



Plant <b>Caustic Soda Expansion</b>	Client <b>Punjab Alkali</b>	Contract Code <b>PACL</b>	Document ID <b>0215-EQM-22-EC-0002</b>	Contract No. <b>66-0215</b>
	<b>Technical Specifications for 22K01FN- Liquid Ring Chlorine Compressor</b>			

<p><b>tkIS India / Vendor</b></p> <p><b>Category Codes (Submission Purpose)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 1 For Approval</li> <li><input type="checkbox"/> 2 For Review / Comments</li> <li><input type="checkbox"/> 3 For Information</li> <li><input type="checkbox"/> 4 For Engineering</li> <li><input checked="" type="checkbox"/> 5 For Enquiry</li> <li><input type="checkbox"/> 6 For Order Placement</li> <li><input type="checkbox"/> 7 Final &amp; Approved</li> <li><input type="checkbox"/> 8 Released for Construction</li> </ul> <hr/> <p><b>Acceptance Codes (Approval Codes)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 1 Approved</li> <li><input type="checkbox"/> 2 Approved for Manufacturing / Fabrication with Comments as marked</li> <li><input type="checkbox"/> 3 Not Approved / Resubmit</li> <li><input type="checkbox"/> 4 Retained for Information / Records</li> <li><input type="checkbox"/> 5 Reviewed</li> <li><input type="checkbox"/> 6 Reviewed as Noted / Resubmit</li> </ul> <p><b>Remarks for AC2 :</b> This marked-up drawings is hereby approved for fabrication / manufacturing and shall be re-sbmitted after revision. This drawing should be revised only to the extent of tkIS India / Owner / Client comments. Any other changes made by you will not be considered unless clearly highlighted in covering letter asking for approval.</p> <p><b>This approval / review does not absolve the supplier from the full responsibility for design and fabrication.</b></p> <p>Date : ___/___/___      Name : _____</p>	<p><b>tkIS India / Owner / Client</b></p> <p><b>Category Codes (Submission Purpose)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 1 For Approval</li> <li><input checked="" type="checkbox"/> 2 For Review / Comments</li> <li><input type="checkbox"/> 3 For Information</li> <li><input type="checkbox"/> 4 For Engineering</li> <li><input type="checkbox"/> 5 For Enquiry</li> <li><input type="checkbox"/> 6 For Order Placement</li> <li><input type="checkbox"/> 7 Final &amp; Approved</li> <li><input type="checkbox"/> 8 Released for Construction</li> </ul> <hr/> <p><b>Acceptance Codes (Approval Codes)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 1 Approved</li> <li><input type="checkbox"/> 2 Approved for Manufacturing / Fabrication with Comments as marked</li> <li><input type="checkbox"/> 3 Not Approved / Resubmit</li> <li><input type="checkbox"/> 4 Retained for Information / Records</li> <li><input type="checkbox"/> 5 Reviewed</li> <li><input type="checkbox"/> 6 Reviewed as Noted / Resubmit</li> </ul> <p>Date : ___/___/___      Name : _____</p>
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00		Issued For Enquiry	30-10-18	ATB	30-10-18	CSP	30-10-18	CSP	-
Rev.	Status	Description	Date	Prepared	Date	Checked	Date	Approved	AC
<div style="border: 1px solid black; padding: 10px; width: 80%; margin: auto;"> <h2 style="margin: 0;">Barcode</h2> </div>					Category Code: - 05				
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**LIQUID RING GAS COMPRESSOR  
DATA SHEET**

CONTRACT NO. 66-0215 ITEM NO: 22K01FN  
 CATEGORY LIQ. RING COMP. P.O. \_\_\_\_\_  
 PAGE NO. 3 OF 9 REV. 00 DATE : 30-Oct-18

1 APPLICABLE TO:  PROPOSALS (ENQUIRY)  PURCHASE (ORDER)  AS BUILT  
 2 PROJECT Caustic Soda Expansion UNIT CHLORINE COMPRESSION  
 3 QTY. (OPERATION /STAND BY) 1W / 0S 4) SERVICE Cl<sub>2</sub> GAS  
 4

