





Plant CAUSTIC SODA	Client Punjab Alkali	Contract Code PACL	Document Number 0215-PRC-41-EC-0001	Contract No. 66-0215	
	Technical Specification for Hydrogen Filter Internals				
				Rev	00

<p>tkIS India / Vendor</p> <p>Category Codes (Submission Purpose)</p> <table style="width: 100%;"> <tr><td><input type="checkbox"/></td><td>1</td><td>For Approval</td></tr> <tr><td><input type="checkbox"/></td><td>2</td><td>For Review / Comments</td></tr> <tr><td><input type="checkbox"/></td><td>3</td><td>For Information</td></tr> <tr><td><input type="checkbox"/></td><td>4</td><td>For Engineering</td></tr> <tr><td><input type="checkbox"/></td><td>5</td><td>For Enquiry</td></tr> <tr><td><input type="checkbox"/></td><td>6</td><td>For Order Placement</td></tr> <tr><td><input type="checkbox"/></td><td>7</td><td>Final & Approved</td></tr> <tr><td><input type="checkbox"/></td><td>8</td><td>Released for Construction</td></tr> </table> <hr/> <p>Acceptance Codes (Approval Codes)</p> <table style="width: 100%;"> <tr><td><input type="checkbox"/></td><td>1</td><td>Approved</td></tr> <tr><td><input type="checkbox"/></td><td>2</td><td>Approved for Manufacturing / Fabrication with Comments as marked</td></tr> <tr><td><input type="checkbox"/></td><td>3</td><td>Not Approved / Resubmit</td></tr> <tr><td><input type="checkbox"/></td><td>4</td><td>Retained for Information / Records</td></tr> <tr><td><input type="checkbox"/></td><td>5</td><td>Reviewed</td></tr> <tr><td><input type="checkbox"/></td><td>6</td><td>Reviewed as Noted / Resubmit</td></tr> </table> <p>Remarks for AC2 : This marked-up drawings is hereby approved for fabrication / manufacturing and shall be re-submitted 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>This approval / review does not absolve the supplier from the full responsibility for design and fabrication.</p> <p>Date : ___/___/___ Name : _____</p>	<input type="checkbox"/>	1	For Approval	<input type="checkbox"/>	2	For Review / Comments	<input type="checkbox"/>	3	For Information	<input type="checkbox"/>	4	For Engineering	<input type="checkbox"/>	5	For Enquiry	<input type="checkbox"/>	6	For Order Placement	<input type="checkbox"/>	7	Final & Approved	<input type="checkbox"/>	8	Released for Construction	<input type="checkbox"/>	1	Approved	<input type="checkbox"/>	2	Approved for Manufacturing / Fabrication with Comments as marked	<input type="checkbox"/>	3	Not Approved / Resubmit	<input type="checkbox"/>	4	Retained for Information / Records	<input type="checkbox"/>	5	Reviewed	<input type="checkbox"/>	6	Reviewed as Noted / Resubmit	<p>tkIS India / Owner / Client</p> <p>Category Codes (Submission Purpose)</p> <table style="width: 100%;"> <tr><td><input type="checkbox"/></td><td>1</td><td>For Approval</td></tr> <tr><td><input type="checkbox"/></td><td>2</td><td>For Review / Comments</td></tr> <tr><td><input type="checkbox"/></td><td>3</td><td>For Information</td></tr> <tr><td><input type="checkbox"/></td><td>4</td><td>For Engineering</td></tr> <tr><td><input type="checkbox"/></td><td>5</td><td>For Enquiry</td></tr> <tr><td><input checked="" type="checkbox"/></td><td>6</td><td>For Order Placement</td></tr> <tr><td><input type="checkbox"/></td><td>7</td><td>Final & Approved</td></tr> <tr><td><input type="checkbox"/></td><td>8</td><td>Released for Construction</td></tr> </table> <hr/> <p>Acceptance Codes (Approval Codes)</p> <table style="width: 100%;"> <tr><td><input type="checkbox"/></td><td>1</td><td>Approved</td></tr> <tr><td><input type="checkbox"/></td><td>2</td><td>Approved for Manufacturing / Fabrication with Comments as marked</td></tr> <tr><td><input type="checkbox"/></td><td>3</td><td>Not Approved / Resubmit</td></tr> <tr><td><input type="checkbox"/></td><td>4</td><td>Retained for Information / Records</td></tr> <tr><td><input type="checkbox"/></td><td>5</td><td>Reviewed</td></tr> <tr><td><input type="checkbox"/></td><td>6</td><td>Reviewed as Noted / Resubmit</td></tr> </table> <p>Date : ___/___/___ Name : _____</p>	<input type="checkbox"/>	1	For Approval	<input type="checkbox"/>	2	For Review / Comments	<input type="checkbox"/>	3	For Information	<input type="checkbox"/>	4	For Engineering	<input type="checkbox"/>	5	For Enquiry	<input checked="" type="checkbox"/>	6	For Order Placement	<input type="checkbox"/>	7	Final & Approved	<input type="checkbox"/>	8	Released for Construction	<input type="checkbox"/>	1	Approved	<input type="checkbox"/>	2	Approved for Manufacturing / Fabrication with Comments as marked	<input type="checkbox"/>	3	Not Approved / Resubmit	<input type="checkbox"/>	4	Retained for Information / Records	<input type="checkbox"/>	5	Reviewed	<input type="checkbox"/>	6	Reviewed as Noted / Resubmit
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Rev.	Status	Description	Date	Prepared	Date	Checked	Date	Approved	AC
<div style="border: 1px solid black; padding: 20px; width: 100%;"> <h2 style="margin: 0;">Barcode</h2> </div>				Category Code: - 5					
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1.0 GENERAL

