



ISSUED BY  
RPP-WTP PDC



PLANT ITEM No.  
**24590-PTF-MV-RDP-VSL-00002C**

**MECHANICAL DATA SHEET: VESSEL**

Project:	<b>RPP-WTP</b>	P&ID:	<b>24590-PTF-M6-RDP-P0001, 24590-PTF-M6-RDP-P0006, 24590-PTF-M6-CNP-P0005</b>
Project No:	<b>24590</b>	Process Calculation:	<b>Deleted</b>
Project Site:	<b>Hanford</b>	Vessel Drawing	<b>24590-PTF-MV-RDP-P0003</b>
Description:	<b>Spent Resin Slurry Vessel</b>		

**Reference Data**

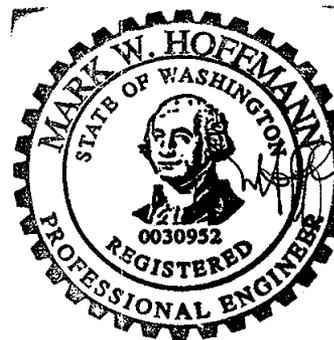
Charge Vessels (Tag Numbers)	<b>NIA</b>
Pulsejet Mixers / Agitators (Tag Numbers)	<b>RDP-PJM-00009-00010-00011-00012</b>
RFDs/Pumps (Tag Numbers)	

**Design Data**

Quality Level	<b>QL-1</b>		Fabrication Specs	<b>24590-WTP-3PS-MV00-TP001</b>		
Seismic Category	<b>SC-1</b>		Design Code	<b>ASME VIII Div 1</b>		
Service/Contents	<b>Resin Slurry</b>		Code Stamp	<b>Yes</b>		
Design Specific Gravity	<b>1.22</b>		NB Registration	<b>Yes</b>		
Maximum Operating Volume	gal	<b>12,688</b>	Weights (lbs)	<b>Empty</b>	<b>Operating</b>	<b>Test</b>
Total Volume	gal	<b>15,230</b>	Estimated	<b>36,500</b>	<b>168,000</b>	<b>164,000</b>
			Actual *			

Inside Diameter	inch	<b>144</b>			Wind Design	<b>Not Required</b>	
Length/Height (TL-TL)	inch	<b>168</b>			Snow Design	<b>Not Required</b>	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	<b>24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-T0001</b>	
Internal Pressure	psig	<b>0</b>	<b>15</b>	<b>NIA</b>	Seismic Base Moment *	ft*lb	
External Pressure	psig	<b>0.22</b>	<b>FV</b>	<b>NIA</b>	Postweld Heat Treat	<b>Not Required</b>	
Temperature	°F	<b>113</b>	<b>138</b>		Corrosion Allowance	Inch	<b>0.04 (Notes 8, 9)</b>
Min. Design Metal Temp.	°F	<b>30</b>			Hydrostatic Test Pressure *	psig	

Note: Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.



3/28/05

EXPIRES 12/10/06

This Bound Document Contains a total of 5 sheets.

3	3/28/05	Issued for Permitting Use				
2	1/25/05	Issued for Permitting Use	C. Thompson	H. Khurana	C. Slater	M. Hoffmann
1	4/28/04	Issued for Permitting Use	K. Brightman	H. Khurana	C. Slater	M. Hoffmann
0	12/18/02	Issued for Permitting Use	J. Jackson	C. Slater	N/A	S. Kirk
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## MECHANICAL DATA SHEET: VESSEL

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### Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	<b>SA 240 316 Note 1</b>	<b>See Drawing</b>	<b>Auxiliary (See Note 5)</b>
Shell	<b>SA 240 316 Note 1</b>	<b>See Drawing</b>	<b>Primary (See Note 5)</b>
Bottom Head	<b>SA 240 316 Note 1</b>	<b>See Drawing</b>	<b>Primary (See Note 5)</b>
Support	<b>SA 240 304 Note 1</b>	<b>See Drawing</b>	<b>NIA</b>
Jacket/Coils/Half-Pipe Jacket	<b>NIA</b>	<b>NIA</b>	<b>NIA</b>
Internals	<b>SA 240 316 Note 1</b>	<b>See Drawing</b>	<b>NIA</b>
Pipe/Nozzles	<b>SA 312 TP 316 Note 1 (Seamless)</b>	<b>See Drawing</b>	<b>Primary (See Note 5)</b>
Forgings/ Bar stock	<b>SA 182 F316 Note 1</b>	<b>See Drawing</b>	<b>NIA</b>
Gaskets	<b>NIA</b>	<b>NIA</b>	<b>NIA</b>
Bolting	<b>NIA</b>	<b>NIA</b>	<b>NIA</b>

