

Title/Subject: Standard Test Procedure - Mechanical Test of Partitions		
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1.0 PURPOSE

- 1.1 This test procedure is used by the Electrical Safety Division (ESD) to determine if representative samples of a partition comply with the requirements of ACRI2001, "Criteria for the Evaluation and Test of Intrinsically Safe Apparatus and Associated Apparatus," Section 9.7.
- 1.2 To provide a person knowledgeable in the appropriate technical field with a written procedure that will assure consistent repeatable test data and results independent of the person conducting the test.

2.0 SCOPE

This Standard Test Procedure (STP) applies to the testing of partitions that are used to segregate intrinsically safe wiring in enclosures of equipment which are approved, certified, or evaluated per 30 CFR Parts 18, 19, 20, 22, 23, and 27.

3.0 REFERENCES

- 3.1 ACRI2001 "Criteria for the Evaluation and Test of Intrinsically Safe Apparatus and Associated Apparatus"
- 3.2 30 CFR Part 18 "Electric Motor-Driven Mine Equipment and Accessories"
- 3.3 30 CFR Part 19 "Electric Cap Lamps"
- 3.4 30 CFR Part 20 "Electric Mine Lamps other than Standard Cap Lamps"
- 3.5 30 CFR Part 22 "Portable Methane Detectors"
- 3.6 30 CFR Part 23 "Telephones and Signaling Devices"
- 3.7 30 CFR Part 27 "Methane-Monitoring Systems"

4.0 DEFINITIONS

- 4.1 **Partition** - A rigidly mounted wall, inside an electrical enclosure, that segregates the electrical terminals and conductors of an intrinsically safe circuit from the terminals and conductors of other intrinsically safe and/or non-intrinsically safe circuits.

- 4.2 **Supporting Structure** - A base and other mechanical members to which a partition is rigidly mounted.
- 4.3 **Partition Assembly** - A partition mounted to its supporting structure.

5.0 TEST EQUIPMENT

- 5.1 A test mass made of solid hard metallic material that weighs 30 newtons (approximately 3.06 kilograms) with its total mass uniformly distributed about the vertical axis and a hemispherical "contact surface", 6 mm in diameter.
- 5.2 Ruler, T-squares, calipers, and micrometers, as needed.
- 5.3 A test fixture that is equipped with:
 - 5.3.1 a mounting bracket that can hold the test mass in place in a plumb position;
 - 5.3.2 an adjustment mechanism to precisely set the elevation of the mounting bracket; and
 - 5.3.3 a quick release mechanism that, when engaged, locks the test mass to the mounting bracket and, when disengaged, permits the test mass to move downward under the force of gravity.

The mounting bracket shall not impede the downward motion of the test mass when the quick release mechanism is actuated, while simultaneously maintaining plumb the axis of the test mass over one inch of downward travel. The test fixture shall be mounted on a flat base table.

- 5.4 Stopwatch with one second resolution.

6.0 TEST SAMPLES

- 6.1 Three representative samples of the partition assembly. Only one supporting structure is required if no damage is incurred during testing and a duplicate set of all partition-mounting hardware components is supplied.
- 6.2 One sample of the specified enclosure with a partition assembly and wiring terminals mounted.

7.0 PROCEDURES

- 7.1 Perform a pre-test inspection. Inspect each partition sample. Reject any sample that does not conform to the manufacturer's specifications. Replace any rejected sample.
- 7.2 Without altering any components used to mount the partition to its supporting structure, remove any material in the supporting structure that prevents applying the test mass, unobstructed, to the partition surfaces. Add mechanical reinforcement to the supporting structure if needed to restore structural integrity lost by material removal.

Note: Describe and justify the modification to the supporting structure on the test sheet. Notify the Division Chief of the modification.
- 7.3 Select the point on the partition surface that has been determined to be the weakest point on the partition. If the design of the partition assembly is such that the weakest point cannot be determined, then select the approximate center of the partition. Identify on the test sheet the weakest point selected and provide an explanation for the selection.
- 7.4 Mount the test mass into the mounting bracket.
- 7.5 Place the partition assembly onto the base table. Position the partition so that the axis of the test mass is perpendicular to the partition surface at the point selected in 7.3. Secure the partition assembly in place, using clamps and shims if necessary.
- 7.6 Lower the mounting bracket until the test mass just contacts the partition without applying the weight of the test mass. Readjust the position of the partition, as necessary, to assure the position specified in 7.3.
- 7.7 Release the catch.
- 7.8 Start the stopwatch.
- 7.9 After 10 seconds, raise the test mass, engage the catch to lock the test mass to the mounting bracket, and remove the test sample from the base table.
- 7.10 Perform a post-test inspection. Visually inspect the tested partition assembly for deformations or perforations in the partition surface.
- 7.11 Determine, by measurement, that the sample partition continues to provide the required minimum separation. If necessary, mount the tested partition assembly in the enclosure to make this determination.

- 7.12 Determine if the intrinsic safety of the circuit has been compromised by any deformation of the partition resulting from the test.
- 7.13 Repeat 7.4 through 7.12 for the remaining two test samples.

8.0 TEST DATA

- 8.1 The manufacturer of the partition assembly.
- 8.2 The manufacturer's model or type number of the electrical assembly of which the partition assembly is a part.
- 8.3 Description of the partition including material, type, and dimensions, or reference to a drawing containing this information.
- 8.4 The pre-test inspection results for every rejected assembly. Photographs may be attached to the test sheet.
- 8.5 The post-test inspection results of the visual inspection performed in 7.10.
- 8.6 The results of the measurements performed in 7.11 and the examination performed in 7.12. If failed, record the reason(s). Photographs may be attached to the test sheet.

9.0 PASS / FAIL CRITERIA

A partition assembly shall be failed for:

- 9.1 Any permanent material deformation in the partition that compromises the required minimum distances.
- 9.2 Any compromise of the intrinsic safety of the circuit due to deformation resulting from the test.