



# **Australian Compliance Laboratory**

*Specialising in performance testing of dangerous goods packaging*

*A mock guide to:*

## **Drop testing drums**

*For those wanting to internally test their dangerous goods packagings before laboratory analysis*

# Table of Contents

|     |   |   |
|-----|---|---|
| 1   | Mock drop testing procedures .....                            | 3 |
| 1.1 | Plastic non-removable head drums containing liquids.....      | 3 |
| 1.2 | Plastic non-removable head drums containing solids .....      | 3 |
| 1.3 | Plastic removable head drums containing liquids.....          | 3 |
| 1.4 | Plastic removable head drums containing solids .....          | 4 |
| 1.5 | Metal non-removable head drums containing liquids.....        | 4 |
| 1.6 | Metal non-removable head drums containing solids .....        | 4 |
| 1.7 | Metal removable head drums containing liquids.....            | 5 |
| 1.8 | Metal removable head drums containing solids .....            | 5 |
| 1.9 | Fibre removable head drums containing solids.....             | 5 |
| 2   | Appendices.....   | 6 |
| 2.1 | Appendix A: Determine the drop height.....                    | 6 |
| 2.2 | Appendix B: Determine the drop orientations.....              | 6 |
| 2.3 | Appendix C: The 8'oclock position.....                        | 6 |
| 2.4 | Appendix D: A note regarding conditioning fibre packages..... | 6 |
| 3   | Document information .....                                    | 7 |
| 3.1 | General guidance.....   | 7 |
| 3.2 | The codes.....  | 7 |
| 3.3 | ACL contact information .....                                 | 7 |
| 3.4 | Revision.....   | 7 |
| 3.5 | Disclaimer .....  | 7 |

# 1 Mock drop testing procedures

## 1.1 Plastic non-removable head drums containing liquids



1. Determine the drop height from Appendix A.
2. Fill 6 samples to their maximum capacity with antifreeze and seal tightly.
3. Chill the samples to  $\leq -18^{\circ}\text{C}$ .
4. Drop the cold samples from the test height. Refer to Appendix B for the orientations.
  - a. drop 3 samples in Orientation 1
  - b. drop 3 samples in the 8 o'clock position (Appendix C)
5. Drill a hole in each sample.
6. Samples must not leak after 5 minutes.

## 1.2 Plastic non-removable head drums containing solids



1. Determine the drop height from Appendix A.
2. Fill 6 samples to their maximum capacity and gross mass with polygranules and sand. Seal them tightly.
3. Chill the samples to  $\leq -18^{\circ}\text{C}$ .
4. Drop the cold samples from the test height. Refer to Appendix B for the orientations.
  - a. drop 3 samples in Orientation 1
  - a. drop 3 samples in 8 o'clock position (Appendix C)
5. The samples must remain sift-proof.

## 1.3 Plastic removable head drums containing liquids



1. Determine the drop height from Appendix A.
2. Fill 6 samples to their maximum capacity with antifreeze and seal tightly.
3. After sealing, leave the samples for 24 hours so the gasket can relax. Simultaneously chill the samples to  $\leq -18^{\circ}\text{C}$ .
4. Drop the cold samples from the test height. Refer to Appendix B for the orientations.
  - a. drop 3 samples in Orientation 1
  - b. drop 3 samples in the 8 o'clock position (Appendix C)
5. Drill a hole in each sample.
6. Samples must not leak after 5 minutes.

#### 1.4 Plastic removable head drums containing solids



1. Determine the drop height from Appendix A.
2. Fill 6 samples to their maximum capacity and gross mass with polygranules and sand. Seal tightly.
3. After sealing, leave the samples for 24 hours so the gasket can relax. Simultaneously chill the samples to  $\leq -18^{\circ}\text{C}$ .
4. Drop the cold samples from the test height. Refer to Appendix B for the orientations.
  - a. drop 3 samples in Orientation 1
  - b. drop 3 samples in the 8 o'clock position (Appendix C)
5. The samples must remain sift-proof.

#### 1.5 Metal non-removable head drums containing liquids



1. Determine the drop height from Appendix A.
2. Fill 6 samples to their maximum capacity with water and seal tightly.
3. Drop the samples from the test height. Refer to Appendix B for the orientations.
  - a. drop 3 samples in Orientation 1
  - b. drop 3 samples in the 8 o'clock position (Appendix C)
4. Drill a hole in each sample.
5. Samples must not leak after 5 minutes.

#### 1.6 Metal non-removable head drums containing solids



1. Determine the drop height from Appendix A.
2. Fill 6 samples to their maximum capacity and gross mass with polygranules and sand. Seal tightly.
3. Drop the samples from the test height. Refer to Appendix B for the orientations.
  - a. drop 3 samples in Orientation 1
  - b. drop 3 samples in the 8 o'clock position (Appendix C)
4. The samples must remain sift-proof.

