



MECHANICAL DATA SHEET: DEMISTER

PLANT ITEM No.
24590-PTF-MV-PJV-DMST-00002A/B/C

Project:	RPP-WTP	P&ID:	24590-PTF-M6-PJV-00002
Project No:	24590	Mechanical Systems Calculation:	ISSUED BY RPP-WTP PDC
Project Site:	Hanford	Vessel Drawing	24590-PTF-MV-PJV-00002/00003
Description:	PJV Demister		

R10925194

Reference Data

Charge Vessels (Tag Numbers)	None
Pulsejet Mixers / Agitators (Tag Numbers)	None
RFDs/Pumps (Tag Numbers)	None

Design Data

Quality Level	Q For Vessel, Note 4		Fabrication Specs	24590-WTP-3PS-MV00-T0001 (Note 9)	
Design Level	See Note 4		Design Code	ASME VIII Div 1	
Seismic Category	SC-I (Note 4)		Code Stamp	Yes	
Service/Contents	Radioactive Mist and Particulate		NB Registration	Yes	
Design Specific Gravity	1.00				
Maximum Operating Volume	gal	0	Weights (lbs)	<u>Empty</u>	<u>Operating</u>
Total Volume	gal	*	Estimated	38000	38000
Radiography	100% (Note 3)		Actual *		58000
Environmental Qualifications	See Attachment 1				
Dangerous Waste Permit Affecting	Yes				

Inside Diameter	inch	96 Max *			Wind Design	Not Required	
Height (TL-Flange Face)	inch	150 Max *			Snow Design	Not Required	
		Max. Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-SS90-T0001 24590-WTP-3PS-MV00-T0002	
Internal Pressure	psig	0	15	NA	Seismic Base Moment *	ft ³ lb	
External Pressure	psig	1.3 (Note 10)	FV	NA	Postweld Heat Treat	Not Required	
Temperature	°F	115	140	NA	Corrosion Allowance	Inch	0.04
Min. Design Metal Temp.	°F	40			Hydrostatic Test Pressure *	psig	
Relative Humidity	%	100					

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	SA 240 304 (Note 1)	See Drawing	Primary
Shell	SA 240 304 (Note 1)	See Drawing	Primary
Bottom Head	SA 240 304 (Note 1)	See Drawing	Primary
Support	SA 240 304 (Note 1)	**	NA
Jacket/Coils/Half-Pipe Jacket	NA	NA	NA
Internals	SA 240 304 (Note 1)	See Drawing	NA
Pipe	SA 312 304 (Note 1)	See Drawing	Primary
Forgings/ Bar stock	SA 182 304 (Note 1)	See Drawing	N/A
Gaskets/O Ring	EPDM/ See Drawing	NA	NA
Bolting	See Drawing	N/A	N/A



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Miscellaneous Data

Orientation	Vertical	Support Type	Skirt
Insulation Function	NA	Insulation Material	NA
Insulation Thickness (inch)	NA	External Finish	NA

Remarks

<p>* To be confirmed by Seller.</p> <p>Note 1: Material shall have carbon content of 0.030% max. dual certified. Non-welded specialty items are excluded.</p> <p>Note 2: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.</p> <p>Note 3: These vessels are located in the PT filter cave and are not designed to be replaceable during the life of the PT facility.</p> <p>Note 4: The vendor shall meet NDE requirements for L-1 vessels in Section 6 of 24590-WTP-3PS-MV00-T0001 and SC-I requirements for internals. Internals upgraded to SC-1 from SC-IV because internals are not replaceable or fixable remotely and the additional NDE will confirm the weld integrity of the internals.</p> <p>Note 5: Separation efficiency for demister is 85% minimum for 1 micron particle size or larger.</p> <p>Note 6: Deleted.</p> <p>Note 7: Vendor shall determine life expectancy for all non-metallic components and gaskets and confirm a minimum life expectancy of five years for each of these components.</p> <p>Note 8: Deleted.</p> <p>Note 9: SC-1 nozzle loads to be used from 24590-WTP-3PS-MV00-T0001 (CCN 175053).</p> <p>Note 10: For the seismic condition the design pressure shall be used.</p>
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Equipment Cyclic Data

This information envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Design Life	40 Years
Component Function and Life Cycle Description	The PJV Demister is a semi-passive device designed for removal of radioactive mists and fine particulate from the PJV vent system. Removal is accomplished by flowing the exhaust gas through glass fiber filter elements. The operation is basically steady-state with the exception of maintenance periods as required. Maintenance would be limited to periodic washing of elements when off-line and the change-out of the glass fiber elements.

