

ISTA 3 Series
General
Simulation
Performance
Test
Procedure

VERSION
DATE

Last
TECHNICAL
Change:
MARCH
2018

Last
EDITORIAL
Change:
JULY
2022

For complete
listing of
Procedure
Changes and
Version Dates
go to
www.ista.org

ISTA, Distributing Confidence, Worldwide™

ISTA 3 Series tests are advanced tests and are designed to:

- Challenge the capability of the package and product to withstand transport hazards, **but**
- Utilize general simulation of actual transport hazards, **and**
- Do not necessarily comply with carrier packaging regulations.

When properly executed, ISTA procedures will provide tangible benefits of:

- Product to market time reduction
- Confidence in product launch
- Reduction in damages and product loss
- Balanced distribution costs
- Customer satisfaction contributing to increased market share

There are two sections to this Procedure: Overview and Testing

- **Overview** provides general knowledge required before testing **and**
- **Testing** presents the specific instructions to do laboratory testing.

Two systems of weights and measures are presented in ISTA test procedures: SI (Metric) or English system (Inch-Pound). Metric units are shown first followed by the Inch-Pound units in parentheses; there are exceptions in some tables (when shown separately).

Familiarity with the following units and symbols used in this document is required:

For measuring	Metric units and symbols	English units and symbols
Weight	kilograms (kg) or grams (gm)	pounds (lb)
Distance	meters (m) or millimeters (mm)	feet (ft) or inches (in)
Volume	Cubic centimeters (cm ³)	Cubic inches (in ³)
Density	kilograms per cubic meter (kg/m ³)	pounds per cubic inch (lb/in ³)
Temperature	Centigrade (°C)	Fahrenheit (°F)
Absolute Pressure	Kilopascal (kPa)	Pounds per square inch (psi)

- Either system may be used as the unit of measure (standard units), **but**
- The standard units chosen shall be used consistently throughout the procedure.
- Units are converted to two significant figures **and**
- Not exact equivalents.

NOTE:

In other ISTA Test Procedures 68 kilograms is used as the conversion from 150 pounds. In 3A, 70 kilograms and 150 pounds are used because it's a common dividing point found in parcel delivery systems from countries that use either metric (SI) or English (inch-pounds) units of measure.

VERY IMPORTANT:

The entire document shall be read and understood before proceeding with a test.

ISTA 3 系列
通用模拟性
能测试程序

版本日期

最近技术
变更：

2018年3月

最后编辑
变更：7
月

2022

如需获取完整
的程序变更及版本日期列表，请访问
www.ista.org

ISTA，全球分销信心™

ISTA 3系列测试属于高级测试，其设计目的包括：

- 挑战包装和产品承受运输危害的能力，但
- 利用实际运输危害的通用模拟，和
- 未必符合承运人包装规定。

若执行得当，ISTA 程序将带来以下切实效益：

- 缩短产品上市时间
- 产品上市信心
- 减少损害和产品损失
- 均衡分配成本
- 客户满意度提升市场份额

本程序包含两个部分：概述与测试

- **概述**提供了测试前所需的通用知识和
- **测试**提供了进行实验室测试的具体说明。

ISTA 测试程序中提供了两种度量衡系统：国际单位制（SI）或英制（英尺-磅）。先列出国际单位制，括号内为英制单位；部分表格存在例外情况（当单独列出时）。

需熟悉本文件中使用的以下单位及符号：

用于测量	公制单位和符号	英制单位和符号
权重	千克 (kg) 或克 (gm)	磅 (lb)
距离	米(m)或毫米 (mm)	英尺 (ft) 或英寸 (in)
音量	立方厘米 (cm ³)	立方英寸 (in ³)
密度	千克每立方米 (kg/m ³)	磅/立方英寸 (lb/in ³)
温度	摄氏度 (°C)	华氏度 (°F)
绝对压力	千帕	磅/平方英寸 (psi)

- 任何一种系统都可以作为计量单位（标准单位），但是
- 所选用的标准单位应在整个操作过程中保持一致使用。
- 单位转换为两位有效数字和
- 非完全等效

注：

在其他 ISTA 测试程序中，150磅的换算值采用68公斤。而在3A测试中，由于公制（SI）和英制（英寸-磅）计量单位国家的包裹递送系统中存在70公斤和150磅的常见分界点，因此采用了这两个数值。

非常重要：

在进行检测前，须完整阅读并理解该文件内容。

Preface

Test Procedure 3A is a general simulation test for individual packaged-products shipped through a parcel delivery system. The test is appropriate for four different types of packages commonly distributed as individual packages, either by air or ground. The types include standard, small, flat and elongated packages. 3A includes an optional test combining Random Vibration Under Low Pressure (simulated high altitude). This tests the container's (whether primary package or transport package) ability to hold a seal or closure and the retention of contents (liquid, powder or gas) without leaking.

STANDARD packaged-products shall be defined as any packaged-product that does not meet any of the definitions below for a small, flat or elongated packaged-product. A Standard packaged-product may be packages such as traditional fiberboard cartons, as well as plastic, wooden or cylindrical containers. Examples shown below:



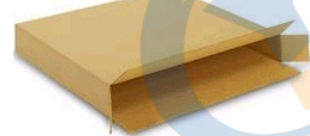
SMALL packaged-products shall be defined as any packaged-product where the:

- volume is less than 13,000 cm³ (800 in³), **and**
- longest dimension is 350 mm (14 in) or less **and**
- weight is 4.5 kg (10 lb) or less.
- Example shown below:



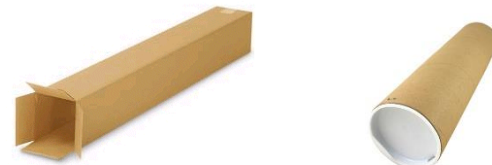
FLAT packaged-products shall be defined as any packaged-product where the:

- shortest dimension is 200 mm (8 in) or less **and**
- next longest dimension is four (4) or more times larger than the shortest dimension, **and**
- volume is 13,000 cm³ (800 in³) or greater.
- Example shown below:



ELONGATED packaged-products shall be defined as any packaged-product where the:

- longest dimension is 900 mm (36 in) or greater **and**
- both of the package's other dimensions are each 20 percent or less of that of the longest dimension.
- Example shown below:

**NOTE:**

If a packaged-product is both Flat and Elongated, the package should be tested as Elongated.

测试程序3A是针对通过包裹递送系统运输的独立包装产品进行的通用模拟测试。该测试适用于四种常见的独立包装类型，包括标准型、小型、扁平型和细长型包装，这些包装通常通过航空或地面运输方式分发。3A测试包含一项可选的低气压随机振动测试（模拟高空环境），用于检验容器（无论是主包装还是运输包装）保持密封或闭合状态的能力，以及在无泄漏情况下保持内容物（液体、粉末或气体）完整性的性能。

标准包装产品是指不符合下列小型、扁平或细长包装产品定义的任何包装产品。标准包装产品可以是传统纤维板纸箱，也可以是塑料、木质或圆柱形容器。如下所示：



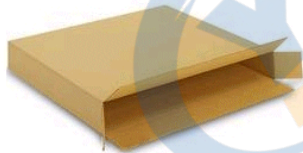
小型包装产品应定义为任何满足以下条件的包装产品：

- 体积小于 $13,000 \text{ cm}^3$ (800 in^3)，且
- 最长尺寸为350毫米（14英寸）或更短且
- 体重为4.5公斤（10磅）或以下。
- 示例如下所示：



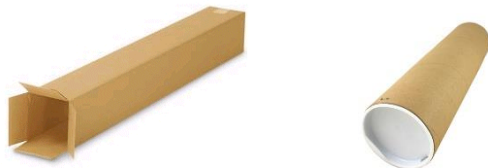
扁平包装产品应定义为任何满足以下条件的包装产品：

- 最短尺寸为200毫米（8英寸）或更小和
- 最长的边是短边的四倍或四倍以上，和
- 体积为 $13,000 \text{ cm}^3$ (800 in^3) 或更大。
- 示例如下所示：



长条形包装产品应定义为任何满足以下条件的包装产品：

- 最长边为900毫米（36英寸）或更长且
- 该包装的其他两个尺寸均不超过最长尺寸的20%。
- 示例如下所示：



注：

若包装产品同时具有扁平 and 细长两种形态，则应按细长形态进行包装测试。

Preface
Continued

- Testing can be used to evaluate the protective performance of a packaged-product related to vibrations, shocks and other stresses normally encountered during handling and transportation in a parcel delivery system.
- Test levels are based on general data and may not represent any specific distribution system.
- The package and product are considered together and not separately.
- Some conditions of transit, such as moisture, pressure or unusual handling may not be covered.

Other ISTA Procedures may be appropriate for different conditions or to meet different objectives.

Refer to *Guidelines for Selecting and Using ISTA Procedures and Projects* for additional information.

NOTE:

Hazardous material packaging that passes this test procedure may not meet international, national or other regulatory requirements for the transport of hazardous materials. **This test is not a substitute** for United Nations and/or any other required test standards for the transport of hazardous materials, but should be used as an additional test in conjunction with them.

Scope

Test Procedure 3A covers testing of individual packaged-products weighing 70 kilograms (150 pounds) or less when prepared for shipment via a parcel delivery carrier.

Product
Damage
Tolerance and
Package
Degradation
Allowance

The shipper shall determine the following prior to testing:

- what constitutes damage to the product **and**
- what damage tolerance level is allowable, if any, **and**
- the correct methodology to determine product condition at the conclusion of the test **and**
- the acceptable package condition at the conclusion of the test.

For additional information on this determination process refer to *Guidelines for Selecting and Using ISTA Procedures and Projects*.

Samples

Samples should be an untested actual package and product, but if one or both are not available, the substitutes shall be as identical as possible to actual items.

One (1) sample is required for this test procedure.

To permit an adequate determination of representative performance of the packaged-product, ISTA:

- Requires the procedure to be performed **one time, but**
- Due to the inherent variability of packaging as well as product characteristics, especially for those fragile items or items which contain liquids, it is recommended that **Fragile & Liquid product types have two (2) or more packaged-product samples tested.**

ISTA encourages performing the procedure five (5) or more times using new samples with each test to improve statistical significance for all package types. Refer to *Guidelines for Selecting and Using ISTA Procedures and Projects* for additional information on statistical sampling.

Definitions:

- **Fragile Products** – Items that could easily break when dropped without having protective packaging; for example- glass, ceramics, porcelains, clay, electronics, etc. See below for **Liquids** definition.
- **Liquids** - or semi-liquids or solids that can become liquid at high temperatures (above 70 degrees Fahrenheit) which can leak from a primary vessel during shipment.

NOTE:

In order to ensure testing in perfect condition, products and packages shipped to an ISTA Certified Laboratory for testing shall be:

- Adequately over-packaged for shipment **or**
- Repackaged in new packaging at the laboratory.

NOTE:

It is important to thoroughly document the configuration, materials, and construction of the tested product and package. Significant variations in performance can sometimes be caused by seemingly insignificant differences. Photo documentation is strongly recommended to supplement detailed written descriptions.

前言续

- 该测试可用于评估包装产品在包裹递送系统中搬运和运输过程中通常遭遇的振动、冲击及其他应力的防护性能。
- 测试水平基于一般数据，可能不代表任何特定的分销系统。
- 包装与产品应作为整体而非分开考虑。
- 某些运输条件（如湿度、压力或异常操作）可能不在承保范围内。

其他 ISTA 程序可能适用于不同情况或实现不同目标。

有关更多信息，请参阅《选择和使用 ISTA 程序和项目指南》。

注：

通过本测试程序的危险材料包装可能不符合危险材料运输的国际、国家或其他监管要求。**本测试不是危险材料运输的联合国和/或其他任何要求的测试标准的替代**，但应作为附加测试与它们一起使用。

范围

测试程序3A涵盖对单个包装产品进行测试，这些产品重量不超过70公斤（150磅），且在通过包裹递送承运商准备运输时进行检测。

Product
Damage
Tolerance 和
Package
Degradation
Allowance

托运方应在测试前确定以下事项：

- 什么构成对产品的损害**和**
- 允许的耐损等级是多少，如果有，**和**
- 确定测试结束时产品状态的正确方法**和**
- 测试结束时的可接受包装条件。

有关该判定流程的更多信息，请参阅《ISTA 程序与项目选择及使用指南》。

样品

样本应为未经测试的实际包装及产品，若无法提供其中一项或两项，则替代品应尽可能与实际物品保持一致。

本检测程序需使用一份(1)样本。

为确保对包装产品代表性能性能的充分判定，ISTA：

- 要求手术只做一次，**但是**
- 由于包装和产品特性本身具有变异性，特别是对于那些易碎物品或包装有液体的物品，建议对易碎和液体产品类型进行两次（2次）或更多次包装产品样本测试。

ISTA 鼓励使用新样本进行五(5)次或更多次检测，以提高所有包装类型的统计显著性。有关统计抽样的更多信息，请参阅《选择和使用 ISTA 程序和项目的指南》。

定义：

- **易碎品**——物品若无保护包装，掉落时极易破碎；例如玻璃、陶瓷、瓷器、黏土、电子产品等。详见下文**液体**定义。
- **液体**-或半液体或固体，可在高温（华氏70度以上）下变成液体，可能在运输过程中从主容器泄漏。

注：

为确保测试条件完美，发往 ISTA 认证实验室进行检测的产品及包装应满足以下要求：

- 包装过度，不适合运输**或**
- 在实验室中重新包装于新包装内。

注：

必须完整记录受试产品及其包装的配置、材料和构造。性能的显著差异有时可能由看似微不足道的差异引起。强烈建议通过照片记录来补充详细的书面描述。

Basis Weight

Basis Weights of Corrugated Board

When the outer package is a corrugated box, it is strongly recommended that the basis weights of the papers/paperboards used to make the box be determined and documented. If the nominal basis weights change, even if the board is rated for the same performance, a retest is appropriate.

Refer to *Guidelines for Selecting and Using ISTA Procedures and Projects* for additional information on documentation and basis weight determination.

The tests shall be performed on each test sample in the sequence indicated in the following tables:

3A – STANDARD, ELONGATED & FLAT Packaged-Product Test

Sequence Number	Test Category	Test Type	Test Level	For ISTA Certification
1	Atmospheric Preconditioning TEST BLOCK 1	Temperature and Humidity	Ambient	Required
2	Atmospheric Conditioning TEST BLOCK 1	Controlled Temperature and Humidity	Temperature and Humidity chosen from chart	Optional
3	Shock TEST BLOCK 3	Drop	9 Drops - height varies with packaged-product weight	Required
4	Vibration TEST BLOCKS 4 & 7 for Standard TEST BLOCKS 5 & 7 for Pails and Short Cylinders	Random With and Without Top Load	Overall G _{rms} levels of 0.53 and 0.46	Required
5	Vibration TEST BLOCKS 2 & 8	Random Vibration Under Low Pressure	Truck or Truck & Air dependent	Optional
6	Shock TEST BLOCK 9	Drop	8 Drops - height varies with packaged-product weight. Includes drop on hazard	Required
7	Shock TEST BLOCK 10	Rotational Edge Drop	200 mm (8 in)	Required for FLAT and ELONGATED
8	Shock TEST BLOCK 11	Full Rotational Flat Drop	Varies with packaged-product dimensions	Required for FLAT and ELONGATED
9	Shock TEST BLOCK 12	Concentrated Impact	Hazard Box dropped 400 mm (16 in)	Required for FLAT ONLY
10	Shock TEST BLOCK 13	Bridge Impact	Hazard Box dropped 400 mm (16 in)	Required for ELONGATED ONLY
11	Integrity TEST BLOCK 14	Leak Test	8 hours	Required for LIQUIDS ONLY

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瓦楞纸板的基重

若外包装采用瓦楞纸箱，强烈建议测定并记录用于制造纸箱的纸张/纸板的基重。若名义基重发生变化，即使纸板的性能等级相同，也应重新进行测试。

有关文件和基重测定的更多信息，请参阅《选择和使用 ISTA 程序和项目的指南》。

应按下表所示顺序对每个测试样本进行检测：

3A – 标准、延长及扁平包装产品测试

序列号	测试类别	测试类型	测试级别	ISTA 认证
1	大气预处理 试验模块1	温度和湿度	周围的	必需
2	大气调节测 试模块1	温湿度控制	温度和湿度从图表中选择	可选
3	震惊 测试模块3	下拉	9 液滴高度随包装产品重量 变化	必需
4	振动 标准测试模块4和7 测试第5和第7块用 于桶和短圆柱体	随机与和 无顶载荷	总体G _{rms} 水平为0.53和 0.46	必需
5	振动试验 2号和8号区块	低压下的随机 振动	卡车或卡车与航空运输依赖	可选
6	震惊 测试模块9	下拉	8 跌落高度——随包装产品 重量变化。包含跌落危害	必需
7	震惊 测试块 10	旋转的 边缘脱落	200毫米（8英寸）	适用于扁平型和细 长型
8	震惊 测试块 11	全旋平降	随包装产品尺寸而变化	适用于扁平型和细 长型
9	震惊 测试块 12	集中冲击	危险盒下降400毫米 （16英寸）	必需 仅限平躺
10	震惊 测试块 13	桥梁冲击	危险盒下降400毫米 （16英寸）	必需 仅延长
11	完整性 测试块 14	渗漏试验	8小时	仅限液体使用

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3A – SMALL Packaged-Product Test

Test
Sequence
SMALL

Sequence Number	Test Category	Test Type	Test Level	For ISTA Certification
1	Atmospheric Preconditioning TEST BLOCK 1	Temperature and Humidity	Ambient	Required
2	Atmospheric Conditioning TEST BLOCK 1	Controlled Temperature and Humidity	Temperature and Humidity chosen from chart	Optional
3	Shock TEST BLOCK 3	Drop (not in a bag)	9 Drops - height varies with packaged-product weight	Required
4	Vibration TEST BLOCKS 6 & 7	Random With and Without Top Load	Overall G _{rms} level of 0.53 and 0.46	Required
5	Vibration TEST BLOCKS 2 & 8	Random Vibration Under Low Pressure	Truck or Truck & Air dependent	Optional
6	Shock TEST BLOCK 9	Drop (in a bag)	7 Drops – height varies with packaged-product weight	Required
7	Integrity TEST BLOCK 14	Leak Test	8 hours	Required for LIQUIDS ONLY

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EQUIPMENT REQUIRED FOR PROCEDURE 3A

Equipment
Required
Atmospheric
Conditioning

Atmospheric Conditioning:

- Humidity recorder complying with the apparatus section of ISO 2233 or ASTM D 4332.
- Temperature recorder complying with the apparatus section of ISO 2233 or ASTM D 4332.

