-PE PILOT PLANT

TITLE: PRESSURE GAUGE DATA SHEET

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No: 900-DAS-A4-IN-0010		
		Owner Job No:			Sheet No: 44 of 183		
General Data	1	Tag No.			PI - 1153		
	2	Tap Nº .					
	3	P&ID No.	Piping Size	Piping Class	011	1/4"	TUBING
	4	Fluid	State		OIL	LIQUID	
	5	Service			OIL TO V 112 A/B		
	6	Pressure rating	Piping material		#3000	S.S	
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	8	Area Classification	Area		ZONE 1	100	
PROCESS CONDITION	9	Normal Temperature	Unit		AMB (1)	ºc	
	10	Max Temperature	Unit		100	ºc	
	11	Normal Pressure	Unit		45 - 75	barg	
	12	Max Pressure	Unit		85	barg	
	13	Solid in suspension					
	14	Op. visc. (when>10 mpa's)			25 (40º)		
	15	Liable to solidify or crystallize					
	16	Fluid, if any, available for purge					
	17	Sensing element material					
	18	Tracing					
	19	Jacketing					
	20	Measurement range	Unit		0 - 100	barg	
	21	Installation			LOCAL		
Gauge	22	Function			Local Indication		
	23	TYPE			Bourdon Tube		
	24	Measurment			Pressure		
	25	Case Material			SS-304		
	26	Mounting			Direct		
	27	Dial			100 mm - white with black figurs		
	28	Wetted Part Material			SS-316		
	29	Ring Material			SS-304		
	30	Degree of Protection			IP 65		
	31	Process connection			1/2" NPT - M		
	32	Measurment to unit			Barg		
	33	Pointer Material			VTA		
	34	Movement Material			SS		
Accessories	35	Siphon			NO		
	36	Snubber					
	37	Oil Fill					
	38	Movement Damping					
	39	Diaphragm Seal			YES		
	40	Manifold			2-VALVE MANIFOLD		
	41	Others					

Notes: (1) Ambient temperature it is suppose -28 ÷ +44°C

1	**0**	**12/14/2021**	**IFA**	**K.A**	**M.N**	**AA.SH**
No.	**Rev**	**Date**	**Status**	**Prepared**	**Checked**	**Approved**

PROJECT: PP-PE PILOT PLANT

TITLE: PRESSURE GAUGE DATA SHEET

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No: 900-DAS-A4-IN-0010		
		Owner Job No:			Sheet No: 45 of 183		
General Data	1	Tag No.			PI - 1154		
	2	Tap Nº .					
	3	P&ID No.	Piping Size	Piping Class	011	1/2"	1FS4
	4	Fluid	State		OIL	LIQUID	
	5	Service			OIL FROM V 112 A/B		
	6	Pressure rating	Piping material		#600	S.S	
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	8	Area Classification	Area		ZONE 1	100	
PROCESS CONDITION	9	Normal Temperature	Unit		AMB (1)	ºc	
	10	Max Temperature	Unit		100	ºc	
	11	Normal Pressure	Unit		25-40	barg	
	12	Max Pressure	Unit		85	barg	
	13	Solid in suspension					
	14	Op. visc. (when>10 mpa's)			17 (30º)		
	15	Liable to solidify or crystallize					
	16	Fluid, if any, available for purge					
	17	Sensing element material					
	18	Tracing					
	19	Jacketing					
	20	Measurement range	Unit		0 - 100	barg	
	21	Installation			LOCAL		
Gauge	22	Function			Local Indication		
	23	TYPE			Bourdon Tube		
	24	Measurment			Pressure		
	25	Case Material			SS-304		
	26	Mounting			Direct		
	27	Dial			100 mm - white with black figurs		
	28	Wetted Part Material			SS-316		
	29	Ring Material			SS-304		
	30	Degree of Protection			IP 65		
	31	Process connection			1/2" NPT - M		
	32	Measurment to unit			Barg		
	33	Pointer Material			VTA		
	34	Movement Material			SS		
Accessories	35	Siphon			NO		
	36	Snubber					
	37	Oil Fill					
	38	Movement Damping					
	39	Diaphragm Seal			YES		
	40	Manifold			2-VALVE MANIFOLD		
	41	Others					

Notes: (1) Ambient temperature it is suppose -28 ÷ +44°C

1	**0**	**12/14/2021**	**IFA**	**K.A**	**M.N**	**AA.SH**
No.	**Rev**	**Date**	**Status**	**Prepared**	**Checked**	**Approved**

PROJECT: PP-PE PILOT PLANT

TITLE: PRESSURE GAUGE DATA SHEET

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No: 900-DAS-A4-IN-0010		
		Owner Job No:			Sheet No: 37 of 108		
General Data	1	Tag No.			PI - 1155		
	2	Tap Nº .					
	3	P&ID No.	Piping Size	Piping Class	011	1/2"	1CS2
	4	Fluid	State		NITROGEN	GAS	
	5	Service			PRESS V 113		
	6	Pressure rating	Piping material		300#	S.S	
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	8	Area Classification	Area		ZONE 1	100	
PROCESS CONDITION	9	Normal Temperature	Unit		AMB (1)	ºc	
	10	Max Temperature	Unit		100	ºc	
	11	Normal Pressure	Unit		7	barg	
	12	Max Pressure	Unit		10	barg	
	13	Solid in suspension					
	14	Op. visc. (when>10 mpa's)					
	15	Liable to solidify or crystallize					
	16	Fluid, if any, available for purge					
	17	Sensing element material					
	18	Tracing					
	19	Jacketing					
	20	Measurement range	Unit		0 - 20	barg	
	21	Installation			LOCAL		
Gauge	22	Function			Local Indication		
	23	TYPE			Bourdon Tube		
	24	Measurment			Pressure		
	25	Case Material			SS-304		
	26	Mounting			Direct		
	27	Dial			100 mm - white with black figurs		
	28	Wetted Part Material			SS-316		
	29	Ring Material			SS-304		
	30	Degree of Protection			IP 65		
	31	Pressure Gauge connection			1/2" NPT - M		
	32	Measurment to unit			Barg		
	33	Pointer Material			VTA		
	34	Movement Material			SS		
Accessories	35	Siphon			NO		
	36	Snubber					
	37	Oil Fill					
	38	Movement Damping					
	39	Diaphragm Seal			YES		
	40	Diaphragm Seal Type	size&rate				
	41	Saze&P. Rating for Upper&Lower Flange			Upper:	Lower:	
	42	Manifold			2-VALVE MANIFOLD		
	43	Others					

Notes: (1) Ambient temperature it is suppose -28 ÷ +44°C

1	**0**	**12/14/2021**	**IFA**	**K.A**	**M.N**	**AA.SH**
No.	**Rev**	**Date**	**Status**	**Prepared**	**Checked**	**Approved**

PROJECT: PP-PE PILOT PLANT

TITLE: PRESSURE GAUGE DATA SHEET

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No: 900-DAS-A4-IN-0010		
		Owner Job No:			Sheet No: 47 of 183		
General Data	1	Tag No.			PI - 1156		
	2	Tap Nº .					
	3	P&ID No.	Piping Size	Piping Class	011	1/2"	TUBING
	4	Fluid	State		OIL	LIQUID	
	5	Service			PRESS . DISCHARGE P 112		
	6	Pressure rating	Piping material			S.S	
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	8	Area Classification	Area		ZONE 1	100	
PROCESS CONDITION	9	Normal Temperature	Unit		AMB (1)	ºc	
	10	Max Temperature	Unit		100	ºc	
	11	Normal Pressure	Unit		45 - 75	barg	
	12	Max Pressure	Unit		100	barg	
	13	Solid in suspension					
	14	Op. visc. (when>10 mpa's)					
	15	Liable to solidify or crystallize					
	16	Fluid, if any, available for purge					
	17	Sensing element material					
	18	Tracing					
	19	Jacketing					
	20	Measurement range	Unit		0 - 100	barg	
	21	Installation			LOCAL		
Gauge	22	Function			Local Indication		
	23	TYPE			Bourdon Tube		
	24	Measurment			Pressure		
	25	Case Material			SS-304		
	26	Mounting			Direct		
	27	Dial			100 mm - white with black figurs		
	28	Wetted Part Material			SS-316		
	29	Ring Material			SS-304		
	30	Degree of Protection			IP 65		
	31	Process connection			1/2" NPT - M		
	32	Measurment to unit			Barg		
	33	Pointer Material			VTA		
	34	Movement Material			SS		
Accessories	35	Siphon			NO		
	36	Snubber					
	37	Oil Fill					
	38	Movement Damping					
	39	Diaphragm Seal			YES		
	40	Manifold			2-VALVE MANIFOLD		
	41	Others					

Notes: (1) Ambient temperature it is suppose -28 +44°C

1	0	12/14/2021	IFA	K.A	M.N	AA.SH
No.	Rev	Date	Status	Prepared	Checked	Approved

PROJECT: PP-PE PILOT PLANT

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شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No: 900-DAS-A4-IN-0010		
		Owner Job No:			Sheet No: 48 of 183		
General Data	1	Tag No.			PI - 1157		
	2	Tap Nº .					
	3	P&ID No.	Piping Size	Piping Class	011	1/2"	TUBING
	4	Fluid		State	OIL	LIQUID	
	5	Service			PRESS . DISCHARGE P 112		
	6	Pressure rating		Piping material		S.S	
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	8	Area Classification		Area	ZONE 1	100	
PROCESS CONDITION	9	Normal Temperature		Unit	AMB (1)	ºc	
	10	Max Temperature		Unit	100	ºc	
	11	Normal Pressure		Unit	45 - 75	barg	
	12	Max Pressure		Unit	100	barg	
	13	Solid in suspension					
	14	Op. visc. (when>10 mpa's)					
	15	Liable to solidify or crystallize					
	16	Fluid, if any, available for purge					
	17	Sensing element material					
	18	Tracing					
	19	Jacketing					
	20	Measurement range		Unit	0 - 100	barg	
	21	Installation			LOCAL		
Gauge	22	Function			Local Indication		
	23	TYPE			Bourdon Tube		
	24	Measurment			Pressure		
	25	Case Material			SS-304		
	26	Mounting			Direct		
	27	Dial			100 mm - white with black figurs		
	28	Wetted Part Material			SS-316		
	29	Ring Material			SS-304		
	30	Degree of Protection			IP 65		
	31	Process connection			1/2" NPT - M		
	32	Measurment to unit			Barg		
	33	Pointer Material			VTA		
	34	Movement Material			SS		
Accessories	35	Siphon			NO		
	36	Snubber					
	37	Oil Fill					
	38	Movement Damping					
	39	Diaphragm Seal			YES		
	40	Manifold			2-VALVE MANIFOLD		
	41	Others					

Notes: (1) Ambient temperature it is suppose -28 ÷ +44°C

1	**0**	**12/14/2021**	**IFA**	**K.A**	**M.N**	**AA.SH**
No.	**Rev**	**Date**	**Status**	**Prepared**	**Checked**	**Approved**

PROJECT: PP-PE PILOT PLANT

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شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No: 900-DAS-A4-IN-0010		
		Owner Job No:			Sheet No: 49 of 183		
General Data	1	Tag No.			PI - 1158		
	2	Tap Nº .					
	3	P&ID No.	Piping Size	Piping Class	011	1/2"	TUBING
	4	Fluid	State		OIL	LIQUID	
	5	Service			OIL TO P 112		
	6	Pressure rating	Piping material			S.S	
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	8	Area Classification	Area		ZONE 1	100	
PROCESS CONDITION	9	Normal Temperature	Unit		AMB (1)	ºc	
	10	Max Temperature	Unit		100	ºc	
	11	Normal Pressure	Unit		8	barg	
	12	Max Pressure	Unit		20	barg	
	13	Solid in suspension					
	14	Op. visc. (when>10 mpa's)			25 (40º)		
	15	Liable to solidify or crystallize					
	16	Fluid, if any, available for purge					
	17	Sensing element material					
	18	Tracing					
	19	Jacketing					
	20	Measurement range	Unit		0 - 25	barg	
	21	Installation			LOCAL		
Gauge	22	Function			Local Indication		
	23	TYPE			Bourdon Tube		
	24	Measurment			Pressure		
	25	Case Material			SS-304		
	26	Mounting			Direct		
	27	Dial			100 mm - white with black figurs		
	28	Wetted Part Material			SS-316		
	29	Ring Material			SS-304		
	30	Degree of Protection			IP 65		
	31	Process connection			1/2" NPT - M		
	32	Measurment to unit			Barg		
	33	Pointer Material			VTA		
	34	Movement Material			SS		
Accessories	35	Siphon			NO		
	36	Snubber					
	37	Oil Fill					
	38	Movement Damping					
	39	Diaphragm Seal			YES		
	40	Manifold			2-VALVE MANIFOLD		
	41	Others					

Notes: (1) Ambient temperature it is suppose -28 ÷ +44°C

1	**0**	**12/14/2021**	**IFA**	**K.A**	**M.N**	**AA.SH**
No.	**Rev**	**Date**	**Status**	**Prepared**	**Checked**	**Approved**

PROJECT: PP-PE PILOT PLANT

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شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No: 900-DAS-A4-IN-0010		
		Owner Job No:			Sheet No: 50 of 183		
General Data	1	Tag No.			PI - 1159		
	2	Tap Nº .					
	3	P&ID No.	Piping Size	Piping Class	011	1/2"	TUBING
	4	Fluid	State		OIL	LIQUID	
	5	Service			OIL TO P 112		
	6	Pressure rating	Piping material			S.S	
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	8	Area Classification	Area		ZONE 1	100	
PROCESS CONDITION	9	Normal Temperature	Unit		AMB (1)	ºc	
	10	Max Temperature	Unit		100	ºc	
	11	Normal Pressure	Unit		8	barg	
	12	Max Pressure	Unit		20	barg	
	13	Solid in suspension					
	14	Op. visc. (when>10 mpa's)			25 (40º)		
	15	Liable to solidify or crystallize					
	16	Fluid, if any, available for purge					
	17	Sensing element material					
	18	Tracing					
	19	Jacketing					
	20	Measurement range	Unit		0 - 25	barg	
	21	Installation			LOCAL		
Gauge	22	Function			Local Indication		
	23	TYPE			Bourdon Tube		
	24	Measurment			Pressure		
	25	Case Material			SS-304		
	26	Mounting			Direct		
	27	Dial			100 mm - white with black figurs		
	28	Wetted Part Material			SS-316		
	29	Ring Material			SS-304		
	30	Degree of Protection			IP 65		
	31	Process connection			1/2" NPT - M		
	32	Measurment to unit			Barg		
	33	Pointer Material			VTA		
	34	Movement Material			SS		
Accessories	35	Siphon			NO		
	36	Snubber					
	37	Oil Fill					
	38	Movement Damping					
	39	Diaphragm Seal			YES		
	40	Manifold			2-VALVE MANIFOLD		
	41	Others					

Notes: (1) Ambient temperature it is suppose -28 ÷ +44°C

1	**0**	**12/14/2021**	**IFA**	**K.A**	**M.N**	**AA.SH**
No.	**Rev**	**Date**	**Status**	**Prepared**	**Checked**	**Approved**

PROJECT: PP-PE PILOT PLANT

TITLE: PRESSURE GAUGE DATA SHEET

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0010
Owner Job No: | Sheet No: 51 of 183

General Data	1	Tag No.			PI - 1160		
	2	Tap Nº .					
	3	P&ID No.	Piping Size	Piping Class	011	1/2"	1CS2
	4	Fluid	State		OIL	LIQUID	
	5	Service			PRESS P 111		
	6	Pressure rating	Piping material		150#	SS	
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	8	Area Classification	Area		ZONE 1	100	
PROCESS CONDITION	9	Normal Temperature	Unit		AMB (1)	ºc	
	10	Max Temperature	Unit		100	ºc	
	11	Normal Pressure	Unit		8	barg	
	12	Max Pressure	Unit		20	barg	
	13	Solid in suspension					
	14	Op. visc. (when>10 mpa's)			25 (40º)		
	15	Liable to solidify or crystallize					
	16	Fluid, if any, available for purge					
	17	Sensing element material					
	18	Tracing					
	19	Jacketing					
	20	Measurement range	Unit		0 - 25	barg	
	21	Installation			LOCAL		
Gauge	22	Function			Local Indication		
	23	TYPE			Bourdon Tube		
	24	Measurment			Pressure		
	25	Case Material			SS-304		
	26	Mounting			Direct		
	27	Dial			100 mm - white with black figurs		
	28	Wetted Part Material			SS-316		
	29	Ring Material			SS-304		
	30	Degree of Protection			IP 65		
	31	Process connection			1/2" NPT - M		
	32	Measurment to unit			Barg		
	33	Pointer Material			VTA		
	34	Movement Material			SS		
Accessories	35	Siphon			NO		
	36	Snubber					
	37	Oil Fill					
	38	Movement Damping					
	39	Diaphragm Seal			YES		
	40	Manifold			2-VALVE MANIFOLD		
	41	Others					

Notes: (1) Ambient temperature it is suppose -28 ÷ +44°C

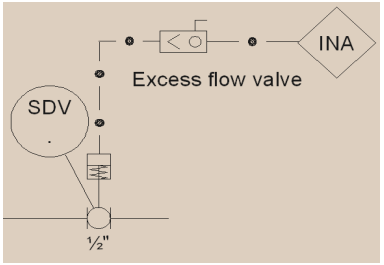
No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/14/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

Safety Device Valve (SAFETY DEPRESSURAIZE VALVE)

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:		Doc. No:	
		Owner Job No:		Sheet No: of	
Valve (HV)	General Data	Item		SDV 1101	
		Sevice		V-114 VENT	
		Location		V-114	
		P&I n.			
		Fluid		Nitrogen	
		State		GAS	
	Condition	Normal Pressure	Barg	30	
		Normal DP	Barg	30	
		Max Pressure	Barg	40	
		Normal Temp.	°C	20	
		Max. Temp.	°C	-45 +70	
	Flowrate	Normal	Kg/h		
		Minimum	Kg/h	0	
		Full Scale	Kg/h	0	
	Sp. Gr.	Gas vapurs	Kg/m3		
		Liquid	Kg/m3		
		Mol. Weight	Kg/Kmol		
		Viscosity	mPa's		
	Body	Type		BALL FULL BORE	
		Size		½" 1CS2	
		Rating		RF Flange-S.S-150#	
		Fire Safe Seat			
		Body material			
		Valve Seat			
		Valve Seat material			
		Notes			
Actuator		Type		PNEUMATIC	
		Acition		SINGLE ACTION	
		Air supply press.	Barg	7	
		On Air Failure		OPEN	
		On Power Failure			
		SEAT Leakage Class ANSI			
ACCESSORIES		Melting conection valve		YES	
		Pressure gauge and filter		YES	
		Manual Control Wheel		NA	
		Cable Gland	Size/Qty	NA	
		Electrical Conection		NA	
		Tubing & Conection		SS Tube 1/4"	
		Switch / Protection / Certificate		NA	EExia-IIC T4 / YES



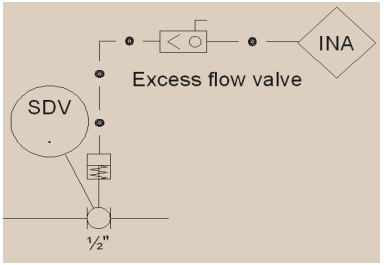
No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/27/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

Safety Device Valve (SAFETY DEPRESSURAIZE VALVE)

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:		Doc. No:	
		Owner Job No:		Sheet No: of	
Valve (HV)	General Data	Item		SDV 1102	
		Sevice		V-115 VENT	
		Location		V-115	
		P&I n.			
		Fluid		Nitrogen	
		State		GAS	
	Condition	Normal Pressure	Barg	30	
		Normal DP	Barg	30	
		Max Pressure	Barg	40	
		Normal Temp.	°C	20	
		Max. Temp.	°C	-45 +70	
	Flowrate	Normal	Kg/h		
		Minimum	Kg/h	0	
		Full Scale	Kg/h	0	
	Sp. Gr.	Gas vapurs	Kg/m3		
		Liquid	Kg/m3		
		Mol. Weight	Kg/Kmol		
		Viscosity	mPa's		
	Body	Type		BALL FULL BORE	
		Size		½" 1CS2	
		Rating		RF Flange-S.S-150#	
		Fire Safe Seat			
		Body material			
		Valve Seat			
		Valve Seat material			
		Notes			
Actuator		Type		PNEUMATIC	
		Acition		SINGLE ACTION	
		Air supply press.	Barg	7	
		On Air Failure		OPEN	
		On Power Failure			
		SEAT Leakage Class ANSI			
ACCESSORIES		Melting conection valve		YES	
		Pressure gauge and filter		YES	
		Manual Control Wheel		NA	
		Cable Gland	Size/Qty	NA	
		Electrical Conection		NA	
		Tubing & Conection		SS Tube 1/4"	
		Switch / Protection / Certificate		NA / EExia-IIC T4 / YES	



No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/27/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: Pressure Safety / Relief Valve Data Sheet

شرکت ملی صنایع پتروشیمی

شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No:

Owner Job No: | Sheet No: of

General Data	1	Tag No.				PSV 1101		
	2	Piping or Vessel				P 111		
	3	P&ID No.	Piping Size	Class	Line No	012	1/2"	1CS2
	4	Fluid		State		OIL		X Liq. o Aer. o Flash
	5	Pressure rating		Piping material		#150		S.S
	6	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-20)°C / 50°C	0.82 Bara	86%
	7	Area Classification		Area		zone 1		100
OPERATING CONDITIONS	8	SP. WEIGHT		VISC. AT RELIEV. T.		860 kg/m3		2.87 cp
	9	MOLEC. WEIGHT		SPEC. HEAT RATIO		60		
	10	INLET COMPRESSIBILITY FACTOR						
	11	OPERATING PRESS.		MIN - MAX		5 barg		
	12	BACK-PRESS.	SUPERIMP.	MIN - MAX		0.1 barg		
	13		BUILT-UP AT DISCHARGE			0.15 barg		
	14	SET Press.				10 barg		
	15	OVERPRESSURE				10 %		
	16	OPERATING/DISCHARGE TEMP.				25 °C		
	17	TEMPERATURE RANGE				-45 +100 °C		
	18	FLOW RATE TO BE DISCHARGED				4.55 kg/h		
	19	CALCULATION HYPOTHESIS				o FIRE o LIQ. EX. X OPER. MISTAKE		
SIZING	20	AREA: CALCULATED-SELECTED				0,002 (1) cm2		
	21	ORIFICE				"D" (1)		
	23	CONNECTION & NOMIN. PRESSURE				INLET ½" #150		
						OUTLET ½" #150		
Materials	24	BODY				o C.S. o 304 S.S. X 316 S.S.		
	25	BONNET				o C.S.		
	26	SPRING				o C.S. X 316 S.S. o TUNGST. ST.		
	27	STEM & GUIDE				STD SS		
	28	NOZZLE OR SEAT				Metal-to-Metal - STD S.S.		
	29	PLUG				STD SS		
ACCESS.& OPTIONALS	30	BONNET: CLOSED - EXTENS. - OPENED				CLOSED		
	31	LIFTING LEVER				o WITH PACKING o PLAIN		
	32	BALANC. BELLOWS - MATERIAL				o YES		
	33	BALANC. PISTON - METAL				o YES		
	34	HEATING: JACKET - NOZZLE - INJECT.				NO		
	35	HEATING CONNECTIONS				NO		

Notes:

(1) To be checked by Vendor.

