TEST 1: RESISTANCE TO ELECTRICAL STRESS

Customer: SIEPEL
Anthony LOISEAU
Parc d'Activités de Kermarquer, Impasse de la Manille,
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France

Content: 2 report pages.

ORIENTATION TEST: Tests not covered by the accreditation of the laboratory

Date: 01/03/2018

This Naval Research Laboratory Standard NRL 8093, March 9, 1997, describes smoldering modified test method Standards for assessing urethane foam used in anechoic chamber. The NRL 8093 have been adopted as performance specifications in procurement contracts for chamber materials used by various governmental, institutional, and commercial agencies.

The test 1 - Resistance to electrical test - describes the ability of the foam to withstand electrical overload or short-circuit testing the specimen to 240 V ac during 60 s. The specimen passes the test if it self extinguishes within 60 s after removal of the ignition source and if specimen damage is < 90 % mass loss.

This test method is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions. These results of the test may be used as elements of a fire-hazard assessment or a fire-risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire-hazard or fire-risk of a particular end use.

The results are valid only for the fire-test-exposure conditions described in this procedure and for the specimens assessed.

The test's report must not be reproduced without a written approbation of the test laboratory.

Test responsible

Technical Manager

CREPIM reference: 529/03/059 A-1
Resistance to electrical test

Referenced document:
NRL report 8093 - Test 1

1 - Sample

Identification: Foam 18X M25
Description: Carbon loaded polyurethane foam + flame retardant
Size: 52 x 151 x 151 mm.
Test date: 01/03/2018
Preserving conditions before test: No specific condition.

2 - Test details

Place of testing: SIEPEL
Operator: Patrick GOBERT (CREPIM)
Operator: David PENLAE (SIEPEL)

Temperature: 22°C - Humidity: 22% HR

3 - Results

<table>
<thead>
<tr>
<th>Specimen number</th>
<th>Self extinguish within 60 s after the removal of the source</th>
<th>Details</th>
<th>Compliant?</th>
<th>Mass loss after 30 min (&lt; 90%)</th>
<th>Compliant?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>After the removal of the source: no inflammation and no electric sparks.</td>
<td>Passes</td>
<td>Yes</td>
<td>Passes</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td>After the removal of the source: no inflammation and no electric sparks.</td>
<td>Passes</td>
<td>Yes</td>
<td>Passes</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td>After the removal of the source: no inflammation and no electric sparks.</td>
<td>Passes</td>
<td>Yes</td>
<td>Passes</td>
</tr>
</tbody>
</table>

4 - Conclusion

The material identified in this report meets the performance specifications for anechoic-chamber materials specified in the NRL report 8093, Appendix A, Test 1.

CREPIM reference: 529/03/059 A-1
REPORT 529/03/059 A-2

TEST 2 : EASE OF IGNITION AND FLAME PROPAGATION

Customer : SIEPEL
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Parc d’Activités de Kermerquer, Impasse de la Manille,
56470 LA TRINITE SUR MER,
France

Content : 2 report pages

ORIENTATION TEST : Tests not covered by the accreditation of the laboratory

Date : 01/03/2018

This Naval Research Laboratory Standard NRL 8093, march 9, 1997, describes smoldering modified test method Standards for assessing urethane foam used in anechoic chamber. The NRL 8093 have been adopted as performance specifications in procurement contracts for chamber materials used by various governmental, institutional, and commercial agencies.

The test 2 –Ease of ignition and flame propagation test– evaluates the ignitability of PU foam and describes the ability of the foam to self-extinguish flame testing the specimen to flame during 30 s. For a material to be classified as self extinguishing by this test, every specimen must self-extinguish within 60 s after flame withdrawal.

This test method is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions. These results of the test may be used as elements of a fire-hazard assessment or a fire-risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire-hazard or fire-risk of a particular end use.

The results are valid only for the fire-test-exposure conditions described in this procedure and for the specimens assessed.

The test's report must not be reproduced without a written approbation of the test laboratory.

Test responsible

Technical Manager

1 - Sample

CREPIM reference : 529/03/059 A-2
Identification: Foam 18X M25  
Description: Carbon loaded polyurethane foam + flame retardant  
Size: 151 x 151 x 151 mm.  
Test date: 01/03/2018  
Preserving conditions before test: No specific condition.

