



**DVP Primary Exhaust HEPA Filter Housing Datasheet:
24590-BOF-MKD-DVP-00004**

| | | |
|----------------|--------------------------------|---------------|
| MR No. | 24590-QL-MRA-MKH0-00018 | |
| Plant Item No. | 24590-BOF-MK-DVP-HEPA-00004A/B | Rev. No. 2 |

| | | | | | | | |
|----|---|---|--|--|----------------------------|---------------------------------|---------|
| 1 | Project | RPP-WTP | Bldg./Rm # | EMF / E-0102A | Manufacturer | Camfil Farr | |
| 2 | Project No. | 24590 | Supporting Calculations | 24590-BOF-MAC-DVP-00001 | Manufacturer Part No. | CF-FB-R-12-12P-316L (SP) * | |
| 3 | Site | DOE Hanford | Associated Drawings | 24590-BOF-M6-DVP-00001001 | Quantity Required | 2 | |
| 4 | Safety Class | Non-Safety | | 24590-BOF-P1-25-00001 | Quality Level | CM (Note 9) | |
| 5 | Seismic Category | SC-IV | Specifications | 24590-BOF-3PS-MKH0-T0001 | | | |
| 6 | System No. | DVP | | | | | |
| 7 | System Description | 24590-BOF-3ZD-25-00001 | | | | | |
| 8 | Description | Process Ventilation Exhaust HEPA Filter and Housing | | | | | |
| 9 | DESIGN CONDITIONS | | | | | | |
| 10 | Inlet Air Temp. °F DB | 143 [2.1] | Housing Interior Chemical Exposure | | Note 4 | | |
| 11 | Site Storage Conditions - Summer °F DB | 113 [1.1] | Radiological dose rate (mrem/hr) | | 0.5[1.2, 6] | | |
| 12 | Site Storage Conditions - Winter °F DB | (-)23 [1.1] | Rad dose for 40-yr facility life (rem/40 yr) | | 175 | | |
| 13 | PERFORMANCE RATING | | | | | | |
| 14 | Design Flow Rate (ACFM) | 160 [2.2] | Max. Allow. Leakage (CFM/housing) | | 0.0002 cfm - See Note 6 * | | |
| 15 | Max Velocity thru Filter Media (ft/min) | 5 | Maximum Design Temperature (°F DB) | | 195 [7] | | |
| 16 | Operating Pressure (psig) | (-)1 [7] | Leak Test Pressure (psig, initial) | | (-) 1.25 [Note 6] | | |
| 17 | Design Pressure (psig) | 15 [Note 8] | Housing Press. Drop w/ Clean Filters (psig) | | * | | |
| 18 | Total Filter Openings Required | N/A | Housing Weight without HEPA Filters (lbs) | | ≈200 * | | |
| 19 | No. Filters per Bank | 1 | | | | | |
| 20 | CONSTRUCTION | | | | | | |
| 21 | Design Housing Manufacturer | Camfil Farr | Design Housing Model Number | | CF-FB-R-12-12P-316L (SP) * | | |
| 22 | Housing Construction Method | All Welded | Max. Housing Dim. (in.) - Note 2 | L =37 | H = 29 | W = 33 | |
| 23 | Housing Material | 316 / 316L / 316 (max 0.030% C; dual certified) - See Note 12 | | Housing Material Gauge | | 11 Ga | |
| 24 | Top Panel Material | N/A | Top Panel Material Gauge | | N/A | | |
| 25 | Structural Frame Material | N/A | Structural Frame Features | | N/A | | |
| 26 | Inlet Plenum Total Volume | 0.045 ft ³ * | Outlet Plenum Total Volume | | 0.045 ft ³ * | | |
| 27 | Inlet Position (Top/Side) | Side | Outlet Position (Top/Side) | | Side | | |
| 28 | Inlet Nozzle Dimensions (inches) | sch 40, 4 in. Diameter | Outlet Nozzle Dimensions (inches) | | sch 40, 4 in. diameter | | |
| 29 | Inlet Connection Type | Welded | Outlet Connection Type | | Welded | | |
| 30 | Inlet Flange Bolt Required | N/A | Outlet Flange Bolts Required | | N/A | | |
| 31 | Inlet Flange Bolt Size | N/A | Outlet Flange Bolt Size | | N/A | | |
| 32 | Inlet Flange Bolt Material | N/A | Outlet Flange Bolt Material | | N/A | | |
| 33 | Inlet Flange Gasket Material | N/A | Outlet Flange Gasket Material | | N/A | | |
| 34 | Paint and Finish Material | N/A | Seal Type | | Knife edge gel seal | | |
| 35 | HOUSING ACCESSORIES | | | | | | |
| 36 | Accessory Provided | Yes | No | Accessory Information | | | |
| 37 | Test w/ Inlet Isolation Damper | | X | Damper Provided By | | N/A | |
| 38 | | | | Inlet Isolation Damper Type | | N/A | |
| 39 | | | | Inlet Isolation Damper Size | | N/A | |
| 40 | Inlet Transition Piping | X | | Inlet Transition Piping Overall Length (in.) | | * | |
| 41 | | | | Inlet Transition Smallest Inside Dimension (in.) | | sch 40, 4 in. pipe - See Note 3 | |
| 42 | | | | Inlet Transition Largest Inside Dimension (in.) | | sch 40, 4 in. pipe - See Note 3 | |
| 43 | Inlet Aerosol Test Port Criteria | X | | Challenge Aerosol Injection Port Connection Type | | NPT | |
| 44 | | | | Challenge Aerosol Injection Port Connection Size | | 3/4 inch | |
| 45 | | | | Challenge Aerosol Injection Port Connection Quantity | | 1 | |
| 46 | | | | Challenge Aerosol Sample Port Connection Type | | NPT | |
| 47 | | | | Challenge Aerosol Sample Port Connection Size | | 3/8 inch | |
| 48 | | | | Challenge Aerosol Sample Port Connection Quantity | | 1 | |
| 49 | Inlet Viewing Ports | | X | Total Number of Viewing Ports Required | | N/A | |
| 50 | | | | Inlet Viewing Port Type | | N/A | |
| 51 | | | | Inlet Viewing Port Locations | | N/A | |
| 52 | | | | Inlet Viewing Port Dimensions (in.) | | L = N/A | W = N/A |
| 53 | Internal Fire Suppression | | X | Fire Suppression System Description | | N/A | |
| 54 | Vacuum-Relief Vent Assembly | | X | Number Required | | N/A | |
| 55 | | | | Vacuum-Relief Vent Assembly Setpoint | | N/A | |
| 56 | | | | Vacuum-Relief Vent Assembly Manufacturer | | N/A | |
| 57 | | | | Vacuum-Relief Vent Model Number | | N/A | |