5 NOTES:  BY PURCHASER  BY MANUFACTURER  BY PURCHASER / MANUFACTURER  
 6 COMPR. MFGR. : \_\_\_\_\_ \* MODEL \_\_\_\_\_ \* SERIAL NO. \_\_\_\_\_ \*  
 7 TYPE OF DRIVER :  ELECTRICAL  L.V. MOTOR  DRIVER MFGR. \*  
 8 DRIVE SYSTEM / SUPPLIED BY: DIRECT COUPLED /  DRIVER NAMEPLATE KW/OPERATING RPM \_\_\_\_\_ \*  
 9 TYPE OF COMPR. LIQUID RING GAS COMPRESSOR  DRIVER BY COMPRESSOR VENDOR  
 10 SERVICE :  CONTINUOUS  INTERMITTENT  STANDBY  DRIVER MOUNTED BY PURCHASER  COMP. MFGR.

11 **MEDIUM**  
 12  NAME Cl<sub>2</sub> GAS DRY WITH 50 PPM MOISTURE (MAX)  
 13  COMPOSITION (VOL) Cl<sub>2</sub>: 97.4%; CO<sub>2</sub>: 0.4%; H<sub>2</sub>: 0.05%; N<sub>2</sub>: 0.15%; O<sub>2</sub>: 2.0%  
 14  RELATIVE HUMIDITY 50 PPM % SOLIDS \_\_\_\_\_ mg/m<sup>3</sup>

OPERATING CONDITIONS			RATED	NORMAL	MIN SUCTION
17	<input checked="" type="radio"/> CAPACITY	Nm <sup>3</sup> /hr		1450	-
18	<input checked="" type="radio"/> CAPACITY AT SUCTION CONDITION	m <sup>3</sup> /hr	1)	1320	1445
19	<input checked="" type="radio"/> SUCTION PRESSURE (at battery limit)	kg/cm <sup>2</sup> a		1.10	1.02
20	<input checked="" type="radio"/> SUCTION TEMPERATURE (at battery limit)	°C		25	
21	<input checked="" type="radio"/> DENSITY	kg/m <sup>3</sup>		3.25	
22	<input checked="" type="radio"/> DISCHARGE PRESSURE (at battery limit)	kg/cm <sup>2</sup> a		4.889	
23	<input checked="" type="radio"/> DISCHARGE TEMPERATURE (at battery limit)	°C		*	
24	<input checked="" type="radio"/> DIFF. PRESSURE	kg/cm <sup>2</sup>		3.789	
25	<input type="radio"/> MAX. DISCHARGE PRESSURE	kg/cm <sup>2</sup>		*	
26	<input checked="" type="radio"/> MAX. DISCHARGE TEMPERATURE	°C	2)	40	
27	<input checked="" type="radio"/> EFFICIENCY	%		*	
28	<input checked="" type="radio"/> RATED POWER	KW	3)	*	
29	<input checked="" type="radio"/> SPEED	RPM		*	
30	<input checked="" type="radio"/> E. MOTOR	KW		*	
31	<input checked="" type="radio"/> E. MOTOR SPEED	RPM		*	
32	<input checked="" type="radio"/> SOUND LEVEL ACTUAL / REQD.	dBA		< 85 dBA @ 1 m	

SERVICE LIQUID		CONSTRUCTION	
34	<input checked="" type="checkbox"/> SERVICE LIQUID: <u>96-98% H<sub>2</sub>SO<sub>4</sub></u>	CASING <input checked="" type="checkbox"/> DESIGN PRESSURE _____ * kg/cm <sup>2</sup> TEMP _____ * °C	
35	CIRCUIT <input checked="" type="checkbox"/> CLOSED <input type="checkbox"/> OPEN <input type="checkbox"/> WITH BOOSTER PUMP	<input checked="" type="checkbox"/> MOUNTING <input checked="" type="checkbox"/> FOOT <input type="checkbox"/> BRACKET <input type="checkbox"/>	
36	<input checked="" type="checkbox"/> CAPACITY _____ * m <sup>3</sup>	<input checked="" type="checkbox"/> NUMBER OF STAGES <u>ONE</u>	
37	<input checked="" type="checkbox"/> CIRCULATION _____ * m <sup>3</sup> /hr	<input checked="" type="checkbox"/> BASE PLATE FOR <input checked="" type="radio"/> COMP. + DRIVER (COMMON) <input type="radio"/> COMP. ONLY	
38	<input checked="" type="checkbox"/> INLET TEMPERATURE <u>AMBIENT</u> °C	<input checked="" type="checkbox"/> IMPELLER <input checked="" type="checkbox"/> DIAMETER _____ * mm WIDTH _____ * mm	
39	<input type="checkbox"/> INLET PRESSURE _____ kg/cm <sup>2</sup> g	<input checked="" type="checkbox"/> DESIGN <input checked="" type="checkbox"/> BLADE / VANES <input type="checkbox"/> BUCKET	
40	<input checked="" type="checkbox"/> FRESH LIQUID:	<input checked="" type="checkbox"/> MOUNTING <input checked="" type="checkbox"/> OVERHUNG <input type="checkbox"/> BETWEEN BEARINGS	
41	<input checked="" type="checkbox"/> CIRCULATION _____ * LPD		
42	<input checked="" type="checkbox"/> TEMPERATURE _____ * °C		
43	<input checked="" type="checkbox"/> PRESSURE _____ * kg/cm <sup>2</sup> g		

