

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS DT-4
		Former Designation: <i>CEMS DT-4 (example)</i>
Impact Test For Plastics		CURRENT REV No.: 1606
		DATE: June 2016
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<i>This specification may involve hazardous materials, equipment, and procedures. This specification does not purport to address all of the safety issues associated with its use. The user is responsible to consult appropriate safety and health practices and to determine the applicability of regulatory limits prior to use.</i>		

1.0 SCOPE

This is a method to determine the 50% failure level (FL50), in the impact test, for thermoplastic test panels or production parts.

2.0 REFERENCE DOCUMENTS

Unless otherwise specified the latest issue of all referenced standards shall apply. The following specifications and standards are referenced in this specification:

ASTM D 5420

3.0 APPARATUS

3.1 Impact tester per ASTM D 5420 except male punch (indenter) will be 0.625 inch (15.88 mm) diameter and the female die (support ring) will be 2.0 inch (50 mm) OD and 1.250 inch (31.75 mm) ID.

3.2 Micrometer, 0 to 1 inch (0 to 25 mm).

3.3 Impact weights: 0.5, 1.0, 2.0, 4.0 and 6.0 lb (0.23, 0.45, 0.91, 1.81 and 2.72 kg).

4.0 TEST SPECIMENS

Test specimens will be at least 2.0 inches (50 millimeters) square. On larger specimens, impact sites to be at least 2.0 inches between centers.

5.0 PROCEDURE

5.1 Visually inspect test specimens. Discard any that exhibit cracks, crazes, etc., which may affect strength.

5.2 Locate and mark the impact sites on the test specimens. Measure the thickness at each site and record to the nearest 0.001 inch (0.025 mm). Specimen thickness at each site must agree within 2% for valid comparison of impact data.

5.3 Maintain apparatus and specimens at test temperature for no less than 16 hours prior to testing.

5.4 Install the 0.5 lb. (0.23 kg) impact weight and impact foot slightly and place a test specimen on the tester anvil, with the steel ring removed. Lower the foot to impact site and make certain that the specimen rests flat on the anvil.

5.5 Lift the weight the full 40 inches (1.02 meters) and release.

5.6 Inspect the specimen for failure.

5.7 Failure is defined as cracks, splits or breaks which appear as a result of the impact on the surface of the test specimen. Usually, cracking occurs on the surface opposite the impact surface.

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5.8 If no failure is noted, repeat Steps 4 and 5 using a new specimen each time with successively larger weights until a failure is noted.

5.9 If a failure is noted, proceed to **5.10**; however, if no failure is noted at 40 inches with the 6.0-lb. weight, then test nine additional specimens at this level and report the percent that pass.

5.10 When a failure is noted at a 40-inch level, using the same weight, reduce the height by 50% and test another specimen. Continue retesting, halving the height each time, until a pass is noted.

5.11 When a pass is noted, impact each successive specimen from a height midway between the last fail and last pass levels until these points are about 6 inches (152 mm) apart.

5.12 Starting at a point midway between the last two levels (**5.9**) continue testing, raising the impact height 1 inch (25 mm) each time a specimen passes and lowering it 1 inch each time a specimen fails. Use a minimum of 15 test specimens.

6.0 CALCULATIONS

Calculate the FL50 using the following equation:

$$FL50 = \frac{S}{N} \times W$$

N = the number of specimens that failed or passed in **5.12** (whichever is smaller).

S = the sum of the impact heights for the specimens that comprise "N".

W = the impact weight used in Step 12.

7.0 REPORT

7.1 The final impact weight used

7.2 The thickness of the specimens tested

7.3 The FL50 or the % pass from **5.7**.

REVISION HISTORY

Revision Level	Change	Approved by	Date Approved
1606	Converted to MPAPS	R. Goluch	5/24/2016

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