### Miscellaneous Data

Orientation	<b>Vertical</b>	Support Type	<b>Skirt</b>
Insulation Function	<b>Not Applicable</b>	Insulation Material	<b>Not Applicable</b>
Insulation Thickness (inch)	<b>Not Applicable</b>	Internal Finish	<b>Note 3</b>
		External Finish	<b>Note 3</b>

### Remarks

**\* To be determined by the vendor.**

**Note 1: Max. Carbon content 0.030%**

**Note 2: Deleted**

**Note 3: Welds de-scaled as laid**

**Note 4: This vessel is in a Black Cell**

**Note 5: All welds forming part of the Primary and Auxiliary Containment, including nozzle attachment welds, shall be subjected to 100% volumetric examination**

**Note 6: Contents of this document are Dangerous Waste Permit affecting.**

**Note 7: Deleted.**

**Note 8 : Seller shall ensure that an additional 0.060" is available for erosion in the bottom head and shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances.**

**Note 9: Seller shall ensure that an additional 0.038" is available for erosion in the lower 4" of the interior conical surface of the pulse jet mixers.**



**MECHANICAL DATA SHEET: VESSEL**

PLANT ITEM No.  
**24590-PTF-MV-RDP-VSL-00002C**

**Equipment Cyclic Data Sheet**

Component Plant Item Number:	<b>RDP-VSL-00002C</b>
Component Description	<b>Parent Vessel</b>

*The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.*

Materials of Construction	<b>SA 240 316 with 0.03% max. carbon</b>
Design Life	<b>40 Years</b>
Component Function and Life Cycle Description	<b>The purpose of the Spent Resin Slurry Vessel is to receive and hold one batch of spent resin.</b>

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	<b>FV</b>	<b>15</b>	<b>10</b>	<b>Nominal Assumption</b>
Operating Pressure	psig	<b>-0.22</b>	<b>0</b>	<b>NIA</b>	<b>This vessel will remain under constant pressure depending upon the vessel plant HVAC system.</b>
Operating Temperature	°F	<b>59</b>	<b>113°F<sub>3</sub></b>	<b>NIA</b>	<b>Temperature will not cycle appreciably with vessel cycling.</b>
Contents Specific Gravity		<b>*1.00</b>	<b>1.22</b>	<b>NIA</b>	<b>* The value given is for the pure liquid phase of vessel contents. The vessel will normally contain slurry of resin particles with particle density of approximately 1.4glcc. The slurry solids content will be between 0 and 35 % by volume.</b>
Contents Level	inch	<b>0</b>	<b>139</b>	<b>1.66 x 10<sup>4</sup></b>	

<b>Localized Features</b>					
Nozzles					
Supports					

**Notes**

- Cycle increase: The seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.**



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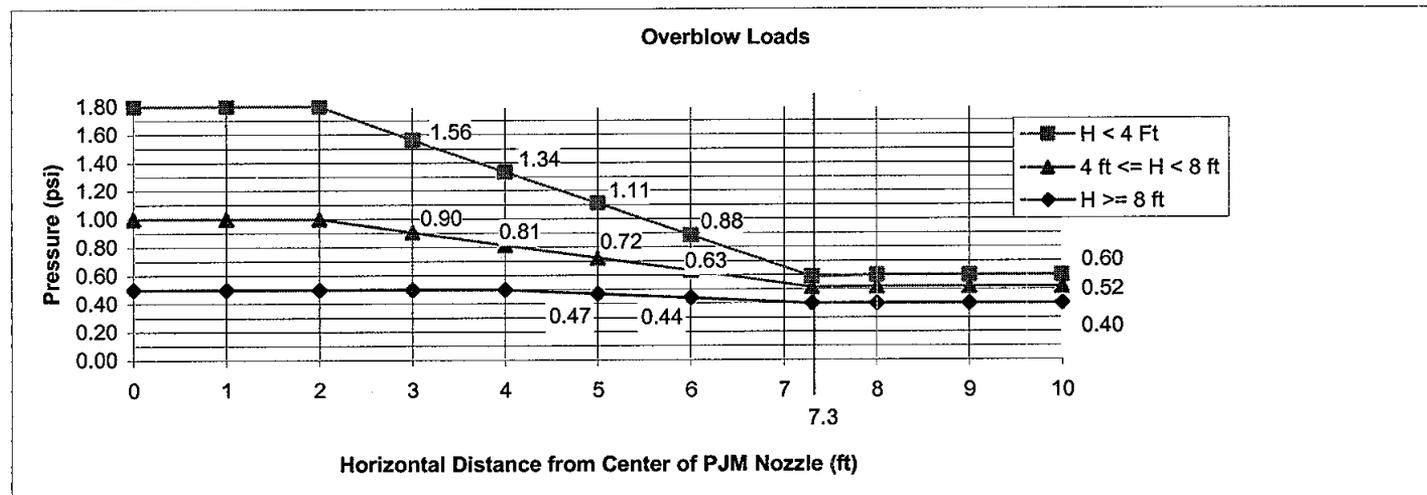
### Hydrodynamic Loading