SITE / LOCATION CONDITIONS		NOZZLE TABLE				
44		<input checked="" type="checkbox"/> NOZZLES	DN	PN	STANDARD	LOC
45	<input checked="" type="radio"/> ELEVATION <u>348</u> m BAROMETER <u>0.978</u> kg/cm <sup>2</sup> a	SUCTION	*	150 #	ANSI B16.5	SIDE
46	<input checked="" type="radio"/> AMBIENT TEMP: MAX. <u>48</u> °C MIN <u>2</u> °C	DISCHARGE	*	150 #	ANSI B16.5	SIDE
47	COMPRESSOR LOCATION	DRAIN	*	150 #	ANSI B16.5	BOTTOM
48	<input type="radio"/> INDOOR <input type="radio"/> HEATED <input type="radio"/> UNHEATED	VENT	*	150 #	ANSI B16.5	
49	<input checked="" type="radio"/> AT GRADE LEVEL <input type="radio"/> PARTIAL SIDES	OTHER				
50	<input checked="" type="radio"/> OUTDOOR <input type="radio"/> NO ROOF <input checked="" type="radio"/> UNDER ROOF					
51	<input type="radio"/> OFF-SHORE <input type="radio"/> WEATHER PROTECTING REQ.					
52	<input type="radio"/> ELEVATED <input type="radio"/> PLATFORM <input type="radio"/> ON-SHORE					
53	<input type="radio"/> WINTERIZATION REQUIRED <input type="radio"/> TROPICALIZATION REQ.					
54	<input type="radio"/> CORROSIVES <input type="radio"/> DUST <input type="radio"/> FUMES					
55	<input type="radio"/> OTHER					
56						
57						

58 **REMARKS :** 1) NO -VE TOLERANCE ON CAPACITY 2) NO +VE TOLERANCE ON DISCHARGE TEMPERATURE  
 59 3) NO POSITIVE TOLERANCE ON POWER CONSUMPTION  
 60 4) THIS COMPRESSOR WILL OPERATE IN PARALLEL WITH EXISTING COMPRESSOR. VENDOR TO HIGHLIGHT SUITABLE MEASURES TO BE  
 61 TAKEN BY PURCHASER FOR SMOOTH OPERATION.

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**UTILITY CONDITIONS**

1  **ELECTRICITY** DRIVERS HEATING CONTROL SHUTDOWN  
 2 VOLTS 415 V ± 10% 110 V DC  
 3 HERTZ 50 Hz +/- 3% 50 Hz  
 4 PHASE 3 Ph 1 Ph  
 5  
 6  **INSTRUMENT AIR**  
 7 Nor.PRESS 7 kg/cm<sup>2</sup> g MIN. 4 kg/cm<sup>2</sup> g  
 8  **CHILLED WATER**  
 9 TEMP INLET 10 °C MAX.RETURN 15 °C  
 10 PRES.NORM 2.0 kg/cm<sup>2</sup> g DESIGN 6 kg/cm<sup>2</sup> g  
 11 MIN.RETURN 1.5 kg/cm<sup>2</sup> g MAX.ALLOW DP 0.5 kg/cm<sup>2</sup>  
 12 WATER SOURCE \_\_\_\_\_  
 13  
 14