### 1.7 Metal removable head drums containing liquids



1. Determine the drop height from Appendix A.
2. Fill 6 samples to their maximum capacity with water and seal tightly.
3. After sealing, leave the samples for 24 hours so the gasket can relax.
4. Drop the samples from the test height. Refer to Appendix B for the orientations.
  - a. drop 3 samples in Orientation 1
  - b. drop 3 samples in the 8 o'clock position (Appendix C)
5. Drill a hole in each sample.
6. Samples must not leak after 5 minutes.

### 1.8 Metal removable head drums containing solids



1. Determine the drop height from Appendix A.
2. Fill 6 samples to their maximum capacity and gross mass with polygranules and sand. Seal tightly.
3. After sealing, leave the samples for 24 hours so the gasket can relax.
4. Drop the samples from the test height. Refer to Appendix B for the orientations.
  - a. drop 3 samples in Orientation 1
  - b. drop 3 samples in the 8 o'clock position (Appendix C)
5. The samples must remain sift-proof.

### 1.9 Fibre removable head drums containing solids



1. Determine the drop height from Appendix A.
2. Fill 6 samples to their maximum capacity and gross mass with polygranules and sand. Seal tightly.
3. After sealing, leave the samples for 24 hours so the gasket can relax.
4. Drop the samples from the test height. Refer to Appendix B for the orientations.
  - a. drop 3 samples in Orientation 1
  - b. drop 3 samples in the 8 o'clock position (Appendix C)
5. The samples must remain sift-proof and in good condition.

## 2 Appendices

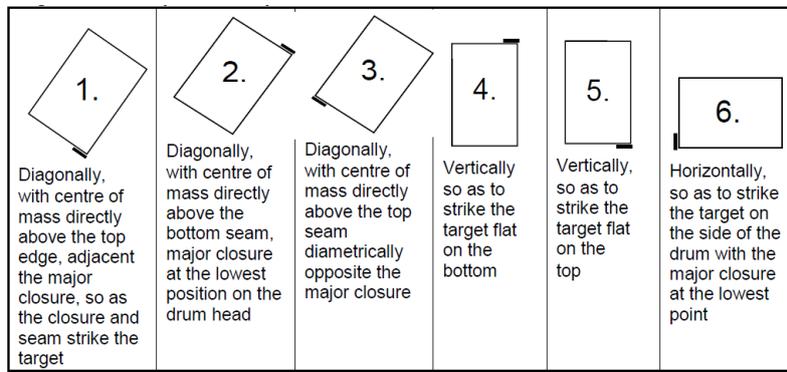
### 2.1 Appendix A: Determine the drop height

| Packing group                                | Drop height (metres) |          |           |
|--|----------------------|----------|-----------|
|  | I                    | II       | III       |
| Solid contents (powders, granules, articles) | 1.8                  | 1.2      | 0.8       |
| Liquids contents ≤1.2kg/L                    |                      |          |           |
| Liquid contents >1.2kg/L                     | 1.5 x SG             | 1.0 x SG | 0.67 x SG |

Where SG is the specific gravity of the liquid expressed as kg/L

### 2.2 Appendix B: Determine the drop orientations

Figure 6.1: The Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code), Edition 7.6



### 2.3 Appendix C: The 8'oclock position

This is the 8 o'clock position. For removable-head drums, the securing mechanism of the locking ring should be similarly orientated in the 4 o'clock position.

The idea here is that the sealing mechanisms are on the crimp line when the sample is dropped. This deforms the them and increases the likelihood of leakage. See a good video of it [here](#).



### 2.4 Appendix D: A note regarding conditioning fibre packages

For in-house testing, it's okay to test fibre packages at ambient conditions. This deduction is made after considering clause 6.1.5.1.3 of the ADG Code which waives fibre conditioning when samples are retested.

However, it should be said that actual laboratory conditions test fibre packages at 23°C and 50% relative humidity. This is done after a 'drying' period where the fibre is left to pre-condition at approximately 25°C and 30% relative humidity.

## 3 Document information

### 3.1 General guidance

1. Mock testing on one package means nothing as it may give an out-lying result. You need to test on many samples to create reliable data. The more samples you test, the more reliable your data.
2. It's prudent to over-test your package before submitting. This can be achieved by exceeding the test requirements and/or performing many tests on one package.
3. The more measurement, control, and repeatability of your tests, the better.
4. The closer to laboratory conditions of your tests, the better.

### 3.2 The codes

The mock test methods in this document are modelled on those in the [Australian Code for the Transport of Dangerous Goods by Road and Rail \(ADG Code\)](#) and the [United Nations Recommendations on the Transport of Dangerous Goods \(UNRDG\)](#), Chapter 6.1.5.

### 3.3 ACL contact information

If you need more information then please contact us. We'd love to share our insights.

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### 3.4 Revision

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### 3.5 Disclaimer

This article is subject to ACL's [Disclaimer of Published Materials](#). Mock testing equipment, methods, and procedures may not be the same as those used in the laboratory and may produce different results. A passing result using these procedures may not result in a passing result in the laboratory. ACL is not responsible for any of the reader's results, observations, or interpretations arising from this article. Each packaging design may have special clauses or extra testing requirements. Readers should refer to the [ADG Code](#) for complete information.