Load Type	Min	Max	Number of Cycles	Comments
Design Pressure (psig)	FV	15	10	WTP Calc 24590-PTF-MVC-10-00003
Operating Pressure (psig)	-1.3	-0.29	7.0E6	WTP Calc 24590-PTF-MVC-10-00003
Operating Temperature (°F)	80	115	5,150	WTP Calc 24590-PTF-MVC-10-00003
Contents Specific Gravity	1.0	1.0	N/A	WTP Calc 24590-PTF-MVC-10-00003
Contents Level (inch)	Normally empty	Normally empty	N/A	WTP Calc 24590-PTF-MVC-10-00003
Localized features:	Temperature Range (°F)		Number of Cycles/Comment	
Nozzles	N/A		N/A	
Supports	N/A		N/A	

Notes

1. The Seller shall increase the number of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

Safety/Screening/Evaluation Required? If yes per 24590-WTP-GPP-SREG-002, E&NS signature required below.	Yes	X	No
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24590-PTF-MV-PJV-DMST-00002A/B/C

Approval

Rev	Description	System Engr	Vessel Engr	Checked	Reviewed	E&NS	Approved	Date
A	Issued for Quote	J. Dave	M. Arulampalam	C. Slater/A. Molina	S. Atri	N/A	M. Hoffmann	1/23/04
B	Added or revised environmental qualification, radiation dose rate and notes	J. Dave	M. Arulampalam	C. Slater/A. Molina	D. Adler	N/A	M. Hoffmann	4/13/05
C	Corrected plant item number, assigned Design Level, revised pressure and temperatures, added calc references & cyclic data.	J. Dave	R. Peters	M. Seed/S. Sain	D. Adler	J. Brown	J. Julyk	10/24/06
0	Issued for purchase, deleted old EQ data, added new EQ Datasheet	D. Mildon <i>[Signature]</i>	R. Peters <i>R.P. PETERS</i>	C. Chung <i>Chun</i>	Mike Seed <i>MSeed</i>	G. Hendricks <i>[Signature]</i>	J. Julyk <i>[Signature]</i>	6/10/08



EQUIPMENT QUALIFICATION DATASHEET (EQD)

24590-PTF-MVD-PJV-00004 Rev.: 0

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Equipment Identification			
Component Tag Number	24590-PTF-MV-PJV-DMST-00002A, 00002B, 00002C	Safety Classification	<input checked="" type="checkbox"/> SC <input type="checkbox"/> SS <input type="checkbox"/> APC <input type="checkbox"/> SDC <input type="checkbox"/> SDS <input type="checkbox"/> RRC
Manufacturer / Supplier	TBD		
Requisition Number	24590-QL-MRA-MVA0-00013		
Model	N/A	Seismic Category	<input checked="" type="checkbox"/> SC-I <input type="checkbox"/> SC-II <input type="checkbox"/> SC-III <input type="checkbox"/> SC-IV
Description (Include descriptive text [e.g., location, elevation])	Pulse Jet Ventilation (PJV) System Demister. Located in Room P-0335, Elev. 56'-0", K/23 (24590-PTF-P1-P23T-01001)		
Safety Function(s)	The PJV Demister housing is SC for confinement (SED PTF 24590-WTP-SED-ENS-03-002-02 Rev 2, Section 4.3.19.2). The piping and equipment housings will not bend or fold to block the passage of the PJV exhaust gases. The in-line component internal elements are constructed of materials and supported to prevent blocking the pathway established by the piping (SED PTF 24590-WTP-SED-ENS-03-002-02 Rev 2, Section 4.3.19.5).		
Seismic Safety Function	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Room Number(s): P-0335	
Maintenance Accessible	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Method of Maintenance Access: <input checked="" type="checkbox"/> Remote <input type="checkbox"/> Hands On <input type="checkbox"/> None	
Seismic Operability Requirements:	<input checked="" type="checkbox"/> During Seismic Event <input checked="" type="checkbox"/> After Seismic Event		
ITS Equipment Type:	<input checked="" type="checkbox"/> Passive Mechanical <input type="checkbox"/> Active Mechanical <input type="checkbox"/> Electrical		