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/26/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: Pressure Safety / Relief Valve Data Sheet

شرکت ملی صنایع پتروشیمی

شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No:

Owner Job No: | Sheet No: of

General Data	1	Tag No.				PSV 1102		
	2	Piping or Vessel				V-115		
	3	P&ID No.	Piping Size	Class	Line No	012	1/2"	1FS4
	4	Fluid		State		OIL		X Liq. o Aer. o Flash
	5	Pressure rating		Piping material		#600		S.S
	6	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-20)°C / 50°C	0.82 Bara	86%
	7	Area Classification		Area		zone 1		100
OPERATING CONDITIONS	8	SP. WEIGHT		VISC. AT RELIEV. T.		850 kg/m3		2.87 cp
	9	MOLEC. WEIGHT		SPEC. HEAT RATIO		60		
	10	INLET COMPRESSIBILITY FACTOR						
	11	OPERATING PRESS.		MIN - MAX		30 barg		
	12	BACK-PRESS.	SUPERIMP.	MIN - MAX		0.1 barg		
	13		BUILT-UP AT DISCHARGE			0.15 barg		
	14	SET Press.				65 barg		
	15	OVERPRESSURE				10 %		
	16	OPERATING/DISCHARGE TEMP.				25 °C		
	17	TEMPERATURE RANGE				-45 +100 °C		
	18	FLOW RATE TO BE DISCHARGED				4.55 kg/h		
	19	CALCULATION HYPOTHESIS				o FIRE o LIQ. EX. X OPER. MISTAKE		
SIZING	20	AREA: CALCULATED-SELECTED				0,002 (1) cm2		
	21	ORIFICE				"D" (1)		
	23	CONNECTION & NOMIN. PRESSURE				INLET ½" #600		
						OUTLET 1" #150		
Materials	24	BODY				o C.S. o 304 S.S. X 316 S.S.		
	25	BONNET				o C.S.		
	26	SPRING				o C.S. X 316 S.S. o TUNGST. ST.		
	27	STEM & GUIDE				STD SS		
	28	NOZZLE OR SEAT				Metal-to-Metal - STD S.S.		
	29	PLUG				STD SS		
ACCESS.& OPTIONALS	30	BONNET: CLOSED - EXTENS. - OPENED				CLOSED		
	31	LIFTING LEVER				o WITH PACKING o PLAIN		
	32	BALANC. BELLOWS - MATERIAL				o YES		
	33	BALANC. PISTON - METAL				o YES		
	34	HEATING: JACKET - NOZZLE - INJECT.				NO		
	35	HEATING CONNECTIONS				NO		

Notes:

(1) To be Checked By Vendor

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/26/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: Pressure Safety / Relief Valve Data Sheet

شرکت ملی صنایع پتروشیمی

شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No:

Owner Job No: | Sheet No: of

General Data	1	Tag No.				PSV 1103		
	2	Piping or Vessel				V-114		
	3	P&ID No.	Piping Size	Class	Line No	012	1/2"	1FS4
	4	Fluid		State		OIL		X Liq. o Aer. o Flash
	5	Pressure rating		Piping material		#600		S.S
	6	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-20)°C / 50°C	0.82 Bara	86%
	7	Area Classification		Area		zone 1		100
OPERATING CONDITIONS	8	SP. WEIGHT		VISC. AT RELIEV. T.		850 kg/m3		2.87 cp
	9	MOLEC. WEIGHT		SPEC. HEAT RATIO		60		
	10	INLET COMPRESSIBILITY FACTOR						
	11	OPERATING PRESS.		MIN - MAX		30		barg
	12	BACK-PRESS.		SUPERIMP.	MIN - MAX	0.1		barg
	13			BUILT-UP AT DISCHARGE		0.15		barg
	14	SET Press.				65		barg
	15	OVERPRESSURE				10		%
	16	OPERATING/DISCHARGE TEMP.				25		°C
	17	TEMPERATURE RANGE				-45 +100		°C
	18	FLOW RATE TO BE DISCHARGED				4.55		kg/h
	19	CALCULATION HYPOTHESIS				o FIRE X OPER. MISTAKE		o LIQ. EX.
SIZING	20	AREA: CALCULATED-SELECTED				0,002 (1)		cm2
	21	ORIFICE				"D" (1)		
	23	CONNECTION & NOMIN. PRESSURE				INLET	½" #600	
						OUTLET	1" #150	
Materials	24	BODY				o C.S.	o 304 S.S.	X 316 S.S.
	25	BONNET				o C.S.		
	26	SPRING				o C.S.	X 316 S.S.	o TUNGST. ST.
	27	STEM & GUIDE				STD SS		
	28	NOZZLE OR SEAT				Metal-to-Metal - STD S.S.		
	29	PLUG				STD SS		
ACCESS.& OPTIONALS	30	BONNET: CLOSED - EXTENS. - OPENED				CLOSED		
	31	LIFTING LEVER				o WITH PACKING		o PLAIN
	32	BALANC. BELLOWS - MATERIAL				o YES		
	33	BALANC. PISTON - METAL				o YES		
	34	HEATING: JACKET - NOZZLE - INJECT.				NO		
	35	HEATING CONNECTIONS				NO		

Notes:

(1) To be checked by Vendor.

1	0	12/26/2021	IFA	K.A	M.N	AA.SH
No.	Rev	Date	Status	Prepared	Checked	Approved

PROJECT: PP-PE PILOT PLANT

TITLE: Pressure Regulator Valve Data Sheet

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0006
Owner Job No: | Sheet No: 1 of 18

General Data	1	Tag No.				PCV-1161			
	2	Service				NHC TO V 114			
	3	P&ID No.	Piping Size	Class	Line No	011	1/4"	Tubing	1101
	4	Fluid		State		Nitrogen		Gas	
	5	Pressure rating		Piping material					
	6	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-20)°C / 50°C	0.82 Bara		86%
	7	Area Classification		Area		ZONE 1		100	
process condition	8	Normal Temperature		Unit		AMB		◦C	
	9	Max Temperature		Unit		100		◦C	
	10	Normal Pressure		Unit		40 - 60		barg	
	11	Max Pressure		Unit		70		barg	
Flow Rate	12	Max.Continuous		Unit		0.25		Kg/h	
	13	Min.Continuous		Unit		0.025		Kg/h	
	14	Max.In Transients		Unit		0.3		Kg/h	
	15	Allow. with closed valve		Unit		0		Kg/h	
Press	16	Norm . Op. upstr. Press		Unit		80 - 200		barg	
	17	Dp. At max. flowrate		Unit		20 - 140		bar	
	18	Max. Dp with closed valve		Unit		200		bar	
Temperature	19	Norm . upstr. Temp		Unit		AMB		◦C	
	20	Max . upstr. Temp		Unit		100		◦C	
Sp. Gr.	21	Gases vapours		Unit		98.8 - 220		Kg/m3	
	22	Liquids		Unit				Kg/m3	
	23	Mol.weight		Unit		28		Kg/Kmol	
Visc.	24	Op. visc. (when>5mpa's)				0.019			
	25	Solid in suspension							
INSTRUMENT	26	Range (SET POINT)		Unit		30 - 65		barg	
	27	Installation				LOCAL			
	28	Pressure increase valve				CLOSES			
Cv	29	Min/Norm/Max		Required		VTA		VTA	
Body	30	Body type		Body material		Globe		SS-304	
	31	Size Body		Port		1/4"		Single	
	32	Design Pressure		Min. Bar a	Max. Bar a			Barg	
	33	Design Temperature		Min. °C	Max. °C			◦C	
	34	Valve end con. & rating		Seat leakage class				ANSI IV	
	35	Packing mat.		Lubricator		PTFE		VTA	
	36	Flow direction				FTO			
	37	Bonnet type				Standard			
	38	Back Pressure Range				VTA			
	39	D.PRESS (DESIGN)				VTA			
	40	D.TEMP (DESIGN)				VTA			
Trim	41	Plug type		Plug material		Contoured		SS - 316	
	42	Characteristics				Equal Percentage			
	43	Seat Material		Cage/Guide Material		SS - 316		NA	
Actuator	44	Type / Material				Diaphragm/VTA			
	45	Spring range				VTA			

Notes:

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/23/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: Pressure Regulator Valve Data Sheet

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0006

Owner Job No: | Sheet No: 2 of 18

General Data	1	Tag No.				PCV-1162		
	2	Service				NIT TO V 113		
	3	P&ID No.	Piping Size	Class	Line No	011	1/2"	1CS2	1101
	4	Fluid		State		Nitrogen		Gas	
	5	Pressure rating		Piping material		150#		Stainless Steel	
	6	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-20)°C / 50°C	0.82 Bara		86%
	7	Area Classification		Area		ZONE 1		100	
process condition	8	Normal Temperature		Unit		AMB		◦C	
	9	Max Temperature		Unit		100		◦C	
	10	Normal Pressure		Unit		5		barg	
	11	Max Pressure		Unit		7		barg	
Flow Rate	12	Max.Continuous		Unit		0.08		Kg/h	
	13	Min.Continuous		Unit		0.008		Kg/h	
	14	Max.In Transients		Unit		0.096		Kg/h	
	15	Allow. with closed valve		Unit		0		Kg/h	
Press	16	Norm . Op. upstr. Press		Unit		5		barg	
	17	Dp. At max. flowrate		Unit		2 - 4		bar	
	18	Max. Dp with closed valve		Unit		7		bar	
Temperature	19	Norm . upstr. Temp		Unit		AMB		◦C	
	20	Max . upstr. Temp		Unit		100		◦C	
Sp. Gr.	21	Gases vapours		Unit		6.8		Kg/m3	
	22	Liquids		Unit				Kg/m3	
	23	Mol.weight		Unit		28		Kg/Kmol	
Visc.	24	Op. visc. (when>5mpa's)				0.018			
	25	Solid in suspension							
INSTRUMENT	26	Range (SET POINT)		Unit		2 - 4		barg	
	27	Installation				LOCAL			
	28	Pressure increase valve				CLOSES			
Cv	29	Min/Norm/Max		Required		VTA		VTA	
Body	30	Body type		Body material		Globe		SS-304	
	31	Size Body		Port		1/2"		Single	
	32	Design Pressure		Min. Bar a	Max. Bar a			Barg	
	33	Design Temperature		Min. °C	Max. °C			◦C	
	34	Valve end con. & rating		Seat leakage class		Flange 150#		ANSI IV	
	35	Packing mat.		Lubricator		PTFE		VTA	
	36	Flow direction				FTO			
	37	Bonnet type				Standard			
	38	Back Pressure Range				VTA			
	39	D.PRESS (DESIGN)				VTA			
	40	D.TEMP (DESIGN)				VTA			
Trim	41	Plug type		Plug material		Contoured		SS - 316	
	42	Characteristics				Equal Percentage			
	43	Seat Material		Cage/Guide Material		SS - 316		NA	
Actuator	44	Type / Material				Diaphragm/VTA			
	45	Spring range				VTA			

Notes:

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/23/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: Flow Transmitter (Integral Orifice) Data Sheet

شرکت ملی صنایع پتروشیمی

شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:				Doc. No: 900-DAS-A4-IN-0016			
		Owner Job No:				Sheet No 20 of 109			
General Data	1	Tag No.				FT - 1101			
	2	Tap N° .							
	3	P&ID No.	Piping Size	Class	Line No	011	1/2"	1CS2	1102
	4	Fluid		State		OIL		LIQUID	
	5	Service				OIL TO P 112			
	6	Pressure rating		Piping material		150 #		SS	
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-28)°C / 44°C	0.82 Bara	86%	
	8	Area Classification		Area		ZONE 1		100	
PROCESS CONDITION	9	Flowrate	Max. Continuous	Unit		20		Kg/h	
	10		Min. Continuous	Unit		2		Kg/h	
	11		Full Scale	Unit		24		Kg/h	
	12	Meters	Operation	hours/24					
	13		Piping arrangement						
	14		Flow direction						
	15	Normal Temperature		Unit		AMB		°C	
	16	Max Temperature		Unit		100		°C	
	17	Normal Pressure		Unit		8		barg	
	18	Max Pressure		Unit		20		barg	
	19	Allow . Press . Drop		Unit		0.5		barg	
	20	Sp . Gr	Gases Vapours	Unit				kg/m3	
	21		Liquids	Unit		850		kg/m3	
	22		Mol.Weight	Unit				kg/kmol	
	23	Viscosity at OP . Cond		Unit		25 (40°)		m pa's	
	24	OP . Compressib . Factor							
	25	Solids in suspension				NO			
	26	Sensing element material							
	27	tracing		Jacketing		NO		NO	
Integral Orifice	28	Type				Integral Orifice (Orifice Plate+Flange+Straight run pipe)			
	29	Pipe & Flange Material				STAINLESS STEEL			
	30	Orifice Plate Material				SS-316			
	31	Orifice Plate Bore Diameter				VTA			
	32	Beta Ratio (d/D)				VTA			
	33	Diffrential Pressure Range				Preferably 250 mBar			
TRANSMITTER	34	Function				Indicating Transmitter			
	35	TYPE				d/p Cell (Integrated with manifold & orifice)			
	36	Power Supply				24V DC			
	37	Case Material				AISI 304			
	38	Mounting				Direct			
	39	Measuring Range				VTA			
	40	Accuracy				0.20%			
	41	Wetted Part Material				AISI 316			
	42	Degree of Protection				IP 65			
	43	Explosion Protection				EExib IIB T3			
	44	Process connection				to be suit to direct connection to manifold			
	45	Element Material				AISI 316L			
	46	Electrical Connection				Gland M20			
	47	Out Put Signal				4-20 mA-Loop Powered, HART			
Accessories	48	Local Indication				Yes			
	49	Others				NA			

NOTE:

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	1/8/2022	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: Level Transmitter Data Sheet

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No:

Owner Job No: | Sheet No: of

General Data	1	Tag No.				LT - 1101		
	2	Tap Nº .				V-112A		
	3	P&ID No.	Piping Size	Class	Line. No	0011		
	4	Fluid		State		OIL	LIQUID	
	5	Service				V 112A LEVEL		
	6	Pressure rating		Piping material				
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max		(-28)°C / 44°C	0.82 Bara	86%
	8	Area Classification		Area		ZONE 1	000	
	9	Upper fluid						
	10	Upper fluid Sp . Gr		Unit			Kg/m3	
	11	Lower fluid				OIL		
	12	Lower fluid Sp . Gr		Unit		870	Kg/m3	
	13	Type of connections				SEE VESSEL DETAIL		
	14	Normal Temperature		Unit		15	ºC	
	15	Max Temperature		Unit		-40 +70	ºC	
	16	Normal Pressure		Unit		30	barg	
	17	Max Pressure		Unit		65	barg	
	18	Allow . Press . Drop		Unit			barg	
	19	Measurement Range		Unit		SEE VESSEL DETAIL	mm	
TRANSMITTER	20	Function				Indicating Transmitter		
	21	TYPE				VTA		
	22	Case Material				AISI 304		
	23	Mounting				VTA		
	24	Measuring Range				0-100%		
	25	Accuracy				0.20%		
	26	Wetted Part Material				AISI 316		
	27	Degree of Protection				IP 65		
	28	Explosion Protection				EExib IIB T3		
	29	Process connection				SEE VESSEL DETAIL		
	30	Element Material				AISI 316L		
	31	Electrical Connection				M20		
	32	Out Put Signal				4-20 mA-Loop Powered, HART		
Accessories	33	Local Indication				Yes		
	34	Manifold				VTA		
	35	Others				NA		

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	1/10/2022	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: Level Transmitter Data Sheet

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No:			
		Owner Job No:			Sheet No: of			
General Data	1	Tag No.			LT - 1102			
	2	Tap Nº .			V-112B			
	3	P&ID No.	Piping Size	Class / Line. No	0011			
	4	Fluid		State	OIL		LIQUID	
	5	Service			V 112B LEVEL			
	6	Pressure rating		Piping material				
	7	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%	
	8	Area Classification		Area	ZONE 1		000	
	9	Upper fluid						
	10	Upper fluid Sp . Gr		Unit			Kg/m3	
	11	Lower fluid			OIL			
	12	Lower fluid Sp . Gr		Unit	870		Kg/m3	
	13	Type of connections			SEE VESSEL DETAIL			
	14	Normal Temperature		Unit	15		ºC	
	15	Max Temperature		Unit	-40 +70		ºC	
	16	Normal Pressure		Unit	30		barg	
	17	Max Pressure		Unit	65		barg	
	18	Allow . Press . Drop		Unit			barg	
	19	Measurement Range		Unit	SEE VESSEL DETAIL		mm	
TRANSMITTER	20	Function			Indicating Transmitter			
	21	TYPE			VTA			
	22	Case Material			AISI 304			
	23	Mounting			VTA			
	24	Measuring Range			0-100%			
	25	Accuracy			0.20%			
	26	Wetted Part Material			AISI 316			
	27	Degree of Protection			IP 65			
	28	Explosion Protection			EExib IIB T3			
	29	Process connection			SEE VESSEL DETAIL			
	30	Element Material			AISI 316L			
	31	Electrical Connection			M20			
	32	Out Put Signal			4-20 mA-Loop Powered, HART			
Accessories	33	Local Indication			Yes			
	34	Manifold			VTA			
	35	Others			NA			