Optional Atmospheric Conditioning

- Chamber and Control apparatus complying with the apparatus section of ISO 2233 or ASTM D 4332.

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3A - 小型包装产品测试

序号	测试类别	测试类型	测试级别	ISTA 认证
1	大气预处理 试验模块1	温度和湿度	周围的	必需
2	大气调节测 试模块1	温湿度控制	温度和湿度从图表中选择	可选
3	震惊 测试模块3	下拉 (未装袋)	9 液滴高度随包装 产品重量变化	必需
4	振动 试验块6和7	随机的 有无顶载荷	总体 G _{rms} 水平为 0.53 和 0.46	必需
5	振动 试验块2与8	低压下的随机振动	卡车或卡车与航空运 输依赖	可选
6	震惊 测试模块9	袋内滴注	7 液滴高度随包装 产品重量变化	必需
7	完整性 测试块 14	渗漏试验	8小时	仅限液体

操作 3A 所需设备

所需设备:

大气调节

大气调节:

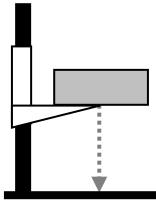
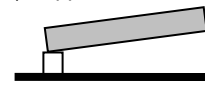
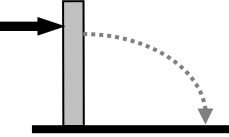
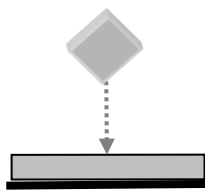
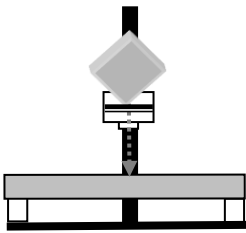
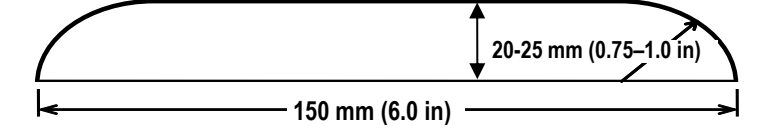
- 符合ISO 2233或ASTM D 4332装置章节要求的湿度记录仪。
- 符合ISO 2233或ASTM D 4332装置章节要求的温度记录仪。

可选大气调节

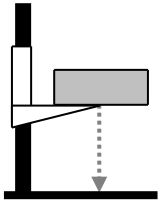
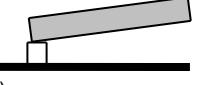
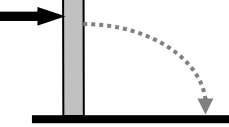
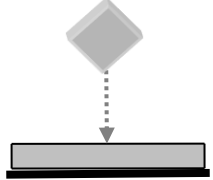
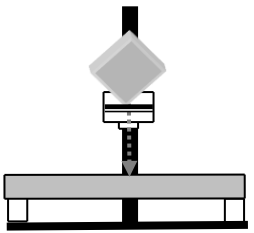
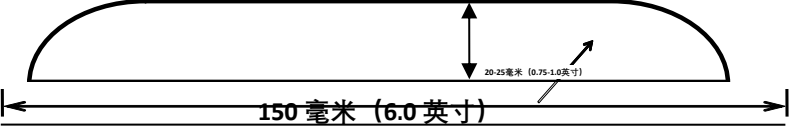
- 符合ISO 2233或ASTM D 4332装置章节要求的腔室与控制装置。

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Equipment
Required
Shock

	All Protocols	Flat and Elongated	Flat	Elongated
Type of Shock Test	Drop Test	Rotational Edge Drop Test Full Rotational Test	Hazard Impact Test	Bridge Impact Test
Type of Equipment	Free-fall drop tester 	1) Support Block  2) 	Hand Drop with Hazard Box 	Free-fall Drop Tester with Hazard Box 
In compliance with the apparatus section of...	ISO 2248 or ASTM D 5276	ISO 2876 or ASTM D 6179		ASTM D 5265 with the exception of the Hazard Box (Impactor). See below
Additional Required Equipment	Hazard block See below.	Support block 90 to 100 mm (3.5 to 4.0 in) in height and width and at least 200 mm (8 in) longer than the shortest dimension of face 3.	Hazard box 300 x 300 x 300 mm (12 x 12 x 12 in) dense wooden box with a total weight of 4.1 kg (9 lb) The box shall have least one bottom edge covered by angle iron. The box should be filled with a sand bag and void fill to hold the bag in place.	
				Support blocks (2) 90 to 100 mm (3.5 to 4.0 in) in height and width and at least 200 mm (8 in) longer than the shortest dimension of face 3.
<p>Hazard block: The block shall be made of hardwood or metal. The height shall be 20 to 25 mm (0.75 to 1.0 in) and the width 150 mm (6.0 in). The length shall be at least 200 mm (8.0 in) longer than the second shortest package dimension of the length, width and height. The long top edges of the block shall be rounded to a radius equal to the height of the block ± 2.0 mm (0.0625 in).</p> 				

设备
所需冲击

	所有方案	扁平 and 细长	公寓	延长的
冲击试验类型	跌落试验	旋转边缘跌落试验 全旋转试验	危害影响试验	桥梁冲击试验
设备类型	自由坠落试验器 	1) 支撑块  2) 	手抖 带危险箱的 	带危险箱的自由落体 跌落试验机 
根据 ... 的 装置部分 规定	ISO 2248或 ASTM D 5276	ISO 2876或 ASTM D 6179		ASTM D 5265, 但 不包括危险盒 (撞 击器)。详见下文
其他所需 设备	危险区 见下文。	支撑块 高度和宽度均为90至 100毫米 (3.5至4.0英 寸), 且比表面3的 最短边长至少多出 200毫米 (8英寸)。	危险箱 300 x 300 x 300 毫米 (12 x 12 x 12 英 寸) 致密木箱, 总重4.1千克 (9磅)。 该箱体至少有一条底边需用角钢覆盖。 该容器应装入沙袋及空隙填充物以固定袋体位置。	支撑块(2) 高度和宽度均为90至 100毫米 (3.5至4.0英 寸), 且比表面3的 最短边长至少多出 200毫米 (8英寸)。
			危险块: 该块应由硬木或金属制成。高度应为20至25毫米 (0.75至1.0英寸), 宽度为150毫米 (6.0英寸)。长度应比长度、宽度和高度的第二短包装尺寸至少长200毫米 (8.0英寸)。块的长顶边应圆角, 半径等于块的高度±2.0毫米 (0.0625英寸)。 	

Equipment
Required
Vibration

Random Vibration Test:

- Random Vibration Test System complying with the apparatus section of ISO 13355 or ASTM D 4728.
- A form of column stack fixturing
- Top-Load Apparatus
- Plastic bags
- Sand or other dense, flowable material

Optional Random Vibration Under Low Pressure:

- Low Pressure Chamber: complying with the apparatus section of ISO 2873 or ASTM D 6653; able to fit on the vibration table; able to draw down the internal absolute pressure to 60 kPa (8.7 psi) for the truck and air test, or 70 kPa (10 psi) for the truck-only test; and able to withstand the air and/or truck random vibration input.

Equipment
Required
Additional

3A - SMALL

- Two (2) large Consolidation Bags, approximately 1.0 x 0.7 m (39 x 27 in), made of canvas, polyolefin film/fabric, or similar strong flexible material, and with a zipper or other suitable closure at one end. The bags shall have sufficient capacity and strength to meet the requirements below, in the "Before You Begin Vibration Under Dynamic Load Testing" section, and in Test Block 6 (Vibration for Small).
 - One bag is the Top Load Bag, filled with 36 kg (80 lb) of sand, or other dense, flowable material, suitably packaged in smaller bags.
 - One bag is the Sample Bag, filled with the Test Specimen and dunnage packages, to simulate a typical pack.
- Three (3) over-night style envelopes, 1-#5 padded mailer and 1-#6 fiberboard mailer.
- Fiberboard containers as described in the table below are to be constructed of C-flute board with any of the following **minimum** values and construction:
 - Burst Test: 1380 kPa or 14 kg/cm² or 200 lb/in² **or**
 - ECT Value: 7.0 kN/m width or 40 lb/in width
 - RSC style boxes shall be used for any dunnage package 125 mm (5 in) or more in height **and**
 - Book-wrap or telescoping tray may be used for any dunnage package less than 125 mm (5 in) in height.
- Fill each envelope, mailer and corrugated container as indicated in the table below. Corrugated boxes and book wraps are filled until the desired weight is achieved.
 - It is allowable to substitute dunnage packages with Test Specimen packages or envelopes. The dunnage package that most closely represents the Test Specimen shall be substituted. Internal voids of dunnage packages should be filled in order to secure dunnage weight and eliminate concentrated load.

The following describes the numbers and sizes of each dunnage package:

Quantity	Package Type	Approximate Size LxWxH		Contents	Approximate Weight	
		Millimeters (mm)	Inches (in)		Kilograms (kg)	Pounds (lb)
3	Over-night envelope	318 x 242	12 ½ x 9 ½	25-sheets of paper		
1	#5 Padded mailer	268 x 407	10 ½ x 16	50-sheets of paper		
1	#6 Fiberboard mailer	318 x 483	12 ½ x 19	50-sheets of paper		
1	Fiberboard box or Book-wrap or Telescoping tray	200 x 125 x 50	8 x 5 x 2	Each corrugated package type and size shall be filled with foam, paper, sand, etc until the desired weight indicated in this table is achieved.	0.5	1.0
1		225 x 150 x 50	9 x 6 x 2		0.5	1.0
1		275 x 275 x 100	11 x 11 x 4		1.0	2.0
1		275 x 200 x 100	11 x 8 x 4		1.0	2.0
1		175 x 150 x 100	7 x 6 x 4		1.8	4.0
1		300 x 300 x 75	12 x 12 x 3		1.8	4.0
1	Fiberboard box	200 x 200 x 200	8 x 8 x 8	4.5	10.0	
1		150 x 150 x 150	6 x 6 x 6	1.0	2.0	
1		250 x 125 x 125	10 x 5 x 5	1.0	2.0	

随机振动试验:

- 符合ISO 13355或ASTM D 4728装置章节要求的随机振动测试系统。
- 一种柱堆装夹具
- 顶载装置
- 塑料袋
- 沙子或其他致密、可流动的物质

低压下可选随机振动

- 低压舱: 需符合ISO 2873或ASTM D 6653标准的装置要求; 可安装于振动台; 可将内部绝对压力降至卡车与空气测试所需的60 kPa (8.7 psi), 或仅卡车测试所需的70 kPa (10 psi); 并能承受空气和/或卡车的随机振动输入。

3A - 小型

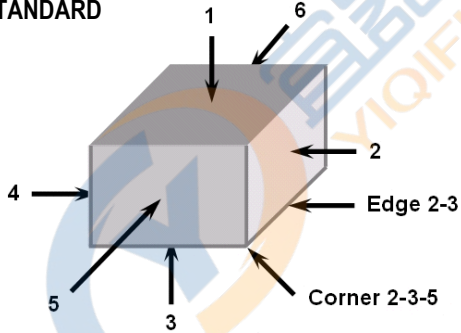
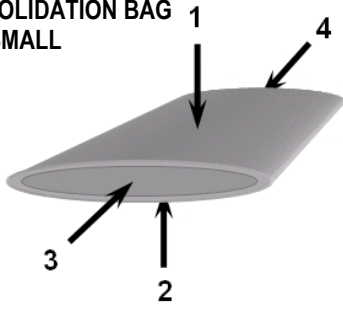
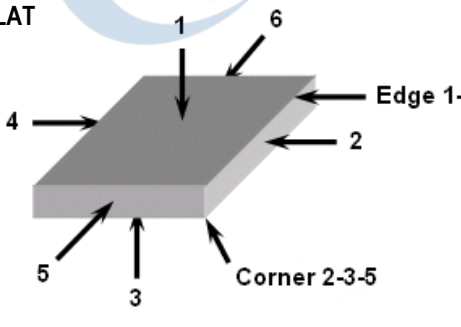
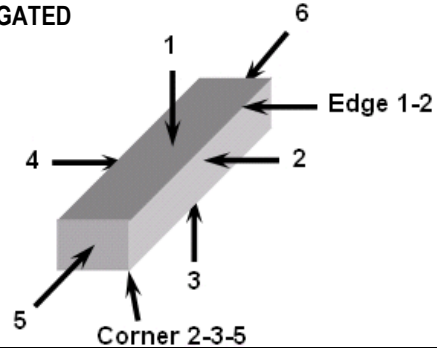
- 两个(2)大型加固袋, 尺寸约1.0×0.7米 (39×27英寸), 采用帆布、聚烯烃薄膜/织物或类似高强度柔性材料制成, 一端配有拉链或其他合适闭合装置。该袋体需具备足够的容量与强度, 以满足“动态载荷振动测试前准备”章节及测试模块6 (小型振动) 中的相关要求。
 - 其中一袋为顶部装载袋, 内装36公斤 (80磅) 沙子或其他密实、可流动的材料, 这些材料需以较小的包装袋进行适当封装。
 - 其中一个袋子为样本袋, 内装测试样本及衬垫包装, 用于模拟典型包装。
- 三(3)个隔夜式信封, 1-#5号衬垫信封及1-#6号纤维板信封。
- 下表所述纤维板集装箱应采用C型槽板建造, 且具有以下任一**最低值**和构造:
 - 爆破试验: 1380 kPa 或 14 kg/cm²或 200 lb/in²或
 - ECT值: 7.0 kN/m宽度或40磅/英寸宽度
 - 对于高度≥125毫米 (5英寸) 的任何垫料包装, 应使用RSC风格的包装盒和
 - 对于高度小于125毫米 (5英寸) 的任何衬垫包装, 可采用书包式或伸缩式托盘。
- 按下表所示内容填充每个信封、邮寄件及瓦楞纸箱。瓦楞纸箱和书籍包装需填充至达到指定重量。
 - 允许用测试样本包装或外包装替代垫料包装。应选用最接近测试样本的垫料包装进行替换。需填充垫料包装内部空隙, 以确保垫料重量并消除集中载荷。

下文列明各填充物包装的数量与规格:

数量	包装类型	近似尺寸 (长×宽×高)		目录	近似重量	
		毫米 (mm)	英寸 (in)		千克 (kg)	磅 (lb)
3	夜间包皮	318 x 242	12 ½ x 9 ½	25张纸		
1	#5 带衬垫的信封	268 x 407	10 ½ x 16	50张纸		
1	#6 纤维板邮寄箱	318 x 483	12 ½ x 19	50张纸		
1	纤维板箱或书 包或伸缩托盘	200 x 125 x 50	8 x 5 x 2	每条波状结构包类型和应填写尺寸泡沫、纸张直至达到本表所示的预期重量。	0.5	1.0
1		225 x 150 x 50	9 x 6 x 2		0.5	1.0
1		275 x 275 x 100	11 x 11 x 4		1.0	2.0
1		275 x 200 x 100	11 x 8 x 4		1.0	2.0
1		175 x 150 x 100	7 x 6 x 4		1.8	4.0
1		300 x 300 x 75	12 x 12 x 3		1.8	4.0
1	纤维板箱	200 x 200 x 200	8 x 8 x 8		4.5	10.0
1		150 x 150 x 150	6 x 6 x 6		1.0	2.0
1		250 x 125 x 125	10 x 5 x 5		1.0	2.0

Identification of Faces, Edges and Corners

Prior to beginning the tests identify the faces, edges and corners according to the procedure below.

