85-gal Drum and NucFil-007LS Filters

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85-gal Drum and NucFil-007LS Filters

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Loss of DOT 7A Type A Certification using NucFil-007LS Filters

Presented to: Contractors Transportation Management Association Workshop - 2009

Presented by: J. B. "Woody" Woodbury, Packaging Design Authority, Cavanagh Services Group
Background

- 55-gallon drums were overpacked into 85-gallon drums
- A NucFil-007LS long-stem filter was installed
  - NucFil certified the use of NucFil-007LS filters in 85-gallon drums as DOT 7A Type A
  - Wood wedges were used during the tests to center and stabilize the inner 55-gallon drums
- During inspection, a few filters were found to be loose, canted, and/or with RTV seals broken
  - No contamination or loss of container integrity
- Discovered in November 2008
Possible Causes

- Configuration: Per NucFil test report, 6 wooden wedges were required to keep 55-gallon drum from moving inside 85-gallon overpack during handling

- During handling drums were rolled on the bottom chine, dropped onto their base, and/or fork-lifted over rough terrain
  - The wedges worked loose and fell to the bottom of the inner-outer drums annulus
  - 80% plus failure rate
Radiograph – No wedges
Radiograph – With wedges
Possible Causes (continued)

- Why did they fail?
  - Wedge design was inadequate
  - Proper number not installed
  - Wedges were not installed properly
85-gallon drums no longer met
  - Onsite Safety Analysis Report for Packaging (SARP) requirements
  - Department of Transportation (DOT) Specification 7A Type A

Shipment of 007LS configured containers halted (onsite and offsite)

Both Skolnik and Myers contracted to conduct DOT testing of the drums without the wedges in place to evaluate packaging integrity
Test Plan

- Each manufacturer was asked to prepare 6-drum configurations, 3 light (136 kg) and 3 heavy (204 kg)
- NucFil installed the NucFil-007LS filters
- To simulate handling prior to DOT testing
  - Drums were rolled on their chines for 20 feet (minimum) and then allowed to fall onto their bases
  - They were also loaded on a forklift or truck and transported over rough terrain at least ¼ mile at speeds of 5 – 10 mph
Test Plan cont.

- Testing consisted of 49 CFR (Transportation) requirements
  - 173.465 (Type A Packaging Tests)
    - Free drop (Inverted four-foot drop)
    - Penetration (3.3-foot) bar (6 kg) dropped adjacent to the filter head
    - Stacking and water spray test documentation
  - 178.608 (Vibration standard)
    - One hour on vibration stand and subsequent leak test
- Filters sent to NucFil for analysis after testing
Test Results

• Skolnik test results
  - Heavy drum (204 kg) configuration failed
  - Light drum (136 kg) configuration passed
    • All subsequent tests passed
    • Draft Test Report received May 18

• Myers test results
  - Heavy drum (204 kg) configuration passed
    • Light drum (136 kg) not tested
    • All subsequent tests passed except pending Vibration Test
      - Scheduled week of May 25
Conclusion

- The light-weight Skolnik configuration can be recertified as a DOT Specification 7A Type A package.
- The Skolnik heavy-weight configuration will require overpacking, lid replacement, or repackaging prior to shipment as a DOT Specification 7A Type A package.
  - The containers may be shipped within a Type A or Type B shipping container under their present configuration.
- Both the heavy-weight and light-weight Myers configuration can be recertified as a DOT Specification 7A Type A package.