**CONSTRUCTION CONTD.**

**SEPARATOR**  
 DESIGN PRESSURE \_\_\_\_\_ \* kg/cm<sup>2</sup> g  
 VOLUME \_\_\_\_\_ \* m<sup>3</sup> TEMP \_\_\_\_\_ \* °C  
 INTERNAL ELEMENTS SS 316  
 **COOLING**  BEARINGS  MECHANICAL SEAL  
 STUFF. BOX  GEAR  SEPARATOR  
 **COOLING FLUID** \_\_\_\_\_  
 FLOW \_\_\_\_\_ m<sup>3</sup>/hr  PRESSURE \_\_\_\_\_ kg/cm<sup>2</sup> g  
 TEMPERATURE \_\_\_\_\_ °C  
 PIPING  THREADED  FLANGED  WELDED  
 ACCORD. TO API PLAN \_\_\_\_\_  
 PIPING MATERIAL \_\_\_\_\_

**PACKING / MECHANICAL SEAL**

16  **SHAFT SEALING**  
 17  PACKING MATERIAL \_\_\_\_\_  
 18  MECHANICAL SEAL  SINGLE  DOUBLE  TANDEM  
 19  INTERNAL  BALANCED  UNBALANCED  
 20  METALLIC BELLOWS \_\_\_\_\_  
 21  MFGR Flowserve / Eagle Burmann / Johncrane  
 22  SIZE / NO OF RINGS \_\_\_\_\_  
 23  TYPE Cartridge Mech. Seal MFGR. CODE \_\_\_\_\_  
 24  MATERIAL \_\_\_\_\_  
 25  SEAL FACE SiC / SiC  LANTERN RING \_\_\_\_\_  
 26  SEC. SEAL \_\_\_\_\_  O RING FFKM  
 27

**FLUSHING (Note 1)**  
 INTERNAL  EXTERNAL  LANTERN RING  
 MECHANICAL SEAL  QUENCHING  
 FLUSH FLUID H<sub>2</sub>SO<sub>4</sub>  
 FLOW \_\_\_\_\_ m<sup>3</sup>/hr  PRESSURE \_\_\_\_\_ kg/cm<sup>2</sup> g  
 TEMPERATURE \_\_\_\_\_ °C  
 ACCORD. TO API PLAN \_\_\_\_\_  
 PIPING MATERIAL SS 316  
 REMARK: 1) Seal flushing Plan shall be Plan 13.  
 \_\_\_\_\_  
 \_\_\_\_\_

**DESIGN DATA FOR HEAT EXCHANGER (ALSO SEE PAGE 6) 2)**

29  INLET RATE OF PUMP \_\_\_\_\_ m<sup>3</sup>/hr  
 30  INTAKE PRESSURE \_\_\_\_\_ kg/cm<sup>2</sup> g  
 31  SERVICE LIQUID CAPACITY \_\_\_\_\_ \* m<sup>3</sup>/hr  
 32  CHILLED WATER FLOW \_\_\_\_\_ \* m<sup>3</sup>/hr  
 33  TEMPERATURE IN 10 °C OUT 15 °C

INLET RATE OF STANDBY PUMP \_\_\_\_\_ m<sup>3</sup>/hr  
 HEAT TO BE DISSIPATED \_\_\_\_\_ \* kCal/hr  
 MAKE UP WATER \_\_\_\_\_ m<sup>3</sup>/hr  
 PRESSURE DROP \_\_\_\_\_  
 MAX PERMISSIBLE 0.5 kg/cm<sup>2</sup> ACTUAL \_\_\_\_\_ \* kg/cm<sup>2</sup>

**MATERIALS 4)**

36 MATERIALS ACCRD. TO  DIN  ASTM  IS  OTHERS  
 37  CASING Carbon Steel  
 38  STUFFING BOX CASING SS  
 39  WEAR CASING -  
 40  INTERMEDIATE PIECE \*  
 41  HEAD COVER \*  
 42  CONE SS 304  
 43  VALVE BALL CI 1-2%Ni (BODY), SS INTERNALS  
 44  IMPELLER SS316  
 45  SHAFT \*  
 46  SHAFT SLEEVE HASTELLOY C  
 47  THROAT BUSHING SS 316  
 48  SUCTION VESSEL A 516 GR. 70  
 49  DEMISTER / IMPINGEMENT SS 316 L  
 50  DRIP TRAY \_\_\_\_\_  
 51  GUIDE DISC \_\_\_\_\_  
 52  FLUSHING PIPING SS 316  
 53  BASE PLATE MS  
 54