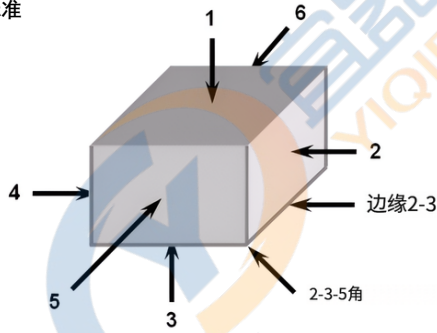
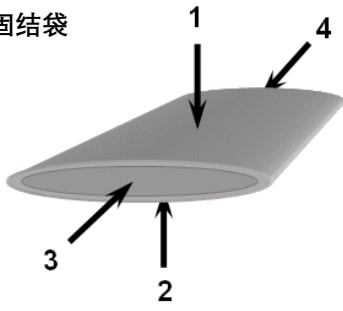
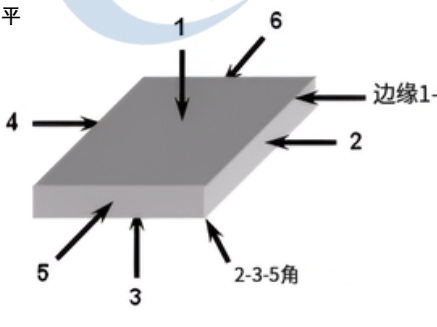
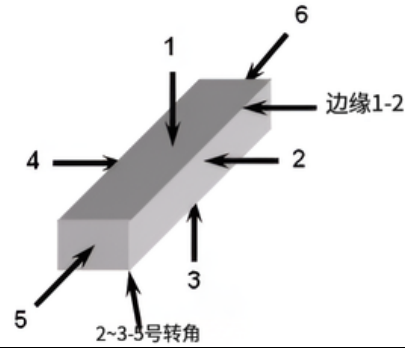
Step	Action	
1	<p>Place the packaged-product so the package is in its most stable orientation (NOTE: <i>most stable orientation may be different than intended shipping orientation. The most stable orientation is the orientation where the center of gravity is the lowest. If the center of gravity is unknown for a packaged-product then the packaged-product should be placed with its largest face down.</i>)</p>	
	<p>IF the test specimen is ...</p>	
	<p>A Standard, Small, Flat or Elongated with only six faces (2 sides, 2 ends, top and bottom)</p>	
	<p>A Standard, Small, Flat or Elongated with less than or more than six faces</p>	
	<p>A filled Consolidation Bag or other bag</p>	
	<p>An express envelope or similar type mailer</p>	
	<p>THEN...</p>	
	<p>Turn the packaged-product so that one of the smallest faces is directly in front of you. If the one end of the package is noticeably heavier than the other, then position the smallest face with the heaviest end directly in front of you. See Step 2.</p>	
	<p>Develop a method to identify each face, edge and corner and document with a diagram.</p>	
	<p>Turn the filling end toward you with a side seam (if applicable) on the right and facing downward (nearest the surface). The longitudinal seam (middle seam), if present, should be facing downward and resting on the surface. See Step 2.</p>	
	<p>Position the envelope or mailer so that it is lying flat and the opening is toward you. See Step 3.</p>	
	<p>See Step 4</p>	
2	<p>STANDARD</p> 	<p>CONSOLIDATION BAG FOR SMALL</p> 
	<p>FLAT</p> 	<p>ELONGATED</p> 
	<p>Identify faces according to the diagrams.</p> <p>Identify edges using the numbers of the two faces forming that edge. Example: Edge 1-2 is the edge formed by face 1 and face 2 of the packaged-product.</p> <p>Identify corners using the numbers of the three faces that meet to form that corner. Example: Corner 2-3-5 is the corner formed by face 2, face 3, and face 5 of the packaged-product.</p> <p>Identify orientation of the product inside the package as it rests on the vibration table.</p>	

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鉴定

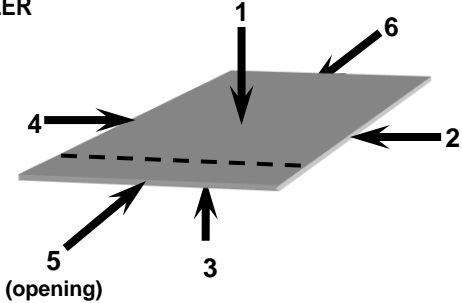
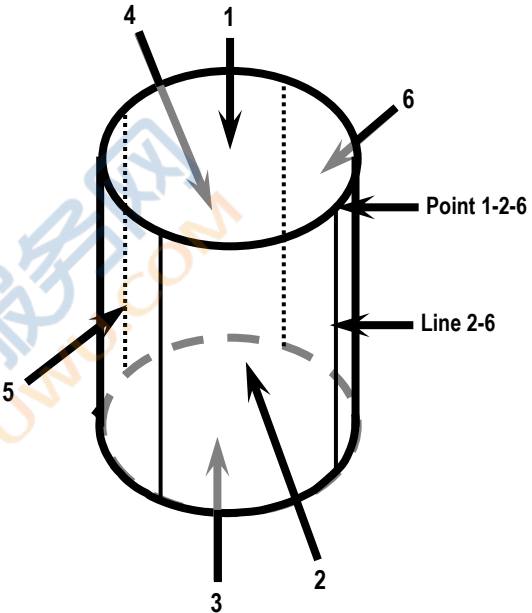
面部, 边缘
和科纳

在开始测试前, 请按照以下步骤识别面部、边缘和角点。

步骤	行动	
1	将包装产品置于最稳定的方向 (注: 最稳定的取向可能与预期的运输取向不同。最稳定的取向是重心最低的取向。如果包装产品的重心未知, 则包装产品应以最大的面朝下放置。)	
	若受试标本为...	那时:
	标准型、小型、扁平型或细长型, 仅具有六个面 (2个侧面、2个端面、顶部和底部)	将包装产品翻转, 使最小面之一正对您。 若包装一端明显较重, 则将最小面最重端正对您。参见步骤2。
	标准型、小型、扁平型或细长型, 具有少于或超过六个面	开发一种方法以识别每个面、边和角, 并用图表进行记录。
	已装填的整合袋或其他袋子	将填充端朝向您, 右侧为侧缝 (如适用), 朝下 (最靠近表面)。纵向缝 (中间缝) 如存在, 应朝下并置于表面。参见步骤2。
	快递信封或类似邮件	将信封或邮寄件平放, 开口朝向您。请参见步骤3。
	一个圆筒或桶	
2	标准	小型固结袋
		
	扁平	延长的
		
根据示意图识别面部。 通过构成该边的两个面的编号来识别边。例如: 边1-2是由包装产品表面1和表面2形成的边。 通过三个面的编号来识别角落。 示例: 角落2-3-5是由包装产品表面2、表面3和表面5形成的角落。确定产品在振动台上放置时的内部朝向。		

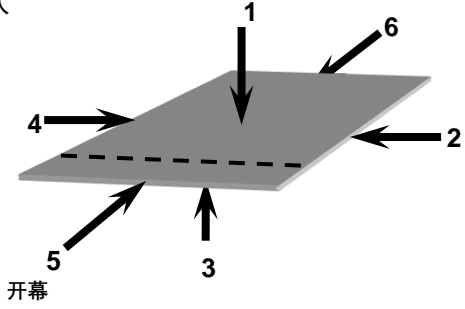
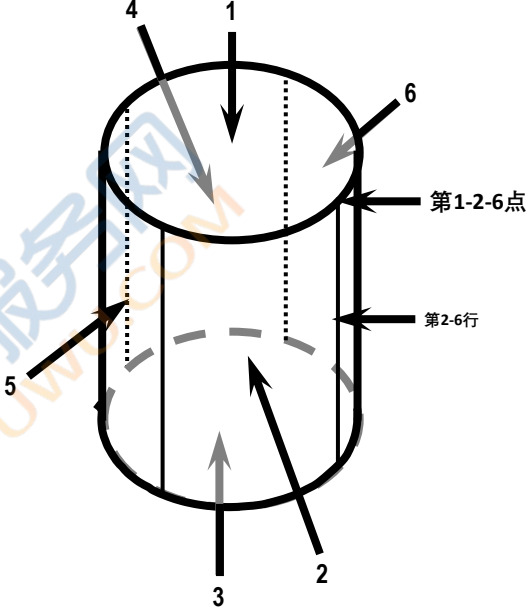
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Step	Action
3	<p>TWO-DIMENSIONAL EXPRESS ENVELOPE OR MAILER</p> <p>Mark the face that is up (typically with label) as 1 The right end is 2 The left end is 4 The opening of the envelope shall be 5 (top) The end opposite 5 (top) shall be 6 (bottom) Mark the face that is down (typically with flap) as 3</p> 
4	<p>SHORT CYLINDER OR UNPACKAGED PAIL</p> <p>Identify top and bottom as surfaces 1 and 3, according to the diagram.</p> <p>Designate four sidewall line locations, equally spaced around the perimeter of the container as shown. Identify sidewall surfaces between the lines as shown. The lines shall be designated as intersections between the sidewall surfaces. Example: line 2-6 is the intersection between sidewall surfaces 2 and 6.</p> <p>If the cylinder has one or more side seam joints, one of these seams shall be coincident with line 2-6.</p> <p>Identify points on the chimes using the top or bottom number and the numbers of the sidewall line that intersect to form that point. Example: point 1-2-6 is the intersection with top 1 and sidewall line 2-6.</p> <p>NOTE: If a packaged-product is both Cylinder or Pail and Elongated, the package faces, edges and corners should be identified as Elongated.</p> 

鉴定
面部, 边缘
和科纳
持续

上页继续

步骤	行动
3	<p>二维快速包络 邮寄人</p> <p>将上方（通常带有标签）的面部标记为1，右侧末端为2 左端为4 信封开口应为5（顶部），与之相对的端部应为6（底部）。将朝下的面（通常为翻盖式）标记为3。</p> 
4	<p>短圆柱形或未包装桶</p> <p>根据示意图，将顶部和底部标识为表面1和3。</p> <p>在容器周缘等距分布四个侧壁线位置（如图所示），并标明线间侧壁表面（如图所示）。这些线应标注为侧壁表面的交点。示例：线2-6为侧壁表面2与6的交点。</p> <p>若气瓶存在一个或多个侧缝接头，则其中一条接缝应与2-6号线重合。</p> <p>使用顶部或底数与上位侧壁线相交形成该点。 示例：点1-2-6是与顶部1和侧壁线2-6的交点。</p> <p>注： 若包装产品同时为圆柱形或桶形且呈细长状，则其包装正面、边缘及角部应标注为细长状。</p> 

You shall know the packaged-product's:

- Gross weight in kilograms (kg) for Metric and pounds (lb) for English units
- Exterior dimensions of Length, Width and Height (L x W x H) in millimeters (mm) or meters (m) for Metric and inches (in) or feet (ft) for English units.

Required Preconditioning:

The packaged-product shall be preconditioned to laboratory ambient temperature and humidity for twelve (12) hours prior to testing.

Optional Conditioning Recommended (to be performed after the required preconditioning):

To permit an adequate determination of packaged-product performance at anticipated atmospheric limits and where it is known that the atmospheric extremes are detrimental to the product, ISTA:

- **Requires** the highest temperature and humidity limits of the product be used, **but**
- **Recommends** that both the highest and lowest atmospheric conditions be used.

Condition packaged-products according to one or more of the conditions listed in the table below.

- Remaining test requirements should be performed as soon as possible after removing the packaged-product from environmental conditioning apparatus.

NOTE: If more than one conditioning sequence is selected, a new and complete test should be performed following each sequence.

Anticipated Conditions	Time in Hours	Temperature in °C ±2°C (°F ±4°F)	Humidity in %
Extreme Cold, Uncontrolled RH	72	-29°C (-20°F)	Uncontrolled RH
Cold, Humid	72	5°C (40°F)	85% RH ±5%
Controlled Conditions	72	23°C (73°F)	50% RH ±5%
Hot, Humid	72	38°C (100°F)	85% RH ±5%
Hot, Humid then Extreme Heat, Moderate RH:	72 then 6	38°C (100°F) then 60°C (140°F)	85% RH ±5% then 30% RH ±5%
Elevated Temperature, Uncontrolled RH	72	50°C (120°F)	Uncontrolled RH
Extreme Heat, Dry	72	60°C (140°F)	15% RH +/- 5%
Severe Cold, Uncontrolled RH	72	-18°C (0°F)	Uncontrolled RH
User Defined High Limit	72	Based upon known conditions	Known conditions
User Defined Low Limit	72	Based upon known conditions	Known conditions
User Defined Cycle	72	Based upon known conditions	Known conditions

NOTE: Conditioning of the test specimen is optional in the overall Test Sequences, but is required before the start of the Optional Vibration Under Low Pressure Test Block. See Test Blocks 2 and 8.

包装产品重
量和尺寸
测量

在开始大气
调节
之前

您应了解该包装产品的：

- 公制单位下的总重量（千克，kg）与英制单位下的总重量（磅，lb）
- 外部尺寸（长x宽x高，L x W x H）的单位为毫米（mm）或米(m)（公制单位）及英寸（in）或英尺（ft）（英制单位）。

必要预处理：

包装产品应在测试前预先适应实验室环境温度和湿度条件十二（12）小时。

推荐选择性预处理（需在完成必要预处理后进行）：

为确保在预期大气极限条件下对包装产品性能进行充分评估，且已知极端大气条件会对产品造成损害时，ISTA：

- 需要使用产品的最高温度和湿度限制，但
- 建议采用最高和最低的大气条件。

根据下表所列的一项或多项条件对包装产品进行处理。

- 其余测试要求应在包装产品从环境调节装置中取出后尽快执行。

注：若选择多个预处理序列，则应在每个序列后执行新的完整测试。

预期情况	小时数	温度 (°C) ±2°C (°F ±4°F)	湿度 (%)
Extreme Cold, Uncontrolled RH	72	-29°C (-20°F)	未控制的RH
寒冷、潮湿	72	5°C (40°F)	85% RH ±5%
受控条件	72	23°C (73°F)	50% RH ±5%
高温高湿	72	38°C (100°F)	85% RH ±5%
高温高湿 那时	72 那时	38°C (100°F) 那时	85% RH ±5% 那时
极端高温，中等相对湿度：	6	60°C (140°F)	30% RH ±5%
Elevated Temperature, Uncontrolled RH	72	50°C (120°F)	未控制的RH
极度炎热、干燥	72	60°C (140°F)	15%相对湿度 ± 5%
Severe Cold, Uncontrolled RH	72	-18°C (0°F)	未控制的RH
用户定义的高限	72	基于已知情况	已知情况
用户定义的下限	72	基于已知情况	已知情况
用户定义周期	72	基于已知情况	已知情况

注：在整体测试序列中，试件的预处理是选配的，但在开始选配低压振动测试模块之前必须完成。参见测试模块2和8。

Before You
Begin
Shock Testing

Catching or Restraining Packaged-Products After Free-Fall Drop Testing

Refer to *Guidelines for Selecting and Using ISTA Test Procedures and Projects* for recommendations, cautions, and documentation requirements.