**DVP Primary Exhaust HEPA Filter Housing Datasheet:
24590-BOF-MKD-DVP-00004**

MR No. **24590-QL-MRA-MKH0-00018**

Plant Item No. **24590-BOF-MK-DVP-HEPA-00004A/B**

Rev. No. **2**

| | | | | | | |
|---|--------------------|---|-------------------------|--|-----------------------|----------------------------|
| 1 | Project | RPP-WTP | Bldg./Rm # | EMF / E-0102A | Manufacturer | Camfil Farr |
| 2 | Project No. | 24590 | Supporting Calculations | 24590-BOF-MAC-DVP-00001 | Manufacturer Part No. | CF-FB-R-12-12P-316L (SP) * |
| 3 | Site | DOE Hanford | Associated Drawings | 24590-BOF-M6-DVP-00001001 24590-BOF-P1-25-00001 | Quantity Required | 2 |
| 4 | Safety Class | Non-Safety | Specifications | 24590-BOF-3PS-MKH0-T0001 | Quality Level | CM (Note 9) |
| 5 | Seismic Category | SC-IV | | | | |
| 6 | System No. | DVP | | | | |
| 7 | System Description | 24590-BOF-3ZD-25-00001 | | | | |
| 8 | Description | Process Ventilation Exhaust HEPA Filter and Housing | | | | |