SLEEVE BEARING \_\_\_\_\_  
 BEARING GASKET Non- Asbestos  
 CASING GASKET Non- Asbestos  
 MECH. SEAL COVER \*  
 MECH SEAL ROT. FACE SiC  
 MECH. SEAL STAT. FACE SiC  
 MECH. SEAL O RING -  
 SPACER CS / IS - 2062  
 CASING SCREW / NUTS A 193 GR B7 / A 194 GR 2H  
 THROAT BUSH SCREWS \_\_\_\_\_  
 COUPLING CS  
 BASE PLATE \_\_\_\_\_  
 CONNECTING PIPES SA 106 GR B  
 SEPARATOR A 516 GR 70  
 BEARING BRACKET LANTERN CAST IRON  
 COOLING PIPING \_\_\_\_\_  
 COUPLING GUARD CS PAINTED

55 **REMARK:** 1) MECHANICAL SEAL SHALL BE CARTRIDGE TYPE  
 56 2) THE HEAT EXCHANGER SHALL BE DESIGNED FOR ADDITIONAL CAPACITY TO ALLOW INCREASE IN CHILLED WATER TEMP.  
 57 FROM 10 deg C to 16 deg C FOR SHORT PERIOD (6 TO 8 hrs.)  
 58 3) ALL GASKETS SHALL BE NON ASBESTOS TYPE (ASBESTOS FREE ) AND SUITABLE FOR WORKING CONDITIONS.  
 59 4) VENDOR TO SELECT AND CONFIRM THE COMPATIBILITY OF MOC FOR ALL WETTED PARTS IN CONTACT WITH PROCESS AND SERVICE FLUIDS.

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**QA INSPECTION AND TESTS**

1	● SHOP INSPECTION BY _____ Client / Client's Representative	● SITE PERFORMANCE CHECK (Refer Page 6 Line 44) ○
2	_____ WITNESS NON WIT	● MATERIAL CERTIFICATES
3	● HYDROTEST 1.5 * MAWP ● ○	ACCORDING TO ○ DIN ● ASTM ○ OTHER
4	TEST PRESSURE * kg/cm <sup>2</sup> g ° C	FOR
5	● TIGHTNESS TEST ○ ●	● CASING ● SHAFT ● SEPARATOR
6	TEST PRESSURE kg/cm <sup>2</sup> g ° C	● ROTOR ● SHAFT SLEEVE ● BUFFER VESSEL
7	● BALANCING ● ○	○ GUIDE DISC
8	ACCORDING TO ○ VDI 2060 Q 6.3 ● ISO 1940 GR 2.5	<b>REMARKS: QAP for compressor and other items in the package</b>
9	FOR ○ ROTOR ● IMPELLER ONLY	<b>shall be submitted along with the offer</b>
10	● PERFORMANCE AS PER APPLICABLE STD ● ○	
11	● VIBRATION & NOISE TEST ● ○	
12	● MECHANICAL RUN TEST (4 HOURS) ● ○	