Before You
Begin
Vibration
Under
Dynamic Load

CAUTION:

A restraining device or devices (fixturing) shall be used with the vibration test system to:

- Prevent the Top-Load from moving off the package being tested **and**
- Prevent the test specimen from moving off the platform **and**
- Maintain test orientation of the stack, **but**
- The device or devices shall not restrict the vertical motion of the test specimen during the test.

CAUTION:

When using weights and a load spreader use extreme caution to prevent injury during stacking, testing and removal.

Number of axes and package orientations to be tested:

Type of Package	Number of Axes to Test	Orientations to Test	Dynamic Top-Load Range
Standard	3	3	11 kg – 140 kg (25 lb – 300 lb)
Small in Bag	1	2	36 kg (80 lb)
Flat	3	3	11 kg – 140 kg (25 lb – 300 lb)
Elongated	3	3	11 kg – 140 kg (25 lb – 300 lb)
Unpackaged Pail or Short Cylinder	2	2	11 kg – 140 kg (25 lb – 300 lb)

Dynamic Top-Load Bag – Small

A Consolidation Bag as described in Equipment Required Additional.

Sample Bag with Test Specimen - Small

Randomly fill the second Consolidation Bag, or equivalent, approximately one-half full of the filled dunnage packages described in the table found in the Vibration Equipment section, pack the test specimen into the middle of the bag and then insert the remaining dunnage packages into the bag to simulate a typical pack.

The **Top-Load** is to simulate the effect of 100 kg/m³ (6 lb/ft³ - 0.0035 lb/in³) of assorted freight on top of a floor loaded shipping unit in an over-the-road trailer with an inside height of 2.7 m (108 in).

The **Loading Factor** has been determined by empirical testing that resulted in correlation between damage in the test lab and damage in the field.

自由落体跌落试验中包装产品的捕捉或约束

有关建议、注意事项和文件要求，请参阅《选择和使用 ISTA 测试程序和项目的指南》。

谨慎

振动测试系统应配备约束装置（夹具），以实现以下目的：

- 防止顶载物从受试包装上移开和
- 防止试件移出平台和
- 保持堆栈的测试方向，但
- 测试过程中，该装置不得限制试样的垂直运动。

谨慎

使用配重及负载分散器时，必须极度谨慎以防止在堆叠、测试及移除过程中发生伤害。待测试的轴数及包装方向：

包装类型	待测轴数	测试取向	动态最大载荷范围
标准的	3	3	11 kg – 140 kg (25 lb – 300 lb)
袋内尺寸	1	2	36 kg (80 lb)
公寓	3	3	11 kg – 140 kg (25 lb – 300 lb)
延长的	3	3	11 kg – 140 kg (25 lb – 300 lb)
未包装桶或短瓶	2	2	11 kg – 140 kg (25 lb – 300 lb)

动态顶载袋——小型

如《所需额外设备》中所述的整合袋。

带测试样本的样本袋 - 小号

将第二号加固袋（或等效容器）随机填充至约半满，所用填充物为振动设备章节表格中所述的填充垫料包。将测试样本置于袋体中央后，再将剩余垫料包装入袋内，以模拟典型包装状态。

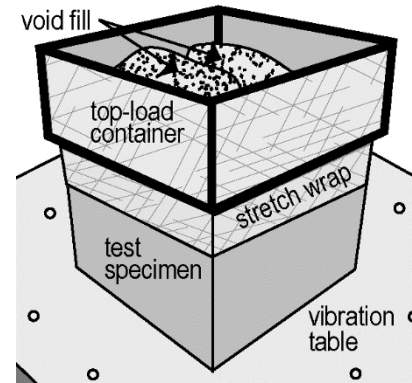
顶载荷用于模拟在一辆内部高度为2.7米（108英寸）的公路拖车中，地板装载的运输单元上放置100 kg/m³（6磅/英尺³- 0.0035磅/英寸³）各种货物的效果。

载荷系数是通过实证测试确定的，该测试结果表明测试实验室中的损伤与现场损伤之间存在相关性。

Before You
Begin
Top-Load
Apparatus

The Top-Load Apparatus for STANDARD, FLAT and ELONGATED package-types shall be: (see Figure below for example of Top-Load Apparatus)

- A fiberboard box, or other container, of sufficient strength and ability to hold a load spreader (such as a 3/4" piece of plywood or a plate of steel that is the same length and width as the inside dimensions of the load apparatus) and required weight for each axis **and**
- The length and width dimensions of the Top-Load package or apparatus which will be applied to the test specimen shall each be a minimum of 50 mm (2 in) longer than each of the two dimensions of the test specimen's top face when positioned for testing [i.e., a minimum of 25 mm (1 in) overhang on each side] **but**
- The length and width dimensions of the Top-Load package or apparatus may each be longer by a maximum of 150 mm (6 in) than each of the two dimensions of the test specimen's top face when positioned for testing [i.e., a maximum of 75 mm (3 in) overhang on each side] **and**
- Some means of adding additional weight so that the Top-Load (TL) is distributed evenly over the entire inside face area of the Top-Load apparatus that will apply the Top-Load to the entire top face of the test specimen when it's positioned for testing **and**
- Adequate void fill that shall securely hold the weight in place to prevent the weight from moving or bouncing within the top-load apparatus (it is also required to use stretch wrap around the test specimen and the top-load apparatus to prevent the top-load apparatus from bouncing on top of the test specimen) **and**
- The top-load apparatus shall never be smaller than the test face; the calculated weight must cover the entire surface of the test face during the testing.



Top-Load Apparatus for UNPACKAGED PAILS and SHORT CYLINDERS. For the testing of unpackaged pails and short cylinders, an additional top-load apparatus is required as follows:

- A pail or short cylinder which is identical or essentially identical to the test item, **and**
- Fitted with a load spreader on the bottom (such as a 3/4" piece of plywood or a plate of steel that's the same size and shape as the inside bottom surface), **and**
- Some means of adding weight so that the Top-Load (TL) is distributed evenly over the entire inside bottom area, **and**
- Adequate void fill to securely hold the weight in place to prevent it from moving or bouncing within the top-load apparatus.
- It is also recommended to use stretch wrap around the test specimen and the top-load apparatus to prevent the top-load apparatus from bouncing on top of the test specimen.

Top-Load Apparatus for SMALLS:

- A large Consolidation Bag, approximately 1.0 x 0.7 m (39 x 27 in), made of canvas, polyolefin film/fabric, or similar strong flexible material, and with a zipper or other suitable closure at one end. The bag shall have sufficient capacity and strength to meet the weight requirements here, and the performance requirements of Test Block 6 (Vibration for Small). The bag shall be filled with 36 kg (80 lb) of sand, or other dense, flowable material, suitably packaged in smaller bags.

Determination of Top-Load Weight:

- Determine the proper top-load weight for Standard, Flat, and Elongated packaged-product types, and for Unpackaged Pails and Short Cylinders, by first using the "Top-Load Formulas TL" chart at the top of page 14, then following instructions in the "Top-Load weight (TL) for any Axis" table at the bottom of page 14 to determine the specified Top-Load. A tolerance of $\pm 3\%$ is allowed for this specified Top-Load.
- The Top-Load Weight required for Smalls is 36 kg. (80 lb) $\pm 5\%$.

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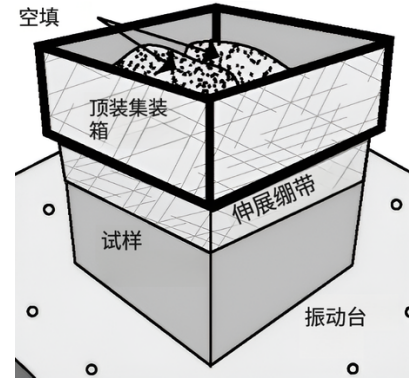
标准、扁平 and 细长包装类型的顶装装置应为：（顶装装置示例见下图）

- 一种纤维板箱或其他容器，具有足够的强度和承重能力以容纳
负载分散器（例如3/4英寸厚的胶合板或钢板）
与装载装置内部尺寸相同长度和宽度）和
每个轴的所需重量和

- 顶载式包装或装置的长度与宽度尺寸
施加于测试样本的各部分最小应为50毫米（2英寸）
当试样顶面的两个尺寸均超过其长度时
处于测试位置[即每侧至少有25毫米（1英寸）悬垂]

但是

- 顶载式包装或装置的长度和宽度尺寸可能
每条比两条中的每一条最长可延长150毫米（6英寸）
测试时试样顶面的尺寸[即，a
两侧悬垂最大不超过75毫米（3英寸）和
- 一些增加附加重量的方法，以便使顶载荷（TL）均匀分布于顶载荷装置的整个内表面区域，当试样定位进行测试时，将顶载荷施加于试样的整个顶面和
- 适当的充液量应能牢固地固定重量，防止重量在顶载装置内移动或弹跳（还要求在测试样本和顶载装置周围使用拉伸包装，以防止顶载装置在测试样本上弹跳）且
- 顶载装置的尺寸不得小于受试面；计算重量必须覆盖受试面的整个表面。



用于未包装桶和短圆筒的顶装装置。对于未包装桶和短圆筒的测试，需额外配备如下顶装装置：

- 与受试品相同或基本相同的桶或短圆筒，且
- 底部装有载荷分散器（例如一块3/4英寸厚的胶合板或一块与底部内表面尺寸形状相同的钢板），和
- 一些增加重量的方法，使顶载荷（TL）均匀分布在整個内底区域，和
- 充分的容积填充可确保重量稳固固定，防止其在顶装装置内移动或弹跳。
- 建议在测试样本及顶部加载装置周围使用拉伸包装，以防止顶部加载装置在测试样本上发生弹跳。

小型顶载装置

- 一个大型整合袋，尺寸约1.0×0.7米（39×27英寸），采用帆布、聚烯烃薄膜/织物或类似高强度柔性材料制成，一端配有拉链或其他合适闭合装置。该袋需具备足够的容量和强度，以满足此处的重量要求及测试模块6（小型振动）的性能要求。袋内应装填36公斤（80磅）沙子或其他致密可流动材料，并采用小袋进行适当包装。

顶载重量的测定

- 确定标准型、扁平型及延长型包装产品的正确顶部载荷重量，以及未包装桶和短圆柱体的顶部载荷重量时，需先使用第14页顶部的“顶部载荷公式TL”图表，再参照第14页底部“任意轴顶部载荷重量（TL）”表格中的说明，以确定指定的顶部载荷。该指定顶部载荷允许±3%的容差。
- 小型设备的顶部载荷重量要求为36公斤（80磅）±5%。

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Familiarity with the following formulas is required:

Note: Dimension for “Top-Load Formulas TL” are based upon the packaged-product being in the most stable orientation which could be different than the intended shipping orientation.

Top-Load Formulas TL		Metric Units (m and kg)	English Units (in and lb)
Top-Load (TL-H) with face 3 down		$(2.7 - H) \times L \times W \times 100$	$(108 - H) \times L \times W \times 0.0035$
Top-Load (TL-W) with face 4 down		$(2.7 - W) \times L \times H \times 100$	$(108 - W) \times L \times H \times 0.0035$
Top-Load (TL-L) with face 6 down		$(2.7 - L) \times W \times H \times 100$	$(108 - L) \times W \times H \times 0.0035$
Where	Represents		
TL	Total Weight of the Top-Load Apparatus	Kilograms (kg)	Pounds (lb)
2.7 and 108	Height of typical trailer	Meters (m)	Inches (in)
H	Height of shipping unit	Meters (m)	Inches (in)
L	Length of shipping unit	Meters (m)	Inches (in)
W	Width of shipping unit	Meters (m)	Inches (in)
100 and 0.0035	Loading Factor: 50% of the average density of freight*	100 kg/m ³	0.0035 lb/in ³

Determine the Top-Load weight using the following table:

Top-Load weight (TL) for any Axis	
Determine the Top-Load weight to be used for each axis by comparing the calculated TL against the following statements.	
IF the calculated Top-Load for an axis is ...	THEN ...
Less than 11kg (25 lb)	Do not use a Top-Load during vibration testing.
11 kg (25 lb) to 140 kg (300 lb)	Use the calculated Top-Load (TL) rounded up to the next closest increment of 2 kg (5 lb) for that axis. <i>Examples:</i> If the calculated Top-Load is 21 kg you would round up and use 22 kg as the Top-Load; If the calculated Top-Load is 32 lb you would round up and use 35 lb as the Top-Load.
Greater than 140 kg (300 lb)	Use 140 kg (300 lb) as the Top-Load (TL).

* The **Loading Factor** has been determined by empirical testing that resulted in correlation between damage in the test lab and damage in the field.

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需熟悉以下公式：

注：“托盘装载公式TL”尺寸基于包装产品处于最稳定取向，可能与预期运输取向不同。

顶载公式		公制单位（米和千克）	英制单位（英寸和磅）
顶装式（TL-H），面3朝下		$(2.7 - H) \times L \times W \times 100$	$(108 - H) \times L \times W \times 0.0035$
顶装式（TL-W），面4朝下		$(2.7 - W) \times L \times H \times 100$	$(108 - W) \times L \times H \times 0.0035$
顶装式（TL-L），面6朝下		$(2.7 - L) \times W \times H \times 100$	$(108 - L) \times W \times H \times 0.0035$
在哪里	代表		
TL	顶载装置总重量	千克（kg）	磅（lb）
2.7和108	典型挂车高度	米(m)	英寸（in）
H	船舶高度	米(m)	英寸（in）
L	装运单位长度	米(m)	英寸（in）
W	装运单位宽度	米(m)	英寸（in）
100和0.0035	载重系数：按货物平均密度的50%计算*	100 kg/m ³	0.0035磅/英寸 ³

使用下表确定顶载重量：

任一轴的顶载重量（TL）	
通过将计算得出的TL与以下陈述进行比较，确定各轴所使用的顶载重量。	
若某轴的计算顶载荷为...	那时
小于11公斤（25磅）	振动测试期间禁止使用顶载荷。
11公斤（25磅）至140公斤（300磅）	使用计算得出的顶载荷（TL），向上取整至该轴上最近的 2 kg（5 lb） 增量。 <i>示例：</i> 若计算得出的顶载荷为21公斤，则应向上取整为22公斤作为顶载荷； 若计算得出的顶载荷为32磅，则应向上取整为35磅作为顶载荷。
大于140公斤（300磅）	使用140公斤（300磅）作为顶载荷（TL）。

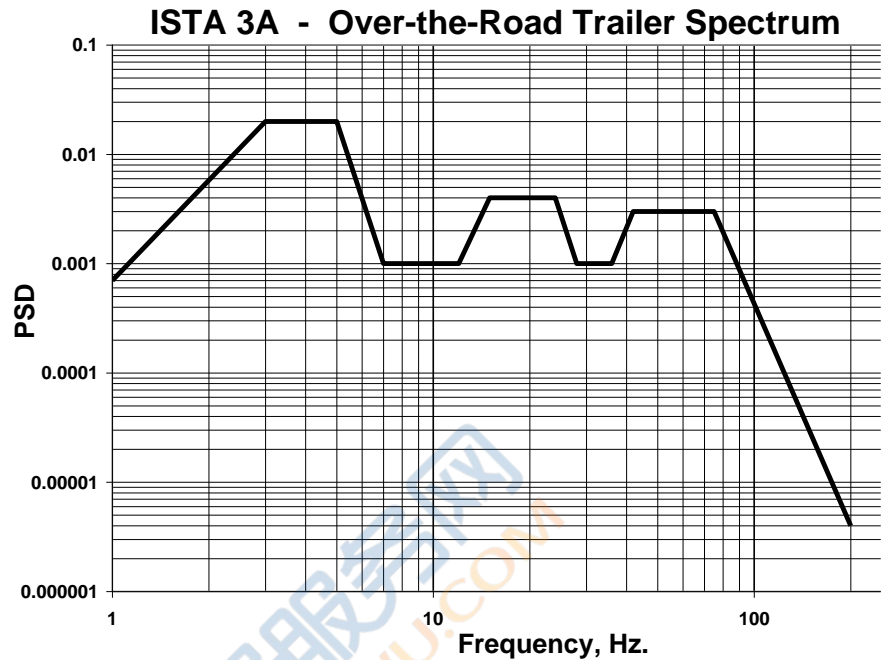
* 负荷系数是通过实证测试确定的，该测试结果表明实验室测试中的损伤与现场损伤之间存在相关性。