1	0	1/10/2022	IFA	K.A	M.N	AA.SH
No.	Rev	Date	Status	Prepared	Checked	Approved

PROJECT: PP-PE PILOT PLANT

TITLE: Pressure Transmitter Data Sheet

شرکت ملی صنایع پتروشیمی

شرکت پژوهش و فناوری پتروشیمی

		Contractor Job No:			Doc. No: 900-DAS-A4-IN-0004		
		Owner Job No:			Sheet No: 13 of 59		
Primary Element	1	Tag No.			PT - 1101		
	2	Service			RECYCLE P111		
	3	Tap No					
	4	P&ID No.	Line No	Area	011	1104	100
	5	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	6	Piping Size		Piping Class	1/2"	1CS2(ET)	
	7	Pressre Rating		Piping Material	150#	STAINLESS STELL	
	8	Connections	Material		S.S		
	9		Type		1/2" NPT Male		
	10	Fluid		State	OIL	LIQUID	
	11	Normal Temperature		Unit	AMB	ºC	
	12	Max Temperature		Unit	100	ºC	
	13	Normal Pressure		Unit	8	barg	
	14	Max Pressure		Unit	20	barg	
	15	Solids in suspension					
	16	Op . Visc . (when > 10 mpa's)		Unit	25(40°)	mpa's	
	17	L.iable to solidify or crystalize					
	18	Fluid if any available for purge					
	19	Sensing element material					
	20	tracing		Jacketing			
TRANSMITTER	25	Function			Indicating Transmitter		
	26	TYPE			Gauge Pressure Transmitter		
	27	Power Supply			Loop Powered (24 V DC)		
	28	Case Material			AISI 304		
	29	Mounting			Direct		
	30	Measuring Range			0 - 20 barg		
	31	Accuracy			0.20%		
	32	Wetted Part Material			AISI 316		
	33	Degree of Protection			IP 65		
	34	Explosion Protection			EExib IIB T3		
	35	Process connection			1/2" NPT Female		
	36	Element Material			AISI 316L		
	37	Electrical Connection			Gland M20		
	38	Output Signal			4-20 mA-Loop Powered, HART		
Diaphragm Seal	39	Type		size & Rating	Direct Diaphragm	NA	
	40	Material			NA		
	41	Seal Liquid			NA		
	42	Capillary Length			NA		
Accessories	43	Local Indication			Yes		
	44	Manifold			2 Valve-Remote Mount		
	45	Others			NA		

1	0	1/8/2022	IFA	K.A	M.N	AA.SH
No.	Rev	Date	Status	Prepared	Checked	Approved

PROJECT: PP-PE PILOT PLANT

TITLE: Pressure Transmitter Data Sheet

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0004
Owner Job No: | Sheet No: 14 of 59

Primary Element	1	Tag No.			PT - 1102		
	2	Service			PRESS TO V 112 A/B		
	3	Tap No					
	4	P&ID No.	Line No	Area	011	1104	100
	5	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	6	Piping Size		Piping Class	1/4"	TUBING	
	7	Pressre Rating		Piping Material	#3000	S.S	
	8	Connections	Material				
	9		Type		1/2" NPT Male		
	10	Fluid		State	OIL	LIQUID	
	11	Normal Temperature		Unit	AMB	ºC	
	12	Max Temperature		Unit	100	ºC	
	13	Normal Pressure		Unit	45 - 75	barg	
	14	Max Pressure		Unit	100	barg	
	15	Solids in suspension					
	16	Op . Visc . (when > 10 mpa's)		Unit	25(40°)	mpa's	
	17	L.iable to solidify or crystalize					
	18	Fluid if any available for purge					
	19	Sensing element material					
	20	tracing		Jacketing			
TRANSMITTER	25	Function			Indicating Transmitter		
	26	TYPE			Gauge Pressure Transmitter		
	27	Power Supply			Loop Powered (24 V DC)		
	28	Case Material			AISI 304		
	29	Mounting			Direct		
	30	Measuring Range			0 - 100 barg		
	31	Accuracy			0.20%		
	32	Wetted Part Material			AISI 316		
	33	Degree of Protection			IP 65		
	34	Explosion Protection			EExib IIB T3		
	35	Process connection			1/2" NPT Female		
	36	Element Material			AISI 316L		
	37	Electrical Connection			Gland M20		
	38	Output Signal			4-20 mA-Loop Powered, HART		
Diaphragm Seal	39	Type		size & Rating	Direct Diaphragm	NA	
	40	Material			NA		
	41	Seal Liquid			NA		
	42	Capillary Length			NA		
Accessories	43	Local Indication			Yes		
	44	Manifold			2 Valve-Remote Mount		
	45	Others			NA		

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	12/14/2021	IFA	K.A	M.N	AA.SH

PROJECT: PP-PE PILOT PLANT

TITLE: Pressure Transmitter Data Sheet

شرکت ملی صنایع پتروشیمی

شرکت پژوهش و فناوری پتروشیمی

Contractor Job No: | Doc. No: 900-DAS-A4-IN-0004

Owner Job No: | Sheet No: 15 of 59

Primary Element	1	Tag No.			PT - 1103		
	2	Service			PRESS V 114		
	3	Tap No					
	4	P&ID No.	Line No	Area	012		100
	5	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	6	Piping Size		Piping Class	1/2"		1FS4
	7	Pressre Rating		Piping Material	600#		STAINLESS STEEL
	8	Connections	Material		S.S		
	9		Type		1/2" NPT MALE		
	10	Fluid		State	NITROGEN		GAS
	11	Normal Temperature		Unit	AMB		ºC
	12	Max Temperature		Unit	-30+120		ºC
	13	Normal Pressure		Unit	40 - 70		barg
	14	Max Pressure		Unit	100		barg
	15	Solids in suspension					
	16	Op . Visc . (when > 10 mpa's)		Unit			mpa's
	17	L.iable to solidify or crystalize					
	18	Fluid if any available for purge					
	19	Sensing element material					
	20	tracing		Jacketing			
TRANSMITTER	25	Function			Indicating Transmitter		
	26	TYPE			Gauge Pressure Transmitter		
	27	Power Supply			Loop Powered (24 V DC)		
	28	Case Material			AISI 304		
	29	Mounting			Direct		
	30	Measuring Range			0 - 100 barg		
	31	Accuracy			0.20%		
	32	Wetted Part Material			AISI 316		
	33	Degree of Protection			IP 65		
	34	Explosion Protection			EExib IIB T3		
	35	Process connection			1/2" NPT FEMALE		
	36	Element Material			AISI 316L		
	37	Electrical Connection			Gland M20		
	38	Output Signal			4-20 mA-Loop Powered, HART		
Diaphragm Seal	39	Type		size & Rating	Direct Diaphragm		NA
	40	Material			NA		
	41	Seal Liquid			NA		
	42	Capillary Length			NA		
Accessories	43	Local Indication			Yes		
	44	Manifold			2 Valve-Remote Mount		
	45	Others			NA		

No.	Rev	Date	Status	Prepared	Checked	Approved
1	0	1/8/2022	IFA	K.A	M.N	AA.SH

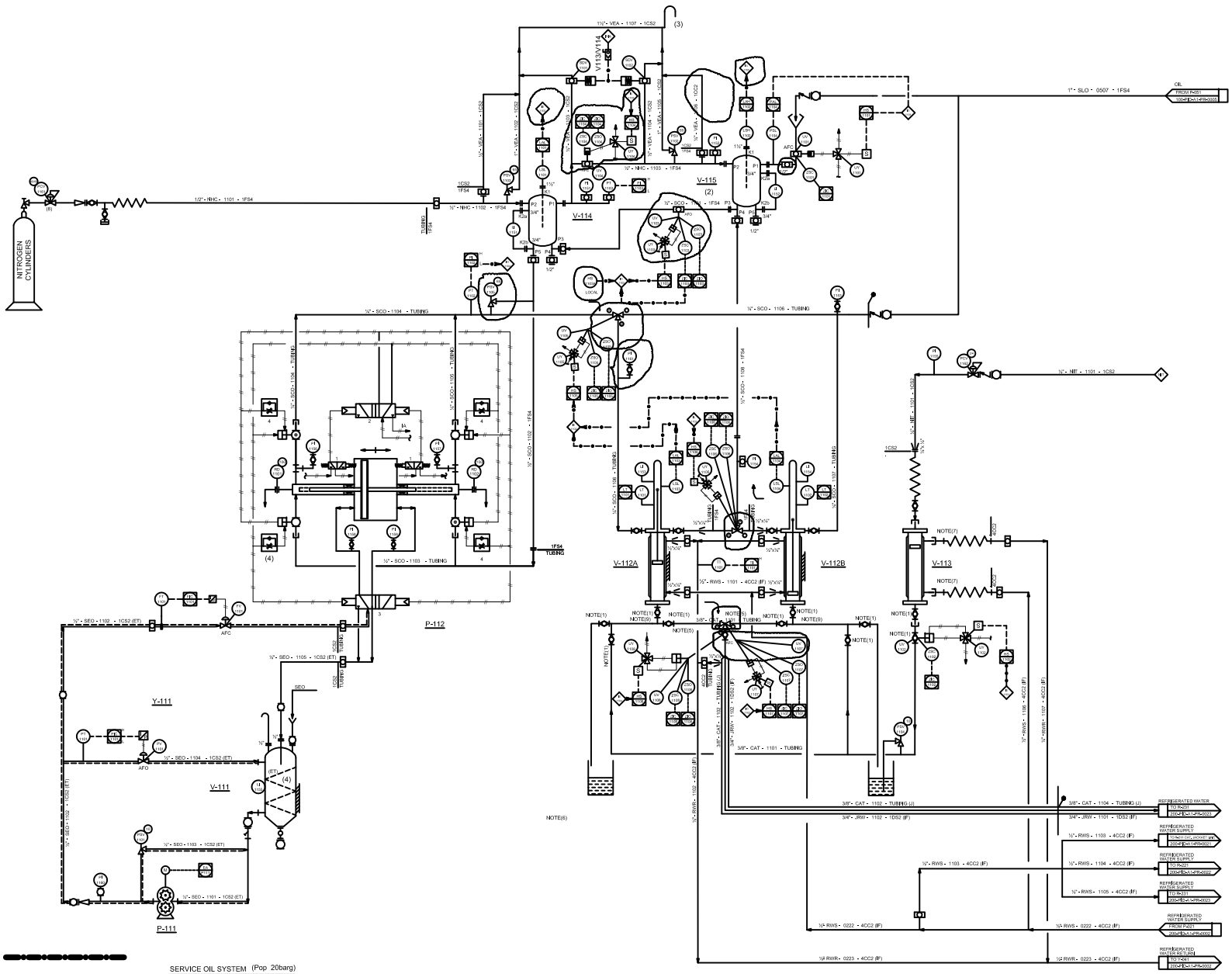
PROJECT: PP-PE PILOT PLANT

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

TITLE: Temperature Transmitter Data Sheet

		Contractor Job No:			Doc. No: 900-DAS-A4-IN-0014		
		Owner Job No:			Sheet No 41 of 103		
Primary Element	1	Tag No.			TT - 1101		
	2	Service			TEMP . V 112 A/B		
	3	Tap			LINE		
	4	P&ID No.		Line No.	011	1102	
	5	Amb.Temp	Amb Press	Amb.Rel.Humidity Max	(-28)°C / 44°C	0.82 Bara	86%
	6	Piping Size		Piping Class	1/2"	4CC2(IF)	
	7	Pressre Rating		Piping Material	150#	CARBON STEEL	
	8	Connection size		Connection type			
	9	Fluid		State	WATER GLYCOL		
	10	Normal Temperature		Unit	2 - 5	ºC	
	11	Max Temperature		Unit	(-10) +100	ºC	
	12	Normal Pressure		Unit	3	barg	
	13	Max Pressure		Unit	10	barg	
	14	Well	Identification tag				
	15		Type (special application)				
	16		Materials				
	17	Instrument	Measurement range	Unit	(-10) +40	ºC	
	18		Installation		DCS		
	19		Requested accuracy				
	20		Control modes				
TRANSMITTER	21	Function			**Indicator Transmitter**		
	22	TYPE			**RTD**		
	23	Output			**4-20 mA-Loop Powered, HART**		
	24	Range			**(-10) +40 ºc**		
	25	Power Supply			**24V DC**		
	26	Accuracy			**0.20%**		
	27	Zero Adjust		Span Adjust			
	28	Degree of protection			**IP 65**		
	29	Explosion protection			**EExia IIB T3**		
	30	Linerization			**YES**		
	31	Head material			**SS-304**		
	32	Wire Break Function (Up/Down)			**UP**		
	33	Electrical connection			**Gland M20**		
ELEMENT	34	Type		single/double	**RTD - Pt 100**	**Single**	
	35	Sheath material		Sheath diameter	**SS-316**	**6 mm**	
	36	Connection type		Length	**3 wire**	**VTA**	
	37	Wire Size		Insulation	**VTA**	**VTA**	
	38	Hot Junction			**NA**		
	39	Spring Load			**YES**		
	40	Element Housing			**VTA**		
	41	Manufacturer			**VTA**		
	42	Certificate			**YES**		
	43	Model No			**VTA**		
THERMOWELL	44	Material		Size & Rating	**SS-316**	**1/2" -150 # - RF**	
	45	Insertion Length (U)			**200 mm**		
	46	Standard No			**ANSI**		
	47	Leg Extension			**VTA**		
	48	Watted Parts To Nace			**NO**		
	49	Requisition(sensor-well)			**YES**		
	50	Instrument Connection (sensor - well)			**VTA**		

1	**0**	**1/8/2022**	**IFA**	**K.A**	**M.N**	**AA.SH**
No.	**Rev**	**Date**	**Status**	**Prepared**	**Checked**	**Approved**



NOTES

1. FULL BORE VALVE ØI=~7MM.
2. INSTALLED ~500MM HIGHER THEN V-114.
3. TO VENT IN SAFETY LOCATION.
4. ELECTRICAL TRACING.
5. NOT JACKETED CATALYST PIPE, MUST BE THE SHORTEST POSSIBLE.
6. SUPPLIER LIMIT.
7. FAST CONNECTION WITH CHECK VALVE.
8. PCV PROVIDED OF INTERNAL SAFETY VALVE: SET PRESSURE=65 BAR.
9. 3 WAY VALVE MUST BE SWITCH ONLY FROM A TO B OR A TO C
10. DETIALS BY PACKAGE VENDOR.

READING

POS.	DESCRIPTION
1	THREE WAYS - TWO POSITIONS (ONE STABLE AND ONE UNSTABLE) PNEUMATIC ENDSTROKE. SPRING RETURN.
2	FIVE WAYS - TWO STABLE POSITIONS PNEUMATIC VALVE - PNEUMATIC DRIVE >= 15 P.S.I.
3	FIVE WAYS - TWO STABLE POSITIONS HYDRAULIC VALVE - PNEUMATIC DRIVE >= 15 P.S.I.
4	UNIDIRECTIONAL METERING PNEUMATIC VALVE
5	OPENED VALVE / CLOSED VALVE

REF.	REFERENCE DRAWINGS	DWG NO.
1	P&ID BASELL	FE-312002-011

EQUIPMENT LIST

Y-111	V-113	
V-112A		
V-112B		

REV.	ISSUE DATE	DESCRIPTION	DWN.BY	CHKD.BY	APPR.BY

OWNER :

NATIONAL PETROCHEMICAL COMPANY
PETROCHEMICAL RESEARCH & TECHNOLOGY CENTER (ARAK)
مرکز پژوهش و فناوری پتروشیمی (مرکز اراک)

PROJECT :

PP-PE PILOT PLANT
ARAK-IRAN

CONTRACTOR : | MC : | LICENSOR : basell Polydec

TITLE :

PIPING & INSTRUMENT DIAGRAM
CATALYST METERING

CONTRACTOR DRAWING NO.	STATUS	SCALE
100-PID-A1-PR-0011		—
OWNER DRAWING NO.	REV.	SHEET
	04	1 / 1

National Petrochemical Company
Petrochemical Research & Technology Co.

PP-PE Pilot Plant

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Title: INSTRUCTION FOR VENDOR DOCUMENTATION

Page: A

REV. / PAGE	0	1	2	3	4	5	REV. / PAGE	0	1	2	3	4	5	REV. / PAGE	0	1	2	3	4	5
A	X																			
1	X																			
2	X																			
3	X																			
4	X																			
5	X																			
6	X																			
7	X																			
8	X																			
9	X																			
10	X																			
11	X																			
12	X																			
13	X																			
14	X																			
15	X																			
16	X																			

Rev	Date	Prepared By (Discipline)	Checked By (Discipline)	Approved By (Discipline)	Approved By (PEM)	Approved By (PM)	Status
5							
4							
3							
2							
1							
0	20-Oct-20	M.Asgari	M.Nazeri Nasab	M.Danehgar	M.Asadi	N.Nouhjah	IFA

Document Revisions

CONTENTS

1. Purpose

The purpose of this procedure is to give instructions for preparation of Vendor's data book (mechanical catalogue) applicable to the contract.

2. Difinition

VENDOR — Companies Awarded by Owner for Procurement Services, Inspection Affairs or Transportation, Providing of Project's goods, following up all transport activities from VENDOR workshop to final destination as defined in the purchase order.

OWNER: — Petrochemical Research & Technology Company

3. Content

The Vendor's Data Book shall contain comprehensive detailed information covering design and engineering, inspection and testing, installation, operation and maintenance manual of the equipment and accessories included in, and supplied for the plant.

In addition, VENDOR shall submit the drawings and documents according to the "LIST OF DOCUMENTS REQUIRED FROM VENDOR "given in the requisition / purchase order.

For a sample of the contents of VENDOR's data book refer to Attachment No. 1.

4. Instructions Concerning Vendor's Data Books Presentation

4.1 Language / Units

All documents and drawings for design and fabrication shall be written in English as well as all Maintenance and Operating Instructions.

All units and dimensions shall be in the metric system except for the following:
- Size of pipe and valve (Inch)
- Flange rating (Pound)

If necessary, other units and dimensions shall be used with OWNER approval.

4.2 Size Of Documents

- All drawings shall be prepared on ISO standard size sheets, i.e.

  A0 : 840 x 1188 mm
  A1 : 594 x 840 mm
  A2 : 420 x 594 mm
  A3 : 297 x 420 mm
  A4 : 210 x 297 mm

- Size A0 should be used only with OWNER approval.
  Larger sizes are not allowed.
- In general all drawings shall be reduced to 297 mm x random length size for convenience in handling.
- All documents other than drawings shall be prepared on standard A3 or A4 size sheets suitable for insertion in an A4 hard-core binder.
- All reduced drawings, data, etc. shall be legible.

4.3 Class Of Documents

All drawings / data submitted must be of good quality that will allow production of legible copies.

- Documents submitted to OWNER for comments:
  These documents give all data necessary to understand operation and to appraise the construction method, assembly, disassembly, fastening and connections of equipment. They clearly indicate the scope of supply and specify all details necessary for installation.

- Final documents:
  These documents are certified, "As built" documents finally reviewed without comment by OWNER.
  OWNER comments on VENDOR documentation shall in no way relieve the VENDOR of his responsibility especially concerning the design of the equipment or facilities.

4.4 Books Form

All the documentation shall be inserted in A4 (297 mm x 210 mm) white color binder (Punch holes shall be two).

Other types, such as folders or boxes with loose sheets, are not acceptable.
The thickness of each volume shall under no circumstance exceed that of a normal file (7 cm). The paper level inside each file shall be at least 5 mm below the opening point of the binder.

Drawings and documents with sizes larger than A3 will be folded in plastic jackets inserted in the file, with opening upward.

4.5 Identification

Each Vendor's data book shall be identified on its back and on the cover by a standard label, the format of which is given in Attachment No.2.

4.6 Internal Presentation

All drawings and documents shall be written in English.
Cardboard division sheets shall separate different groups of documents, sheets and directions. At least rigid index sheets with numbering shall separate the different chapters.

The wording and presentation of the reports will be controlled with utmost care.

Consequently, any loose presentation, which may give the OWNER impression of careless work, will be rejected. This applies in particular to:

- All manuscripts or type texts with handwritten comments (except for technical documents on OWNER or Vendor's standard forms).
- All texts in any language other than English, unless they are transmitted together with a translation in compliance with the above requirement.
- All copies that might be questionable: writing too light, dark background areas, dark edge due to poor centering, titled copy, perforation marks, etc.

4.7. Vendor Document Numbering

In addition to the Vendor's document number, VENDOR shall add
OWNER's document number.
The block shown here below will be placed on each "first page" of specification, data sheet and each drawing in addition to the Vendor's label.