**SCOPE OF SUPPLY**

**A Scope of supply shall include: (Also see scope diagram attached)**

- 1 Compressor according to data sheet (with seal & piping as per page 3 & 4)
- 2 Buffer vessel (Size to be specified along with back up calculations)
- 3 Separator (Size to be specified along with back up calculations)
- 4 H2SO4 Cooler and all piping ,instrument related with H2SO4 cooler shall be in compressor vendor scope.
- 5 Strainer & spool piece for strainer removal on inlet to compressor
- 6 Non return valve at the separator outlet
- 7 Valve on discharge to waste air pipe
- 8 Two parallel loops with strainer and isolation valves for ring fluid from separator to cooler
- 9 Ball Valve for pressure indicator on the buffer vessel
- 10 Ball valve for pressure indicator on the separator
- 11 Two ball valves for the level gauge on separator
- 12 Safety valve with piping to purchaser piping B/L
- 13 a) Chlorine bypass valve shall be Uniklinger / Bellow seal make bellow seal type.  
b) Bellow seal Globe (on-off) valve with solenoid, pneumatically operated and Hastelloy C-276 moc.
- 14 Compressor casing drain valve at upstream of sight glass
- 15 Compressor casing drain valve at downstream of sight glass
- 16 Ring fluid make up valve
- 17 Isolation valve for drain on separator and cooler
- 18 Primary drain valve, Drain header - common for all drain connections within the package
- 19 Valve for analysis point
- 20 Sight glass for ring fluid circulation
- 21 Sight glass for ring fluid make up
- 22 Sight glass for stuffing box outlet
- 23 Sight glass for ring fluid samples
- 24 Temperature Indicator for compressor inlet gas
- 25 Temperature Indicator for ring fluid inlet and outlet of the cooler
- 26 Temperature Indicator for chilled water outlet and inlet of the cooler
- 27 Level indicator for separator
- 28 Pressure indicator for separator and buffer vessel
- 29 Temperature transmitter on the separator
- 30 Isolation valve for water inlet and outlet of the cooler
- 31 Isolation valve from compressor for ring fluid make up.
- 32 Temperature transmitter at ring liquid outlet end of cooler
- 33 Temperature transmitter and Temperature Indicator at compressor outlet
- 34 Pressure indicator with isolation valve at inlet of ring fluid to compressor
- 35 All interconnecting piping as shown in the sketch
- 36 Common base frame for compressor and motor with foundation bolts and motor mounting bolts
- 37 One set of special tools

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38 Commissioning spares.  
Refer Annexure I - GES for Compressor  
For vessels Refer Annexure II

39 Spares for 2 yrs normal operation.  
Separate quote for 2 years spares list shall be provided with the offer. However include following as minimum  
Refer Annexure I - GES for Compressor  
For vessels Refer Annexure II

40 Electric motor is in vendor's scope of supply.

41 Vendor to provide name plates details for tkIS / Client approval.

**B** Painting suitable to resist sulphuric acid and atmosphere containing chlorine (As per vendor's standard after having approval from tkIS /Client)

**C** Instruments are agreed as under :

1 Level Instruments: (Chemtrols / Bliss Anand / Gauges Bourdon)  
Level gauges shall be reflex type with forged plate, connection size shall be 1" flanged

2 Pressure Gauges: (Baumer Technologies / Gauges Bourdon / Wika Instrumentation / Precision Mass / Goa Thermostatic)  
Pressure gauge shall be bourdon or diaphragm. Connection size shall be ½ " NPT (M) or 1" Flange. Dial shall be 150mm

3 Temperature Gauges: (Gauges Bourdon / Goa Thermostatic / Goa Instruments / Baumer Technologies)  
Local temperature gauges shall be all angle, bi-metal type with 150 mm dial size.  
Thermowell should have 1 ½" flange connection

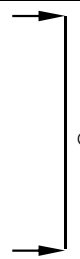
4 Temperature Elements (RTD): (Thermal Instruments / Pyro Electric / Goa Instruments / Gauges Bourdon)  
Temperature elements for remote temperature indications. RTD with separate mounted transmitters shall be used.  
RTD's shall be 3 wire, Duplex with 2 cable entries along with SS nipple - Union Nipple.

5 Temperature Transmitter (TT - 2" Pipe Mounted)  
2" Pipe mounted universal type with LCD meter having 4 ~ 20 mA HART output.  
Make / Model nos. of temperature transmitters  
Yokogawa YTA 110  
Emerson 3144P  
E&H

**D Scope of Services**  
Precommissioning and commissioning of the unit at site is the responsibility of the supplier. Performance of the unit will be checked at site for satisfactory operation for 72 hours.

**E** Vendor to submit filled-in Annexure IV - Technical Requirement Sheet  
Vendor to submit offer as per Annexure V - Offer Completeness Checklist.