Equipment Environmental Qualification (EEQ)					
Environment	<input type="checkbox"/> Mild <input checked="" type="checkbox"/> Harsh		Hi Rad Service	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Contamination Class:	C5		Design Life (yrs)	<input checked="" type="checkbox"/> 40 <input type="checkbox"/> Other _____	
Radiation Class:	R5				
Parameter Type/Units	Parameter Value	Time Duration (number)	Time Units	WTP Document Number (BUYER)	Submittal Number (SELLER)
Normal					
Normal High Temperature (°F)	113	40	yrs	24590-PTF-U0D-W16T-00001	Note 11
Normal Low Temperature (°F)	59	40	yrs	24590-PTF-U0D-W16T-00001	Note 11
Normal High Relative Humidity (%RH)	100	40	yrs	24590-PTF-U0D-W16T-00001	Note 11
Normal Low Relative Humidity (%RH)	5	40	yrs	24590-PTF-U0D-W16T-00001	Note 11
Normal High Pressure (in.-w.g.)	0 (Note 12)	40	yrs	24590-PTF-U0D-W16T-00001	Note 11
Normal Low Pressure (in.-w.g.)	- 1.4 (Note 12)	40	yrs	24590-PTF-U0D-W16T-00001	Note 11
Normal Radiation Dose Rate (mR/hr)	53,050	1	YR	Note 14	Note 11
Vibration Magnitude (g)	N/A	N/A	N/A	N/A	N/A
Vibration Frequency (Hz)	N/A	N/A	N/A	N/A	N/A
Additional Normal Information:	N/A				



EQUIPMENT QUALIFICATION DATASHEET (EQD)

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Equipment Environmental Qualification (EEQ) (continued)

Parameter Type/Units	Parameter Value	Time Duration (number)	Time units	WTP Document Number (BUYER)	Submittal Number (SELLER)
Abnormal					
Abnormal High Temperature (°F)	146	8	hrs/yr	24590-PTF-U0D-W16T-00001	Note 11
Abnormal Low Temperature (°F)	40	8	hrs/yr	24590-PTF-U0D-W16T-00001	Note 11
Abnormal High Relative Humidity (%RH)	100	24	hrs/yr	24590-PTF-U0D-W16T-00001	Note 11
Abnormal Low Relative Humidity (%RH)	4	22	hrs/yr	24590-PTF-U0D-W16T-00001	Note 11
Abnormal High Pressure (in.-w.g.)	4 (Note 12)	8	hrs/yr	24590-PTF-U0D-W16T-00001	Note 11
Abnormal Low Pressure (in.-w.g.)	- 7.3 (Note 12)	8	hrs/yr	24590-PTF-U0D-W16T-00001	Note 11
Abnormal Radiation Dose Rate (mR/hr)	40000	N/A	N/A	24590-PTF-U0D-W16T-00001	Note 11
Wet Sprinkler System Present	No	N/A	N/A	24590-PTF-U0D-W16T-00001	Note 11
Additional Abnormal Information	N/A				
Design Basis Events (DBE)					
DBE High Temperature (°F)	146	1000	hrs	24590-PTF-U0D-W16T-00001	Note 11
DBE Low Temperature (°F)	40	1000	hrs	24590-PTF-U0D-W16T-00001	Note 11
DBE High Relative Humidity (%RH)	100	482	hrs/yr	24590-PTF-U0D-W16T-00001	Note 11
DBE Low Relative Humidity (%RH)	4	1000	hrs	24590-PTF-U0D-W16T-00001	Note 11
DBE High Pressure (in.-w.g.)	4 (Note 12)	1000	hrs	24590-PTF-U0D-W16T-00001	Note 11
DBE Low Pressure (in.-w.g.)	- 7.3 (Note 12)	1000	hrs	24590-PTF-U0D-W16T-00001	Note 11
DBE Radiation Dose Rate (mR/hr)	40000	N/A	N/A	24590-PTF-U0D-W16T-00001	Note 11
Flood Height (ft)	0.96	1000	hrs	24590-PTF-U0D-W16T-00001; flood height per 24590-PTF-M0C-10-00009; flood duration per 24590-WTP-SE-ENS-07-0119	Notes 11
Submergence (ft)	N/A (Note 13)	N/A	N/A	N/A	N/A
Chemical/Spray Exposure	Yes	1000	hrs	24590-PTF-U0D-W16T-00001	Note 11
Additional DBE Information	N/A				