58 HOUSING ACCESSORIES (continued)

| 59 | Accessory Provided | Yes | No | Accessory Information | | |
|----|-----------------------------------|-----|----|---|--|------------------------------|
| 60 | Test w/ Outlet Isolation Damper | | X | Damper Provided By | | N/A |
| 61 | | | | Outlet Isolation Damper Type | | N/A |
| 62 | | | | Outlet Isolation Damper Size | | N/A |
| 63 | Outlet Transition Piping | X | | Outlet Transition Piping Overall Length (in.) | | * |
| 64 | | | | Outlet Transition Smallest Inside Dimension (in.) | | sch 40, 4" pipe - See Note 3 |
| 65 | | | | Outlet Transition Largest Inside Dimension (in.) | | sch 40, 4" pipe - See Note 3 |
| 66 | Outlet Aerosol Test Port Criteria | X | | Challenge Aerosol Sample Port Connection Type | | NPT |
| 67 | | | | Challenge Aerosol Sample Port Connection Size | | 3/8 inch |
| 68 | | | | Challenge Aerosol Sample Port Connection Quantity | | 1 |
| 69 | Outlet Viewing Ports | | X | Total Number of Viewing Ports Required | | N/A |
| 70 | | | | Outlet Viewing Port Type | | N/A |
| 71 | | | | Outlet Viewing Port Locations | | N/A |
| 72 | | | | Outlet Viewing Port Dimensions (in.) | | L = N/A W = N/A |
| 73 | Differential Pressure Taps | X | | Differential Pressure Tap Size (inches) | | 1/2 |
| 74 | Drain Connection | X | | Drain Connection Size (inches) | | 3/4 |
| 75 | Drain Connection Valve | | X | Drain Connection Valve Size (inches) | | N/A |
| 76 | Lifting Lugs | X | | PVC Safe Change Bag Type | | * |
| 77 | Mounting Legs | X | | | | |

78 UTILITY REQUIREMENTS

| | | |
|----|--------------------------------|-----|
| 79 | Electrical (volts/phase/hertz) | N/A |
| 80 | Compressed Air | N/A |
| 81 | Instrumentation Taps | N/A |
| 82 | Pressure/Leak Test Ports | N/A |
| 83 | Air/Aerosol Mixing Test Ports | N/A |

84 Notes:

- 85 1.) Vendor to fill in or re-confirm data in cells with (*) asterisk. N/A means not applicable. Source references for inputs are identified in brackets [] and are for BNI internal use only. Supporting calculations, associated drawings, and system description are for BNI internal use only.
- 86 2.) Not to exceed housing dimensions. Vendor to provide actual dimensions.
- 87 3.) Vendor to provide inlet/outlet transition from housing to connect to 4 inch nominal diameter type 316L SS pipe.
- 88 4.) The total inorganic constituents of potential concern (COPC) emissions from the DVP System unabated streams are 0.104 g/sec [4.1].
- 89 The radionuclide COPC Emissions from the DVP System are the following [4.2]:

| 90 | Radionuclide | Unabated Emissions (Ci/yr) | Percent Contribution (%) |
|-----|--------------|----------------------------|--------------------------|
| 91 | 137Cs | 5.27E-02 | 1% |
| 92 | 137mBA | 4.98E-02 | 1% |
| 93 | 14C | 1.82E-01 | 3% |
| 94 | 151Sm | 2.75E+00 | 38% |
| 95 | 241Pu | 6.45E-02 | 1% |
| 96 | 63Ni | 1.10E-01 | 2% |
| 97 | 90Sr | 1.97E+00 | 27% |
| 98 | 90Y | 1.97E+00 | 27% |
| 99 | Other | 9.10E-02 | 1% |
| 100 | TOTAL | 7.24E+00 | 100% |

101 5.) Equipment shall be designed for a minimum useful life of 40 years.

102 6.) Max allowable leakage (CFM) = .003 * (Housing Volume (ft^3)) / 60 minutes @ leak test pressure of 1.25 * (Operating Pressure)



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|----------------|--------------------------------|---------------|
| MR No. | 24590-QL-MRA-MKH0-00018 | |
| Plant Item No. | 24590-BOF-MK-DVP-HEPA-00004A/B | Rev. No. 2 |

| | | | | | | |
|---|--------------------|---|-------------------------|--|-----------------------|----------------------------|
| 1 | Project | RPP-WTP | Bldg/Rm # | EMF / E-0102A | Manufacturer | Camfil Farr |
| 2 | Project No. | 24590 | Supporting Calculations | 24590-BOF-MAC-DVP-00001 | Manufacturer Part No. | CF-FB-R-12-12P-316L (SP) * |
| 3 | Site | DOE Hanford | Associated Drawings | 24590-BOF-M6-DVP-00001001 24590-BOF-P1-25-00001 | Quantity Required | 2 |
| 4 | Safety Class | Non-Safety | Specifications | 24590-BOF-3PS-MKH0-T0001 | Quality Level | CM (Note 9) |
| 5 | Seismic Category | SC-IV | | | | |
| 6 | System No. | DVP | | | | |
| 7 | System Description | 24590-BOF-3ZD-25-00001 | | | | |
| 8 | Description | Process Ventilation Exhaust HEPA Filter and Housing | | | | |

- 103 **Notes (Continued):**
- 104 7.) Input values are taken directly from their source documents. There is no additional margin added to values on this datasheet.
- 105 8.) Based on the maximum design pressure unit commercially available.
- 106 9.) Quality Level is CM but remains Air Permit affecting. The design will meet ASME AG-1 requirements (Ref. 8)
- 107 10.) All materials shall be fully identified by ASME/ASTM standard and type/grade or UNS.
- 108 11.) Contents of this document are Dangerous Waste Permit affecting.
- 109 12.) Springs in the filter clamping mechanism may be 300 series stainless steel.

