

PLANT ITEM MATERIAL SELECTION DATA SHEET



HOP-ABS-00002 & 3 (HLW)

Silver Mordenite Column

- Design Temperature (°F): 330/59
- Design Pressure (psig) (max/min): +3/-3
- Location: outcell
- Anticipated 40 y radiation dose: gamma <<2x10<sup>8</sup> rad, alpha << 2x10<sup>9</sup> rad

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on sheet 3

Operating Modes Considered:

- Off-normal conditions assume a 7X melter off-gas surge.
- Equipment is maintainable.
- Process conditions for HOP-ABS-00003 are identical to those for HOP-ABS-00002.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

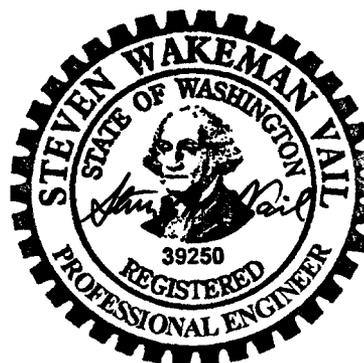
Recommended Material: 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: NA

Process & Operations Limitations:

- Equipment will be visually examined for evidence of corrosion during the change-out of the cartridges.
- Develop start-up and shut-down procedure.

ISSUED BY  
RPP-WTP PDC  
MD 1/26/04  
INIT DATE



1/26/04

EXPIRES: 12/07/05

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This bound document contains a total of 3 sheets.

1	1/26/04	Issued For Permitting Use		GDR	
0	9/25/02	Issued For Permitting Use	DLA	JRD	MHoffmann
REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER

**PLANT ITEM MATERIAL SELECTION DATA SHEET****Corrosion Considerations:****a General Corrosion**

None anticipated.

*Conclusion*

Either 304L or 316L would be satisfactory.

**b Pitting Corrosion**

Pitting corrosion will only be a concern if column is allowed to cool below 225°F in the presence of moisture. For safety, use 316L and develop a procedure to evaluate equipment following any such low temperature event.

*Conclusion*

At the stated operating conditions, pitting corrosion is not a significant concern. Recommend 316L.

**c End Grain Corrosion**

None anticipated.

**d Stress Corrosion Cracking**

Stress corrosion cracking will only be a concern if column is allowed to cool below 225°F in the presence of moisture. See Pitting.

*Conclusion*

At the stated operating conditions, stress corrosion cracking is not a concern.

**e Crevice Corrosion**

Crevice corrosion will only be a concern if column is allowed to cool below 225°F in the presence of moisture.

*Conclusion*

At the stated operating conditions, crevice corrosion is not a concern.

**f Corrosion at Welds**

None anticipated.

**g Microbiologically Induced Corrosion (MIC)**

None anticipated.

**h Fatigue/Corrosion Fatigue**

None anticipated.

**i Vapor Phase Corrosion**

None anticipated.

**j Erosion**

None anticipated.

**k Galling of Moving Surfaces**

None anticipated.

**l Fretting/Wear**

None anticipated.

**m Galvanic Corrosion**

None anticipated.

**n Cavitation**

None anticipated.

**o Creep**

Creep is not expected at stated operating conditions.

*Conclusion*

At the stated operating conditions, creep is not a problem.

**PLANT ITEM MATERIAL SELECTION DATA SHEET**  
**OPERATING CONDITIONS**

**Materials Selection Data**

**Component (Name/ID)** Silver Mordenite Column  
HOP-ABS-00002  
**System** HLW HOP

**Operations**

Chemicals	Unit	Cold Startup	Normal Operation	Standby/Idle	Cleaning	Accident
Aluminum	g/l	Note 2		Note 2	Note 3	Note 4
Chloride	g/l		4.0E-08			2.8E-07
Fluoride	g/l		5.9E-08			4.1E-07
Hydroxide	g/l					
Iron	g/l					
Nitrate	g/l		4.2E-05			3.0E-04
Nitrite	g/l					
Phosphate	g/l					
TOC <sup>‡</sup>	g/l					
Sulfate	g/l		1.5E-05			1.1E-04
Undissolved solids	g/l					
Particle size/hardness	µm (##)					
Other (NaMnO <sub>4</sub> , Hg, etc)	g/l					
Carbonate	g/l					
pH	-					
Dose rate, α, β/γ (Note 1)	Bq/l		3.4E-9, 4.4E-5			2.4E-8, 3.1E-4
Temperature	°F	330	330	77		392
Velocity	fps					
Vibration						
Time of exposure	#					

# - % of total; ## - use Mho scale

Assumptions: Column receives offgases from Catalyst Skid and sends it to the stack

Note 1: Excluding Tritium, Carbon-14, and Iodine-129.

Note 2: Assumes normal air at elevated temperatures.

Note 3: No cleaning operations required. Absorbtion cartridges are disposable.

Note 4: Accident assumes a 7X melter offgas surge.

Comments: Based on stream #HV243

Black Cell

<sup>‡</sup> List expected organic species:

Flushing

Use maximum of 2 significant figures