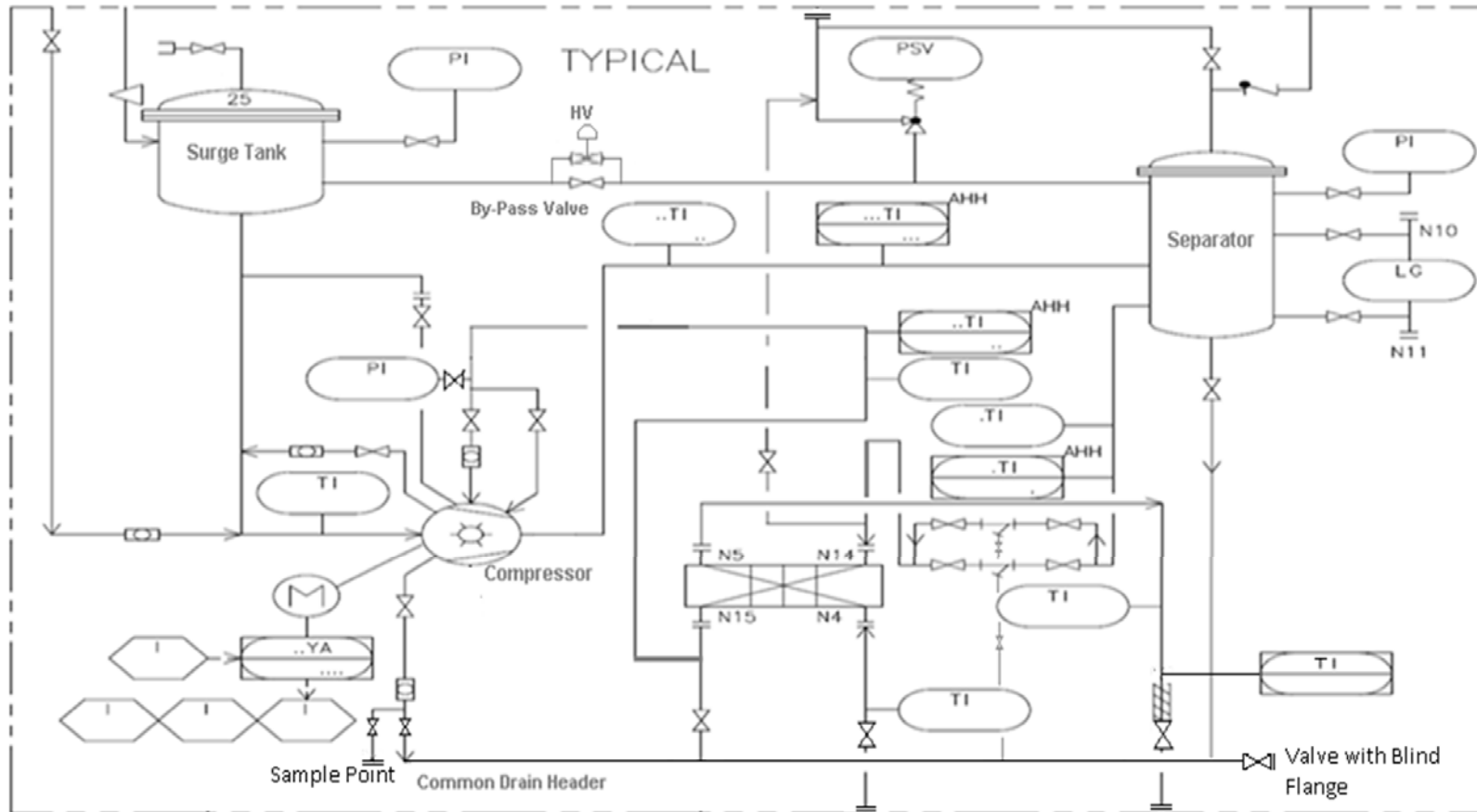
thyssenkrupp Industrial Solutions (India)		Plant <b>CAUSTIC SODA EXPANSION</b>	Customer <b>Punjab Alkali</b>	Code <b>PACL</b>	UAN	<b>66-0215</b>	Page <b>8 OF 9</b>
<b>Summary of Engineering &amp; Final Documents</b>					TON	22K01FN	
					Item		
					Rev.	00	
					DOC. NO.	0215-EQM-22-EC-0002	
LIQUID RING GAS COMPRESSOR (WITH SEPARATOR AND COOLER)							
1 <b>The following engineering and final documents shall be furnished by the manufacturers :</b>							
2 <b>Version and delivery date shall be specified</b>							
3							
4 <b>1.0 For engineering and approval</b>				<b>Quantity</b>			
5	Pos	<b>Documents</b>	<b>Reproducible 1)</b>	<b>Copy</b>	<b>Version</b>	<b>Delivery Date</b>	
6	1	Assembly drawing - Arrangement drawing	1)	1S*	II	A, B	
7	2	Foundation plan - Load plan	1)	1S*	II	B	
8	3	Cross sectional drg.- for compressor, mech seal etc.	1)	1S*	II	B	
9	4	Engineering data and specifications (tkIS DATA SHEETS FILLED)	1)	1S*	II	A, B	
10	5	Piping plan or piping diagram / P&ID	1)	1S*	II	B	
11	6	Motor Specifications, Instrument list (Make / Type) refer motor annexure.	1)	1S*	II	B	
12	7	Delivery schedule for equipment		1S*	II	B	
13	8	Quality assurance plan	1)	1S*	II	B	
14	9	Erection instructions	1)	1S*	II	B	
15	10	Stress analysis (for information)					
16	11	Product catalogue, Instrument Specs. Including Instruments & G.A. for Panel.					
17	12	Reference list for similar equipment		1S*	II	A	
18	13	Documents bearing tkIS notes shall be resubmitted	As Indicated Above			C	
19 <b>2.0 SPARE PARTS</b>							
20	1	Quotation for two years operation & commissioning spares	1)	1S*	II	A	
21	2	Spare part list with itemized drawing or sketches	1)	1S*	II	B	
22							
23 <b>3.0 FINAL DOCUMENTS</b>							
24	1	Final documents as listed under 1.0	1)	4H+3S**	II		
25	2	Instructions for operation and maintenance	1)	4H+3S**	II		
26	3	Erection instructions	1)	4H+3S**	II		
27	4	Table of lubricants and lubrication schedule	1)	4H+3S**	II		
28	5	Test certificates for explosion proof items of equipment					
29	6	Summary of antifriction bearings					
30	7	Stress analysis					
31	8	Exhaustive Component List					
32	9	Test Certificate of bought-out items	1)	4H+3S**			
