



Mechanical Data Sheet: VESSEL

Plant Item No:
24590-BOF-MV-DEP-VSL-00004A/00004B

Data Sheet No:
24590-BOF-MVD-DEP-00005

Rev:
1

River Protection Project
Waste Treatment and Immobilization Plant

Project:	RPP-WTP	P&ID:	24590-BOF-M6-DEP-00004001/-00004002, Rev 1 (Ref. 1, 20)
Project No:	24590	Process Data:	24590-BOF-MVC-DEP-00007, Rev A (Ref. 2)
Project Site:	Hanford	Vessel Drawing:	24590-BOF-MV-DEP-00006001,-00007001 (Ref. 16, 17)

Description: Overhead Sampling Vessel

Reference Data

Charge Vessels (Tag Numbers)	None
Eductors (Tag Numbers)	24590-BOF-MP-DEP-EDUC-00006, -00007, -00008, -00009 (Ref. 14)
Nozzle (Tag Numbers)	24590-BOF-MN-DEP-NOZ-00005, -00006 (Ref. 1, 20)
RFDs/Pumps (Tag Numbers)	None

Design Data

Quality Level	CM	Fabrication Specs	24590-BOF-3PS-MVSC-T0003 (Ref. 4)		
Seismic Category	SC-IV	Design Code	ASME VIII Div 1		
Service/Contents	Process Radioactive Condensate	Code Stamp	Yes		
Specific Gravity of fluid (Min/Max)	0.99/1.05 (Ref. 2)	NB Registration	Yes		
Maximum Operating Volume	gal	36600 (Ref. 3)	Weights (lbs)	Empty	Operating
Batch Volume	gal	23600 (Ref. 18)	Actual	*	*
Total Volume	gal	40800 (Ref. 3)	Not to exceed wet weight (lbs)	423,000	
Area Classification	R2/C1 (Ref. 8) (Note 11)	Not to exceed size (Notes 1 and 2)	16' Diameter x 46' High		

General Data

Inside Diameter	feet	14 (Ref. 3)		Wind Design	ASCE 7 - 1998
Length/Height (TL - TH)	feet	30.8 (Ref. 3)		Snow Design	ASCE 7 - 1998
	Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-BOF-3PS-MVSC-T0003 (Ref. 4)
Internal Pressure (psig)	Full Vacuum/0 (Min/Max) (Ref. 2)	15 (Ref. 5, 6)	N/A	Postweld Heat Treat	Per Code
External Pressure (psig)	0	15 (Ref. 6)	N/A	Corrosion/Erosion Allowance (inch)	0.04 (Ref. 19)
Temperature (°F)	40/126 (Min/Max) (Ref. 2)	155 (Note 9) (Ref. 6)	N/A	Head Type (Top and Bottom)	2:1 Semi-Ellipsoidal
Min Design Metal Temp. (°F)	-23 (Ref. 10)		Maximum Circulating Pump Discharge Pressure (psig)	147 (Ref. 13)	

Materials of Construction (Ref. 19)

Component	Material	Minimum Thickness/Size	Containment
Top Head	SA 240 304 (Note 7)	*	Auxillary
Shell	SA 240 304 (Note 7)	*	Primary
Bottom Head	SA 240 304 (Note 7)	*	Primary
Support	SA 240 304 (Note 7)	*	N/A
Jacket/Coils/Half-Pipe Jacket	SA 240 304 (Note 7)	N/A	N/A
Internals	SA 240 304/SA 312 TP304 (Note 7)	*	Thermocouples Primary
Internals - Spray Nozzle	Type 304L SS (Note 7)*	*	N/A
Internals - Piping	SA 312 TP304 Seamless (Note 7)	*	(Note 8)
Forgings/Bar Stock	SA 182 F304 (Note 7)	*	N/A
Gaskets	EPDM	N/A	N/A
Bolting	SA-193 Gr. B8M/SA-194 Gr. 8M	N/A	N/A

Vessel Connections (Ref. 1, 16, 17)

See Note 26

Miscellaneous Data

Orientation	Vertical	Support Type (Note 3)	Skirt
Insulation Function (Note 4)	Freeze Protection	Insulation Material	By Buyer
Insulation Thickness (inch)	3 (Ref. 1) (Note 4)	Internal Finish	Welds descaled as laid
		External Finish	Welds descaled as laid
DEP-VSL-00004A Spray Nozzle Preferred Operating Point (Pressure [psig], Flow [gpm])	*	DEP-VSL-00004A Spray Nozzle Available Pressure at Design Flow (Pressure [psig], Flow [gpm])	44.02, 105 (Ref. 7)
DEP-VSL-00004B Spray Nozzle Preferred Operating Point (Pressure [psig], Flow [gpm])	*	DEP-VSL-00004B Spray Nozzle Available Pressure at Design Flow (Pressure [psig], Flow [gpm])	43.85, 105 (Ref. 7)

Remarks

* To be determined/confirmed by the vendor

Note 1 - Not to exceed size diameter includes allowance for cooling jackets and side nozzle protrusion in addition to the vessel ID.

Note 2 - Not to exceed size height includes allowance for top manway and bottom skirt height dimension, from Top of Concrete (TOC) to bottom of vessel, in addition to total vessel height.

Note 3 - Skirt must be designed with 14'-0" Internal Diameter Ring Beam attachment in consideration.

Note 4 - Insulation is required on both the shell and top/bottom head of the vessel (by BUYER).

Note 5 - The contents of this document are Dangerous Waste Permit affecting.

Note 6 - 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.

Note 7 - Max. Carbon content 0.030%.

Note 8 - Nozzle necks below the high operating liquid level are Primary, others Auxiliary.

Note 9 - Vessel design temperature is determined by adding 25 °F to the max vessel operating temperature and rounding up to the nearest 5 °F.