National Petrochemical Company / Petrochemical Research & Technology Company PP-PE Pilot Plant				
NPC-RT **PP-PE Pilot Plant**	Owner Project No.	Rev.	Date	Signature
	Owner Doc/Dwg. No.			
	Sh. Of			

All other pages of the specifications and data sheets shall have the following block.

Project No.	Owner Project No.	Rev. Sh. Of
OWNER DOC. No.		

5. Number Of Vendor's Data Books Per Purchase Order

If the purchase order includes several separate requisitions or covers several items, which are to be shipped with different vessels, the VENDOR shall supply as many separate Vendor's data books, as there are separate requisitions and/or shipments.

If the requisition covers a large number of items, a common part and specific chapters by item may be planned in agreement with OWNER.

VENDOR shall prepare:

- 3 Copies of the complete VENDOR Data Book.
- Copy of electronic file in CD
- 2 Reproducible copy of final drawings / documents

6. Delivery Time

Documents submitted for review are forwarded in compliance with the dates specified on the Attachment # 2 of requisition.
Final documents shall be forwarded 15 days after receipt of documents commented by OWNER.

Delivery dates are mandatory and a payment installment may be conditioned by the receipt of documents and/or drawings (refer to the order provisions).

7. Transmittal Of Documentation

All drawings and documents shall be transmitted with a transmittal note to the address indicated in the Purchase contract. Purchase order number should be clearly indicated.

Any drawing, which is unreadable, will be returned without fail to the VENDOR who shall in no case use this as an excuse for delivery delay.

Any revision made on documentation should be highlighted with a cloud mark.

8. Documents For Engineering

This paragraph is to clarify OWNER requirements concerning the presentation of some essential engineering documents and drawings submitted for approval. The items indicated below refer to the items listed in the "LIST OF DOCUMENTS REQUIRED FROM THE VENDOR" shown in the attachment # 2 of requisition.

8.1 Vendor Drawing And Documentation List

The VENDOR'S shall provide an exhaustive list of the documentation to be delivered. It should be sent together with the first issue of documents.

8.2 Plate Arrangement Drawing And Material List

This drawing shall be in proper scale.

The plate arrangement drawing or sketch shall indicated as a minimum:

- A general outline of the equipment (shells, heads, supports, skirt, lugs, saddles, stiffeners,etc.) ;
- For columns, shell / cone / skirt development including all internal & external attachments;
- Position of circumferential and longitudinal weld seams in accordance with plates sizes;

- Head shape (and plate arrangement in case of composed head);
- Shape of reduction cone (straight flange, knuckle radius, etc.) ;
- Plate thickness after plate forming;
- Material specification;
- Material list

Approval of this document enables order of main materials to be finalized.

The material list for nozzles shall be presented in schedule form. It shall be established from the nozzles list shown on the engineering arrangement drawing or process data sheet, and shall include:

- Identification (or item), quantity and diameter of nozzles;
- Type, rating, facing and material of flanges;
- Schedule or thickness of nozzle necks;
- Diameter, thickness and material of reinforcements;
- Material, thickness, rating of blind flanges (if any);
- Diameter, quantity, length, thread type, material of stud bolts and nuts;
- Definition, rating, materials of gaskets

This document is prepared from information known when equipment is ordered. Its approval will allow the above accessories to be supplied.

Any modifications of one of the items listed above will involve revision of the documents and be followed by new approval.

After approval, the material list shall be transferred on the VENDOR general arrangement drawing.

Note: these documents do not apply to storage tanks.

8.3 Item: General Arrangement Drawing

The VENDOR can start fabrication only after receiving OWNER approval of this document as a minimum.

This drawing shall be in proper scale.
This drawing shall give the following technical information:

- Main dimensions, overall length, minimum thickness of major components;
- Design code, design pressure and temperature, hydrostatic test pressure, non-destructive tests, heat treatment, etc.;
- Corresponding material specification;
- Location and orientation of weld seams (shells, heads, skirt, etc.);
- Shape of heads or, type/ angle of roof for storage tanks;
- Location, orientation of nozzle gussets and other external welded Attachments;
- Location & orientation of internals (trays supports, coils, demisters, baffles, etc.);
- List of nozzles and connections in accordance with material list (dia., type, rating, schedule, etc.);
- Gaskets and bolting (type, material, etc.);
- All information of scope of supply;
- All information on anchoring system;
- Fabricated weight;
- Empty weight;
- Hydro test weight;
- Operating weight;
- Net weight of removable parts;
- Type of paint and its surface preparation;
- North direction;
- List of detail drawings;
- Insulation / fire proofing support detail;

Note: OWNER guide drawings shall not be used as construction drawings.

8.4 Detail Drawings

These drawings shall include references to general arrangement drawing and show:

- Detail of all accessories, internal and external attachment (gussets, etc.): With weld geometry and specification in accordance with approved welding procedure;
- Weight and dimension of removable internals;
- Part list of the various elements;
- Weld geometry and specification in accordance with approved welding procedure;
- All information required on manufacturer name plate;
- Insulation / Fire proofing support detail;
- All construction details not covered above;

All this information may be shown on general arrangement drawing, at Vendor's choice.

8.5 Calculation Notes

Calculation notes shall be in accordance with general arrangement drawing.
VENDOR shall establish calculation notes for each equipment.
They shall in all cases be included in "manufacturer file".

These documents shall be clearly marked with identification numbers as other VENDOR documents.

They shall include full reference to information sources (codes, formulas, etc.) used for design.

These documents shall be transmitted for review / approval to OWNER.
These documents shall be approved prior to general arrangement drawing approval.
OWNER approval shall in no case relieve the VENDOR from his responsibilities.

8.6 Spare Parts List

SPARE PARTS LIST AND INTERCHANGEABILITY RECORD (SPIR form) to be filled out by VENDOR according to it's filling procedure.

9. Description Of Inspection And/Or Acceptance Documents

This paragraph clarifies OWNER requirements for documents relating to inspection and acceptance of equipment.
The items indicated below refer to the items listed in the "LIST OF DOCUMENTS REQUIRED FROM THE VENDOR" included in the requisition.

9.1 Material Certificates

All pressurized parts shall be considered as main components requiring certificates type 3 .1. B including:
- Shell, heads, cones
- Skirt, saddles, support brackets
- Tubes, flanges, forging, internal piping, nozzle necks
- Bolting for nozzle and shell flanges
- Welding material

9.2 Welders Qualification

This document shall contain all the information concerning:
- Welders (name, number, mark)
- Welding procedure
- Base material (specification, thickness, etc.)
- Welding material (specification, diameter, etc.)
- Electrode type
- Destructive tests results (bending, tensile, impact tests)

All information required on the QW 484 forms given by ASME section IX shall be considered as a minimum.

9.3 Hydraulic Test Report

This document shall contain the following information:
- Type and volume of equipment
- Contained gas analysis
- Description of equipment (length, width or diameter, nature of base material, thickness)
- Construction number and date
- Hydrostatic test pressure in letters
- Date of inspection (before test) and inspector's name
- Hydrostatic test data
- Signatures of inspectors

10. Issuance Schedule

Final Vendor's data books should normally be shipped to the OWNER as per agreed delivery schedule specified in PO of the relevant equipment.
Such final Vendor's data books shall be an integral part of the Vendor's services set forth in the purchase order and the following precautions must be taken in order to meet the above shipping requirements:

At the latest 2 months before the scheduled delivery date, the VENDOR shall transmit the Vendor's data book model to OWNER for comments and approval.
The model shall be in conformity with the final internal and external presentation and shall contain all documents required for the final report.

A non- completed form will replace the final acceptance documents, which do not exist at that stage.

Note: Recommendation for handling, transport and storage shall be shipped in box together with the equipment.

ATTACHMENT # 1

VENDOR DATA BOOK'S CONTENT (SAMPLE)

PART 1 : General Descripton Of The Equipment

1.1. OWNER's requisition
1.2. General description including OWNER's specifications and data sheets and drawings

PART 2 : Recommendations For Storage, Handling And Lifting

2.1. Special precautions for handling prior erection (1)
2.2. Recommendations for storage prior and during erection

PART 3: Erection

3.1. List of components to be erected/installed on site
3.2. Detailed schedule of the erection including hypothesis taken into account
3.3. Procedures for erection and installation of the equipment
3.4. Schedule of connection points detailing locations and dimensions
3.5. Electrical terminal wiring diagrams
3.6. Details of site assembly, and filed welds
3.7. List of special tools for site erection and assembly
3.8. Procedures for site assembly, leveling and welding
3.9. Welding specifications for field welds
3.10. List of checks and tests to be performed on site
3.11. Site testing and acceptance procedures
3.12. Procedures for preparation of the equipment for commissioning (including the calibration of instruments)
3.13. List of works to be implemented on site instead of Vendor's shop (When required)
3.14. Weight (empty, full of water)

PART 4 : Start-Up Running Instructions

4.1. General
4.2. Principle
4.3. Operation
4.4. Description of the apparatus
4.5. Commissioning
4.6. Running instructions

PART 5 : Maintenance Instructions

5.1. Maintenance
5.2. Safety instructions
5.3. General maintenance
5.4. Lubricant table and equivalence
5.5. Trouble shooting check lists and diagrams
5.6. Maintenance Schedule

PART 6: Spare Parts (2), (6)

6.1. Spare parts for erection, precommissioning, commissioning and start-up
6.2. Spare parts for 2 years operation
6.3. Sectional drawings

PART 7: Manufacturer's Documents / Drawings (3)

7.1. List of drawings (4)
7.2. Manufacturer's data report
7.3. Drawings (5)
7.4. Calculation notes
7.5. Curves and technical data (including P.W.H.T. if applicable)
7.6. MANUFACTURER name plate photography

PART 8: Quality Assurance And Manufacturing Documents

8.1. Material test certificates
8.2. Welding Inspection controls and test reports
8.3. Welding procedure specification
8.4. Welding procedure qualification reports
8.5. Welder qualification reports
8.6. Weld identification
8.7. Plate identification sketch with heat numbers
8.8. Certificate of shop inspection (before hydrostatic test)
8.9. X-Ray identification
8.10. Radiographic procedure qualification
8.11. Radiographic reports along with radiographs
8.12. Batch test certificates from manufactures for electrodes
8.13. Hydrostatic and other test results and reports (such as visual control and N.D.T., etc.).
8.14. Precommissioning / commissioning check Lists & procedures
8.15. All other requirements as specified in the respective specifications

Remarks

(1) Including a copy of transportation drawing
(2) No spare parts price must be incorporated in this book
(3) Only issues approved by as "FINAL"
(4) Only the drawings included in this part 7.
(5) Drawings larger than A3 format must be folded and inserted in individual plastic skirts.
(6) Sufficient information to be prepared for spare parts Such as: materials of construction sizes / three proposed Vendor's, etc.

ATTACHMENT # 2

VENDOR'S DATA BOOK

COVER

Attachment #5 Instruction for making Data CD

- CD Title CASE

VENDOR DATA BOOK

<Project Name>

<P.O No.>
<P.O Description>

<Vol. No.>

<Client Name>

<Purchaser Name>

<Vendor Name>

- Construction of the Data Folder

P.O No. + Description + Vendor Name ← Main Folder

Item No. + Item Name ← Sub-folder

Item No. + Item Name ← Sub-folder

Serial No. + Doc. Title + _ + Ext. Name ← File Name

Serial No. + Doc. Title + _ + Ext. Name ← File Name

National Petrochemical Company
Petrochemical Research & Technology Co.

PP-PE Pilot Plant

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Title: PACKING AND MARKING PROCEDURE

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0	20-Oct-20	M.Asgari	M.Nazeri Nasab	M.Daneshgar	M.Asadi	N.Nouhjah	IFA

Document Revisions

CONTENTS

1. Scope

1.1 This procedure gives the information for Packing and Marking and it is to be applied to vendors for the preparation, protection and packaging of materials, equipment, requiring export shipments for the PP-PE Pilot Plant Project to be built in Petrochemical Research & Technology Company, Arak/Iran.

The following instructions are intended as minimum requirements, and adherence to these instructions in no way, absolves or relieves Vendors of any responsibility or obligation outlined in the Purchase Order.

2 . Purpose

This document defines the criteria required by the Project in relation to the packing and marking of both Project's Equipment and materials including Electrical Panels and Instruments.

3. Definitions

OWNER	Petrochemical Research & Technology Company
PROJECT	PP-PE Pilot Plant
GOODS	All kind of materials and equipment to be incorporated in the Project.
VENDOR	Companies Awarded by Owner for Procurement Services, Inspection Affairs or Transportation, Providing of Project's goods, following up all transport activities from VENDOR workshop to final destination as defined in the purchase order.

4. Packing For Equipment And Materials

4.1 Equipment and material shall be exported packed in compliance with General Purchase Conditions and the best established practice for overseas construction jobs in accordance with the following directives. In the event of any divergence between this specification and the established practice, this specification shall govern.

4.1.1. "Seaworthy and tropical proof " according to international standard.

4.1.2 Packing and conservation of goods shall be sufficient to protect them from damage during transit from point of manufacture to the delivery at job site under conditions

which may involve multiple handling, extended storage, exposure to moisture and the possibility of pilferage. The contents must withstand one year transit conditions without suffering damage and Vendors shall give recommendations for a further two(2) years storage under SITE conditions.
Required storage facilities and procedure shall be advised by manufacturer/seller in advance.

4.1.3 The packing of the equipment and materials shall be carried out in order to comply with transport conditions.

4.1.4 Individual packages shall be kept as small in bulk as possible.

4.1.5 Individual packages exceeding a gross weight of 3,000 kgs shall be avoided, if possible.

4.1.6 Kind and dimension of packages shall be chosen to suit overseas transport in contáiners and to fully utilize the size of containers.

4.1.7 The following inside dimension of containers are to be observed :
40-feet-containers : 1195x220x205 cms.
20-feet-containers : 595x220x205 cms.

4.2 Modes of Packing

In accordance with the nature of the contents, the following modes of packing shall be considered:

a) wooden cases
b) wooden crates
c) skid-construction (for vessels etc.)
d) non-returnable steel drums (export variety)
e) non-returnable cable reels
f) bales
g) 20 ft - 40 ft non-refundable containers

4.3 General Rules for Packing

4.3.1 Cases and crates shall be made from new, sound and seasoned lumber. Sheathing shall be of min 24 mm thickness.
If so required for static reasons, thicker sheathing shall be used, in accordance with size and weight of the package. Timber crates and boxes shall be strong enough to withstand without any damage , transport on ship board at sea and numerous handling between the works and the port of origin and between the port of destination and the site.

4.3.2 Cases and crates with gross weight up to 1,000 kgs shall be provided with bottom cleats of min. 40 mm thickness to ensure clearance for handling by forklift.
Cases and crates exceeding gross weight of 1,000 kgs shall be provided with skid runners, number and size according to weight of package.

4.3.3 The contents of cases shall be protected by waterproof and strong plastic foil which shall be sealed by welding. An adequate quantity of moisture absorbent (silica gel) shall be added to protect the contents for sufficiently long time from corrosion.

4.3.4 Felt , cellophane paper, polyester cuttings , crepe cellulose and some equally efficient materials may be used for padding or cushioning.
Wood shavings and other paper shall not be used for padding or cushioning.

4.3.5 Materials shall be protected against corrosion during transit as necessary.
All bright and machined parts shall be coated with a recognized rust preventative suited to the particular application concerned. All internal parts of machinery shall be treated with lubricant containing rust and oxidation inhibitors to protect equipment from any damage possible. Such lubricants shall be compatible with those which will subsequently be used in service and shall be identified by appropriate tagging.

4.3.6 When required, materials shall be painted or coated in accordance with the particulars contained in the purchase order and/or specifications.

4.3.7 All flanges, machined working surfaces and threaded parts of all equipment shall be suitably protected . All flanged connections of vessels shall be protected by metal plates correctly gasketed by wooden plugs or plastic caps suitably secured in position.

4.3.8 Units or parts belonging to main equipment but separately packed shall be clearly marked for easy identification with the main equipment to which they relate.

4.3.9 Packages containing "FRAGILE" articles shall be appropriately packed and in addition to the words "FRAGILE-HANDLE WITH CARE" being stenciled on two opposite sides, internationally recognized symbols shall also be used “This Side Up”.

4.3.10 Pipe, structural steel sections and plates shall be strapped in bundles of convenient size and weight for handling. Rolled and shaped plates shall be provided with suitable bracing to eliminate distortion during transit, and shall be bundled in uniform lengths.
The weight of each bundle shall be within the breaking strain of the steel wrapping. Each bundle shall be marked with a metal tag ,hard stamped, secured under steel wrapping. A 2000 kg limitation shall be imposed for lifts in this category. Where praticable long lengths shall be limited to 12.2 meters to avoid long length carriers. All small steel sections, handraíl stanchions, gusset plates etc. shall be boxed.

4.3.11 Black steel pipes with an outside diameter of up to 168.3 mm shall be bundled by strapping cleats above and below the load, with boards between each pipe layer and secured by bolts.

Black steel pipes exceeding the above outside diameter shall be treated as an individual package and marked accordingly.
All black steel pipes shall be protected by means of TECTYL spray. The pipe ends shall be closed with plastic caps.
If, in case of pipes with large diameters, the pipe ends cannot be closed with plastic caps, the interior of the pipes shall also be protected and sprayed with TECTYL.

4.3.12 Bitumen coated pipes shall be prepared, packed and handled according to established practice.

4.3.13 Stainless steel pípes shall be packed in wooden cases.
Protection with TECTYL is not necessary.

4.3.14 All valves and fittings (pipe elbows, flanges,etc.) shall be suitably protected and their method of shipment shall be:

a) All valves and fittings shall be suitably packed and shipped in metal strapped or wood re-enforced waterproof wooden cases with metal corner protection .
b) All treaded fittings shall be greased and provided with plastic caps.
c) Control valves shall be packed in wooden cases having adequately designed interior support with interior water proof protection .

4.3.15 Apparatus and vessels shall, where possible, be packed on skid constructions and secured with adjustable steel straps. All unprotected surfaces shall be sprayed with TECTYL. Manholes and other major openings shall be protected with either plastic caps or wooden lids, which shall be firmly secured. Smaller openings shall be closed with plastic plugs.

4.3.16 All vessel internals and items not installed by the vendor at works including accessories such as small parts, bolts, nuts, gaskets etc. shall be packed in wooden cases separately for each vessel or apparatus and marked with the same item number as the vessel/apparatus in order to protect all parts from loss or damage in transit. Internals, bolts and gaskets for service/ testing operations shall be supplied with the vessels/items by the vendor and all internals, boxed separately and marked according to marking procedures. Each item shall be supplied correctly and identified for field installation by others.

NOTE: It is imperative that all these items be clearly listed on the packing list.

4.3.17 Fire bricks, special tiles and insulation refractories shall be boxed after sealing in a polyethylene liner. These boxes shall be skid mounted. Instructions regarding storage prior to installation shall be stenciled on each box with particular reference to adverse weather/temperature/humidity conditions.

4.3.18 All electrical motors whether coupled or uncoupled, generatorors and electrical equipment shall have all openings sealed with protective tape, shall be packed in suitable weather proof skid mounted boxes, and protected from moisture ingress by desiccant as described above.

Items with brushes shall be brushed and rust removed before shipment.
All electrical equipment shall be suitably protected to withstand 1 year transit conditions and Vendors shall give recommendations for a further , 2 years storage under site conditions
Batteries shall be shipped dry with electrolyte packed separately and shall include charging instructions.

4.3.19 All electronic and pneumatic instruments to be packed in accordane with given instructions and must be suitably protected to withstand 1 year transit conditions and Vendors are to give recommendations for a further 2 years storage under site conditions.

4.3.20 Pipeline / vessel insulation shall be packed in double water-proof wooden plywood cases and secured to pallets.
Drums of insulation mastic will also be shipped on pallets.

4.3.21 Spare parts for two years operation, which shall be individually tagged, must be covered with a suitable preservative and wrapped with greaseproof paper and be packed in separate cases from the base item. The cases are to bear the markings as specified and in addition the words "SPARE PARTS FOR TWO YEARS OPERATION".

4.3.22 Commissioning spares shall be individually tagged and marked "COMMISSIONING SPARES" and shall be packed and shipped with the base item.

4.3.23 All vessels/heat exchangers or items of such kind shall be dried, thoroughly cleaned inside and be free of all dirt and loose materials.

4.3.24 Should any materials be scheduled to be freighted as deck cargo, additional packing instructions may be required; the Vendor will advise, for vessels and columns, which shipment cradles will be used throughout the transportation. Cradles to be secured to vessels and columns, by strapping.