EQUIPMENT QUALIFICATION DATASHEET (EQD)

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DBE Chemical Exposure Details	
DBE Chemical Types/Concentrations	Nitric Acid (2M) Sodium Hydroxide (2M)

Interfaces (Electrical)	
Power Supply Voltage (VAC, VDC)	N/A
Power Supply Frequency (Hz)	N/A
Power Connection Method	N/A
I/O Signals to/from Equipment	N/A
I/O Connection Method	N/A

Interfaces (Mechanical)	
Mounting Configuration (orientation)	Vertical vessel with skirt.
Mounting Method (bolts, welds, etc.)	Bolts.
Auxiliary Devices	N/A

Equipment Seismic Qualification (ESQ)				
Parameter	Title	Reference/Document Number	Version / Revision	Remarks
WTP Seismic Design Specification (BUYER)	Engineering Specification for Seismic Qualification of Seismic Category I/II Equipment and Tanks	24590-WTP-3PS-SS90-T0001	2	N/A
	Engineering Specification for Seismic Qualification Criteria for Pressure Vessels	24590-WTP-3PS-MV00-T0002	2	
Specified Seismic Load (BUYER)	In-Structure Response Spectra (ISRS), Figures 11E, 12E, and 119	24590-PTF-S0C-S15T-00005; CCN 138085	B	Provided to the vendor via MR 24590-QL-MRA-MVA0-00013
Design Seismic Load (SELLER)	N/A	N/A	N/A	To be provided by the Seller via the G-321E submittal process
Qualification Method (SELLER)	N/A	N/A	N/A	Dynamic Analysis utilizing response spectra curves
Qualification Report Number (SELLER)	N/A	N/A	N/A	To be provided by the Seller via the G-321E submittal process
Submittal Number (BUYER)	N/A	N/A	N/A	N/A



EQUIPMENT QUALIFICATION DATASHEET (EQD)

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Notes and Additional Information

Note 11: BNI (BUYER) shall perform Equipment Environmental Qualification in accordance with 24590-WTP-DC-ENG-06-001, Design Criteria for Equipment Seismic and Environmental Qualification.

Note 12: Where pressure is given in inches of water column (in-w.c.) in the source document, it is generally assumed that this is in reference to atmospheric pressure and is therefore equivalent to inches of water gage (in-w.g.).

Note 13: Submergence is N/A since the vessel is over 16 ft. tall and flood height is 0.96 ft.

Note 14: The radiation dose is the conservatively bounding sum of internal dose (13,050 mR/hr per CCN 172556) and external dose (40,000 mR/hr per CCN 167203) and assumes filter element washdown once per year. Total annual dose is:

$$53,050 \text{ mR/hr} * 8,760 \text{ hrs/yr} * m/1,000 = 464,718 \text{ R/yr}$$

The damage threshold for EPDM is 1E06 Rads.

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