Before You
Begin
Vibration
Testing

OVER-THE-ROAD TRAILER SIMULATION

The following breakpoints are for an Over-the-Road trailer typical for parcel delivery movement and shall be programmed into the vibration controller to produce the acceleration versus frequency profile (spectrum) with an overall G_{rms} level of 0.53 (see below). The theoretical stroke required to run this vibration profile is 47.12 mm (1.855 in) peak to peak:

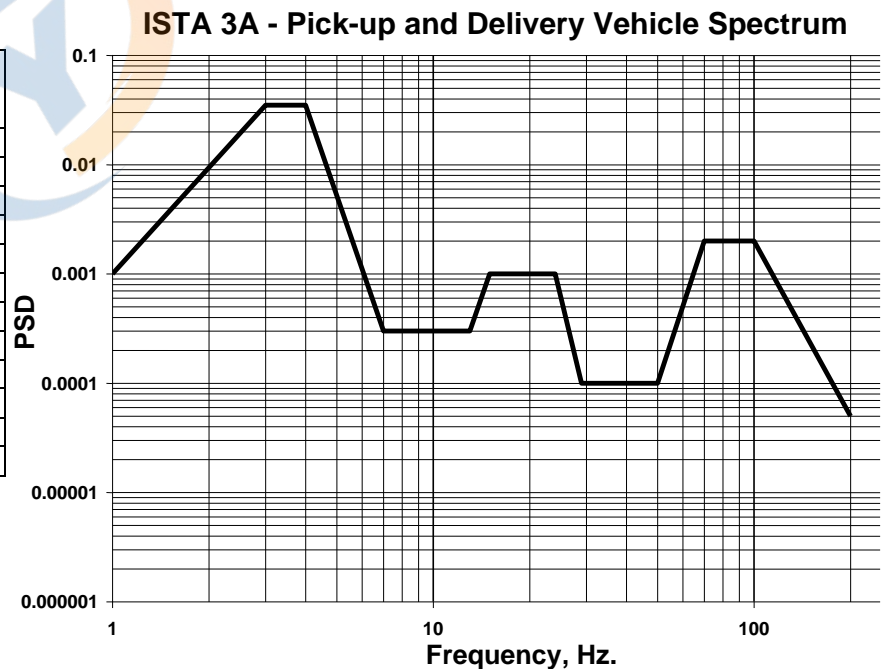
Frequency (Hz)	PSD Level, g^2/Hz
1.0	0.0007
3.0	0.02
5.0	0.02
7.0	0.001
12.0	0.001
15.0	0.004
24.0	0.004
28.0	0.001
36.0	0.001
42.0	0.003
75.0	0.003
200.0	0.000004



PICK-UP AND DELIVERY VEHICLE SIMULATION

The following breakpoints are for a pick-up and delivery vehicle and shall be programmed into the vibration controller to produce the acceleration versus frequency profile (spectrum) with an overall G_{rms} level of 0.46 (see below). The theoretical stroke required to run this vibration profile is 58.72 mm (2.312 in) peak to peak:

Frequency (Hz)	PSD Level, g^2/Hz
1.0	0.001
3.0	0.035
4.0	0.035
7.0	0.0003
13.0	0.0003
15.0	0.001
24.0	0.001
29.0	0.0001
50.0	0.0001
70.0	0.002
100.0	0.002
200.0	0.00005

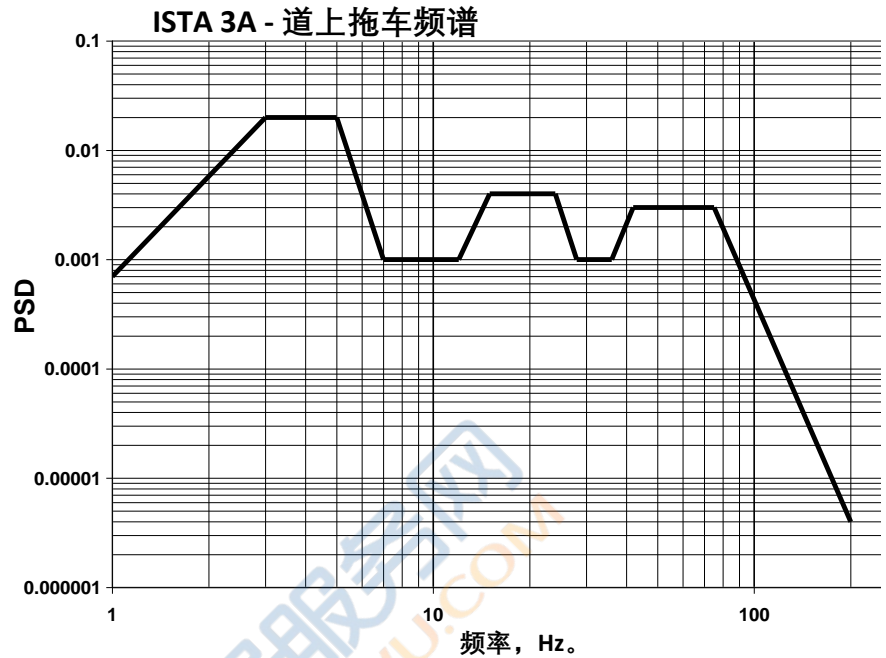


振动前须
知
测试

公路拖车模拟

以下断点适用于包裹运输中典型的公路拖车，应编程到振动控制器中，以产生加速度与频率的曲线（频谱），总体 G_{rms} 水平为0.53（见下文）。运行此振动曲线所需的理论行程为47.12 mm（1.855 in）峰峰值：

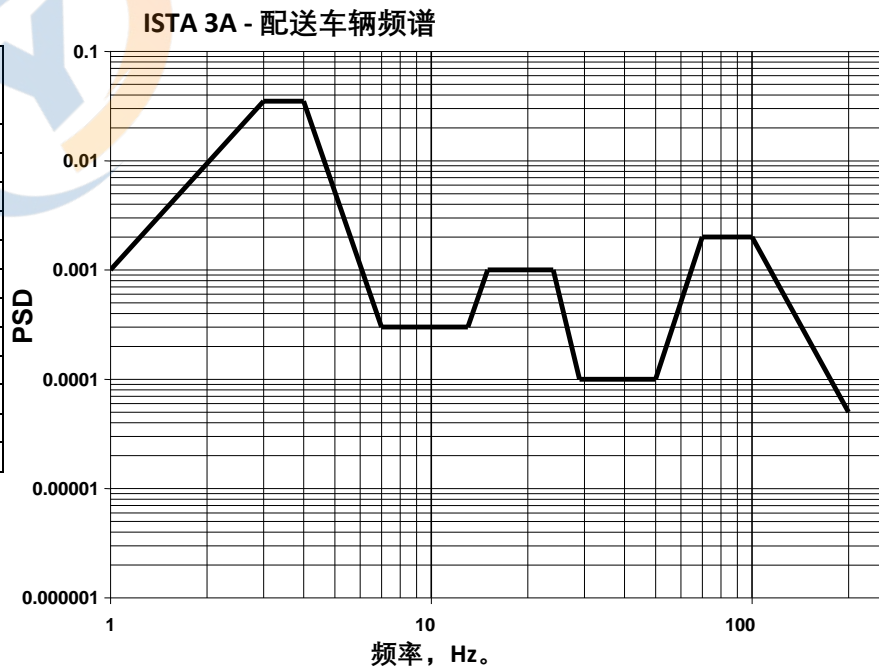
频繁性 薄雾	PSD级别 g^2/Hz
1.0	0.0007
3.0	0.02
5.0	0.02
7.0	0.001
12.0	0.001
15.0	0.004
24.0	0.004
28.0	0.001
36.0	0.001
42.0	0.003
75.0	0.003
200.0	0.000004



皮卡和送货车的仿真

以下断点适用于接送车辆，应编程到振动控制器中，以产生加速度与频率曲线（频谱），总体 G_{rms} 水平为0.46（见下文）。运行此振动曲线所需的理论行程为58.72 mm（2.312 in）峰峰值：

频繁性 薄雾	PSD级 g^2/Hz
1.0	0.001
3.0	0.035
4.0	0.035
7.0	0.0003
13.0	0.0003
15.0	0.001
24.0	0.001
29.0	0.0001
50.0	0.0001
70.0	0.002
100.0	0.002
200.0	0.00005



Determine the Low Pressure using the following Table:

IF the Test Specimen will be shipped via ...	THEN ...
Truck <u>Only</u>	Use an absolute pressure of 70 kPa (10 psi) [approximate altitude equivalent of 3000 m (10,000 ft)]
Truck and Air	Use an absolute pressure of 60 kPa (8.7 psi) [approximate altitude equivalent of 4250 m (14,000 ft)]

NOTE: There are two ways of measuring pressure, **absolute pressure** or **gauge pressure**. Both measure pressure in kilopascals (kPa) or pounds per square inch (psi). Absolute pressure is measured relative to absolute zero pressure. Gauge pressure uses atmospheric pressure (101.3 kPa, 14.7 psi) as a zero reference.

Examples:

Given a gage pressure reading, calculate absolute pressure as follows:

$$\text{Absolute pressure} = \text{gage pressure reading} + \text{atmospheric pressure [101.3 kPa (14.7 psi)]}$$

Gage pressure readings for low pressures (altitudes above sea level) are negative:

$$\text{Gage pressure} = \text{absolute pressure} - \text{atmospheric pressure [101.3 kPa (14.7 psi)]}$$

The following Table shows pressure conversions:

Metric Units				English Units			
Altitude Above Sea Level	Barometric Reading	Absolute Pressure	Gage Pressure	Altitude Above Sea Level	Barometric Reading	Absolute Pressure	Gage Pressure
Meters (m)	mm Hg (torr)	kPa	kPa	Feet (ft)	in Hg	psi	psi
0	760	101.3	0	0	29.92	14.7	0
3,048	522.84	69.7	-31.6*	10,000	20.6	10.11	-4.59*
4,267	446.33	59.5	-41.8*	14,000	17.57	8.63	-6.07*

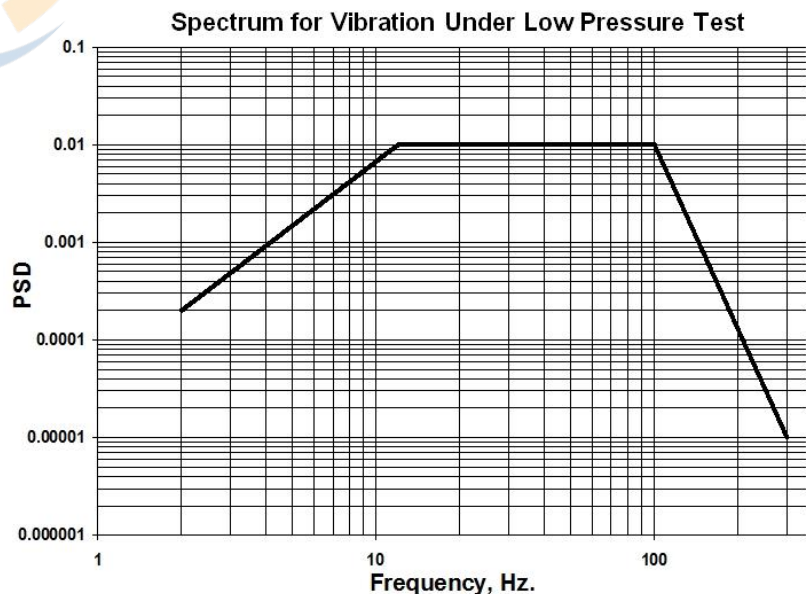
*Negative gage pressures are sometimes referred to as "vacuum kPa" or "vacuum psi".

SPECTRUM FOR OPTIONAL RANDOM VIBRATION UNDER LOW PRESSURE

The spectrum described here is for use in Test Block 8 – OPTIONAL Random Vibration Under Low Pressure. In combination with the required low pressures, it has been shown to replicate certain leakage failures encountered in low pressure (altitude) environments. The spectrum shall be programmed into the vibration controller to produce an acceleration-versus-frequency profile with an overall level of 1.05 G_{rms}. The theoretical stroke required to run this vibration profile is 7.52 mm (0.296 in) peak to peak.

This spectrum is to be used for Vibration Under Low Pressure only.

Frequency (Hz)	PSD Level, g ² /Hz
2.0	0.0002
12.0	0.01
100.0	0.01
300.0	0.00001



使用下表确定低压值：

若测试样本将通过...运输	那时
卡车 <u>仅限</u>	使用绝对压力70 kPa (10 psi) [约3000米 (10,000英尺) 高度]
卡车和航空	使用60 kPa (8.7 psi) 的绝对压力 [约4250米 (14000英尺) 高度]

注：测量压力有两种方法，**绝对压力**或**表压**。两者均以千帕 (kPa) 或磅每平方英寸 (psi) 为单位。绝对压力以绝对零压为基准进行测量。表压则以大气压 (101.3 kPa, 14.7 psi) 为零基准。

示例：

根据给定的表压读数，按以下公式计算绝对压力：

$$\text{绝对压力} = \text{仪表压力读数} + \text{大气压力 [101.3 kPa (14.7 psi)]}$$

低压（海拔高度以上）的气压计读数为负值：

$$\text{量规压力} = \text{绝对压力} - \text{大气压力 [101.3 kPa (14.7 psi)]}$$

下表显示压力换算：

公制单位				英制单位			
海拔高度	气压读数	绝对压力	量规压力	海拔高度	气压读数	绝对压力	量规压力
米(m)	毫米汞柱 (托)	千帕	千帕	英尺 (ft)	在汞中	Ψ	Ψ
0	760	101.3	0	0	29.92	14.7	0
3,048	522.84	69.7	-31.6*	10,000	20.6	10.11	-4.59*
4,267	446.33	59.5	-41.8*	14,000	17.57	8.63	-6.07*

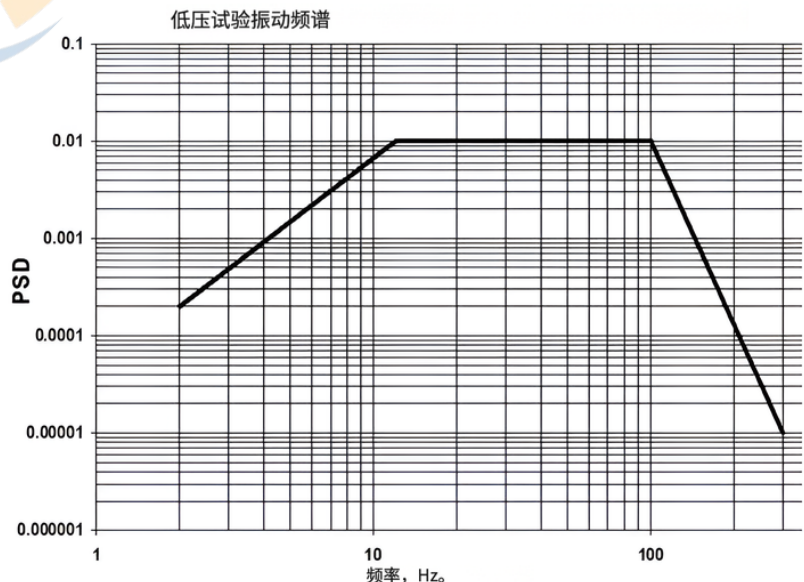
*负表压有时被称为“真空kPa”或“真空psi”。

低压下任意随机振动的频谱

本测试频谱专为测试模块8（可选低压力随机振动测试）设计。结合规定的低压力条件，该频谱能有效模拟低压（高海拔）环境中的典型泄漏故障。需将该频谱参数编程至振动控制器，生成加速度-频率曲线，其总水平值应达到1.05 G_{rms}。该振动曲线的理论行程要求为7.52毫米（0.296英寸）峰峰值。

该频谱仅适用于低压振动测试。

频繁性 薄雾	PSD级别 g ² /Hz
2.0	0.0002
12.0	0.01
100.0	0.01
300.0	0.00001



TEST BLOCK 1
Atmospheric
Conditioning

The test blocks that follow contain tables that indicate the required steps for each test in the procedure.