- 110 **References (BNI Internal Use Only):**
- 111 1.) 24590-WTP-DB-ENG-01-001, Rev. 6 [No changes to the items listed below due to the BOD revision]
- 112 1.1 Table 4-7, Pg. 4-5 - Max and Min Ambient Air Temperatures
- 113 1.2 Table 5-1, Pg. 5-4 - R2 Area Max Dose
- 114 1.3 Deleted.
- 115 2.) 24590-BOF-MAC-DVP-00001, Rev. B
- 116 [Rev. 1 - Four EIEs against this calc address system changes; 24590-BOF-EIE-MS-17-0018, Rev. 1 reflects the current design.
- 117 That EIE states that the deletion of DVP-HEPA-00002A/B and the addition of the turbine flow meters on the inlets of DEP-VSL-00003A/B/C is to be addressed.
- 118 These changes do not affect the overall system flow, line size, or the housing pressure design. Review of the other EIE's indicates no impacts]
- 119 2.1 Section 7.1, Pg. 6
- 120 2.2 Table 8.2.1
- 121 3.) Deleted.
- 122 4.) 24590-BOF-M4C-DEP-00001, Rev. B
- 123 [Rev. 1 - 24590-BOF-EIE PR-16-0006, Rev. 0 updates batch sizes for DEP-VSL-00004A/B and -00005A/B. The change in the batch size due to the additional condensate
- 124 does not affect the design of this housing 24590-BOF-EIE-MS-17-0018, Rev. 1 results in a 1 (one) lb/hr mass flow decrease which has no effect on the design of the housing
- 125 4.1 Table 8-6
- 126 4.2 Table 8-1
- 127 5.) 24590-BOF-M6C-DVP-00001, Rev. B, Attachment D
- 128 [Rev. 1 - The line size for the housing was not affected by the calc revision. There are no EIE's posted against this calc]
- 129 6.) 24590-BOF-P1-25-00001, Rev. 1 [Rev. 1 - The incorporated DCNs in Rev 1 of the drawing do not affect this filter housing]
- 130 7.) 24590-BOF-M6C-DEP-00009, Rev. B, Pg. A-19
- 131 [Rev. 1 - Of 16 listed EIEs, only two affect DVP. Those two are 24590-BOF-EIE-MS-17-0017, Rev.0 which says, under Impacts, that this calc is not impacted
- 132 for 24590-BOF-EIE-MS-17-0018, Rev.1 a minor change in operating pressure is noted which does not affect this design. Therefore, there are no EIE impacts]
- 133 8.) 24590-BOF-ODF-MS-17-0001, Rev. 0, Effluent Management Facility (EMF) Vessel Vent Process System (DVP) Air Permit-Affecting SSCs

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 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.

| | | | | | | | | |
|-----|-----|---|------------|------|--------------|----------|-------------------|-----------|
| 130 | 2 | 1) Revised to correct the equipment Tag Number from Ref. 2 and editorial changes. 2) Incorporated 24590-WTP-SDDR-MS-17-00065. 3) Incorporated EIE 24590-WTP-EIE-ENG-17-0018, Rev. 0 and has no impact to this data sheet because the EIE description of change did not impact process stream DEP15 which is for this equipment process stream | | N/A | | N/A | Y. Mohammad-Zadeh | 3/29/18 |
| 131 | 1 | Revised to change Quality Level from Q to CM per 24590-BOF-QDF-MS-17-0001. Updated Ref. revs. Incorp'd EIE 24590-BOF-EIE-MS-17-0060, Rev. 0, incorporated SDDR 24590-WTP-SDDR-MS-17-00028. | M/ Silver | N/A | T. Fogle | N/A | Y. Mohammad-Zadeh | 9/14/2017 |
| 134 | 0 | Issued for Purchase Information added from Bid Margin was not reduced | R. Preston | N/A | H. Hendricks | N/A | Y. Mohammed-Zadeh | 3/1/2017 |
| 135 | Rev | Description | Originator | ES&H | Checker | Reviewer | Approver | Date |