4.3.25 Paper bags suítably boxed, or water tight Steel Drums will be used for shipping cement, special aggregate, etc. Paperbags must not be less substantial then 60 lbs outer wall, 40 lbs inner wall and one moisture craft inner wall.

4.3.26 Unless otherwise specified, all export cases, boxes, bundles and containers are to be securely metal strapped with a minimum of two unanealed steel straps in each of two right angled and opposite directions, or where applicarle wood re-enforced.

NOTE: Should consignments arrive at the shipment point of origin visually damaged, the shipping agent will advise and await instruction before onward shippings.

4.3.27 All bulk items, lighting, fittings, cable glands, switches etc. are to be packed in batches sufficient for a specific volume of work.

4.3.28 Cases and crates shall, according to their weight and size , be provided with two or more steel straps made of unannealed steel, applied with a stretching tool and secured with crimped steel seals.

4.3.29 Fittings (valves, pipe elbows, flanges, etc.) must be packed in wooden cases and must be protected.

4.3.30 Accessories for apparatus and vessels (small parts, bolts, nuts, washers, gaskets, etc.) are to be packed in wooden cases, separatelly for each apparatus or vessel. These cases must be marked with the same item No. as the apparatus/vessel to which it belongs (see also Item 5 - packing lists).
All commissioning spare parts to be packed separately, being the packing marked with the relevant main item.

4 .4 Marking of Packages

4.4.1 All packages shall be clearly stencílled on two opposite sides with black, indelible and seawater proof paint, as follows:
Wherever possible , the stenciled characters shall be 8 cms high.
In case the surfaces of a package are too small to permit stenciling, sheet metal tags shall be embossed with the above marking and shall be securely fastened on two opposite ends of the package.

4.4.2 If necessary, packages shall be additionally marked with cautionary symbols on two opposite ends.

4.4.3 Packages which may be stored in the open but under a tarpaulin, shall be marked with a red "double roof" symbol.

4.4.4 Packages which are to be stored in closed and dry places shall be marked with a red "double roof" symbol.

4.4.5 The system of package-numbering shall be indicated to the OWNER in due course of time.

4.4.6 The gross weight shall be determined by the party who is responsible for the packing of the items/materials.

4.4.7 Example for marking of packages is shown in attach 1.

4.5 Packing list

The packing lists shall be prepared on standard forms :
The necessary number of forms will be made available to OWNER , who shall advise about the quantity required.
The packing list forms shall be filled in ENGLISH language.

OWNER shall supply VENDOR with a specimen packing list showing how it is to be filled in.
At the same time OWNER shall be informed of the package numbers required for marking the packages. one column of the packing list shall be filled in with OWNER "ITEM NO. " These item numbers shall be taken from the order form. Special attention shall be paid to the order form that the item number is correctly attributed to the goods to which it belongs . If any question should arise in this respect VENDOR shall contact the OWNERS Representative.
Special care shall be taken that all accessory parts loose or detachable, belonging to the main item under dispatch, shall also be individually listed in the packing list. In the event these accessory parts are not listed in the packing list , they shall be considered by OWNER as not delivered.
Two copies of the packing list in a water-proof plastic envelope shall securely be mailed under a galvanized steel sheet on the outer surface of the package The final packing list in 2-folds shall be available in OWNERS office 10 (TEN) working days prior to dispatch of the goods from the manufacturer's premises.

4.6 Liability and Guarantee

The party responsible for the packing shall be fully liable for and guarantee proper, sufficient and adequate packing, completeness of the contents, protection of the contents for a storage time of 12 month starting from the date when the equipment is loaded on the ship, and the correct preparation of the packing list.
All cost whatever resulting from inadeguate or insufficient packing shall be fully charged to the responsible party.

5. Packing And Marking For Electrical Panels And Instruments

5.1 Scope

This section covers the method for packaging of electric and instrument panels for export delivery, which are to be provided with full protection against physical damage and atmospheric attack during transit and possible long periods under adverse storage conditions which may extend to two years.

5.2 General

This specification is for the package Vendor’s guidance only.
Vendor shall remain fully responsible for selecting suitable materials for proper packaging and shall comply with the latest issues of the following European or British Standards: Where standards conflict with this specification, specification shall govern .

- Packing Code
- Silica gel for use as desiccant for packages
- Method of determining the permeability of materials used for packaging.

The Vendor shall provide written instructions for the removal of protective coatings and devices.

5.3 Method

5.3.1 The instrument or panel which shall be thoroughly clean, dry and free from rust shall be totally enclosed in a polythene shroud after sharp projections on the instrument or panel have been padded . Silica gel or other approved desiccant shall be strapped inside the shroud, but shall not come into contact with the paint work.
After the desiccant is strapped into position, the open ends of the shroud shall be heat sealed , only leaving an opening large enough for the insertion of an air extracting pipe. After extraction of the air from the shroud, the opening shall be completely sealed.

5.3.2 Packing Case Materials

- All wood shall be thoroughly seasoned and thoroughly sound without knots, knot holes, shakes and checks .
- Wood which can cause metallic such as oak , western red cedar and sweet chestnut shall not be used .
- The case shall be of sill base type. All sheating shall be tongued and grooved.

5.3.3 Packing Case Lining

The packing case shall be lined with completely multilayer waterproof.
The lining shall have as few joints as possible. If joints are necessary, the pieces shall be overlapped so that any rain water which may penetrate the case is shed automatically when the case is upright. Overlaps shall be 75 mm minimum Joints shall be made with Bostik 'C".

5.3.4 Securing Instruments or Panels Inside Packing Case.
a)The instrument or panel shall be completely secured by wooden battens faced with suitable rubber or other shock absorbing materials.
b)Wood, wool and other hydroscopic shall not be used.
c)Hay and straw shall not be used.

5.3.5 Sealing of Packing Case

After nailing, joints in the case shall be sealed with Bostik Sealing Compound and the outside bound with steel strapping .

5.4 Marking of Packing Cases

5.4.1 Cases which are for Carriage by sea shall be marked "*HOLD STORAGE*".

5.4.2 All cases shall be marked to indicate the correct way up and bear the marking described here in above.

ATTACHMENT No.1

MARKING OF PACKAGES

PROJECT :

PROJECT No. :

L/C No. :

OWNER :

ORDERED BY :

ORDER No. :

FINAL DESTINATION : Pouyesh Site, Arak / Iran

STORAGE CODE :

DIMENSION : L x W x H

GROSS WEIGHT :

NET WEIGHT :

PACKAGE No. :_____OF_____ .

MADE IN :

National Petrochemical Company
Petrochemical Research & Technology Co.

PP-PE Pilot Plant

شرکت ملی صنایع پتروشیمی
شرکت پژوهش و فناوری پتروشیمی

Title: SPARE PARTS PROCEDURE

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0	20-Oct-20	M.Asgari	M.Nazeri Nasab	M.Daneshgar	M.Asadi	N.Nouhjah	IFA

Document Revisions

These instructions outline the requirements for providing original manufacturer's pre-commissioning, commissioning and two years operation spare parts for a PP-PE Pilot Plant to be built in Petrochemical Research & Technology Company, Arak/Iran.

CONTENTS

Attachments:

1) General Information

These instruction outline the requirements for providing original manufacture's pre-commissioning, commissioning and two years operation spare parts for PP-PE Pilot Plant to be built in Petrochemical Research & Technology Company, Arak/Iran.
The Vendor is obliged to provide with an original equipment manufacturer spare parts data package, containing full and complete spare parts information and prices for each item of equipment supplied.
The Vendor shall recommend those spare parts that are deemed necessary on the basis of Vendor's recommendations and experience.

2) Definitions

2.1 "Erection, Precommissioning, Commissioning and start-up spare parts" are those material, equipment or components necessary during the erection, precommissioning, commissioning and start-up activities of the Plant.

2.2 "Operating Spare Parts" are spare parts material, equipment or components necessary for the continuous operation of the plant after commissioning completion for a period of two years.

2.3 GOODS: All kind of materials and equipment to be incorporated in the Project.

2.4 VENDOR: Companies Awarded by Owner for Procurement Services, Inspection Affairs or Transportation, Providing of Project's goods, following up all transport activities from VENDOR workshop to final destination as defined in the purchase order.

2.5 OWNER: Petrochemical Research & Technology Company.

3) Spare Parts Required

3.1 Capital spare parts

Capital spare parts are defined in documentation prepared by technical department.

3.2 Erection, precommissioning, commissioning and start-up Spare Parts

Vendor is requested to submit a Spare Parts proposal togheter with base quotation. Such spare parts shall be packed in separate boxes and shipped together with the main equipment/material purchased in order to be available at the site together with the base order supply.

Minimum required quantities are shown in attachment 1.

3.3 Two years operation spare parts

Vendor is requested to submit a Operation Spare Parts quotation based on his experience together with base quotation
The necessary and sufficient two years spare parts include those parts that are normally required to mantain the plant in a satistactory working condition for a period of two years of continuous operation after plant start-up.
These Operation Spare Parts shall be packed in separate boxes.
Guidelines for selection of two years spare parts are shown in attachment 2.

4) Required Information

4.1 All information and drawings must be in English language.

4.2 Data sheets, engineering drawings. manufacturer's catalogs and operating and maintenance manuals required to identify the function of and fully describe all parts associated with the equipment

4.3 The interchangeability of spare parts must be completely assured between all units contained on the parent equipment purchase order.

4.4 The Vendor shall guarantee the spare parts in accordane with the requirements requested for the parent equipment.

4.5 The offer must be valid for supply either for total or partial quantities.

4.6 All Spare Parts list shall be filled-in using the attached "Spare Parts Card" according also to the instructions attached herein.
Photocopied or hand-written documents are not acceptable.
Twelve (12) months price validity is required

5) Identification

All spare parts shall be individually identified by one of the followlng methods:

5.1 A stainless steel label imprinted with letterine approximately 6 mm (1/4) high and secured to the part with S.S. wire.

5.2 Inscribing with an electric spark erosion pencil

5.3 On large items inscribing with non-fading,moisture resistant marking ink, figures/ letters to be at least 25 mm (1) high. Ink shall be Pannier 1001 Yellow Industrial or equal.

5.4 Items such as Ball Bearings which in actual storage will remain in their packing may be identified with an adhesive label firmly attached to the outside of the carton.

5.5 Alternative methods which are standard industrial practice may be used provided SP's approval has been obtained in writing in advance. Stamping directly into spare parts will not be allowed.

5.6 The following shall appear on each spare or spare part label:
Manufacturer's real part number.
Short description (one word will suffice if space is limited).
Tag number of equipment (if applicale).

6) Packing And Protection

6.1 Packing protection and marking of the packing container shall be as described in Project Packing and Marking Procedure 000-PCR-PRC-0002. Spare parts shall be packed separately from main equipment and the packing containers shall clearly be marked “erection, pre-commissioning, commissioning, and start-up spare parts” or "two years operating spare parts" as applicale. The following additional comments apply :

6.2 Packing cases and other shipping containers must be capable of giving adequate protection to contents for a period of one year after despatch from Vendor work-shop (i.e. cases may after receipt at the Plant Site be stored outside before being unpacked).

6.3 Two years operating spares are to be protected and packed in such a manner as to ensure a minimum shelf life of four years in an un-air-conditioned warehouse sited in extremely dusty heavy industrial and coastal area with salt pollution location where the maximum shade temperature may exceed -14 +45 C. and where relative humidity reaches 90%.

6.4 Consumables items such as bolts and nuts shall be adequately oiled to prevent corrosion.

6.5 Other unpackaged items shall be protected by a rust preservative oil, hard drying type. if the nature of the item permits the removal of the deposited tar oil skin by means of petroleum based solvents or the use of hot dip strippable coating.

6.6 Any protection for stainless steel parts shall not contain chlorides or harmful metal salts such as Zinc, Lead, Copper. etc. Also marking paint or ink shall not contain similar harmful components.

6.7 Electronic and instrument parts shall be packed in sealed clear plastic bags along with a bagged amount of dessicant.

7) Special Storage Items

7.1 Vendor must advise of any spares which cannot be stored under the conditions stated in para. 6.2 and which require special storage conditions

7.2 Special Storage Items are to be clearly labelled with storage instructions such as:
STORE IN A COOL DRY PLACE AT C
STORE IN DARK PLACE
KEEP HUMIDITY BELOW %
etc.

7.3 Owner must be notified of all such items without delay before order placement since a restricted shelf life may require an amendment to order quantity and an appropriata re-ordering procedure.

ATTACHMENT 1

ERECTION, PRECOMMISSIONING, COMMISSIONING AND START UP SPARE PARTS

1) FURNACES

Gaskets for coil:	50%
-Burner Tiles	100%
-Burner Tips	5%
-Fire eyes	10%
-Gas valves seat	100%
-Solenoid valves	25%

2) EXCHANGERS, REACTORS & DRUMS/TANKS

Gaskets for Girth Flange, M/H& H/H	100%
Stud Bolts and Nuts for the Above	5%(Min. 2 Sets)
Field-Installed Trays:	
-Bolts and Nuts	15% (Min. 2 Sets)
-Washers (Metal and Asb.)	20% (Min. 2 Sets)
-Tray Clamps	10% (Min. 2 Sets)
-Asb. Rope and Tape	25% (Min. 2 Sets)
Field-Installed Internals, Piping and Other Bolted Internals:	
Stud Bolts (Alloy and C.S.)	10% (Min. 2 Sets)
Washers and Nuts	10% (Min. 2 Sets)
Packing:	
-Inert Balls	15%
-Raschig Rings / Sllotted Rings	15%
-Gaskets Sets And O-Rings	100%
-Fan for Air Cooler	

3) STEEL STRUCTURE AND PLATFORM

Bridge Crane:	
-Bolts & Washers	15%

-Gashels	10%
-Contactors	5%
-Tension Springs	10%
-Fuse Elements	10%
-Gaskets	10%
-Oil Seals	25%
-Relays	5%
-Collectors	1 set Each Size
-Contact Shoes	1 set Each Size
-Limit Switches	1 set Each Size
-Welding Rod	10%

4) MACHINERY / PACKAGES

Please see the relevant engineering specifications of each equipment for commissioning spares.

Electrical Equipment:	See item 9
Instrumentation:	
- Control panel	See item 10
- Board instruments	See item 10
- Field Transmitters	See item 10
- Field instruments	See item 10
- Others	0%

5) H.V.A.C.

Bolts, Nuts, Gaslets for Field installation of Pipe/Duct	5%
Rotating Equipment	See item 5
Heat Exchangers	0%
Filter Element	1 Set Each Size/Material
Electrical	See Item 9
Instrumentation:	
-Control panel	See Item 10
-Board Instruments	See Item 10
-Field Transmitters	See Item 10

-Field Instruments	See Item 10
-Others	5%

6) SPECIAL EQUIPMENT

Heat Exchanger	See Item 2
Rotating Equipment	See Item 5
Filter Element	1 Set Each Size/Mat'l
Piping	0%
Electrical	See Item 9
Instrumentation:	
-Control panel	See Item 10
-Board Instruments	See Item 10
-Field Transmitters	See Item 10
-Field Instruments	See Item 10
-Others	0%

7) PIPING

Gaskets, all sizes	20%
Stud Bolts less than1"	15%
Stud Bolts 1" to 1 7/8"	10%
Stud Bolts 2" and over	5%
Welding Rods	10%
Coating and Wrapping	10%

	Carbon Steel	Alloy/SS	Cast Iron
Pipe 2" and below	15%	4%	0%
3" to 6"	10%	2%	5%
8" and over	5%	1%	5%
(*) Valves 2" and below screwed and welded	10%	5%	0%
(*) flanged	2%	2%	0%

(*) Valves 3" to 10"	2%	2%	0%
(*) Valves over 10"	0%	0%	0%
(*) Flanges up to 12"	5%	3%	0%
(*)14" and over	2%	2%	0%
(*) Fittings welded up to 2"	10%	6%	0%
(*)2 ½" to 10"	5%	3%	0%
(*)12" and over	3%	2%	0%
(*) Fittings Screwed up to 2"			
(*) 3" and over	5%	3%	0%
(*)Flanged all sizes	5%	3%	0%
(*) Hub and Spigot 3" to 12"	0%	0%	5%
(*) 4" and over	0%	0%	3%

Note: as indicated with (*), where the percent gives the quantity consisting of a whole number plus a decimal less than 0.5, the decimal portion will be dropped; where the decimal portion is 0.5 and more, the next higher whole number quantity will be selected.

8) ELECTRICAL EQUIPMENT

Switchgear, Motor Control Centers MV/LV:

-Fuse elements	50%
-Bulb for Signal Lamps	50%

Local Control Panels & control stations:

-Fuse elements	50%
-Bulb for Signal Lamps	50%

Electirc Motors:

-Grease Nipples where applicable	10%+power terminal (in J.B.) 2%
Lighting Fixtures	3%
Flag Relay	2%
Time Relay	2%
Terminal Block	2%
Auxiliary Relays	1%
Moving Contacts	15%

Fixed Contacts	15%
Coils for Contactors	10%
Boucholz Relay	one of each type and size
Thermometer	
Local Control Station:	5%
-Ammeter	
-Push button	5%
-Selector Switch	5%
UPS:	
-Fuse	*
-MCB (miniature circuit breaker)	*
-SCR	*
-DIOD	*
-Transistor	*
-Control cards	*
-Signaling lamps	*
-Batteries	*
Battery Charger:	
-Fuse	*
-MCB(miniature circuit breaker)	*
-SCR	*
-DIOD	*
-Transistor	*
-Control cards	*
-Signaling lamps	*
-Batteries	*
Fire Alarm System	*
Telephone System	*
Paging System	*
Radio System	*
Emergency Diesel Generator	*
Sockets (400V, 230V, 24V)	5%

Plugs(400V, 230V,24V)	5%
Portable 110V AC, 50Hz, with transformer	5% each type
Socket and plug (ex-type)	
Hand lamp 24V AC, 50Hz(ex-type)	10 no.

All special tools, equipment and spare parts required for commissioning and start-up shall be provided.

These are the spare parts that VENDORS shall recommend based on experience.

9) INSTRUMENTATION

For control Panel:	
- Bulbs For Signal Lamps	50%
- Fuse Elements	50%
Boards instruments:	
- Fuse elements	50%
- Chart paper for recorders	3 boxes each type
- Ink for Recorder	7 sets each type
- Pens for Recorders	50%
Field transmitters:	
- Gasket	15%
Field instruments:	
- Air pressure regulators	5%
- Temperature Indicators	10% each range
- Pressure gauges	10% each range
Solenoid Valves	2% each type(min 1 set)
Selonoid coils	3 coil each type
Valve positioners	2% each type(min 1 set)
Cable – Single Pair	20%
Cable – Multi Pair	15%
Cable Glands	20%
Junction Boxes – Large	1 min.
Pipe and Tube	10%

Fittings all type	15% each size
Valves	20%
Manifold Valves	10% each size
Cable Tray	20%
DCS:	
- Bulbs for signal lamps	50%
- Fuse elements	50%
- Printer paper, Chart paper	4 boxes each type
- Printer Ribbon	10 sets each type
- Blank Floppy disks/magnetic tape cartridge	10 pieces
Gas Chromatograph:	
-Filter elements	10%
-Calibration gas cylinders	1 cylinder (100 liter) each type
-Standard gas cylinders	1 cylinder (100 liter) each type
-Other gas cylinders	1 cylinder (100 liter) each type
Other Analyzers:	
-Filter Elements	10%
-Calibration Gas Cylinders	1 cylinder (100 liter) each type
-Standard gas cylinders	1 cylinder (100 liter) each type
-Other gas cylinders	1 cylinder (100 liter) each type

10) PAINT AND INSULATION

Paint	10%
Insulation material	10%
Insulation Band & Seal	10%
Insulating Cement	10%
Insulation Sheet Metal	15%
Insulation Wire	10%

11) UTILITY EQUIPMENT

Heat Exchanger, Vessel, Tank and Tower	See item 2

Rotating Equipment	See item 5
Filter Elements	1 Set Each Size/Mat'l
Piping	0%
Electrical	See item 9
Insturmentation :	
-Control panel	See item 10
-Board Instruments	See item 10
-Field Instruments	See item 10
-Others	0%

ATTACHMENT 2

GUIDELINES FOR SELECTION OF 2 YEARS OPERATION SPARE PARTS

Spare parts for equipment are shown in the following tables:

Table 1 – Spare parts for machinery/packages.