Note 10 - Deleted

Note 11 - This equipment is located in R2 radiation area (radiological buffer area) which is designed to have a target radiation level of less than 0.250 mrem/hr. The average contact dose rate for this equipment is 3.75E-04 Rad/hr. (Ref. 8, 10, and 11)

Note 12 - Deleted

Note 13 - Deleted.

Note 14 - Deleted.

Note 15 - Deleted.

Note 16 - Deleted.

Note 17 - Center line of nozzle N13 (Ref. 16, 17) for level instrumentation must be located at least 54" from the side wall of vessel to allow for stilling well placement.

Note 18 - Seller to provide access platform and ladders.

Note 19 - Vessel is not Black Cell/Hard-to-Reach.

Note 20 - Vessel Discharge Outlet nozzle (N11, Ref. 16, 17) to be flush with vessel bottom, centered on vessel, and fitted with a vortex breaker.

Note 21 - For nozzles N02, N03, N04, N08, N09 (Ref. 16, 17) Inlet lines to be extended into the vessel and directed away from the vessel walls in order to prevent liquid from flowing down the vessel walls.

Note 22 - All internal supports and welds that interact with the primary confinement barrier (vessel) shall maintain equal quality level and seismic category as the vessel.





Note 23 - For Nozzle N07 (Ref. 16, 17), spray nozzle to be located as close to the center of the top head as possible.

Note 24 - Vessel vent nozzle (N12, Ref. 16, 17) to be located at the center of the top head. Intake air nozzle (N06, Ref. 16, 17) to be located at a maximum radius within the crown region of the head.

Note 25 - Deleted.

Note 26 - Refer to 24590-BOF-MV-DEP-00006001,-00007001 for vessel details including dimension, nozzle schedule table and locations/orientations.

Revision History

Rev.	Description	Originator	Checker	MET Reviewed	Approver	Date
1	Issued for Procurement (to reuse UFP-VSL-00002A/B). Major Revision (Revision Bars Not Shown). No EIEs against this document.	Jung Shin 	Ryan Rickenbach 		Youssef Mohammad-Zadeh 	6/30/17
0	Issued for Purchase. Impacts against this document have been evaluated and EIE, 24590-BOF-EIE-MS-16-0060, Rev. 0 is incorporated in this revision.	Jung Shin	Holden Carroll	Debbie Adler	Youssef Mohammad-Zadeh	1/18/2017

Attachment A – References for Mechanical Datasheet 24590-BOF-MVD-DEP-00005, Rev. 1
(For internal reference; except for Ref. 4, 14, 16, 17)

1. 24590-BOF-M6-DEP-00004001, Rev 2 - P&ID - BOF/EMF Direct Feed LAW EMF Process System Overhead Sampling Vessel DEP-VSL-00004A
2. 24590-BOF-MVC-DEP-00007, Rev A - Process Data for the Overhead Sampling Vessels (DEP-VSL-00004A/B) and Pumps (DEP-PMP-00004A/B/C)
3. 24590-BOF-MVC-DEP-00002, Rev A - Overhead Sampling Vessel (DEP-VSL-00004A/B) - Vessel Sizing, Vessel Overflow Nozzle Sizing, and Plant Wash System Sizing
4. 24590-BOF-3PS-MVSC-T0003, Rev 0 - Engineering Specification for DFLAW EMF Lag Storage and Overhead Sampling Vessels
5. 24590-BOF-M6C-DEP-00009, Rev B - Design Pressure and Temperature Calculation for the EMF DEP/DVP/AFR/NLD/SHR/SNR Systems
6. 24590-WTP-3DG-M40T-00001, Rev 0 - Design Parameters and Test Pressures for Equipment and Piping
7. 24590-BOF-M6C-PSW-00008, Rev B - EMF Process Service Water (PSW) Line Sizing (PIPE-FLO)
8. 24590-BOF-P1-25-00001, Rev 0 – Balance of Facilities LAW Effluent Process BLDG & LAW Effluent Drain Tank BLDG General Arrangement Plan at Elev 0 ft – 0 in
9. Deleted.
10. 24590-WTP-DB-ENG-01-001, Rev 5 – Basis of Design
11. 24590-WTP-Z0C-W13T-00010, Rev. G – Contact Dose Rates to Equipment From Beta and Gamma Emitters
12. Deleted.
13. 24590-BOF-MPC-DEP-00004, Rev A - BOF DEP Overhead Sampling Vessel Pump (DEP-PMP-00004A/B/C) Sizing and Line Sizing
14. 24590-BOF-MPD-DEP-00018, Rev 0 - 24590-BOF-MP-DEP-EDUC-00006, -00007, -00008, -00009 - Mixing Eductors for Atmospheric Vessels DEP-VSL-00004A/B
15. Deleted.
16. 24590-BOF-MV-DEP-00006001, Rev 1 - Equipment Assembly Overhead Sampling Vessel DEP-VSL-00004A
17. 24590-BOF-MV-DEP-00007001, Rev 1 - Equipment Assembly Overhead Sampling Vessel DEP-VSL-00004B
18. 24590-BOF-MVC-DEP-00009, Rev C - Batch Sizing Calculation of DEP (Direct Feed LAW Effluent Management Facility Process System) Vessels: DEP-VSL-00001, -00002, -00003A/B/C, -00004A/B, -00005A/B
19. 24590-BOF-N1D-DEP-00004, Rev 0 - DEP-VSL-00004A/B - Overhead Sampling Vessel Corrosion Evaluation
20. 24590-BOF-M6-DEP-00004002 - Rev 2 - P&ID - BOF/EMF Direct Feed LAW EMF Process System Overhead Sampling Vessel DEP-VSL-00004B