33	10	Panel Wiring Diagram					
34	11	Mech Seal drg	1)	4H+3S**	II		
35	12	Bill of material for complete supply	1)	4H+3S**	II		
36	13						
37	14						
38 <b>4.0 INSPECTION</b>							
39	1	Shop inspection certificate					
40	2	Inspection reports to DIN 50 049/3.1A-3.1C		4H+3S**	II	D	
41	3	Final Inspection reports issued by inspection authority / third party		4H+3S**	II	G	
42	4	Inspection reports		4H+3S**	II	D	
43	5	MOC Certificates / Hydrotest / Pneumatic test		4H+3S**	II	E	
44	<b>5.0 Explanation of figures listed in column version</b>		Notes pertaining to column "delivery date"				
45	I	Lettering or wording in German	A To be submitted with quotation				
46			B 15 days after order placements				
47	II	Lettering or wording in English	C Two weeks after return of documents				
48			D Two weeks after order placement, thereafter monthly				
49	III	Lettering or wording in German and English	E Not later than date of final inspection				
50			F One month after final inspection; to be submitted with shipping documents if				
51	IV	Lettering or wording in German	the equipment has to be shipped				
52			G After final release, but not later than 4 weeks prior to final inspection				
53 <b>6.0 REMARKS :</b>							
54	1) Standard size DIN A3 and smaller on white sheets, larger sizes on reproducibles						
55	2) Assembly drawing, shall be in A3 size						
56	3) Vendor to give a soft copy of all final documents for A3 size and above.						
57	4) Vendor to furnish catalogues, reference list, part lists with material of construction along with the offer.						
58							
59	S* = Soft Copy through E-mail/CDs      S** = Soft Copy in CD      H = Hard Copy						
60							
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thyssenkrupp Industrial Solutions (India)	Plant CAUSTIC SODA EXPANSION	Customer Punjab Alkali	Code PACL	UAN	66-0215	Page 9
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**SCOPE DIAGRAM  
LIQUID RING GAS COMPRESSOR-P&ID**

Rev.	00
Doc. No.	0215-EQM-22-EC-0002
TON	22K01FN



Flanges : ANSI 150-300  
RF WN Type

THE ITEMS SHOWN ABOVE ARE MIN REQUIREMENT, VENDOR TO SUBMIT DETAILED PID UNIT. ALSO ANY OTHER ITEM INDICATED IN THE SPECIFICATION AND SCOPE TO BE INCLUDED IN THE OFFER