*In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overflow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overflow loads, and this load combination is also to be assumed to act concurrently with seismic loads.*

*Hydrodynamic loads acting on a surface vary with the location of the surface within the vessel. The following table indicates the normal hydrodynamic pressure ranges and the number of design cycles. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Seller shall apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.*

Condition	Hydrodynamic Pressure Range, psi				Number of Cycles
	Between PJM Center and Vessel Wall		Between Vessel Center and PJM Center		
	Radial	Vertical	Radial	Vertical	
Normal Operation	-0.80 to 0.80	-0.80 to 0.40	-0.20 to 0.30	-0.20 to 0.25	6.2 x 10 <sup>6</sup>

*Overflow loads vary as a function of the distance from the center of the overflowing pulse jet mixer nozzle and the elevation 'H' above the overflowing pulse jet mixer nozzle up to the overflow level as plotted:*



*The overflow pressure shall only be applied to the projected area of the overflowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overflowing pulse jet mixer. Seller shall consider that any single pulse jet mixer may overflow 100 cycles.*

#### Notes

- Cycle increase:** The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.



**MECHANICAL DATA SHEET: VESSEL**

PLANT ITEM No.  
24590-PTF-MV-RDP-VSL-00002C

**Equipment Cyclic Data Sheet**

Component Plant Item Number:	<b>24590-PTF-MV-RDP-PJM-00009, 00010, 00011, 00012</b>
Component Description	<b>Pulse Jet Mixers</b>

*The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.*

Materials of Construction	<b>SA 240 316 with 0.03% max. carbon</b>
Design Life	<b>40 Years</b>
Component Function and Life Cycle Description	<b>These pulse jet mixers are cyclically loaded using vacuum to fully fill the pulse jet mixer with process liquid and compressed air to fully empty the pulse jet mixer. The pulse jet mixers are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum operating pressure and the minimum operating pressure plus the external static head imposed by the parent vessel. The pulse jet mixer supports shall be designed to cycle between fully buoyant (pulse jet mixer empty and parent vessel full) and fully loaded (pulse jet mixer full and parent vessel empty) in addition to thrust. Thrust load shall be applied only to the fully Buoyant state. Assume the parent vessel is full for 50% of number of cycles of PJM.</b>

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	<b>FV</b>	<b>80</b>	<b>6.2x10<sup>6</sup></b>	<b>Based upon 168 sec cycle time, assuming that the parent vessel will be used 200 times in 40 years for 2 months at a time.</b>
Operating Pressure	psig	<b>FV</b>	<b>72.5</b>	<b>6.2x10<sup>6</sup></b>	
Operating Temperature	°F	<b>59</b>	<b>113</b>	<b>N/A</b>	<b>Temperature will not cycle appreciably with vessel cycling.</b>
Contents Specific Gravity		<b>*1.00</b>	<b>1.22</b>	<b>N/A</b>	<b>*The value given is for the pure liquid phase of vessel contents. The vessel will normally contain slurry of resin particles with particle density of approximately 1.4g/cc. The slurry solids content will be between 0 and 35 % by volume.</b>
Contents Level	inch	<b>Empty</b>	<b>Flooded</b>	<b>6.2x10<sup>6</sup></b>	<b>Based upon 168 sec cycle time, assuming that the parent vessel will be used 200 times in 40 years for 2 months at a time.</b>
Thrust		<b>0</b>	<b>262</b>	<b>6.2x10<sup>6</sup></b>	
<b>Localized Features</b>					
Nozzles					
Supports					