Research and Development Initiatives on Packaging Testing

Research and Development Forum
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Background

- Performance oriented packaging introduced in 1990
- Few changes since then
- Variations among testing methods are common between testing facilities
Ongoing R&D initiatives

• Conditioning time prior to drop test
• Corner drop selection for combination pkg
• Leakproofness test methods and gases
• Hydrostatic test fittings placement
• Study of simultaneous stack and vibration tests
Conditioning Time Prior to Drop Test

• Goal: Determine the minimum time to ‘cold condition’ (to -18\degree C) an Intermediate Bulk Container (IBC) and its contents

• Achievements and products to date
  − Study revealed differences of conditioning times used by different facilities
  − Experiments showed a difference in IBC conditioning to reach the required temperature based on
    The outside of the container versus the center of the container

• Expected outcomes
  − Determine a specific timeframe for uniform conditioning of IBC and contents for drop test
  − Establish uniformity in test standardization for repeatability
Corner-Drop Selection for Combination Package

• **Goal:** Determine the box corner that most adequately tests the performance of an HM combination package when dropped

• **Expected outcomes**
  - Determine the reliability of test results by evaluating the difference in packaging performance based on drop orientation
  - Define ‘corner drop’ more accurately and evaluate how each corner orientation affects test results
  - Establish uniformity in test standardization for repeatability
Leakproofness Test Methods and Gases

• **Goals**
  - Evaluate alternative test methods for determining ‘leakproofness’
  - More clearly define ‘suitable gases’ for leak testing

• **Expected outcomes**
  - Evaluate compressed air as a ‘suitable gas’
  - Determine if other methods for evaluating leakproofness are available
  - Evaluate use of suitable gases as part of the leakproofness test
  - Establish uniformity in test standardization for repeatability
Placement of Hydrostatic Test Fittings

• **Goal:** Evaluate placement of fittings to determine if their location affects hydrostatic test results

• **Achievements and products to date**
  − Experiments with various fitting locations indicate no appreciable effects on test results thus far
  − Results suggest more research required to adequately evaluate fitting placement

• **Expected outcomes**
  − A guide for fitting placement which will result in consistent and reliable hydrostatic test results
  − Establish uniformity in test standardization for repeatability
Simultaneous Testing Studies

• **Goal:** Determine if testing three (3) packages simultaneously is equivalent to testing one (1) package at a time
  
  – For stack, vibration, hydrostatic testing, and leakproofness

• **Expected outcomes**
  
  – Determine the effect of simultaneous testing on various test results
  
  – Determine if current methods of simultaneous testing are adequate
  
  – Establish uniformity in test standardization for repeatability
Future R&D initiatives

• Root-cause research of packaging failure
• Reuse, Reconditioning, Remanufacturing Packaging Research
• Leakproofness testing methods for IBCs
Root-cause research of packaging failure

• **Goal:** Identify through analytical research of packaging data potential root-causes of packaging failure

• **Expected outcomes**
  – Determine data elements to identify root-causes of package failures
  – Create algorithmic method to identify gaps and vulnerabilities within regulations
  – Provide recommendations to improve or develop packaging regulations
Reuse, Reconditioning, Remanufacturing Packaging Research

• Goal: Determine if, in addition to leakproofness testing, other testing is recommended for reused, reconditioned, and remanufactured packaging

• Expected outcomes
  - Determine if reused, reconditioned, and remanufactured packaging meets the testing standards for new packaging
  - Provide recommendations to improve or develop testing methods under 49 CFR 173.28
Leakproofness Testing Methods for IBCs

- **Goal:** Determine IBC leakproofness test duration and best test method

- **Expected outcomes**
  - Define “suitable length of time” for Section 173.813(c)
  - Test various methods used for leak detection to determine if there is an ideal process