Designation : Hydrogen Filter Internals

Plant location : Naya Nangal, Punjab

Ton No. :

Manufacturer : *

Quotation No. : *

Date : *

LOI No. : *

Date : *

PO No. : *

Date : *

SERVICE

Filter system to separate out NaOH mist in moist hydrogen gas from a membrane cell electrolysis plant.

No. of Filter Vessel in operation : 1

No. of Filter Vessel in stand by : 0

2.0 SERVICE CONDITIONS

2.1 Medium : Hydrogen gas saturated with water vapour and NaOH mist (Aerosol)

2.2 Inlet composition :

	Units	Case I - 350 TPD (Note 1)		Case II - 500 TPD (Note 1)	
		Normal	Design	Normal	Design
Hydrogen	kg/h	395	474	565	677
Water vapour	kg/h	232	279	332	398
NaOH (1 to 200 µm)		Aerosol	Aerosol	Aerosol	Aerosol
Water spray at inlet nozzle	kg/h	500	500	500	500
2.3 Gas flow rate	m ³ /h	4550	5460	6500	7800
2.4 Temperature	Deg C	40	95	40	95
2.5 Pressure (Max.)	kg/cm ² a	1.18	1.45	1.18	1.45
Pressure (Min.)	kg/cm ² a	-	-	-	-

Notes:

- The filter vessel will be designed for Case - II (i.e. 500 tpd). At present, Candles will be installed for Case - I (i.e. 350 tpd). The balance Candles for case - II (i.e. 500 tpd) will be installed in future.
- All '*' marked fields to be filled by vendor.