TEMPERATURE AND HUMIDITY	
Step	Action
1	PRE-CONDITIONING: The packaged-product should be stored at laboratory ambient temperature and humidity for twelve (12) hours prior to testing.
2	Is optional conditioning going to be performed? <ul style="list-style-type: none"> • If Yes, go to Step 6. • If No, go to the next Step.
3	Record the ambient laboratory temperature and humidity when testing starts.
4	At the end of testing record temperature and humidity.
5	Go to TEST BLOCK 3 (Shock: First Sequence – Drop).
6	Select an anticipated condition from Before You Begin Atmospheric Conditioning.
7	Check the conditioning apparatus to insure that the temperature and humidity are at the required levels.
8	Place the packaged-product in the conditioning apparatus.
9	At the completion of the required conditioning time remove the packaged-product from the conditioning apparatus.
10	Conditioning is now complete. When testing starts, record the ambient temperature and humidity. Go to TEST BLOCK 3 (Shock: First Sequence – Drop) and perform the remaining test sequence as quickly as possible.

TEST BLOCK 2
OPTIONAL
Atmospheric
Conditioning
for Vibration
Under Low
Pressure

TEMPERATURE AND HUMIDITY FOR VIBRATION UNDER LOW PRESSURE	
Step	Action
1	Set the temperature and humidity according to the Controlled Conditions values in Before You Begin Atmospheric Conditioning [23°C (73°F) and 50% RH].
2	Check the conditioning apparatus to insure that the temperature and humidity are at the required levels.
3	Place the packaged-product in the conditioning apparatus.
4	At the completion of the required conditioning (8 hours) remove the packaged-product from the conditioning apparatus.
5	Record the ambient laboratory temperature and humidity when testing starts. Go to TEST BLOCK 8 (Vibration Under Low Pressure) Step 2 and perform the remaining test sequence as quickly as possible.

测试模块1 大
气调节

后续测试模块包含表格，列明了流程中各项测试所需的步骤。

温度与湿度	
步骤	行动
1	预处理：包装产品应在测试前于实验室环境温度及湿度条件下储存十二（12）小时。
2	是否将实施选择性预处理？ <ul style="list-style-type: none"> • 如果是，则转至步骤6。 • 如果否，则进入下一步。
3	测试开始时记录实验室环境温度与湿度。
4	测试结束时记录温度和湿度。
5	转至测试模块3（电击：第一序列——跌落测试）。
6	从《开始前的大气调节》中选择预期条件。
7	检查调节装置，确保温度和湿度达到要求水平。
8	将包装产品置于调节装置中。
9	在完成规定的预处理时间后，将包装产品从预处理装置中取出。
10	预处理现已完成。测试开始时，记录环境温度与湿度。进入测试模块3（冲击：首序列——跌落），并尽快执行剩余测试序列。

试验模块2 低
压振动环
境下的大
气调节
(可选)

低压振动的温度和湿度	
步骤	行动
1	根据《开始前的大气调节控制条件》[23]中的数值设置温度和湿度°C (73°F) 以及 50% 相对湿度]。
2	检查调节装置，确保温度和湿度达到要求水平。
3	将包装产品置于调节装置中。
4	完成规定的预处理（8小时）后，将包装产品从预处理装置中取出。
5	测试开始时记录实验室环境温度与湿度。进入测试模块8（低压振动）步骤2，并尽快完成剩余测试序列。

3A

TEST SEQUENCE FOR PROCEDURE 3A

TEST BLOCK 3
Shock:
First Sequence
(Drop)

For STANDARD,
SMALL,
FLAT and
ELONGATED

SHOCK - DROP					
Complete the following test sequence for each type of package that has a check in the box: <input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> Small (DO NOT test in bag) <input checked="" type="checkbox"/> Flat <input checked="" type="checkbox"/> Elongated					
Step	Action				
1	Follow the table below to determine the height and orientation for the first 9 drops.				
	Drop Number	< 32 kg (70 lb)	32-70 kg (70-150 lb)	Standard, Flat, Elongated, Small (not in bag)	Two-Dimensional Envelopes and Mailers (not in bag)
	1	460 mm (18 in)	300 mm (12 in)	Edge 3-4	Edge 4
	2	460 mm (18 in)	300 mm (12 in)	Edge 3-6	Edge 6
	3	460 mm (18 in)	300 mm (12 in)	Edge 4-6	Edge 5
	4	460 mm (18 in)	300 mm (12 in)	Corner 3-4-6	Corner 4-6
	5	460 mm (18 in)	300 mm (12 in)	Corner 2-3-5	Corner 2-5
	6	460 mm (18 in)	300 mm (12 in)	Edge 2-3	Edge 2
	7	460 mm (18 in)	300 mm (12 in)	Edge 1-2	Edge 5
	8	910 mm (36 in)	600 mm (24 in)	Face 3	Face 3
9	460 mm (18 in)	300 mm (12 in)	Face 3	Face 1	
2	Shock test is now complete. Go to TEST BLOCK 4 (Vibration Under Dynamic Load).				

试验模块3 休克:

第一序列 (滴)

对于标准的小型

扁平 and 细长的

休克-跌倒					
对每种在方框中勾选的包装类型, 完成以下测试序列:					
<input checked="" type="checkbox"/> 标准的 <input checked="" type="checkbox"/> 小包装 (请勿在袋中测试) <input checked="" type="checkbox"/> 公寓 <input checked="" type="checkbox"/> 延长的					
步骤	行动				
1	请按照下表确定前9个液滴的高度和方向。				
	下落数	< 32 kg (70 lb)	32-70 kg (70-150 lb)	标准、扁平、细长、小型 (未装入袋中)	二维信封与信函 (未装入袋中)
	1	460毫米 (18英寸)	300毫米 (12英寸)	边缘3-4	边缘4
	2	460毫米 (18英寸)	300毫米 (12英寸)	边缘3-6	边缘6
	3	460毫米 (18英寸)	300毫米 (12英寸)	边缘4-6	边缘5
	4	460毫米 (18英寸)	300毫米 (12英寸)	3-4-6角	4-6号角
	5	460毫米 (18英寸)	300毫米 (12英寸)	2-3-5角	2-5号拐角
	6	460毫米 (18英寸)	300毫米 (12英寸)	边缘2-3	边缘2
	7	460毫米 (18英寸)	300毫米 (12英寸)	边缘1-2	边缘5
	8	910毫米 (36英寸)	600毫米 (24英寸)	面3	面3
9	460毫米 (18英寸)	300毫米 (12英寸)	面3	面1	
2	冲击试验现已完成。请转至TEST模块4 (动态负载下的振动测试)。				

TEST BLOCK 4
Vibration Under
Dynamic Load
(Over-The-Road
spectrum)

For STANDARD,
FLAT and
ELONGATED

VIBRATION - DYNAMIC LOAD, RANDOM (using OVER-THE-ROAD spectrum)			
Complete the following test sequence for each type of package that has a check in the box: <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Small <input checked="" type="checkbox"/> Flat <input checked="" type="checkbox"/> Elongated			
Step	Action	Testing Orientation	Vibration Duration
1	IF the test specimen is...	THEN...	
	An unpackaged pail or short cylinder (not in a box or other outer container)	Go to TEST BLOCK 5 (Vibration for Unpackaged Pails and Short Cylinders).	
	Small	Go to TEST BLOCK 6 (Vibration – Over-the-Road).	
	Standard, Flat or Elongated	Go to Step 2.	
2	Place the packaged-product on the vibration table so that face-3 rests on the center of the platform.	FACE 3 on table surface	60 MINUTES
3	Place the Dynamic Top-Load apparatus as determined in Before You Begin Vibration Under Dynamic Load for TL-H on top of the test specimen.*		
4	Using some form of column stack fixturing, make sure that the stack will maintain its orientation without restricting the vertical motion of the Top-Load apparatus or the test specimen.		
5	Start the vibration machine to produce the Over-the-Road random vibration spectrum indicated in Before You Begin Vibration Testing.		
6	After 60 minutes, stop the vibration testing and remove the Dynamic Top-Load apparatus.		
7	Rotate the test specimen so that face-4 rests on the center of the vibration table platform.	FACE 4 on table surface	30 MINUTES
8	Place the Dynamic Top-Load apparatus as determined in Before You Begin Vibration Under Dynamic Load Testing for TL-W on top of the test specimen.*		
9	Using some form of column stack fixturing to make sure that the stack maintains its orientation without restricting the vertical motion of the Top- Load apparatus or the test specimen.		
10	Start the vibration machine to produce the Over-the-Road random vibration spectrum indicated in Before You Begin Testing.		
11	After 30 minutes, stop the vibration testing and remove the Dynamic Top-Load apparatus.		

* If the test item is an elongated packaged-product with a non-rectangular cross-section (round tube, triangular tube, etc.), **do not** use a Dynamic Top-Load in the large-face-down orientations.

Continued next page

测试模块4 动态负载振动
(过路频谱)
标准、扁平及细长型

振动-动态载荷，随机（采用道路谱）			
对每种在方框中已勾选的包装类型，完成以下测试序列： <input checked="" type="checkbox"/> 标准的 <input type="checkbox"/> 小的 <input checked="" type="checkbox"/> 公寓 <input checked="" type="checkbox"/> 延长的			
步骤	行动	测试定向	振动持续时间
1	若受试标本为...	那时	
	未包装桶或短圆筒（未置于盒或其他外容器中）	转至测试模块5（未包装桶及短圆柱体的振动测试）。	
	小的	转至测试模块6（振动——路面行驶）	
	标准型、扁平型或细长型	转至步骤2。	
2	将包装产品置于振动台上，使面3位于平台中心。	面部3号开启台面	60 分钟
3	将TL-H型动态顶部加载装置（具体位置参照《动态负载振动测试前准备》章节）置于测试试样上方。		
4	采用某种形式的柱体堆叠固定装置，确保堆叠体保持其方向，同时不限制顶载装置或测试样本的垂直运动。		
5	启动振动机，生成《振动测试前须知》中规定的道路随机振动谱。		
6	60分钟后，停止振动测试并移除动态顶载装置。		
7	旋转测试样本，使面4位于振动台平台中心。	FACE 4 已启用台面	30 分钟
8	将TL-W型动态负载测试振动前准备中确定的动态顶载装置置于测试样本上方。		
9	采用某种形式的立柱堆叠固定装置，以确保堆叠物保持其方向，同时不限制顶载装置或测试样本的垂直运动。		
10	启动振动机，生成测试前说明中指定的公路随机振动谱。		
11	30分钟后，停止振动测试并移除动态顶载装置。		

* 如果受试品是具有非矩形横截面的细长包装产品（圆管、三角管等），请勿在大面朝下的方向使用动态顶载。

下页继续

3A

TEST SEQUENCE FOR PROCEDURE 3A

TEST BLOCK 4
CONTINUED
Vibration Under
Dynamic Load
(Over-The-Road
spectrum)

For STANDARD,
FLAT and
ELONGATED

Continued from previous page

Step	Action	Testing Orientation	Vibration Duration
12	Rotate the test specimen so that face-6 rests on the center of the vibration table platform.	FACE 6 on table surface	30 MINUTES
13	Place the Dynamic Top-Load apparatus as determined in Before You Begin Vibration Under Dynamic Load for TL-L on top of the test specimen.		
14	Using some form of column stack fixturing, make sure that the stack will maintain its orientation without restricting the vertical motion of the Top-Load apparatus or the test specimen.		
15	Start the vibration machine to produce the Over-the-Road random vibration spectrum indicated in Before You Begin Vibration Testing.		
16	After the completion of 30 minutes, stop the vibration testing and remove the Dynamic Top-Load apparatus.		
17	This vibration testing is complete. Go to TEST BLOCK 7 (Vibration – Pick-Up and Delivery).		



测试模块4继续
进行动态
负载振动测
试（过路频
谱）

标准、扁平及
细长型

上页继续

步骤	行动	测试定向	振动持续时间
12	旋转测试样本，使面-6位于振动台平台中心。	第6张面孔已开启 台面	30 分钟
13	将TL-L型动态顶部加载装置（具体位置参照《动态负载振动测试前准备》章节）置于测试样本上方。		
14	采用某种形式的柱体堆叠固定装置，确保堆叠体保持其方向，同时不限制顶载装置或测试样本的垂直运动。		
15	启动振动机，生成《振动测试前须知》中规定的道路随机振动谱。		
16	30分钟后，停止振动测试并移除动态顶载装置。		
17	振动测试已完成。请转至测试模块7（振动——拾取与传递）。		

3A

TEST SEQUENCE FOR PROCEDURE 3A

TEST BLOCK 5
Vibration Under
Dynamic Load
(Over-The-Road
spectrum)

For
UNPACKAGED
PAILS and
SHORT
CYLINDERS

VIBRATION - DYNAMIC LOAD – RANDOM (using OVER-THE-ROAD spectrum)			
Complete the following test sequence <i>only</i> for unpackaged pails and short cylinders (not in a box or other outer container)			
STEP	ACTION	TESTING ORIENTATION	VIBRATION DURATION
1	Place the packaged-product on the center of the vibration table so that face-3 rests on the platform.	FACE 3 on table surface	45 MINUTES
2	Place the Top-Load Apparatus for Unpackaged Pails and Short Cylinders, as described in Before you Begin Vibration Under Dynamic Load for TL-H, on the test specimen such that it nests on top of the test specimen.		
3	Using some form of column stack fixturing, make sure that the stack will maintain its orientation without restricting the vertical motion of the Top-Load apparatus or the test specimen.		
4	Start the vibration machine to produce the Over-the-Road random vibration spectrum indicated in Before You Begin Vibration Testing.		
5	After 45 minutes, stop the vibration testing and remove the Dynamic Top-Load apparatus.		
6	Place the Dynamic Top-Load apparatus (fiberboard box with load spreader and weights), as described in Before You Begin Vibration Under Dynamic Load for TL-H, on top of the test specimen.	FACE 3 on table surface	45 MINUTES
7	Using some form of column stack fixturing to make sure that the stack maintains its orientation without restricting the vertical motion of the Top- Load apparatus or the test specimen.		
8	Start the vibration machine to produce the Over-the-Road random vibration spectrum indicated in Before You Begin Vibration Testing.		
9	After 45 minutes, stop the vibration testing and remove the Dynamic Top-Load apparatus.		
10	Rotate the test specimen to place it on its side, so that sidewall line 2-6 rests on the center of the vibration table platform.	SIDEWALL LINE 2-6 on table surface	30 MINUTES
11	Do not place a Dynamic Top-Load apparatus on top of the test specimen.		
12	Start the vibration machine to produce the Over-the-Road random vibration spectrum indicated in Before You Begin Vibration Under Dynamic Load.		
13	After the completion of 30 minutes, stop the vibration testing.		
14	This vibration testing is complete. Go to TEST BLOCK 7 (Vibration – Pick-up and Delivery Vehicle).		

