

**DOE-STD-5506-2021**  
**Frequently Asked Questions**  
**Issued April 2023**

**Q1. Does DOE-STD-5506-2021, *Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities*, require Pipe Overpack Containers (POCs) to have an UltraTech 9424S filter on the outer 55 gallon drum, and associated inner Pipe Components (PCs) to have sintered metal filters in order to utilize a Damage Ratio of zero in fire and deflagration scenarios, respectively?**

**A1.** DOE-STD-5506-2021, *Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities*, includes expectations on source term assumptions applicable to various accident stresses and containers used for TRU waste operations. The Standard recognizes that Pipe Overpack Containers (POCs) have robust design that withstand most mechanical stresses. The containers are also sufficient to withstand fire insults when the POC's outer 55-gallon container is equipped with an UltraTech Model 9424S filter installed per manufacturer's specification. Provided this configuration is met, Section 4.3.3.3 of the Standard states that in fire scenarios POCs can be "assigned a DR [Damage Ratio] of zero, irrespective of whether they contain, residues, particulates, combustibles, or any other waste form in an authorized configuration for scenarios bounded by the evaluated test conditions." The Standard doesn't specify a particular vent filter on the inner pipe component (PC) for fire stresses.

Consideration of deflagration events within a POC is also required when it is considered a "suspect container"<sup>1</sup> in accordance with the definition specified in Section 3.3.2.2, i.e., one that has no vent, a plugged vent, or an inadequate vent and meets a least one of the criteria specified in items a-d. When these conditions exist, the Standard discusses in Section 4.3.2(g) that a hydrogen deflagration would not be sufficient "to damage the pipe component or significantly degrade its sintered stainless-steel filter." Thus, in addition to the POC's outer container having dependency on the UltraTech 9424S for fires, there is some expectation for a sintered stainless-steel filter in order for the PC to withstand a deflagration stress. The Standard doesn't specify a particular vent filter on the outer 55 gallon drum of the POC for deflagration stresses.

Filter vent qualifications for TRU waste containers are described in DOE/WIPP-11-3384, CBFO Approved Filter Vents. Attachment II of this document includes an approved filter vent list specifically for POCs, as well other types of TRU waste containers. The list applicable to inner PCs includes various sintered stainless-steel filters, as well as filters constructed with other media types such as carbon. Any of these filters are considered adequate for addressing hydrogen accumulation that could lead to a "suspect container," provided that an evaluation of waste characteristics concludes that hydrogen generation rates in the container are not sufficient to overcome the filter's venting capacity. A "suspect container" should be assumed for situations where the PC includes (1) waste with hydrogen generation that can overcome the filter venting capacity, or (2) a filter that is not on the approved list in DOE/WIPP-11-3384.

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<sup>1</sup> DOE/WIPP-06-3345, Waste Isolation Pilot Plant Flammable Gas Analysis, Rev.10, may also be considered in assessing "suspect containers."

For “suspect containers” that are POCs, the modeling of a deflagration event should be performed in accordance with Section 4.3.2(g) of the Standard. Note that in this case, only PCs with a sintered metal filter can be assumed to withstand the effects of the accident stresses. Otherwise, the deflagration event should be modeled in accordance with Section 4.3.2(b) of the Standard based on the form of the material, which assumes a seal failure release from the POC’s outer 55-gallon container for combustible waste in the PC that bounds all other waste forms except for powders. For powders, a pressurized release should be modeled, e.g., could apply the pressure correlation from Appendix E using 56.6 psig failure as reported in the Southwest Research Institute report described in Section B.2.9.

POCs that are not defined as a “suspect container” based on the presence of a WIPP approved filter in the PC, or POCs determined to be a “suspect container” that depend on a sintered metal filter in the PC to withstand the effects of a deflagration event should consider such filter vents as important safety components. These components should be credited as safety significant or safety class features, depending on the magnitude of consequences determined in unmitigated analysis or worth of the control determined when such features are initial conditions of the analysis.