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CAUSTIC SODA

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HYDROGEN FILTER INTERNALS

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1		2.6	Specific loading (Case I/Case II)	:	* / *	m ³ / m ² / h (approx. 230 m ³ / m ² / h)
2						
3		2.7	Filtration area (Case I/Case II)	:	* / *	m ²
4						
5						
6						
7		3.0	PERFORMANCE REQUIREMENT			
8						
9						
10		3.1	Guaranteed separation efficiency	:	100 % for particles	≥ 3 μm
11					99.3 % for particles	≤ 3 μm
12						
13						
14						
15		3.2	Guaranteed life	:	* Yrs	> 5 Years
16						
17						
18		3.3	Pressure drop across filter element	:	150 mmWC	(Max. Allowable)
19						
20			New (Guaranteed)	:	* mmWc max	
21			End of life (Guaranteed)	:	* mmWc max	
22						
23		3.4	Filter Area			
24			Per Candle	:	* m ²	
25						
26		3.5	Flow through candles	:	From outside to inside	
27						
28		3.6	The candles are to be constructed to withstand maximum pressure drop of 500 mm WC.			
29						
30		4.	FILTER ELEMENT SPECIFICATION		For 350 tpd (Case - I)	For 500 tpd (Case - II)
31						
32		4.1	No. of filter elements / MODEL NO.	:	* / *	* / *
33						
34		4.2	Filter candle retaining cage (Screen)			
35						
36			- Material	:	SS316	
37						
38						
39			- Dimensions	:	Dia: * mm	(OD)
40					Height: * mm	
41						
42						
43			Dip pipe			
44						
45			- Material	:	SS316	
46						
47						
48			Filter candle housing (Excluded from Vendor's Scope of Supply)			
49						
50			- Material	:	CS	
51						
52			- Dimensions	:	Dia: * mm	(ID)
53					Height: * (Note 2) mm	
54						
55						
56						
57		Notes:				
58		1)	Refer caluse 10.2 for filter candle arrangement in filter vessel.			
59		2)	All '*' marked fields to be filled by vendor.			
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1		4.3	Filter element	:	Polypropylene	
2			- Material			
3						
4		4.4	Pressure ring	:	SS316	
5			- Material			
6						
7		4.5	Gasket Material	:	PTFE	
8						
9		4.6	Nuts, bolts & washer	:	SS316	
10			- Material			
11						
12		4.6	Filter Candle Flange Template	:	IS 2062 Gr. E250A or Equivalent	
13			- Material			
14						
15		5.	SCOPE OF SUPPLY AND SERVICES			
16						
17		5.1	The required elements, accessories, etc. to achieve the above stated separation efficiency.			
18						
19		5.2	Filter Candle Gaskets.			
20						
21		5.3	2 sets of spare gasket to be supplied extra as commissioning spares.			
22						
23		5.4	Vendor to give all details of candle arrangement inside the tank G.A drawing and support details.			
24						
25		5.5	Vendor to provide GA drawing of the Filter tank for preparation of fabrication drawing by tkIS-India. along with quote however, the supply of Filter tank is excluded from the vendor's scope of supply.			
26						
27						
28		5.6	Material test certificate is to be provided for all parts other than Carbon Steel.			
29						
30		5.7	Commissioning spares			
31			Spares for 2 years operation shall be quoted separately.			
32						
33		5.8	Supervision of total filter assembly, commissioning & performance trials at site.			
34						
35		5.9	1 No filter candle flange template			
36			Candle vendor shall use the template for drilling holes in the candle filter flange. The same template shall be supplied to filter vessel vendor to drill holes in the filter mounting plate. This is to avoid any mismatch between holes of filter candle & filter plate. The same template shall be transported to filter vessel vendor by filter internal vendor.			
37						
38						
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40						
41		6.0	GUARANTEE			
42						
43		6.1	Vendor to provide performance guarantee for all parameters under clause 3.1 to 3.3 meeting the service conditions specified under clause 2.0			
44						
45						
46		6.2	Workmanship and material guarantee for the materials specified under clause 4.0			
47						
48		7.0	INSPECTION & TESTING			
49						
50			Inspection will be carried out by tkIS-India / Client representative before delivery. Inspection activity will include material identification, dimension check, test certificates & reports review, and supervision of packing.			
51						
52						
53				Witnessed at Shop	Witnessed at Site	
54			Final Inspection of Candles	Yes	-	
55			Performance Test for the Unit	-	Yes	
56			Vendor to submit all the internal test certificates & inspection certificates to tkIS-India & Client			
57						
58		8.0	DOCUMENTATION			
59			The following documents are to be submitted in case of order placement			
60			- QAP within 1 week of PO (1 soft copies)			
61			- Detail dimensional dwg. of filter candle, filter tank (for preparation of fabrication drawing by tkIS-India) for approval within 10 days of PO (1 soft copies)			
62			- Revised detail drawing within 2 weeks of receipt of comments (1 soft copies)			
63			- Final documentation (4 hard copies) along with delivery should include detail			
64			GA dimensional dwgs., operation & maintenance instruction, installation instruction, material,			
65			test certificates test/inspection certificates etc.			
66			- Three set of electronic copy of final documentation should also be submitted along			
67			with hard copy documents.			
68						
69						
70		9.0	DISPOSAL			
71			Vendor to suggest suitable method for disposing after the end of filter candle life.			
72						