2-Test details

Place of testing: SIEPEL  
Operator: Patrick GOBERT (CREPIM)  
Operator: David PENLAE (SIEPEL)

Temperature: 22°C – Humidity: 22% HR

Remark: The exact temperature of the flame could not been controlled, it has been checked that the temperature of the flame was higher than 1200°C (flame height ≈ 11 cm)

3 - Results

<table>
<thead>
<tr>
<th>Specimen number</th>
<th>Self-extinguish within 60 s after the removal of the source</th>
<th>Details</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>YES</td>
<td>Self-extinguish at 30s (withdrawal of the burner)</td>
<td>Passes</td>
</tr>
<tr>
<td>2</td>
<td>YES</td>
<td>Self-extinguish at 36s</td>
<td>Passes</td>
</tr>
<tr>
<td>3</td>
<td>YES</td>
<td>Self-extinguish at 30s (withdrawal of the burner)</td>
<td>Passes</td>
</tr>
<tr>
<td>4</td>
<td>YES</td>
<td>Self-extinguish at 30s (withdrawal of the burner)</td>
<td>Passes</td>
</tr>
<tr>
<td>5</td>
<td>YES</td>
<td>Self-extinguish at 30s (withdrawal of the burner)</td>
<td>Passes</td>
</tr>
</tbody>
</table>

4 - Conclusion

The material identified in this report meets the performance specifications for anechoic-chamber materials specified in the NRL report 8093, Appendix A, Test 2.
REPORT 529/03/059 A-3

TEST 3 : MODIFIED SMOLDERING TEST

Customer : SIEPEL
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Parc d’Activités de Kermaquer, Impasse de la Manille,
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France

Content : 2 report pages

ORIENTATION TEST : Tests not covered by the accreditation of the laboratory

Date : 01/03/2018

This Naval Research Laboratory Standard NRL 8093, march 9, 1997, describes smoldering modified test method Standards for assessing urethane foam used in anechoic chamber. The NRL 8093 have been adopted as performance specifications in procurement contracts for chamber materials used by various governmental, institutional, and commercial agencies.

The test 3—Modified smoldering test—evaluates the ignitability of PU foam and describes the ability of the foam to self-extinguish smoldering combustion testing the specimen at 600 °C with electric cartridge during 5 min. The specimen fails the test if at any time during the test period the temperature of the thermocouple 2.54 cm from the heater cartridge exceeds 450 +/- 10 °C. When all visible smoldering has ceased, the specimen passes the test if specimen damage is < 90 % mass loss.

This method is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions. These results of the test may be used as elements of a fire-hazard assessment or a fire-risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire-hazard or fire-risk of a particular end use.

The results are valid only for the fire-test-exposure conditions described in this procedure and for the specimens assessed.

The test's report must not be reproduced without a written approbation of the test laboratory.

Test responsible

Technical Manager

CREPIM reference : 529/03/059 A-3
1 - Sample

Identification: Foam 18X M25
Description: Carbon loaded polyurethane foam + flame retardant
Size: 20.1 x 20.1 x 20.1 cm
Test date: 01/03/2018
Preserving conditions before test: No specific condition.

2 - Test details

Place of testing: SIEPEL
Operator: Patrick GOBERT (CREPIM)
Operator: David PENLAE (SIEPEL)

Temperature: 22°C – Humidity: 22% HR

3 - Results

Table 1: results

<table>
<thead>
<tr>
<th>Specimen number</th>
<th>Maximum temperature of the second thermocouple</th>
<th>Details</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>164°C</td>
<td>Light smoke, no flame, no glowing</td>
<td>Passes</td>
</tr>
<tr>
<td>2</td>
<td>172°C</td>
<td>Light smoke, no flame, no glowing</td>
<td>Passes</td>
</tr>
<tr>
<td>3</td>
<td>178°C</td>
<td>Light smoke, no flame, no glowing</td>
<td>Passes</td>
</tr>
</tbody>
</table>

4 - Conclusion

The material identified in this report meets the performance specifications for anechoic-chamber materials specified in the the NRL report 8093, Appendix A, Test 3.

CREPIM reference: 529/03/059 A-3