FIBC Performance Standards

Flexible Intermediate bulk containers (FIBCs) are a cost effective and popular method of shipping and storing dry bulk products.

To protect your company and customers, every FIBC (bulk bag) you use should meet or exceed the standards recommended by the Flexible Intermediate Bulk Container Association (FIBCA), in conjunction with the US Department of Transportation (DOT). The descriptions in this article are general summaries of the standards; published standards are available from the DOT (request standard HM-181E).

Transporting hazardous materials in FIBCs requires compliance with the DOT regulation HM-181E. FIBCs must pass a number of tests to legally contain or transport hazardous materials. Summaries of these tests follow.

(For the following tests, unless otherwise specified, the FIBC is evenly filled to 95 percent of its capacity and to its maximum permissible load.)

DROP TEST:

FIBC is filled with hazardous material it will hold (or a comparable non-hazardous material) and dropped onto a rigid, nonresilient, smooth, flat, and horizontal surface. Drop height is 3.9 feet or 2.6 feet, depending on packing group classification.

Pass criteria: No loss of contents.

TOP LIFT TEST:

FIBC is evenly filled to 6 times the maximum permissible load, lifted from the floor per its design, and held in position for 5 minutes. Other top lift testing methods and equally effective preparation may be used.

Pass criteria: No permanent deformation that makes the FIBC unsafe for transport and no loss of contents.

BOTTOM LIFT TEST:

FIBC is evenly filled to 1.25 times its maximum permissible load and raised and lowered twice by a forklift truck with forks positions and spaced across 75% of the side entry dimensions (unless the entry points are fixed). Test must be repeated for each possible forklift entry location.

Pass criteria: No permanent deformation that makes the bag unsafe for transport and no loss of contents.

STACKING TEST:

FIBC is filled and placed on its base on a level, hard surface. FIBCs or weights are stacked on top of the placed FIBC at a load 1.8 times the combined maximum permissible gross mass of the FIBCs to be stacked on top during transport.

Pass criteria: No permanent deformation that makes the FIBC unsafe for transport and no loss of contents.

TOPPLE TEST:

FIBC is filled and toppled onto any part of its top on a rigid, non-resilient, smooth, flat and horizontal surface. FIBC it toppled from 3.9 feet or 2.6 feet, depending on the packing group classification.

Pass criteria: No loss of contents

RIGHTING TEST (for any FIBC designed for top or side lifting).

FIBC is filled, laid on its side on the ground, and lifted upright at a minimum speed of 0.33 ft/s. FIBCs with four lifting loops or other lift devices are to be lifted by two of the four devices.

Pass Criteria: No damage to the FIBC or its lifting device that makes the FIBC unfir for handling.

TEAR TEST:

FIBC is filled and placed on the ground. A 4 inch knife cut is made a 45 degree angle to the FIBCs main axis. Then, a load 2 times the FIBCs maximum permissible load is applied for 5 minutes. Finally, the FIBC must be lifted and held in position for 5 minutes.

Pass Criteria: Cut does not expand more than 1 inch.

VIBRATION TEST:

FIBC is filled and closed for shipment, placed on a vibrating platform, and vibrated rigorously for 1 hour. Then, the FIBC is removed and placed on its side. Other equally effective vibratory methods may be used.

Pass Criteria: No rupture or leakage.

PERFORMANCE TESTS FOR TRANSPORTING NON-HAZARDOUS MATERIALS

Use of FIBCs to contain or transport non-hazardous materials isn't regulated. However, FIBCA members must meet ISO standard ISO/TC 122 sc 2 to ensure that the FIBCs manufactured in the US meet international standards. The FIBCA recommends that all bag manufacturers comply with this standard.

Summary of the ISO standard's test steps:

1. FIBC is filled with a material which has the following properties:

a Bulk density of 0.5 to 0.9 kg/l.

Mesh size from 3 to 12 millimeters.

30 to 35 degree angle of repose.

2. FIBC is conditioned and loaded into a suspension frame and lifted according to the frame manufacturer's recommendations.

3. A flat pressure plate is placed above the FIIBCs contents.

4. Suspension frame is raised so that the material compacts against the pressure plate. Frame is repeatedly raised and lowered at an upward force of 50 to 90 kN./min (Kilo New tons per minute) with a rest period up to 30 seconds between each cycle.

For a heavy duty reusable FIBC: 70 cycles at a test load of 6 times the safe working load (6:1) and a final cycle at a test load of 8:1.

For a standard duty reusable FIBC: 70 cycles at a test load of 4:1 and a final cycle at a test load of 6:1.

For a single trip FIBC: 30 cycles at a test load of 2:1 and a final cycle at a test load of 5:1.

Test results should account for lift device stress, loss of contents, bag deformation, and liner protrusion if applicable.

By Control and Metering Ltd.