Table 2 – Spare parts for electrical equipment

Table 3 – Spare parts for instruments

Table 4 – Spare parts for pressure vessels and heat exchangers

Table 5 – Spare parts for piping.

TABLE 1

SPARE PARTS FOR MACHINERY / PACKAGES

Note 1: Please see the relevant engineering specifications of each equipment for recommended 2-years spares.

Note 2: Please see tables 2 and 3 of attachment-2 for the electrical and instrument spare parts requirements of machinery / packages for 2 -years.

TABLE 2

MINIMUM SPARE PART FOR ELECTRICAL EQUIPMENT

Item:		Quantities
1) Switchgears:	MV Fuses	15%
	Protecting and Flag Relay	2%
	Time Relay	2%
	Lamps	10%
	Space Heaters	10%
	L.V. Fuses	2%
	Auxiliary Relays	1%
	Moving Contacts	15%
	Fixed Contacts	15%
	Circuit Breakers(MCCB,MCB)	10%
	Contactors	15%
	Metering	15%
	CT	20%
	PT	20%
2)Power Motors Control Center:	L.V. Fuses	15%
	Time Delayed Relays	8%
	Lamps	10%
	Space Heaters 10%	
	Terminal Blocks 7%	
	Auxiliary relays	To be
	Contactors	determined later
	Thermal	in conjunction
	overload Relays	with the equipment vendor
	Isolators for each trip	21%
	Current Setting	11%

	Motor Circuit Brakers Complete Unit for Each Type & Size(incoming & bus tie)		15%(min 1)
	Moving Contacts20%		
	Fixed Contacts	20%	
	Metering	15%	
	CT	20%	
	PT	20%	
	Circuit Breaker	one per each type	
3) Transformers :	Bucholz Relays	one each type & size	
	Thermometer	10%	
	Bushing HV/LV	50%	
	Measuring and cintrol devices	20%	
	CT of natural resistor	10% (of each type)	
4) Power Material:	a) Local Control Stations	5%	
	b) Sockets 400V AC	10%	
	c) Plugs 400V AC	10%	
5) Lighting Materials:	a) Switches	10%	
	b) Fuses	30%	
	c) Sockets(230 V, 24V)	10%	
	d) Plugs(230 V, 24V)	10%	
	e) Lighting Fixtures	10%	
	f) Ballast Lamps	5%	
	g) Lamps	20%	
	h) Portable 110V AC,50Hz with transformer (ex-type)socket and plug	10%	
	i) hand amp 24V AC, 50Hz (ex-type)		

6) Motors:

No of Machines	1	2	3	4	5	more
set of Bearing	1	1	1	2	2	40%

Fan, terminal, blocks, space heater (MV)per type 5%

7) UPS:

Fuses	30%
MCB(miniator circuit breaker)	15%
SCR	30%
Signaling lamps and protection device	15%
DIOD	10%
Transistor	30%
Control cards	one per each type
Batteries	5%
Isolator switch (make before break)	one per each type

8)Battery charger:

Fuse	30%
MCB	15%
SCR	30%
DIOD	10%
Signaling lamp	15%
Control cards	one per each type
Batteries	5%

9)Telephoned system *

10) Paging system *

11) Radio system *

12) Fire alarm system *

13) Neutral grounding system *

14) Bus duct *

These are the spare parts required for two years operation. Vendor shall recommend the spares based on their experience.

(*)The Quantities indicated are only preliminary estimation, so the firm quantities will be specified later in conjunction with recommendations of equipment vendors.

The quantities which shall be ordered by VENDOR shall be approved By OWNER.

TABLE 3
SPARE PARTS FOR INSTRUMENTS

Item	Quantities
Flow Instruments	To be determined
Level Instruments	in conjunction with
	the equipment Vendor
Temperature Instruments	(based on Vendor's
	experience on similar
Pressure Instruments	type of plant)
Analyzers	
Control Valves : Valve Bodies	None unless service is corrosive or erosive. For corrosive or erosive services, shall be determined in conjunction with the equipment Vendor.
Valve Plugs	1 of each size/min. 15% or 1
Seat Rings	1 of each size/min. 25% or 1
Actuators	10% (min 1 per type / size)
Valve Stems	1 of each diameter. These vary in length depending on valve size. Purchase the longest of each dia. These can be cut to the correct size.

Stem packings	3 boxes of each size used/min. 20%	
Grease	3 boxes of each type used/min. 20%	
Diaphragms	1 of each size used min. 20%	
Blank Orifice Plates		
Dial Thermometers		
Manual Loading Stations		
Instrument Air Filters (Regulation sets)		
Pressure Gauges		
Pressure Switches		
Plug-in Assemblies for Elect. Instr.		
Plug-in Assemblies for Pneum. Instr.		10%
Seal, Condensate and Vent Pots		(for all)
Solenoid Valves		
Thermocouples		
Thermowells		
Signal Lights		
Pneumatic relay and/or boosh(if any)		
Valve Positioners		10%
I/P Convertes		(for all)

DCS/ESD/PLC (for each system the following items):	
-I/O cards	5% for each type (min 1 for each type)
-Main cards	one set
-Power supply (AC, if any)	one set
-Power supply (DC, if any)	one set
-Barriers cards	5% for each type (min 1 for each type)
On-line gaschromatographs:	
-Main mother board	one set
-Column	one per type

TABLE 4
SPARE PARTS FOR
PRESSURE VESSELS & HEAT EXCHANGERS

ITEM	QUANTITIES
1) Heat Exchangers-Shell and Tube (U Type included)	
- Tubes	Straight tubes sufficient to retube the largest bundle of each tube size and material.
- Bolts and nuts	(Special or Alloy) of each exchanger minimum one set.
- Gaskets	200%
2) Pressure Vessels	
- Gaskets	200%
- Bolts and nuts	10% (Special, Alloy or size 2" diam or greater), minimum one set.
3) Air Cooled Exchangers	
- Plugs	Steel 1%; Non-ferrous 2% (min. one number)
- Plug Gaskets	5% (min. one number)
-Cover plate gaskets	10%
-Tube support boxes	10% (min. one number)

4) Number of Air-fin Coolers Using Part.	1	2	3	4	5	6	7 or more	
(i) V-Belts-Sheaves (Driven & Driver)	0	0	0	0	0	0	1	
- Set of Belts	1	2	3	4	5	6		100%
(ii) Fan Shaft Bearing (Upper & Lower)	1	1	1	2	2	3		50% of No of Air Fins
(iii) Speed Reducers (Gear Box) Shaft								

and pinion

- Bearing Set	1	1	1	2	2	3	50% of No of Air Fins
- O-Rings, Seals, Lock-washers, Locknuts							
(iv) Couplings – Complete Coupling,							
-Flanges, Gaskets, Seals	1	1	1	1	1	1	1
(v) Fan Assemblies	1	2	3	4	5	6	100% of No of Air Fins
-Automatic Pitch Control							
-Hub Assembly Parts Guide Bushing,							
-Pithc Blocks, O-Rings, Clam Gaskets							
(vi) Bolt Assembles, Fork, Pins	1	2	3	4	5	6	100% of No of Air Fins
(vii) Flexible Hose, Rotary Union	1	1	1	1	1	1	2
(viii) Automatic or Manual Adjustments:							
- Blade Retention Clamps, Pitch,	1	1	1	2	2	2	30% of No of Air Fins
Change Forks, Puch Rod, Stub,(with pilot tubes),Bearing Retainer Rings							
(ix) Spring Housing Gasket, Diaphragm, Blade Retainer Ring, Thrust cover Gasket	1	1	1	1	2	2	20% of No of Air Fins
(x) Hub Assembly with Blades	0	0	0	0	0	0	1 (b)

(*) NOTES

(a) Quantities shown are for each size and type of part

(b) Twenty units or more

(c) The parts listed are the principal parts only. Other parts shall be considered for recommendation in quantities consistent with the above table.

5) Plate type Exchangers

Plat gasket	100%
Flow Plate	10%
Nozzle Gasket	200%
Glue (1 Kg. Pot)	1
Special spanner tool	1 for each size/type

TABLE 5
SPARE PARTS FOR PIPING

Item	Quantities
Valves up to 1 ½"	5% for each size, type and material complete units
Valves from 2" to 6"	2% (minimum 2 pieces) for each size , type and material
Valves above 6" to 10"	1 piece for each size, type and material complete units
Valves above 10"	1 only if installed valves quantity is more than 30
Valves up to 10" Gland packing and bonnet gasket	10%
Valves from 2" to 10	2 for each type , size and material set of changeable inner parts
Valves above 10"	1 for each type, size and material
Set interchangeable inner parts: bonnet gasket and stem packing	
Piping gaskets and bolts set for each size and type	10%

ATTACHMENT 3

GUIDELINES FOR THE COMPILATION OF SPARE PARTS INTERCHANGEABILITY RECORD (SPIR)

The manufacturer/supplier shall complete the following parts of th SPIR form as per listed sequence and in the English language:

Line 1: PLANT registration/item number or tag number of equipment/instruments, etc. as stated on requisitions and/or Purchase Orders.

Line 2: Mode, type or other identification of eqipment/instruments, etc. ordered.

Line 3: Serial number of each equipment/instruments, etc. ordered.

Line 6: Purchase Order number reference of equipment/instruments, etc.

Line 6a: Unit of measure, i.e. No., set, pair, kg,roll, etc.

Line 4: Number of identical equipment, etc. of particular model or type being supplied against Purchase Order number mentioned under line 6.

Line 8: Parts description of all component parts considered by supplier as being required for maintenance of equipment, etc. listed in lines 1, 2 and 3. However, all items specified in the appropriate equipment list shall be shown separately.

Col. 9: Drawing number/part number as per supplier's parts list or drawing.

Col. 10: Part identification number shoeing interchangeability within equipment manufacturer's organization.

Note: Identical parts, regardless of whether they have the same part number or drawing number, should be shown only once (see also line 5).

Col.11: Material specification of parts listed in column 8.

Line 5: Enter in appropriate sqare the nuber of parts (listed in column) fitted in each applicable unit. For groups of identical units, denote quantity per unit below quantity shown in line 4.

Col. 7: Total number of identical parts listed in colimn 8 for all equipment, etc. For identical units multiply quantity in line 5 by number in same column in line 4 and enter overall total of each line in column 7.

Col.12: Total spar parts recommended for 2 years operation and commissioning period.

Col.18: Unit price (up to two decimals) for recommended spare parts of column 12.

Col.20: Original identification number for all items of third party manufacture (bought-out items) such as : ball/-roller bearings, mechanical seals, coplings, bearing lock nuts, bearing lock washers, V-bels, bolts/nuts, gaskets, O-rings, and the like. These items should be fully identified by manufacturers' numbers, types, sizes, etc.

V – for: Vital equipment, a breakdown of which would mean an immediate and serious interruption of vital operations in field or plant and with which no risk in the ordering and stocking of spare parts can be justified.

E – for: Essential equipment, engaged in primary operations, but with which a calculated risk can be taken in ordering and stocking of spare parts.

A – for: Auxiliary, general purpose and stand-by equipment, for secondary operations, the temporary lack of spare parts would not have a serious effect.
Under this heading also comes the equipment of which there is a large number of units in used, thus ensuring a sufficient degree of protection in case of failure of one or more units.

<u>The Owner MESC project team should complete the following part of the SPIR form</u>

Col.16: For allocation of the final MESC number.

Col.17: For the classification of spare parts, i.e.:

C – for: Parts wearing out or deteriorating during normal operations,thus shown a fairly regular consumption.

Q - for: Parts not normal stocked, but ordered on request only.

I - for: Insurance items.

O - for: Temporary code number.

THE VENDOR SHALL COMPLETE THE FOLLOWING PART OF THE SPIR FORM:

Col.13: VENDOR'S recommended spare parts for 2 years operation.

Col.14: VENDOR'S recommended spare parts for the precommissioning, commissioning and start-up period.

Col.22: This column has to be filled out for the respective parts purchase order-item reference. This number should be tagged to the respective material fro easy identification upon receipt at site.

Col.19: Total price (up to 2 decimals) of the spare parts for 2 years operation and the commissionng period based upon the quantities approved by the OWNER'S Project Engineer (see column 15)

NOTE: Columns 15, 17 and 21 should be left blank, these are for OWNER's use.

THE OWNER'S PROJECT ENGINEER SHOULD COMPLETE THE FOLLOWING PART OF SPIR FORM:

Col.15: Final quantity to be ordered and Approved by the OWNER's Project Engineer.

Col.21: This column has to be used to indicate the equipment classe, i.e.

IMPORTANT NOTE:

The necessary provisions shall be made to fix the prices of spare parts for all equipment and materials for future purchasig of the spare parts by OWNER more than which shall be purchased by VENDOR for two years operations of the PLANT all EQUIPMENT AND MATERIALS for future purchasing of the spare

ATTACHMENT 4

SPIR Form:

SPARE PARTS LIST AND INTERCHANGEABILITY RECORD

PROJECT: A Project
EQUIPMENT: Centrifugal Pumps for XXXX
PLANT/LOCATION: Plant a: Country B
MANUFACTURER: XXXXXXXXXXXXX
OPU/COMPANY: Good Company.
VENDOR: XXXXXXXXXXXXXXX
NOTE: PLEASE REFER EXPLANATION OF THE COLUMNS ON SHEET 2 BEFORE FILLING UP THE FORM

SPIR NUMBER: (32)
XXX GROUP: (33)
AUTHORISED FOR PURCHASE BY: (34)
REQUIRED ON SITE DATE: (35)

1 EQUIPMENT REQ. OR TAG NO.	2 MANUFACTURER'S MODEL OR TYPE	3 MANUFACTURER'S SERIAL NO.	4 NO. OF UNITS
P-YYYA/B	XXX	XXXXXXXX	2
P-XXXA/B/C	XXX	XXXXXXXX	3

5 ... OF PARTS PER UNIT

MANUFACTURER'S/SUPPLIER'S SPARE PARTS DATA

5 Qty per unit (P-YYYA/B)	5 Qty per unit (P-XXXA/B/C)	7 TOTAL NO. OF IDENTICAL PARTS INSTALLED	8 SERIAL NUMBER	9 DESCRIPTION OF PARTS	10 MATERIAL SPECIFICATION	11 MHI DRAWING No. INCLUDING POSITION OR ITEM NUMBER	12 NAME OF THE SUPPLIER OR BRAND XXX ITEMS OR REMARK	13 PART NUMBER REFER NOTE ON SHEET 3: EQUIPMENT MANUFACTURER	14 PART NUMBER REFER NOTE ON SHEET 3: SUPPLIER OF BOUGHT OUT ITEMS	15 MISC NUMBER	16 XXX OF MEASURE	17 UNIT PRICE: / CURRENCY UNIT: / VALIDITY DATE:	18 DELIVERY TIME BY WEEKS	19 SPARE PARTS RECOMMENDED BY MANUFACTURER: COMMISSIONING	20 ACTUAL (1 YEAR)	21 NORMAL (2 YEAR)	22 CRITICAL	26 SPARE PARTS RECOMMENDED BY LICENSOR: COMMISSIONING	27 ACTUAL (1 YEAR)	28 NORMAL (2 YEAR)	29 CRITICAL	40 PHYSICAL STOCK	41 QUANTITY TO BE ORDERED
1	1	5	1	Ball Bearing	A295 52100	3969 M311-54300-01 No.28	NSK	-	#7238BDF		PC					9							
2	2	10	2	O-Ring	NBR	3969 M311-54300-01 No.44	-	-	-		PC					9							
			3																				
			4																				
			5																				
			6																				
			7																				
			8																				
			9																				
			10																				
			11																				
			12																				

6 MISC NO. OF EQPT OR ORDER REF. NO.

NOTES: (ANY INFORMATION NOT COVERED IN OTHER COLUMNS)

FOCAL POINT OF MANUFACTURE/ SUPPLIER — NAME: / DESIGNATION: / PHONE NUMBER:

CLASSIFICATION OF EQUIPMENT

29 STATUS OF SPIR: (26) / REVISION: (27) / DATE:

...TAL VALUE: THIS SHEET (23) (42) / CUMULATIVE UP TO THIS SHEET (24) (43) / OF THE SPIR FROM LAST SHEET (25) (44) / ...ENCY (ITT$ =) (45)

ALL DRAWINGS AND PARTS LIST ATTACHED: YES

SHEET NO OF

31

SPIR FORM

Annotations:

- PO title or Equipment name to be shown.
- In case of sub-vendor's item, name of sub-vendor to be shown in the clumn of Manufacturer.
- Seller's name to be shown.
- Unit of Q'ty of parts to be shown.
- Unless otherwise instructed, the column can leave it blank.
- Currency unit to be shown.*
- Validity date to be shown.*
- Item No, Model, Serial No.to be shown for each item.
- In case there is interchangeability for each part among several items, the q'ty of parts per unit to be shown in the same line of part. This sample shows there is interchangeability among 5 pumps and q'ty of parts used in 5 pumps is shown in the column 7.
- *The list with "Currency Unit", "Validity Date", "Unit Price", and "Delivery Time" to be sent by excel file via E-mail separately. The list without "Currency Unit, "Validity Date", "Unit Price", and "Delivery Time" to be submitted with cover page as the drawing.
- Drawing No. and Parts No. in the drawing to be shown for identification of each part.
- Q'ty of parts for 1 unit of P-YYYA/B, Q'ty of parts for 1 unit of P-XXXA/B/C to be shown.
- Q'ty of spare parts recommended by Vendor to be shown.
- Supplier or brand for each part to be shown. If not applicable, put "-".
- Parts No. controlled by Vendor or sub-vendor to be shown. If not applicable, put "-".
- Parts No. controlled by supplier or brand specified in the column 12 to be shown. If not applicable, put "-".
- Delively time (Ex-Works) to be shown.*
- Unit price including sea-worthy export packing to be shown.*
- Vendor's Order No to be shown.
- Reference drawing is not required to be attached.
- To be filled by Vendor.

PROJECT: PP-PE PILOT PLANT	Client: شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی
TITLE: UTILITY CONDITION	

UTILITY CONDITION

Document No.: 900-SPC-A4-PR-0006	Rev.: 00
Owner Job No.:	Type: SPC
Contract Job No.:	Page A

PROJECT: PP-PE PILOT PLANT	Client: شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی
TITLE: UTILITY CONDITION	

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Revision	Date	Prepared By	Checked By	Approved By	Status

Document revision

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Nitrogen Specification

Supply conditions at Pilot Plant Battery Limit (B.L.)

	Licensor requirements		Guaranted
Purity			%mol N_2
Oxygen	10	ppm. vol. max	10
Water	20	ppm. vol. max	5
Dew Point			°C

High Pressure

	Max.	Nor.	Min.
Pressure (barg):			
Temperature (°C):			

Mechanical design conditions:

Pressure (barg):	
Temperature (°C):	

Bottle: 150/180 bar

Medium Pressure **NIT**

	Max.	Nor.	Min.
Pressure (barg):	7	6.1	4
Temperature (°C):	Amb	Amb	Amb

Mechanical design conditions:

Pressure (barg):	8
Temperature (°C):	-30/+100

Low Pressure **NIL**

	Max.	Nor.	Min.
Pressure (barg):	4	3.5	
Temperature (°C):	Amb	Amb	

Mechanical design conditions:

Pressure (barg):	5
Temperature (°C):	100

Air Specification

Supply conditions at Pilot Plant Battery Limit (B.L.)

	Licensor requirements	Guaranted
Oil	free	free
Dust	free	free
Dew point (°C)		- 40 ºC

Instrument air **INA**

	Max.	Nor.	Min.
Pressure (barg):	8.5	6.6	4.5
Temperature (°C):	Amb.	Amb.	Amb.

Mechanical design conditions:

Pressure (barg):	10/35
Temperature (°C):	100

Plant Air or Utility Air **UTA**

	Max.	Nor.	Min.
Pressure (barg):	9.5	6.8	
Temperature (°C):	Amb.	Amb.	

Mechanical design conditions:

Pressure (barg):	10
Temperature (°C):	100

Steam Specification

Header conditions at Pilot Plant Battery Limit (B.L.):

High Pressure NOT AVAILABLE

	Max.	Nor.	Min.
Pressure (barg):			
Temperature (°C):			

Mechanical design conditions:

Pressure (barg):	
Temperature (°C):	

Medium Pressure **MPS**

	Max.	Nor.	Min.
Pressure (barg):	25	20	18
Temperature (°C)	sat.+ 30		sat.
Calculated Temp. (	226 - 256	220 - 250	210 -240

min. = sat.
max. = sat. + 30ºC
Mechanical design conditions:

Pressure (barg):	30
Temperature (°C):	256

Low Pressure (LPS) **LPS**

	Max.	Nor.	Min.
Pressure (barg):	6.5	5.5	5
Temperature (°C):	180	162	sat.