测试模块5 动态负载振动
(过路频谱)

用于未包装桶
及短圆筒

振动 - 动态载荷 - 随机 (采用道路谱)			
仅对未包装桶和短圆筒完成以下测试序列 (未置于盒内或其他外容器中)			
步骤	行动	测试方向	振动持续时间
1	将包装产品置于振动台中央, 使面3接触平台。	面部3号开启 台面	45 分钟
2	按照《TL-H动态负载振动测试前准备》中的说明, 将未包装桶和短圆柱体的顶装装置置于测试样本上, 使其完全套叠于测试样本顶部。		
3	采用某种形式的柱体堆叠固定装置, 确保堆叠体保持其方向, 同时不限制顶载装置或测试样本的垂直运动。		
4	启动振动机, 生成《振动测试前须知》中规定的道路随机振动谱。		
5	45分钟后, 停止振动测试并移除动态顶载装置。		
6	按照《TL-H动态载荷振动测试前准备》中的说明, 将动态顶载装置(带载荷扩散器和配重的纤维板箱)置于测试样本顶部。	面部3号开启 台面	45 分钟
7	采用某种形式的立柱堆叠固定装置, 以确保堆叠物保持其方向, 同时不限制顶载装置或测试样本的垂直运动。		
8	启动振动机, 生成《振动测试前须知》中规定的道路随机振动谱。		
9	45分钟后, 停止振动测试并移除动态顶载装置。		
10	旋转测试样本使其侧卧, 使侧壁线2-6位于振动台平台中心。	侧壁线 2-6号 台面	30 分钟
11	请勿将动态顶载装置置于测试样本上方。		
12	启动振动机, 生成《动态负载振动前准备》章节中所述的过路随机振动谱。		
13	完成30分钟后, 停止振动测试。		
14	振动测试已完成。请转至测试模块7(振动——拾取与输送载体)。		

3A

TEST BLOCK 6
Vibration
(Under Dynamic
Load
Over-the-Road
spectrum)

For **SMALL**

TEST SEQUENCE FOR PROCEDURE 3A

VIBRATION - DYNAMIC LOAD AND RANDOM (using OVER-THE-ROAD spectrum)			
Complete the following test sequence for each type of package that has a check in the box: <input type="checkbox"/> Standard <input checked="" type="checkbox"/> Small (test IN bag) <input type="checkbox"/> Flat <input type="checkbox"/> Elongated			
STEP	ACTION	TESTING ORIENTATION	VIBRATION DURATION
1	Place the specimen bag on the center of the vibration table with face 1 in the down orientation.	FACE 1 on table surface	30 MINUTES
2	Place the Top Load bag filled with 36 kg (80 lb) of sand or other dense, flowable material, on top of the test specimen.		
3	Start the vibration machine to produce the Over-the-Road random vibration spectrum indicated in Before You Begin Vibration Testing.		
4	Stop the vibration machine at the completion of 30 minutes.		
5	Turn the bag over so that face 2 is in the down orientation.	FACE 2 on table surface	30 MINUTES
6	Place the Top Load bag filled with 36 kg (80 lb) of sand or other dense, flowable material, on top of the test specimen.		
7	Start the vibration machine to produce the Over-the-Road random vibration spectrum indicated in Before You Begin Vibration Testing.		
8	Stop the vibration testing at the end of 30 minutes.		
9	Vibration testing is now complete. Go to TEST BLOCK 7 (Vibration – Pick-Up and Delivery).		

TEST BLOCK 7
Vibration
(Random
Pick-up and
Delivery Vehicle)

For **STANDARD,**
SMALL,
FLAT and
ELONGATED

VIBRATION - RANDOM (using PICK-UP AND DELIVERY VEHICLE spectrum)			
Complete the following test sequence for each type of package that has a check in the box: <input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> Small (DO NOT test in bag) <input checked="" type="checkbox"/> Flat <input checked="" type="checkbox"/> Elongated			
STEP	ACTION	TESTING ORIENTATION	VIBRATION DURATION
1	Place the packaged-product on the center of the vibration table so that face-3 rests on the platform.	FACE 3 on table surface	30 MINUTES
2	Do not place a Dynamic Top-Load apparatus on top of the test specimen.		
3	Start the vibration machine to produce the Pick-Up and Delivery Vehicle random vibration spectrum indicated in Before You Begin Vibration Testing.		
4	After the completion of 30 minutes, stop the vibration testing.		
5	Testing is complete. Determine the next TEST BLOCK to be used:		
	IF you choose...	THEN ...	
	To conduct the Optional Vibration under Low Pressure testing.	Go to TEST BLOCK 8 (Vibration Under Low Pressure).	
	Not to conduct the Optional Vibration under Low Pressure testing.	Vibration testing is complete. Go to TEST BLOCK 9 (Shock – Drop).	

测试模块6 振动
(动态负
载下)
超道路频谱
小剂量

振动-动态载荷与随机 (采用路面频谱)			
对每种在方框中已勾选的包装类型, 完成以下测试序列: <input type="checkbox"/> 标准的 <input checked="" type="checkbox"/> 小号 (测试IN袋) <input type="checkbox"/> 公寓 <input type="checkbox"/> 延长的			
步骤	行动	测试方向	振动持续时间
1	将标本袋置于振动台中央, 使面1朝下。	面部1开启 台面	30 分钟
2	将装有36公斤 (80磅) 沙子或其他致密可流动材料的顶部载荷袋置于测试样本上方。		
3	启动振动机, 生成《振动测试前须知》中规定的道路随机振动谱。		
4	振动机运行30分钟后停止。		
5	将包装袋翻转, 使面2朝下。	FACE 2 已启用 台面	30 分钟
6	将装有36公斤 (80磅) 沙子或其他致密可流动材料的顶部载荷袋置于测试样本上方。		
7	启动振动机, 生成《振动测试前须知》中规定的道路随机振动谱。		
8	振动测试于30分钟后停止。		
9	振动测试现已完成。请转至测试模块7 (振动——拾取与传递)。		

测试模块7 振动
(随机) 取送
车

对于标准的小型
扁平 and 细
长的

振动 - 随机 (采用拾取与递送载体频谱)			
对每种在方框中已勾选的包装类型, 完成以下测试序列: <input checked="" type="checkbox"/> 标准的 <input checked="" type="checkbox"/> 小包装 (请勿在袋中测试) <input checked="" type="checkbox"/> 公寓 <input checked="" type="checkbox"/> 延长的			
步骤	行动	测试方向	振动持续时间
1	将包装产品置于振动台中央, 使面3接触平台。	面部3号开启 台面	30 分钟
2	请勿将动态顶载装置置于测试样本上方。		
3	启动振动试验机, 生成如《振动测试前须知》所述的拾取与输送车辆随机振动谱。		
4	完成30分钟后, 停止振动测试。		
5	测试已完成。确定下一个待使用的TEST模块:		
	如果你选择...	那时	
	进行低压下可选振动测试。	转至测试模块8 (低压振动测试)。	
	不进行低压条件下的可选振动测试。	振动测试已完成。请转至测试模块9 (冲击-跌落)。	

3A

TEST SEQUENCE FOR PROCEDURE 3A

TEST BLOCK 8
OPTIONAL
Vibration Under
Low Pressure

For STANDARD,
SMALL,
FLAT and
ELONGATED

VIBRATION – OPTIONAL LOW PRESSURE AND RANDOM (using OVER-THE-ROAD and OPTIONAL RANDOM VIBRATION UNDER LOW PRESSURE spectra as applicable)			
NOTE: THIS TEST BLOCK IS OPTIONAL. Complete the following test sequence for each type of package that has a check in the box:			
	<input checked="" type="checkbox"/> Standard	<input checked="" type="checkbox"/> Small (DO NOT test in bag)	<input checked="" type="checkbox"/> Flat
			<input checked="" type="checkbox"/> Elongated
STEP	ACTION		TESTING ORIENTATION
			VIBRATION DURATION
1	Go to TEST BLOCK 2 (Temperature and Humidity for Vibration Under Low Pressure) for conditioning prior to conducting this vibration test.		
2	Place test specimen so that face-6 rests in the center of the bottom surface of the low pressure (altitude) chamber. Do not place a Dynamic Top-Load package on top of the test specimen.		FACE 6 on table surface [For two-dimensional envelopes and mailers (not in bag), place FACE 3 on table surface]
3	Place the low pressure (altitude) chamber on the vibration table platform and seal it.		
4	Turn the chamber on and adjust it to reduce the pressure at a rate of 305 m (1000 ft) per 30-60 seconds. Stop and hold at an absolute pressure of 70 kPa (10 psi), approximately equal to an altitude equivalent of 3000 m (10,000 ft).		
5	Maintain the reduced pressure, start the vibration machine to produce the Spectrum for Over-The-Road random vibration indicated in Before You Begin Vibration Testing.		
6	Stop the vibration testing after the completion of 60 minutes.		
7	Release the low pressure at a rate of 305 m (1000 ft) per 30-60 seconds. Then remove the chamber from the vibration platform and the test specimen from the chamber.		
8	IF the Test Specimen will be shipped via ...		THEN ...
	Truck <u>Only</u> [The low pressure used above is similar to that which might be encountered on high-altitude roads]		Vibration testing is now complete. Go TEST BLOCK 9 (Shock: Second Sequence – Drop)
	Air [Air transport may involve even lower pressures (higher altitudes). Because air shipments typically involve some truck transport, the following test is <u>in addition to</u> the test above]		Go to Step 9.
9	Place test specimen so that face-6 rests in the center of the bottom surface of the low pressure (altitude) chamber. Do not place a Dynamic Top-Load package on top of the test specimen		FACE 6 on table surface [For two-dimensional envelopes and mailers (not in bag), place FACE 3 on table surface]
10	Place the low pressure (altitude) chamber on the vibration table platform and seal it.		
11	Turn the chamber on and adjust it to reduce the pressure at a rate of 305 m (1000 ft) per 30-60 seconds. Stop and hold at an absolute pressure of 60 kPa (8.7 psi) approximately equal to an altitude of 4200 m (14,000 ft.)		
12	Maintain the reduced pressure, start the vibration machine to produce the spectrum for Optional Random Vibration Under Low Pressure as indicated in Before You Begin Vibration Under Low Pressure.		
13	Stop the vibration testing after the completion of 60 minutes.		
14	Release the low pressure at a rate of 305 m (1000 ft) per 30-60 seconds. Then remove the chamber from the vibration platform and the test specimen from the chamber.		
15	Vibration testing is now complete. Go to TEST BLOCK 9 (Shock – Drop).		

程序 3A 测试序列

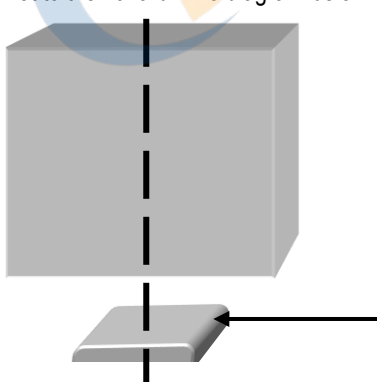
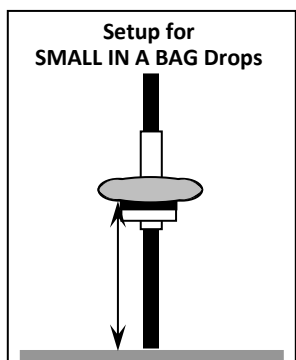
振动——可选低压与随机 (在适用情况下, 采用道路工况及可选的低压随机振动谱)			
注意: 此测试模块为可选内容。请针对每种类型的包装完成以下测试序列 在方框中勾选:			
<input checked="" type="checkbox"/> 标准的 <input checked="" type="checkbox"/> 小包装 (请勿在袋中测试) <input checked="" type="checkbox"/> 公寓 <input checked="" type="checkbox"/> 延长的			
步骤	行动	测试方向	振动持续时间
1	在进行本振动测试前, 请先执行低压力振动测试的温度与湿度调节 (TEST block 2)。		
2	将测试样本放置于低压 (海拔) 舱底部中心位置, 使面6朝下。切勿在测试样本上方放置动态顶载荷组件。	第6张面孔已开启 台面 [针对两个空间的信封和邮件发送者 (不在袋面部3号开启表面	60 分钟
3	将低压 (海拔) 舱置于振动台平台上并密封。		
4	开启舱室并调节使其以每30-60秒305米 (1000英尺) 的速率降低压力。停止并保持在绝对压力70千帕 (10磅/平方英寸) 下, 该压力值约等于海拔3000米 (10,000英尺) 的等效高度。		
5	维持减压状态, 启动振动机, 按照《振动测试前须知》中规定的公路随机振动谱进行测试。		
6	振动测试完成后60分钟终止。		
7	以每30-60秒305米 (1000英尺) 的速率释放低压。随后将腔室从振动台上移除, 并将测试样本从腔室内取出。		
8	若测试样本将通过...运输	那时	
	卡车专用[上文所述的低压与高海拔道路可能遇到的低压相似]	振动测试现已完成。进入测试模块9 (冲击: 第二序列——跌落)	
	空气[航空运输可能涉及更低的压力 (更高海拔)。由于航空运输通常涉及一些卡车运输, 因此以下测试在 <u>上文测试的基础上</u>]	转至步骤9。	
9	将测试样本放置于低压 (海拔) 舱底部中心位置, 使面6朝下。切勿在测试样本上方放置动态顶载荷组件。	第6张面孔已开启 台面 [针对两个空间的信封和邮件发送者 (不在袋面部3号开启表面	60 分钟
10	将低压 (海拔) 舱置于振动台平台上并密封。		
11	开启舱室并调节其以每30-60秒降低305米 (1000英尺) 的速度减压。停止并保持在绝对压力60 kPa (8.7 psi) 下, 该压力大致相当于海拔4200米 (14,000英尺) 的高度。		
12	维持减压状态, 启动振动机, 按照《低压振动操作前须知》中所述的低压随机振动方案生成振动谱。		
13	振动测试完成后60分钟终止。		
14	以每30-60秒305米 (1000英尺) 的速率释放低压。随后将腔室从振动台上移除, 并将测试样本从腔室内取出。		
15	振动测试现已完成。请转至测试模块9 (冲击-跌落)。		

3A

TEST SEQUENCE FOR PROCEDURE 3A

TEST BLOCK 9
Shock:
Second
Sequence
(Drop)

For STANDARD,
SMALL,
FLAT and
ELONGATED

SHOCK - DROP						
Complete the following test sequence for each type of package that has a check in the box: <input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> Small (test IN bag) <input checked="" type="checkbox"/> Flat <input checked="" type="checkbox"/> Elongated						
STEP	ACTION					
1	Follow the table below to determine the height and orientation for the final set of 8 drops for Standard packages and 7 drops for Small packages in a bag.					
	Drop Number	Drop Height			Test Specimen	
		< 32 kg (70 lb)	32-70 kg (70-150 lb)	Small (in a bag)	Standard, Flat, Elongated	Small (in a bag)
	10	460 mm (18 in)	300 mm (12 in)	610 mm (24 in)	Edge 3-4	Face 4
	11	460 mm (18 in)	300 mm (12 in)	610 mm (24 in)	Edge 3-6	Face 1
	12	460 mm (18 in)	300 mm (12 in)	610 mm (24 in)	Edge 1-5	Face 2
	13	460 mm (18 in)	300 mm (12 in)	610 mm (24 in)	Corner 3-4-6	Face 3
	14	460 mm (18 in)	300 mm (12 in)	610 mm (24 in)	Corner 1-2-6	Face 1
	15	460 mm (18 in)	300 mm (12 in)	610 mm (24 in)	Corner 1-4-5	Face 2
	16	910 mm (36 in)	600 mm (24 in)	610 mm (24 in)	Most critical or damage-prone flat orientation	Face 4
17	460 mm (18 in)	300 mm (12 in)	NA	Standard: Face 3 on hazard Flat or Elongated: Face 2 on hazard	NA	
<p>For drop 17, the test specimen should strike the hazard midpoint across the longest dimension of the face and parallel to the shortest dimension of the face being impacted. The required drop distance is to the impact surface, not to the hazard. The diagram below shows this concept:</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Hazard parallel to the shortest dimension of face 3 OR face 2</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Setup for SMALL IN A BAG Drops</p>  </div> </div>						
2	IF the test specimen type is:			THEN:		
	Standard or Small and Does NOT Contain Liquids			All testing is now complete.		
	Standard or Small and Contains Liquids			This Shock test is complete. Go to TEST BLOCK 14 (Integrity – Leak Test).		
	Flat or Elongated			This Shock test is complete. Go to TEST BLOCK 10 (Shock – Rotational Edge Drop).		

