



# 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° 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



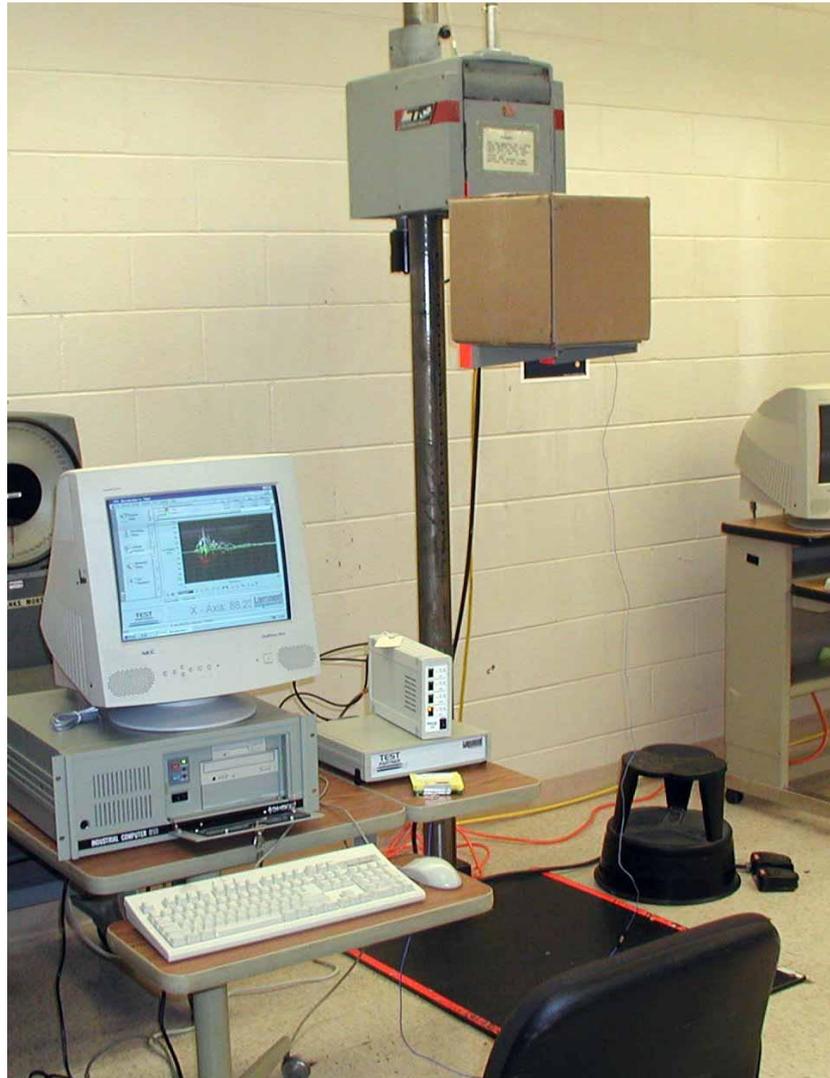




# Corner-Drop Selection for Combination Package

- **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