Technical specifications

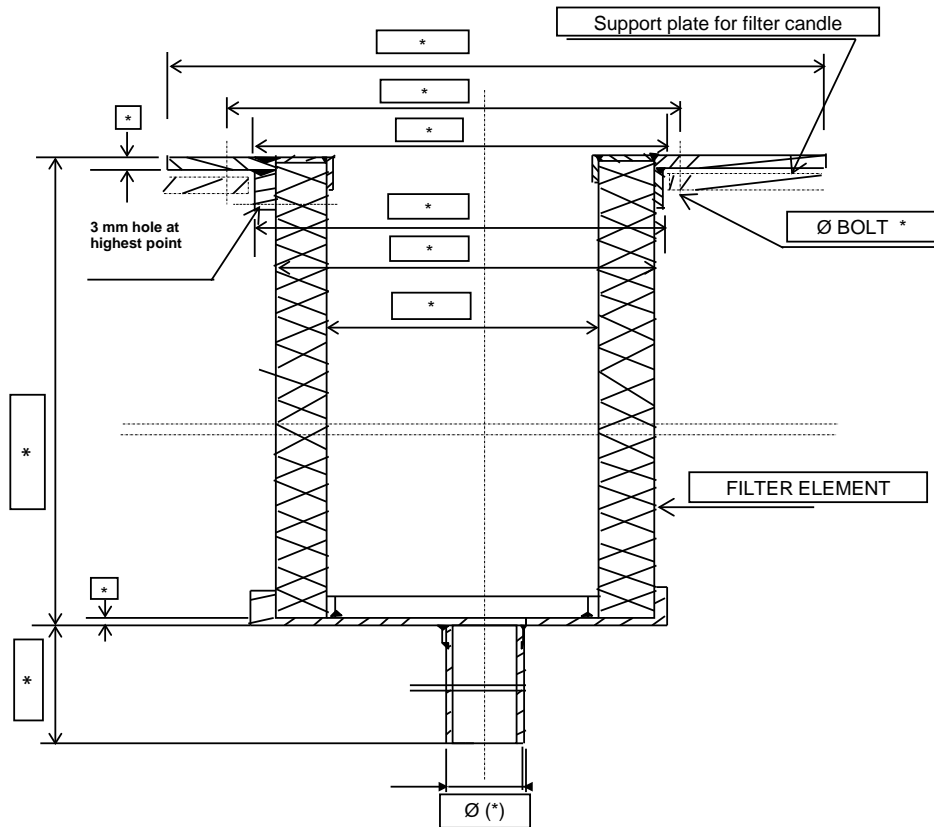
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10. SKETCHS

10.1 Filter candle details



All data marked '*' have to be given or confirmed by manufacturer
 - all dimensions in mm
 - sketch is not to scale

10.2 Typical arrangement of filter candle in filter vessel