测试模块9 电击:

第二序
列 (滴)对于标准的小型
扁平 and 细
长的

休克-跌倒

对每种在方框中已勾选的包装类型, 完成以下测试序列:

标准的 小号 (测试IN袋) 公寓 延长的

步骤	行动					
1	请参照下表确定标准包装袋中最终8滴与小包装袋中最终7滴的高度及方向。					
	下拉 数量	跌落高度			试验样本	
		< 32公斤 (70磅)	32-70公斤 (70-150磅)	小的 (置于袋中)	标准、扁平 延长的	小包装 (袋装)
	10	460毫米 (18英寸)	300毫米 (12英寸)	610毫米 (24英寸)	边缘3-4	面4
	11	460毫米 (18英寸)	300毫米 (12英寸)	610毫米 (24英寸)	边缘3-6	面1
	12	460毫米 (18英寸)	300毫米 (12英寸)	610毫米 (24英寸)	边缘1-5	面2
	13	460毫米 (18英寸)	300毫米 (12英寸)	610毫米 (24英寸)	3-4-6角	面3
	14	460毫米 (18英寸)	300毫米 (12英寸)	610毫米 (24英寸)	1-2-6号拐角	面1
	15	460毫米 (18英寸)	300毫米 (12英寸)	610毫米 (24英寸)	1-4-5角	面2
	16	910毫米 (36英寸)	600毫米 (24英寸)	610毫米 (24英寸)	最危重或易损 平面方位	面4
	17	460毫米 (18英寸)	300毫米 (12英寸)	无	标准: 危险区第3 面 扁平或细长: 危险面2	无
	<p>对于第17次跌落试验, 试样应沿受冲击面的最长边垂直于最短边方向撞击危险点。要求的跌落距离应为撞击表面距离, 而非危险点距离。下图展示了这一概念:</p>					
						
				与面3或面2最短边平行的危险		
2	若测试样本类型为:			那时		
	标准或小包装且不含液体			所有检测现已完成。		
	标准或小瓶装且含有液体			该冲击测试已完成。请转至测试模块14 (完整性-泄漏测试)。		
	扁平或细长			该冲击测试已完成。请转至测试模块10 (冲击-旋转边缘跌落)。		

3A

TEST SEQUENCE FOR PROCEDURE 3A

TEST BLOCK 10
Shock
(Rotational
Edge Drop)

For FLAT and
ELONGATED

SHOCK - ROTATIONAL EDGE DROP			
Complete the following test sequence for each type of package that has a check in the box: <input type="checkbox"/> Standard <input type="checkbox"/> Small <input checked="" type="checkbox"/> Flat <input checked="" type="checkbox"/> Elongated			
STEP	ACTION		
1	Perform three rotational edge drops according to the sequence in the table below.		
	Sequence #	Orientation	Specific edge
	1	Edge	One of the longest face 3 edges
	2	Edge	next longest edge radiating 90° from the edge just tested
	3	Edge	The opposite edge tested in Sequence 2.
2	Place the package with face 3 down onto a flat, rigid surface such as steel or concrete.		
3	Support the face 3 edge that is opposite the face 3 edge that is to be tested with a timber or support 90 to 100 mm (3.5 to 4.0 in) in height and width.		
4	Lift the face 3 edge that is to be tested according to sequence in Step 1 to 200 mm (8 in) off the surface.		
5	Release the edge that is to be tested so that it falls freely onto a flat, rigid surface.		
6	Repeat Step 3 through Step 5 to complete additional edge drops according to the sequence in Step 1.		
7	Testing is complete. Go to TEST BLOCK 11 (Shock – Full Rotational Flat Drop).		

TEST BLOCK 11
Shock
(Full Rotational
Flat Drop)

For FLAT and
ELONGATED

SHOCK - FULL ROTATIONAL FLAT DROP		
Complete the following test sequence for each type of package that has a check in the box: <input type="checkbox"/> Standard <input type="checkbox"/> Small <input checked="" type="checkbox"/> Flat <input checked="" type="checkbox"/> Elongated		
STEP	ACTION	
1	Place the packaged-product so that one of the smallest faces rests on a rigid surface such as steel or concrete and in a position that when pushed over the face 3 surface will impact the rigid surface.	
2	Using any method apply just enough force to the upper half of face 1 to push over the packaged-product without moving the packaged-product from its position.	
3	Place the packaged-product so that one of the next largest faces rests on a rigid surface such as steel or concrete and in a position that when pushed over the face 3 surface will impact the rigid surface.	
4	Using any method apply just enough force to the upper half of face 1 to push over the packaged-product without moving the packaged-product from its position.	
5	Determine the next Shock Test according to the following table:	
	IF the test specimen type is ...	THEN ...
	Flat	Go to TEST BLOCK 12 (Shock – Concentrated Impact).
Elongated	Go to TEST BLOCK 13 (Shock – Bridge Impact).	

测试模块 10 冲击
(旋转
边缘跌落)

适用于扁平型
和细长型

休克-旋转性边缘下降			
对每种在方框中已勾选的包装类型，完成以下测试序列： <input type="checkbox"/> 标准的 <input type="checkbox"/> 小的 <input checked="" type="checkbox"/> 公寓 <input checked="" type="checkbox"/> 延长的			
步骤	行动		
1	按照下表所示顺序进行三次旋转边缘下落操作。		
	序列编号	定向	特异性边缘
	1	边	3边最长之一
	2	边	从刚测试的边缘以90°角向外辐射的次长边缘
	3	边	序列2中测试的相反边缘。
2	将包装正面朝下放置于平坦坚硬的表面（如钢或混凝土）。		
3	使用高度和宽度为90至100毫米（3.5至4.0英寸）的木材或支撑物，支撑与待测3号面相对的3号面边缘。		
4	将待测试的3个边缘面按照步骤1至200 mm（8英寸）的顺序从表面抬起。		
5	释放待测边缘，使其自由落至平坦坚硬的表面上。		
6	按照步骤1的顺序重复步骤3至步骤5，以完成额外的边缘下垂处理。		
7	测试已完成。请转至TEST模块11（冲击-全旋转平跳）。		

试验模块11 电击

完全旋转平降

适用于扁平型
和细长型

休克-完全旋转性扁平下降			
对每种在方框中已勾选的包装类型，完成以下测试序列： <input type="checkbox"/> 标准的 <input type="checkbox"/> 小的 <input checked="" type="checkbox"/> 公寓 <input checked="" type="checkbox"/> 延长的			
步骤	行动		
1	将包装产品放置于最小面之一接触刚性表面（如钢或混凝土）的位置，并确保当产品被推过该表面时，其3号表面会撞击刚性表面。		
2	采用任何方法对包装产品上半部分1施加适当力度，使其翻转而不会从原位移位。		
3	将包装产品放置于以下位置：其次大面之一接触刚性表面（如钢或混凝土），且当产品被推过该表面时，其3号表面将撞击刚性表面。		
4	采用任何方法对包装产品上半部分1施加适当力度，使其翻转而不会从原位移位。		
5	根据下表确定下一次冲击试验：		
	若测试样本类型为...	那时	
	公寓	转至测试模块12（冲击-集中冲击）。	
	延长的	转至测试模块13（冲击-桥接冲击）。	

3A

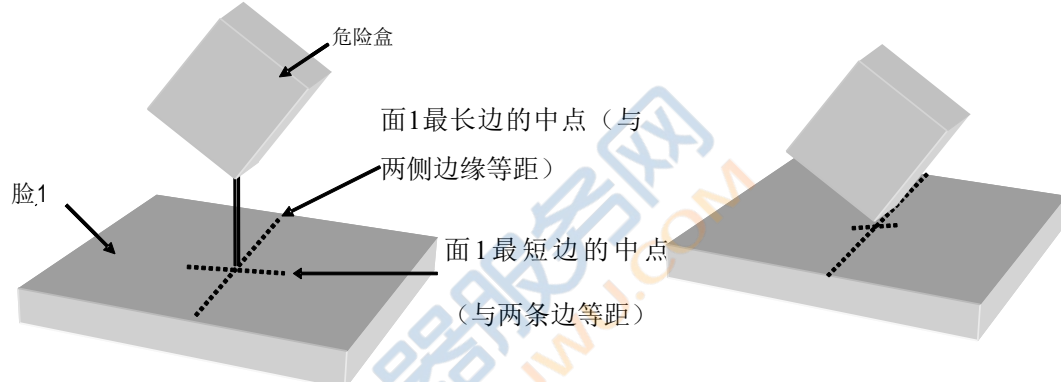
TEST SEQUENCE FOR PROCEDURE 3A

TEST BLOCK 12
Shock
(Concentrated
Impact)

For FLAT

SHOCK - CONCENTRATED IMPACT		
Complete the following test sequence for each type of package that has a check in the box: <input type="checkbox"/> Standard <input type="checkbox"/> Small <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Elongated		
STEP	ACTION	
1	Place the packaged-product so that face 3 rests on a rigid surface such as steel or concrete.	
2	Draw a line parallel to the longest dimension of face 1 and across midpoint of the longest dimension of face 1. Mark the midpoint of the line across the shortest dimension of face 1.	
3	Mark the midpoint of a bottom edge of the hazard box that has the angle iron attached. Tape a string to this point that measures 400 mm (16 in) from the midpoint of the bottom edge of the hazard box to the other end of the string.	
4	Hold the hazard box so that the angle iron bottom edge with the string attached is parallel to the shortest dimension of face 1 and the string just touches the midpoint of face 1. The diagram below shows this concept: <div style="text-align: center;"> <p>Hazard Box</p> <p>Face 1</p> <p>Midpoint of the longest dimension of Face 1 (equal distance to both edges)</p> <p>Midpoint of the shortest dimension of Face 1 (equal distance to both edges)</p> </div>	
5	Drop the hazard box onto the packaged-product without attempting to catch any rebound of the hazard box.	
6	IF the test specimen:	THEN:
	Does NOT Contain Liquids	All testing is now complete.
	Contains Liquids	This Shock test is complete. Go to TEST BLOCK 14 (Integrity – Leak Test).

程序 3A 测试序列

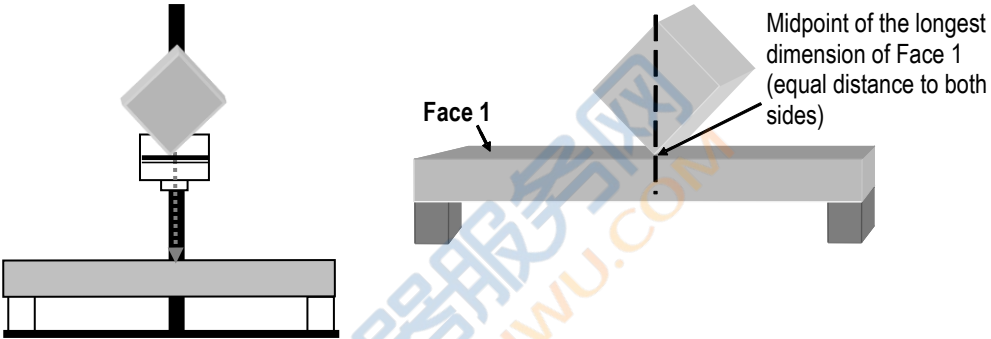
冲击-集中冲击		
对每种在方框中已勾选的包装类型，完成以下测试序列： <input type="checkbox"/> 标准的 <input type="checkbox"/> 小的 <input checked="" type="checkbox"/> 公寓 <input type="checkbox"/> 延长的		
步骤	行动	
1	将包装产品放置于3号面接触坚硬表面（如钢或混凝土）的条件下。	
2	画一条平行于面1最长边的直线，并穿过面1最长边的中点。在面1最短边的中点处做标记。	
3	在危险箱底部边缘的中点处标记出安装角铁的位置。用胶带将一根绳子固定在此处，绳子从危险箱底部边缘中点到另一端的长度为400毫米（16英寸）。	
4	握住危险箱，使带绳的角铁底边与面1的最短边平行，且绳索刚好触及面1的中点。下图展示了这一概念：  <p>危险盒</p> <p>面1最长边的中点（与两侧边缘等距）</p> <p>面1最短边的中点（与两条边等距）</p> <p>脸1</p>	
5	将危险品包装盒放置于包装产品上，切勿试图接住包装盒的反弹。	
6	若受试标本：	那时
	不含液体	所有检测现已完成。
	含液体	该冲击测试已完成。请转至测试模块14（完整性-泄漏测试）。

3A

TEST SEQUENCE FOR PROCEDURE 3A

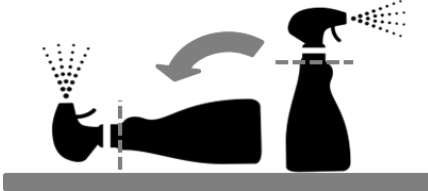
TEST BLOCK 13
Shock
(Bridge Impact)

For
ELONGATED

SHOCK - BRIDGE IMPACT		
Complete the following test sequence for each type of package that has a check in the box: <input type="checkbox"/> Standard <input type="checkbox"/> Small <input type="checkbox"/> Flat <input checked="" type="checkbox"/> Elongated		
STEP	ACTION	
1	Place the packaged-product so that face 3 rests on two separate support blocks (as described in Equipment Required), which are on opposite ends of the longest dimension parallel to each other and the shortest edges. The midpoint of the packaged-product face 1 shall be directly under the midpoint of the end edge of the drop test platen when in the dropping position.	
2	Set the platen of the drop test machine to drop the hazard box from a height that is 400 mm (16 in) above face 1.	
3	Hold the hazard box on the drop test machine platen so an angle iron bottom edge is parallel the length of the platen and parallel to the shortest dimension of face 1. Drop the hazard box parallel to the shortest dimension of face 1 and impact the midpoint across the longest dimension of face 1. 	
4	IF the test specimen:	THEN:
	Does NOT Contain Liquids	All testing is now complete.
	Contains Liquids	This Shock test is complete. Go to TEST BLOCK 14 (Integrity – Leak Test).

TEST BLOCK 14
Integrity
(Leak Test)

0

INTEGRITY – LEAK TEST		
Complete the following test sequence for each type of package that has a check in the box: <input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> Flat <input checked="" type="checkbox"/> Elongated		
STEP	ACTION	EXAMPLE
1	Open the Over Box and remove the TEST SPECIMEN (primary package) that contain liquids.	
2	Place the primary liquid package(s) on their side ensuring that the liquid product is in contact with the closure, challenging the closure's ability to contain the liquid product in the package.	
3	Do not place a top-load on the Test Specimen.	
4	After the completion of eight (8) hours, inspect the primary liquid container for any leakage. Note: If leaking occurs prior to the eight (8) hours being complete, the leak test can be terminated.	
5	All testing is now complete.	

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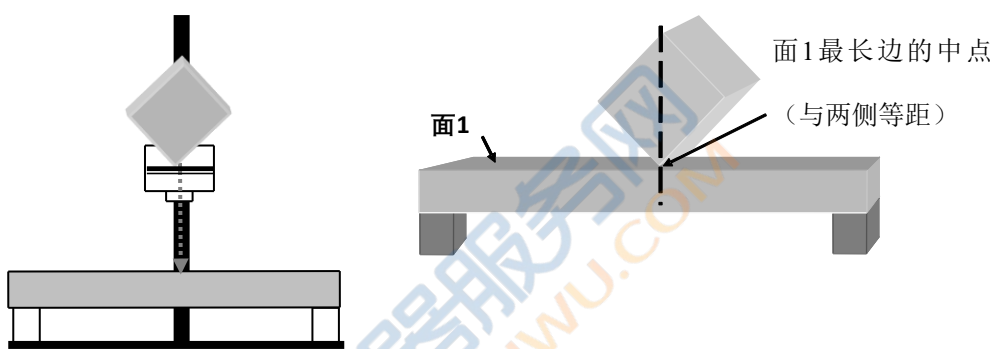
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电击-电桥冲击

对每种在方框中已勾选的包装类型, 完成以下测试序列:

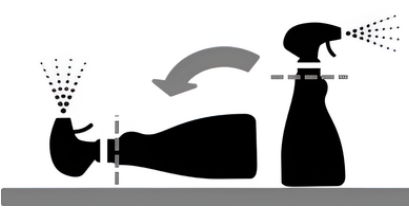
标准的 小的 公寓 延长的

步骤	行动	
1	将包装产品放置于两个独立支撑块上, 使3号面(如设备要求所述)接触。这两个支撑块平行于彼此且与最短边平行, 位于产品最长边的两端。当产品处于下落测试位置时, 其1号面的中点应直接位于下落测试平台端边中点的正下方。	
2	将跌落试验机的压板设置为使危险盒从距表面1高度400毫米(16英寸)处落下。	
3	将危险箱置于跌落试验机的压板上, 使角铁底边与压板长度方向平行, 并与表面1的最短边平行。将危险箱沿表面1最短边方向垂直落下, 撞击表面1最长边的中点。 	
4	若受试标本:	那时
	不含液体	所有检测现已完成。
	含液体	该冲击测试已完成。请转至测试模块14 (完整性-泄漏测试)。

完整性-泄漏测试

对每种在方框中已勾选的包装类型, 完成以下测试序列:

标准的 公寓 延长的

步骤	行动	样例
1	打开上盖, 取出含有液体的TEST试样(主要包装)。	
2	将主液体包装侧放, 确保液体产品与密封件接触, 以测试密封件对包装内液体产品的密封性能。	
3	请勿在测试样本上放置顶部负载。	
4	完成八(8)小时后, 检查主液体容器是否存在泄漏。注: 若在八(8)小时未滴时发生泄漏, 则可终止泄漏测试。	
5	所有检测现已完成。	

本测试程序由以下机构发布:

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