Mechanical design conditions:

Pressure (barg):	10
Temperature (°C):	185

Water Specification

Cooling Water (CW) CWS/CWR

(1) Specification: suitably treated to inhibit biological growth, corrosion and scaling

(2) Supply and return conditions at Pilot Plant Battery Limit (B.L.):

	Pressure (barg)		Temperature (°C)	
Supply:	**6 / 5.5 / 2.5**	max/nor/min	**27**	max
Return:	**2.5**	norm	**37**	max

(3) Mechanical design conditions:

Pressure (barg)	**10**
Temperature (°C)	**185**

Industrial Water IWA

(1) Specification: filtered water suitable for process

(2) Supply conditions at Pilot Plant Battery Limit (B.L.)

Pressure (barg)	5	max
Temperature (°C)	Amb.	max

(3) Mechanical design conditions:

Pressure (barg):	6
Temperature (°C):	100

Demineralized Water DWA

(1) Supply conditions at Pilot Plant Battery Limit (B.L.)

Pressure (barg)	8	max
Temperature (°C)	70	max

(2) Mechanical design conditions:

Pressure (barg):	10
Temperature (°C):	185

National Petroleum Company Co.
Research and Technology

PP-PE Pilot Plant

Document No. : 000-SPC-A4-IN-0009	**Rev.: 01**
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1	Sep.13.2021	K.Asgari/ V.Vasfi	M.Nazeri Nasab	M.Rajabian	M.Asadi	M.Asadi	IFA
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		Discipline			**PEM**	**PM**	

Document Revisions

TABLE OF CONTENTS

1. SCOPE

This specification covers the minimum general requirements for the instrumentation and control system design for PP-PE Pilot Plant in NPC-RT plant, Arak, Iran.
For instrumentation systems and components, as far as mechanical and electrical characteristics and performances are concerned, the present general specification will be used, and specific detailed specifications will be issued for each system and/or component. In case of discrepancy, information contained in the particular instrument specification and data sheet will take precedence over the general specification. The instrument design specification will be updated to include all the requirements of the project during detail engineering and is subject to the client's approval.

Any deviation from the present specification at any stage of the project will be clearly stated to the Contractor/Client by the Vendor or the Bidder. If any variation or addition is required in individual cases, they will be shown on material data-sheets. Any deviation from data-sheets or specifications, must be approved in writing by Contractor/Client, otherwise the equipment will be rejected at factory inspection.

2. TECHNICAL REQUIREMENTS

2.1. Instruments and control equipment will be specified on standard data sheet formats and by written detailed specification and description.
2.2. Design methods and materials will be mainly in accordance with **NPCS** standards while the latest editions of the following standards as well as contractual codes and requirements are applicable:

- ISA Instrumentation Standards:

ISA S 5-1	:	Identification and Symbolization 1992,
ISA S 5-2	:	Graphic symbols for logic diagrams 1992
ISA S 5-3	:	Graphic symbols for distributed control/shared display instrumentation, logic and computer systems
ISA S 18-1	:	Alarm and sequences
ISA S 75-1	:	Control valve sizing, equations
ISA S 75-3	:	Face to Face dimensions of globe type control valves
ISA S 75-19	:	Hydraulic testing of control valves 1991
ISA S 61.1	:	Procedures for executive function for process input output and bit manipulation
ISA S 61.2	:	Procedure for file access and the control of file contention.
ISA RP 60.8	:	Electrical guide for control centers

- ANSI Standards:

ANSI-B 16-5	:	Steel pipe flanges, flanged valve fitting edition + B16-5 a (1992)
ANSI-B 16-10	:	Face to face and end to end dimensions of valves
ANSI-B 31.3	:	Process Piping
ANSI-B 1-20.1	:	Pipe threads
ANSI/FC 70.2	:	Control valve seat leakage
ANSI/MC 96-1	:	Temperature measurement thermocouples
ANSI-B16.37	:	Hydro static Testing

- ASME & ASTM Standards:

  ASME, Div 1, : Hydraulic test for safety relief valve, Sect. VIII
  ASTM : Material specifications

- ISO Standards:

  ISO 5167 : Flow measurement with orifices, nozzles and venturi tubes

- BS Standards

  BS 1042 : Methods for measurement of fluid flow in pipes (where not covered by ISO 5167)
  BS 6739 : Instrumentation in process control systems installation design and practice (1986)
  BS 5308 : Instrumentation cables

- IEC Standards:

  IEC 751 : Industrial platinum resistance - thermometer sensors (1983 + AMD 1 1986)
  IEC 947 : Low voltage switchgear and control gear (1990)
  IEC 61131 : Programmable controllers Programming languages.(for DCS/PLC)
  IEC 61158 : DCS/PLC
  IEC 529 : Mechanical Protection degree for enclosures
  IEC 60548 : Industrial Thermocouples- thermometer sensors (for T/C)
  IEC 60751 : Industrial Thermocouples- thermometer sensors (for RTD)
  IEC 337-1 : Switches Contact Rating

- API Standards

  API-RP 551 : Process measurement Instrumentation
  API-RP 554 : Process Instrumentation and control
  API-RP 555 : Process Analyzers
  API-RP 526 : Dimensions of Flanged type Pressure Safety valves
  API-RP 526 : Valves Leakage Limits
  API-RP 500 : Hazardous Area classification

- Other Standards

  NACE- MR-0175 : In Sour Corrosive Services
  AWS D1.0 : American Welding Society for steel structures and Instrument welding.
  CENELEC-50014 to 50020 : Protection of Electrical apparatus in explosive area
  NAMUR : Proximity switch mounting and solenoid valve connection.
  IPS -G-IN-160 : Engineering & material standard for control valves
  IPS-C-IN-160 : Construction & installation standard for control valves

  Plant control and process monitoring as well as all operational interlocks and sequences shall be performed by DCS.

2.3. When it is commercially available all field instruments shall have a protection of at least IP-65 or better according to IEC 529. In case of non-availability of IP-65 or better, other commercially available IP ratings will be reviewed and approved case by case by the client. Transmitter enclosures shall be rated IP-65 as minimum.

2.4. All instruments will be tested and calibrated by the Manufacturer before delivery and a calibration sheet will be supplied with each instrument.

2.5. In order to achieve a fail safe design all Alarm, safety and interlock contacts will be closed and solenoid valves and relays shall be energized during normal plant operation.

2.6. The actions of valves will be designed in such a way as to keep the plant under safe conditions in case of main electric power or instrument air failure**.**

2.7. Instrumentation system shall be basically electronic type. Final control elements and local loops will be pneumatic Minimization of pneumatic instruments to be considered. Control valves shall have electro-pneumatic positioner Electronic transmitters shall be Smart type.

2.8. Electronic signals shall be 4~20 mA as standard. Isolated outputs to be considered where required. All transmitters shall be Smart type with HART protocol. Communicator shall be supplied by manufacturer.

Pneumatic signals shall be 0.2-1 Bar.
Solenoid valves will be 24 VDC powered.
Cable Entry size shall be generally M20X1.5 mm ISO.

2.9. Electronic instruments and circuit boards will be tropicalized against moisture, fungus growth and insect attack and will have a high degree of environmental protection for such a duty as well as protection against corrosive, saline etc. atmospheres.

2.10. Electronic instruments construction material of wetted parts shall be in accordance with piping class requirements. Wetted parts shall be, as minimum, AISI 316.
Where AISI 316 is not suitable for the application other compatible materials with process fluid at service conditions of pressure and temperature shall be selected as Hastelloy C, Titanium, Monel, etc.

2.11. Electronic instruments installed in classified area shall be selected in accordance with CENELEC or IEC code requirements. Electronic instruments in hazardous area shall be basically Intrinsically safe. Where Intrinsic safe instruments are not available Explosion proof or purged instruments shall be selected**.** Certification shall be provided by a recognized laboratory.

3. BASIC DESIGN VALUES

3.1. All field equipment will be suitable for operation in a corrosive, dusty, saline etc. Atmosphere.

3.2. SITE CONDITION:

- Minimum temp. : -28°C
- Maximum temp. : +44°C
- Maximum humidity : 86% in January

1

3.3. Critical instruments systems and control systems will be supplied by 110V 50Hz single phase from UPS and 24 VDC.

The UPS (un-interruptible power supply) located in the control building, or in the electrical substation (UPS room) will deliver:

- Frequency : 50 Hz ± 0.5 Hz
- Voltage : 110 VAC ± 10%

The UPS is limited to feeding the DCS, analyzers and other specific instruments when required. Instruments such as transmitters, transducers, converters, switches... will be powered by 24 VDC. Power supply will normally be supplied from the DCS or other systems otherwise 24 VDC power supply will be used for solenoid valves.
No voltages other than 24 VDC, and 110 VAC will be used for systems supply except if clearly specified by the Contractor.

3.4. Instrument air supply shall have the following characteristics as minimum:

Normal Pressure	:	7 Barg
Minimum Pressure	:	6.5 Barg
Design Pressure		10.5 Barg
Teperature	:	Ambient
Dew Point	:	-40 °C
Dust,Oil,Water free		

4. MEASUREMENT UNITS

- Density : kg/m3 (kilograms per cubic meter)
- Level : m,cm,mm
  : % of range (for indication)
- Viscosity :
  Liquid : cSt
  Gas : cp

- Other units:
  Rotation : rpm (revolutions per minute)
  Power : kW or kVA
  Voltage : V (volt)
  Electrical current : A (ampere)
  Pressure : barg
  Flow : m3/hr
  Mass flow : kg/s , kg/hr
  Temperature : °C
  Time : Sec,Minute
  Distance : Meter

5. INSTRUMENT GENERAL REQUIREMENTS

5.1. For transmission and control, electronic loops will use a standard 4-20 mA signal. This is based on smart transmission of signal with HART protocol. The electrical instrument signal will increase in level in increase of the process variable.
For temperature instruments, refer to chapter 13 (TEMPERATURE INSTRUMENTS).

5.2. Instrument will in general be of the electronic type.

5.3. Transmitters may be provided with integral or separate local digital indicator per process requirements.

5.4. Millimeters and receiver gauges will be visible and readable at the associated control valve assembly or at the location indicated on the detailed engineering P&ID.

5.5. Process control valves with pneumatic actuators will be actuated via I/P positioners (integral with the control valve).

5.6. Limit switches shall be proximity type (NAMUR type) 

5.7. The component parts of instruments will be of material suitable for the process. Movements or wetted parts for instruments will be stainless steel or better when specified. Materials exposed to the process fluid will be in accordance with the fluid conditions (pressure, temperature, and corrosion). This will be reviewed case by case during detail engineering and is subject to the Client's approval.

5.8. All components, particularly if containing electric contacts, will be vibration resistant. All components will be constructed of material which is resistant to corrosion by the process fluid with which they are in contact internally and to the ambient air environment to which they are externally exposed (corrosive, dusty, saline etc. atmospheres).

5.9. Instrument cables (analog (4- 20 mA), digital signal, RTD and thermocouple cables) will be run separate from power supply cables from the field junction boxes to the control room.

5.10. cables carrying intrinsically safe shall be routed separately with non-IS signal carrying cables.

5.11. Instrument air manifolds shall be used for distributing the instrument air to the consumer. Min 20% spare tapping shall be considered in each manifold.

5.12. Control actions shall be done as much as possible in the DCS system but Local controllers if any will be specified with one or more of the following actions; the control action will be easily reversible.

a. Proportional
b. Integral or reset
c. Derivative or rate.

Generally, temperature controllers will be three term controllers; flow pressure and level will be two term controllers. Integral and derivative actions will have an off position where possible.

5.13. Each pneumatic user shall be provided with a 1/2" block valve. the material of block valve shall be 316 SS. An air filter regulator with pressure gauge shall be considered for each user. For control valves the pressure gauge will be installed on the positioner**.**

5.14. All indicator dials will be white with black graduations. Electronic indicators will be as per supplier standard.

5.15. All field instruments will be provided with a suitable stainless-steel nameplate bearing whenever applicable, the following information:

- tag number
- Manufacturer's name, model and serial number
- Maximum allowable pressure / temperature for the parts concerned
- Scale factors
- Materials of the fluid wetted parts
- Power voltage and frequency or instrument air pressure
- Calibrated range

All indoor instruments will be provided with at least one nameplate for operating and maintenance purposes.

5.16. Final drawing and certificates will be issued in the English language.

6. CONTROL ROOM

6.1. The main apparatus installed in control room is the cabinets of Distributed Control System (DCS) package PLCs and operator stations.

6.2. Cable cross wiring marshalling cabinets, DCS process interface and controller cabinets, DCS historical modules and network modules, marshalling cabinets, electrical distribution panel will be installed in an auxiliary room adjacent to the PCR (process control room).
The DCS operator stations / engineering stations and associated printers will be located in the PCR (process control room).
The UPS cabinets and the UPS batteries will be located in the UPS room and battery room respectively which is in the scope of Electrical.

6.3. All instrument cable entries into the control room and auxiliary room from the outside will be via PVC conduit, which will be sealed in order to prevent the ingress of gas or vapors.

6.4. No process fluids will be piped into the control room or the auxiliary room.

6.5. The process control room and the auxiliary room will be air conditioned, and classified as a general-purpose (unclassified) electrical area. They will also have a false floor for routing of cables and a false ceiling for proper lighting and air conditioning ducting.

7. LOCAL PANELS

All functions for process control of the plant will be done through the Distributed Control System. However, local panels may be provided for main EQUIPMENT, which will be normally controlled by programmable logic controllers (PLC) located in the auxiliary room. The local panels (installed near the EQUIPMENT) will include push buttons, lamps and indicators necessary for local operations, start-up and maintenance (e.g. heater...) and will be the Vendor's standard design.

8. ALARMS AND SHUTDOWNS

8.1. Alarms and shutdown systems will be generally designed to be fail-safe.

8.2. The control systems will be designed in order to protect against tripping from random or spurious signals on deviation from normal operating conditions i.e. to prevent noisy shutdown.

9. CONNECTIONS

9.1. Instrument connections and tapping points on vessels or pipes are defined on table #1.

9.2. Plant pneumatic signal lines will be 1/4" OD stainless steel tubing and fittings.

9.3. All cable runs between the control room and the plant will be made with multi core/pair cables and connected to the field junction boxes.
Cable specifications from the auxiliary room to the field are:
Electronic signals: multi-pair, each pair twisted and screened, overall screened, armored PVC insulated.
On-off signals : multi core, overall screened, armored PVC insulated

9.4. The single pair cable specifications are the following:
Electronic signals single pair, twisted, screened, armored, PVC insulated
On-off signals Two Core, armored, PVC insulated, overall sheath
Cable runs in the main control room as well as in the auxiliary room and the plant, will be tagged at each end for identification purposes. For the cable runs in the plant, cable markers will be provided at specific distances to indicate the route of the cable.

9.5. Multi-strand copper wires for single pair or triple conductor cables will be used in the auxiliary room, and for cables between field junction boxes and instruments. For other connections, solid copper conductors are preferred.

9.6. A maximum voltage drops of 10% at normal loading conditions will be taken into account in the sizing of cables.

9.7. 20% spare cores are required in multi core cables and for spare cable inlets to the junction boxes. All spare conductors will be connected to terminals.

9.8. Minimum 20% spare space is required in junction boxes.

9.9. Screwed terminals will normally be used. Test/disconnect terminals will be used for the connection of field cables in the marshalling cabinets**.**

9.10. Accuracy rating for instruments.

The rated accuracy of individual instruments will be as listed below.

These tolerances will apply to the full-scale reading of the particular instrument, referring to repeatability a deviation of characteristic curve, at constant ambient temperature and a steady power supply (for instruments accuracy values marked with (*) referred to the measured value).

Primary devices:

Standard orifice plates and Venturi tubes (>50% of measuring range)	71.5 %
Resistance thermometers Pt 100 DIN	7 0.6 %
Thermocouples	7 0.75 %

Field indicators:

Pressure gauges	7 1.6 %
Pressure gauges (flanged connections)	72.5 %
Liquid expansion thermometers	71.0 %
Bimetal thermometers	72.5 %

Flow meters (> 10% of measuring range)

Magnetic flow meters	71.0 %
Turbine flow meters	70.5 %
Positive displacement meters	70.5 %
Rotameters	71.6 %
Rotameters with PTFE lining	72.5 %
Rotameters (for purge systems)	74.0 %
Coriolis flow meters for gas streams	(*)7 0.5 %
Coriolis flow meters for liquid streams	(*)70.2 %
Vortex flow meters for gas or vapour streams	(*)71.5 %
Vortex flow meters for liquid streams	(*)71.0 %
Thermal mass flow meters	(*)72.0 %

(*) accuracy rating referred to the measured value

Transmitters

Temperature transmitters for resistance Thermometers/thermocouples	70.6 %
Pressure transmitters	70.2 %
Differential pressure transmitters	70.2 %
Level transmitters (displacer type)	71.0 %
Level transmitters (radar type)	710 mm 70.3 %
I/P transducers	7 0.6 %
A/D or D/A converters	70.2 %

Control room instruments

Line recorders	70.5 %
Dotted line recorders	70.5 %
Pneumatic indicators	70.5 %
Electric indicator	70.5 %

Factors influencing the measuring accuracy:

10.FLOW INSTRUMENTS

10.1. ORIFICE PLATES

In general, flow measurement will be made by means of square-edged concentric orifice plates mounted between flanges with flange taps, in accordance with ISO 5167 recommendations and relevant codes and standards.
Eccentric orifices may be used in horizontal lines to avoid accumulation of liquid when vent or drain holes (maximum 2 mm diameter) are not specified or with fluids containing solids.
Quarter circle or conical entrance orifice plated may be selected when a square-edge type is not appropriate.
Orifice plates shall be in AISI 316 as minimum for general service. Other materials shall be used when AISI 316 is not suitable for the service conditions; The material to be used will be specified on Piping material specification and/or instrument data sheet.
Orifice plate beta ratios shall be between 0.25 to 0.7.
Orifice meter runs shall be used for line size lower than 2".
Integral Orifice assemblies shall be used for to measure flow rates which can't be measured accurately with the minimum size of meter runs.
Orifices will be sized for the following standard instrument DP range:

- 12.5, 25, 50, 62.5, 125, 250, 500, 1000, 1250 mbar.

In order to achieve a minimum pressure loss in the system, the maximum allowable beta value (d/D) will be selected for each orifice.
Straight run pipe requirements shall be in accordance with ISO 5167 or vendor requirements.
Straightening vane can be used to reduce upstream pipe lengths.

10.2. VENTURI AND FLOW NOZZLE

Venturi tubes may be selected for non-viscous fluids when relatively high accuracy is required with a low-pressure drop in the system and or short minimum straight run piping requirements.

10.3. PITOT TUBES

Pitot tubes or modified pitot tubes (Annubars) may be selected for large flows of clean fluid to achieve minimum pressure loss in the system where the pressure drop through an orifice is uneconomical or flow measurement accuracy is not critical.

10.4. MAGNETIC FLOW METERS

Magnetic flow meters may be used for dirty liquids having conductivity higher than 5 μS/cm.

10.5. VORETX FLOW METERS

Vortex and other non differential flow transmitters shall be used only in special applications as shown on P&IDs.

10.6 MASS FLOW METERS

Generally, Coriolis or thermal Mass flow meters shall be used for mass flow measurement. Installation of flow meters shall be in a manner as to ensure that the entire assembly is fitted with the respective process fluid.

10.7 DIFFERENTIAL PRESSURE TRANSMITTERS

Flow measurement signals (e.g. for indication/recording / totalizing / trending etc.) will generally be connected to the DCS:
Transmitter measuring principles used with orifice plates, venturi tubes, pitot tubes, etc. will be in accordance with the selected manufacturer's standards e.g. diffused silicon strain gauge, capacitance etc....
The transmitters will be of the "smart" type (HART Protocol) with accuracy better than 0.2%.
The sensing element material will be AISI 316 minimum.
Electronic transmitters will be furnished with test terminals and by-pass diode to facilitate field testing without disconnection or connection of a field mounted signal indicator (MV-Meter) either integral with or remote from the transmitter. Transmitters shall be reverse polarity protected.

10.8 FLOW SWITCHES

Direct-acting flow switches will not generally be used for process fluids. Switch actions will normally be made via normal measuring means with the switch function on the transmitter output or as threshold contact type on local flow indicator.
The switch function will be adjustable. Switches will have changed-over volt-free snap-acting contacts.
Further detailed data and information will be provided when specifying the instruments

10.9 LOCAL FLOW MEASUREMENT:

For local measurement, variable flow meters or differential head type elements with DP pressure indicator will be used.

10.10 P/T COMPENSATION:

Whenever high fluctuation of pressure or temperature of the process fluids are expected, P/T compensation shall be considered.

11 LEVEL INSTRUMENTS

11.1 DISPLACEMENT TYPE

External displacer-type (torque tube type) transmitters will generally be used for level ranges lower than or equal to 1219 mm (48"). Adequate valves will be provided for maintenance purposes.
The following standard ranges will be used:

- 356, 813, 1219, 1524, 1829, 2134: mm
- 14, 32, 48, 60, 72, 84: inch

Displacement type level instrument shall not be used with viscous, turbulent, solidifying, corrosive conditions or liquids that boils at ambient temperature.

Internal displacer type (displacer handing in vessel) will only be used where conditions dictate that the level shall be measured internally and where turbulence will not detach the displacer. and they shall be avoided practically on vessels that can't be isolated without shutting down a part of the plant.
Extensions will be considered for services above 200°C (fins).
Connections will be in general side-bottom mounted. The housing will be rotatable. Left-hand type or right-hand mounting position of housing will be in accordance with the installation requirements. Drain valves shall be considered for external level transmitters.

11.2 DIFFERENTIAL PRESSURE TYPE

In general, differential pressure transmitters will be used to measure liquid level where the range of level to be measured is greater than 2000 mm and where this type of instrument is preferred to a displacer type like steam drum level.
Transmitter measuring principles will be in accordance with the selected manufacturer's standards, and preferably same as those differential pressure transmitters used for flow measurement.
External differential pressure instruments shall be installed lower than the lowest vessel connection and higher than the highest vessel connection depending on the process fluid or selected purge method.
The transmitters will be of the "smart" type with accuracy better than 0.2%. The sensing element material will be AISI 316 minimum.
Electronic transmitters will be furnished with test terminals and by-pass diode to facilitate field testing without disconnection or connection of a field mounted signal indicator (MV-Meter) either integral with or remote from the transmitter. Transmitters will be reverse polarity protected. D/p transmitters will have zero elevation or suppression as required.

11.3 DIAPHRAGM SEAL AND CAPILLARIES

For measurement of viscous fluids, fluids containing solids, highly corrosive fluids or where temperature changes may influence the fluid conditions, the use of diaphragm seals and capillaries may be considered. Capillaries for remote seal applications will be kept as short as possible and will not exceed 6 m .When remote seal systems are specified, the fill liquid shall be selected to agree with the process requirements, and shall not affect a change in the instrument calibration when subjected to a calibration at ambient conditions versus normal process condition.

11.4 LIQUID LEVEL SWITCHES

Depending on the process requirements, level switches shall be of the float type, tuning fork, or capacitive sensor type. Switches without mechanical contacts are preferred. For process connection reefer to the Table #1 on the attachment.

11.5 SPECIAL LEVEL MEASUREMENTS:

Capacitive level transmitters may be used as an alternative for fluids of high viscosity and for bulk materials.
Ultrasonic or radar methods will be used for tank gauging if physical condition of the process fluid allows this.
Radioactive level measurements will be used in the polymerization reactors only, as in this case it is the only possible method of measurement.

Load cell assemblies normally will be used for silo measurement. In that case the silo shall be installed stress free.

11.6 LOCAL LEVEL INDICATORS:

Local level indicators with all metric construction and magnetic coupling of follower magnet is generally preferred. For process connection refer to Table #1.

The instruments will have vents and drains according to manufacturers standard. In justified exceptional cases and as explicit shown on the PID, permanently attached valves and fluid discharge lines will be used and installed in accordance with the piping specification.

Local tank level gauges with a large measuring range will consist of level transmitters with local indicators.

11.7 REMARKS

- There will be no local recording
- Installing two or more devices on the same connections will be avoided.

12 RESSURE INSTRUMENTS

12.1 GENERAL

Pressure-measuring elements will be minimum AISI 316 stainless steel or comply with piping material if more resistive material required.
Pressure Instruments will have over-range protection to minimize the effect of over pressure in order to avoid a shift in calibration. Instruments, which can be exposed to vacuum, will have under range protection. Over-range protection will cover the Design pressure of line.
Pulsation dampeners or glycerin-filled systems will be supplied for all pressure instruments and gauges in vibrating or pulsating services.
Differential-pressure instruments will generally be capable of withstanding the full static pressure without loss of calibration.
For the measurement of absolute pressure, differential pressure transmitters will be used with an absolute vacuum reference chamber.

12.2 PRESSURE GAUGES

Bourdon-tube type pressure gauges will generally be used. The material of the Bourdon-tube will be SS 316 minimum or better, depending on process requirements.
Pressure gauges shall have stainless steel housings with a blowout disc and zero adjustment. It must be possible to fill the gauge with glycerin.
The movement will be of corrosion and wear-resistant material, e.g. stainless steel/nylon-coated, independent of case.
Gauges for direct mounting will have a 1/2” NPT male bottom connection and a 4” (100 mm) dial.
Bourdon tube type pressure gages shall be used for ranges from 1Barg to 1000 Barg
Diaphragm type pressure gages shall be used for measuring ranges bellow 1 Barg.

Over range protection of pressure gauges shall be 1.3 of full scale. 1

For slurry, viscous, highly corrosive or fluids with suspended solids the pressure gages shall have diaphragm seal with 2" flange connection.
Pressure gauges will preferably be direct-mounted to the process. Receiver gauges may be local field-mounted or panel-mounted (local panel).

12.3 PRESSURE SWITCHES

Pressure switches will be of the Bourdon tube or pressure gauges with adjustable contacts (proximity type), diaphragm or bellows type with a 316 SS element as a minimum requirement. Switches will be adjustable over the full scale. Pressure switches for direct mounting will have a 1/2" NPT female connection. Diaphragm seals with capillary shall be provided where required. Whenever no suitable pressure switch can be found due to material or, over-range protection requirements etc., a 4 - 20 mA electronic transmitter will be used instead. Pressure switches for pneumatic signals will preferably have bellows measuring elements. Connections will be 1/4" NPT female. Pressure switches will have a minimum standard over-range protection of 130% of range and be capable of withstanding the full static design pressure of the system without loss of calibration. Switches will be snap acting hermetically sealed switches with contact rating in accordance with IEC 947-5-1 and relevant codes and standards. The switches type shall be SPDT type.

12.4 TRANSMITTERS

Transmitter measuring principles will be in accordance with the selected manufacturer's standards e.g. diffused silicon strain gauge, capacitance etc.
The transmitter will be of the "smart" (HART protocol) type with accuracy better than 0.2%.
The sensing element material will be AISI 316 minimum.
Electronic transmitters will be furnished with test terminals and by-pass diode to facilitate field-testing without disconnection or connection of a field mounted signal indicator (MV-Meter) either integral with or remote from the transmitter. Transmitters will be reverse polarity protected.
Electronic transmitters will have a provision for checking zero and span on the output terminals while the transmitter is in service.
The manufacturer of each type of transmitter shall supply suitable communicator.

12.5 DIAPHRAGM SEALS AND CAPILLARIES

For measurement of viscous fluids, fluids containing solids, highly corrosive fluids or where temperature changes may influence the fluid conditions the use of remote diaphragm seals and capillaries may be considered. Capillaries for remote seal applications will be kept as short as possible and will not exceed 6 m in length.
Seals and capillaries will be considered to be an integral part of the instrument.

13 TEMPERATURE INSTRUMENTS

13.1 THERMOWELLS

Standard length thermowells will be used. Thermowell will be solid machined and drilled from bar stock. They will be selected in accordance with the piping class.

Thermowells shall be flanged type, for connection size refer to Table #1.

13.2 THERMOCOUPLE ELEMENTS (T/C'S)

Thermocouples will be in accordance with IEC-60548; non-grounded hot junction type will be used for temperature measurement. RTD detectors will be used in preference to thermocouples for temperature ranges of –200 to 600°C. The following types of thermocouples may be used depending on the temperature range to be measured.

- Type K (chromel - alumel) -270 to 1372°C (Nickel-chrome/nickel-aluminum)
- Type R (platinum 13% rhodium-platinum) -50 to 1768°C
- Standard length thermocouples will be used. Thermocouple inserts will match the standard Thermowell diameter and length. Lagging extensions will be supplied as required. Connection heads to be metal type.
- Stainless steel sheathed mineral-insulated spring-loaded 2-wire type elements will be used. Special protection tube/sheathing and/or insulation will be used for temperatures above 800°C, saline environment and when hydrogen diffusion may be expected.
- For services where thermowells must be considered to be an obstacle in the process (clogging/turbulence), skin-type thermocouples may be considered. Skin-type thermocouples will be used to measure heater coil, reactor wall temperatures, as per process.

Skin-type thermocouples will preferably be welded to the surface and as a minimum be spring-loaded or clamped. Open-air skin-thermocouple installations will be insulated. Skin-type thermocouples will not generally be used for shutdown purposes.

13.3 RESISTANCE-TYPE ELEMENTS (RTD'S)

Platinum-type resistance elements, with characteristics in accordance with IEC 751 (resistance 100 ohms at 0°C), will be used in preference to thermocouples for ranges between of –200 to 600 °C

- Standard length elements will be used. RTD inserts will match the standard Thermowell diameter and length. Lagging extensions will be supplied as required. Connection heads to be metal type.
- Stainless steel sheathed mineral-insulated spring-loaded 3-wire type elements will be used.

13.4 THERMISTOR AND SEMICONDUCTOR SYSTEMS

These systems will not be used, except for motor windings when specified.

13.5 BIMETALLIC SYSTEMS

Dial thermometers for local use will be of the bimetallic type with adjustable gland and dial. Dial thermometers will fit the standard Thermowell diameter and lengths.

Thermometers will be heavy duty, industrial type. Nominal dial size will be 100 mm (4").
Case to be stainless steel with back shafts and zero adjustment.
The movement will be of corrosion and wear-resistant material, e.g. stainless steel/nylon-coated, independent of the housing.
Bimetallic-operated switches may only be used in non-critical services such as for tank heater.
Bimetallic switches are not permitted for process alarm and shutdown functions.

13.6 TRANSMITTERS

- Head mounted mV/I (T/C) or ohm/l (RTD) converters will be used as much as possible. The required degree of accessibility will be strictly adhered to.
- In cases head mounting is not possible or when indicator is required, where, the converter will be installed locally, close to the measuring element or in the place where local reading is required.
- Cold junction compensation will be provided for mV/I (T/C) converters.

Transmitters will be of the "smart" type with accuracy better than 0.2%.
Electronic transmitters will be furnished with test terminals and by-pass diode to facilitate field-testing without disconnection or connection of a field mounted signal indicator (MV-Meter) either integral with or remote from the transmitter. Transmitters will be reverse polarity protected. Electronic transmitters will have a provision for checking zero and span on the output terminals while the transmitter is in service.

13.7 SPECIAL APPLICATIONS

Temperature-measurement on rotating equipment:

- A temperature rise in the bearings of rotating machinery, is an indication of approaching problems.
- In thrust bearing, a temperature rise indicates inadequate cooling of bearings or excessive wear.
- Sensors, extension wire, terminal heads, cables,
- boxes, etc., must be capable of withstanding considerable mechanical stress, weather exposure, fire-protection sprinklers, equipment washing etc.

13.8 REMARKS

Local temperature control (thermo-valve) is not recommended. Local recording will not be done.
Further detailed data and application for each type of instrument will be provided when specifying the temperature instruments.

14. CONTROL VALVES

14.1. GENERAL REQUIREMENT

Supplier quotation shall include a detailed specification sheet for each control valve, which shall provide all the details regarding type, construction materials, noise, etc… and any other valve accessories.
This specification is general. If exceptions, variation or additions are required in individual cases they will be shown on specification/data sheets for control valves.
Any proposed deviation from control valve specification /data sheets or this general specification, must be approved in writing by client / contractor.

14.2. CONTROL VALVES SELECTION

14.2.1. Required valves capacities

Required valve capacities shall be referred to in terms of CV coefficients and selected CV value.

14.2.2. Valve sizing

A calculation note / sheet for the sizing of each control valve shall be supplied.
Calculation of the control valves shall be based on ISA S 75.1 “Control valve sizing equations”.
The control valve capacities in term if CV shown on the purchaser’s data sheets has been arrived at using the formula given in the standard ISA-S-75.01, “Control Valve Sizing Equations”. In case of Vendor sizing formula differs from this. Purchaser should be provided with the same.
In general, control valves shall be sized so that the valve opening is as following:

At maximum flow-about 90% open
At normal flow about 75% open
At minimum flow about 20% open

Rangeability of valves shall be 30:1 unless otherwise specified.
Butterfly valves shall be sized assuming a 60° opening at max. flow in general.
Non preferred valve body sizes are 1 ¼”, 1 ¾”, 2 ½”, 3 ½”, 4 ½”, 5”, 7” and 9”.
Vendor shall furnish calculation sheets or computer print out for sizing.

14.2.3. By pass & Block Valve

Block & Bypass valves are mostly manifolded in piping system to allow manual manipulation of flow through systems when control valves are not in service. Bypass valves in sizes of 4 inches or less most be globe valves.
They should have a capacity at least equal to the calculated Cv of control valve.
Block and Bypass valves should be avoided in the following cases:

- On hydgen service
- Around 3-way valves
- Around self-acting steam pressure reducing valves
- Around control valves forming part of a protection system

14.2.4. Valve type

Globe body type control valves shall generally be chosen for standard use (due to bench test requirement).
Butterfly control valves shall be considered where:

- When available pressure drop is low
- For large line sizes
- Where allowed in piping specification

Shut off valves shall be generally selected as Ball type except for high temperature services.
Valves using special technology shall be submitted to the Client / Contractor for approval.(Clearly noted on P&ID)
For small size or special cases (low noise, etc…) other types shall also be considered

14.3. GENERAL VALVE CONSTRUCTION REQUIREMENTS

14.3.1. Flange Finish Facing

Minimum body and connection rating shall be 300 lbs Raised Face (RF). Flange facing shall be chosen in accordance with classes of the piping specification. Contact finish facing shall be as follows:
Spiral serrated finish (conventional symbols: RFD)
Roughness: Ra 6.3 μm to 12.5μm (250 μin to 500 μin AARH)
Smooth finish (conventional symbols: RFC)
Roughness: Ra 3.2 μm to 6.3μm (125 μin to 250 μin AARH)

For RTJ flanges, ring joints will be supplied by others

14.3.2. Accessories

Limit switches if any shall be proximity type with NAMUR standard.
All control valves shall be normally fitted with an electropneumatic positioners.
All accessories specified on data sheets shall be supplied, installed, connected and wired to the valve by the valve supplier.
All tubing shall be in 316 Stainless steel.
Compression fittings shall be in SS 316 Stainless steel double ferrule design.
Pneumatic connections shall be ¼" NPT female minimum, or bigger if stated by supplier for flow considerations.
Electrical connections shall be:

- M20 x 1.5 ISO for positioner
- M20 x 1.5 ISO solenoid valve

All positioners shall have pneumatic gauges, graduated in bar, two (2) incase of electro-pneumatic positioners, three (3) in case of pneumatic positioners if any. Dial size shall be as per Vendor standard.
Solenoid valves shall be provided where specified on data sheets and shall be NAMUR type.
Valve trim shall be stainless steel with Viton or similar resilient seat to provide tight shutoff.
Solenoid valves shall be normally energized. Coils shall be suitable for permanent energizing.
Low power coils shall be proposed (maximum acceptable is 10 W). Electrical power for solenoid valves coils will be 24 VDC.
Solenoid valves shall be suitable for instrument air Service.

When specified, solenoid valves shall be provided with manual reset facilities. The manual reset facilities shall prevent automatic reset but allow local manual reset of individual valves on restoration of electrical power (i.e. reset of electrical logic), and local shutdown.

15. PRESSURE RELIEF VALVES

Pressure relief valves shall be full-bore type.
Relief valves shall be designed in accordance to the requirements of API-RP-520.
Lifting lever shall be provided for steam and air services.
Conventional valves shall be used for constant back pressure applications while pressure balanced valves with stainless steel bellows shall be used for varying back pressure application where the back pressure exceeds 10% of the set pressure of the valve.
Connection of Pressure relief valves shall be flanged type while the connections of thermal relief valves shall be screwed type.

Steel bodies with stainless steel trim shall be used for all pressure relieving devices unless piping specification requires alloy construction.
Rupture Disc may be used in lieu of or in combination with safety and relief valves.
Combination of rupture disc and pressure safety valve shall be used for slurry or highly corrosive services.
Rupture discs shall be provided with bursting alarm device. Combination of rupture disc and relief valves shall include a pressure switch installed between disc and valve to alarm a leakage or burst.

16. ANALYZERS

Process analyzers requiring sampling will be supplied pre-assembled with their own sampling and conditioning systems in open ladder type racks. Analyzer racks will be installed in analyzer houses.
Where possible analyzers will be of the on-line type.
When necessary analyzers will be provided with a fast loop system

Sample purge gas and analyzer vent gas will be properly vented to a safe area.
When applicable analyzer transmitters shall be of the “smart” type with accuracy better than 0.2% and have a 4-20 mA output to DCS.
All materials used shall be suitable for the sample stream and the surrounding atmosphere; AISI 304 / 316 shall be selected as minimum.
Whenever practical sample shall be returned to the process. Other methods of disposal shall ensure safety and pollution restrictions.
Field mounted analyzers shall be used for simple analyzers such as Conductivity, PH, density, etc.

Analyzers shall be in general installed in analyzer house that shall be weather proof, with air conditioning.
Sample Pressure reducers, conditioners, fast loops, and calibration gas cylinders shall be installed outside analyzer house.

Further detailed data and application for each type of analyzer will be provided when specifying the analyzers.

INSTRUMENT ON VESSEL	VESSEL CONNECTION	FIRST BLOCK VALVE	INSTRUMENT CONNECTION
External level instrument	2“ flanged	2“ flanged	2“ flanged
Internal displacer level	4“ flanged	-	-
External ball float level switch	4“ flanged	-	4“ frlanged
Internal ball float level switch	4“ flanged	-	4“ flanged
Level guage on vessel	1“ flanged	1“ flanged	1“ flanged
Level guage on standpipe	1“ flanged	1“ flanged	1“ flanged
Magnetic level instrument	1“ flanged	1“ flanged	1“ flanged
Dp cell on vessel (without diaphragm)	1“ flanged	1“ flanged	½“ NPT
Dp cell on vessel (with diaphragm)	3“ flanged	3“ flanged	3“ diaph.seal
Dp cell on standpipe(without diaphragm)	1“ flanged	1“ flanged	½“ NPT
Dp cell on standpipe (with diaphragm)	3“ flanged	3“ flanged	3“ diaph.seal
Dip tube level instrument	4“ flanged	1“ flanged	½“ NPT
Pressure guage&transmitter(general case)	1“ flanged	1“ flanged	½“ NPT
Pressure transmitter with diaphragm	2“ flanged	2“ flanged	2“ flanged
Pressure gauge with diaphragm	2“ flanged	2“ flanged	2“ flanged
Thermowell (general case)	1 ½“ flanged	-	-
D/P pressure transmitter /gauge(vessel)	1“ flanged	1“ flanged	1/2“ NPT
Radar type level instrument	3“ flanged	-	-

Table #1

PIPING	PIPE CONNECTION	FIRST BLOCK PIPE	INSTRUMENT CONNECTION
Orifice (Dp) flow-meter	½“	½“	½“ NPT
Pitot tube	Acc.mfr.std	Acc.mfr.std	½“ NPT
Pressure transmitter	½ “	½“	½“ NPT
Pressure gauge	½ “	½“	½“ NPT
Pressure transmitter with diaphragm	2“ flanged	2“ flanged	2“ flanged
Pressure guage with diaphragm	2“ flanged	2“ flanged	2“ flanged
Thermowell (flanged connection)	1 ½“ flanged	-	TE : ½“ NPT
Thermowell (Threaded connection)	1 “ NPT	-	
Analyzer connection	1“ flanged	Special valve	Acc.mfr.std
D/P pressure transmitter/guage	1/2“	½“	½“

Table #2