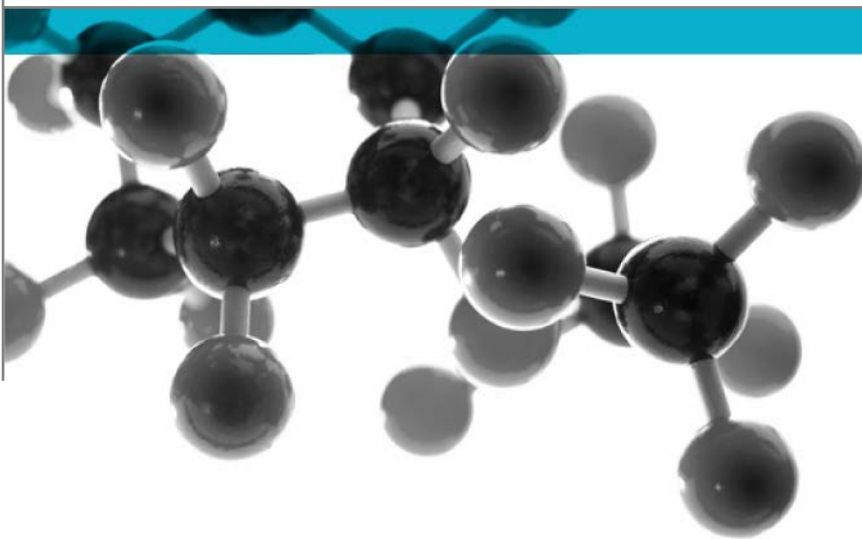


BS EN ISO 4589-2: 2017



Determination of Burning Behaviour By Oxygen Index

A Report To: Wenzhou Longhua Daily Electron Co. Ltd.

Document Reference: 419289

Date: 31st October 2019

Issue No.: 1

Page 1



Executive Summary

Objective To determine the oxygen index of the following product when tested in accordance with BS EN ISO 4589-2: 2017

Generic Description	Product reference	Thickness	Density
Stainless steel based cable tie	"LH-SS-S/LH-SS-H/LH-SS-EH"	0.25mm	7.87g/cm ³ *
*Determined by Warringtonfire			
Please see page 5 of this test report for the full description of the product tested			


Test Sponsor Wenzhou Longhua Daily Electron Co. Ltd., No. 3 Building, Part C, Xixi Industry Zone, Hongqiao Yueqing Zhejiang, China

Test Results: When tested in accordance with the procedure specified in BS EN ISO 4589 - 2: 2017 the material shows an oxygen index of $>80 \pm 0.54\%$


The reported uncertainty is defined in ISO 4589-2: 2017 clause 9.4.2. The uncertainty reported is in accordance with UKAS requirements.

Date of Test 23rd October 2019

Signatories



Responsible Officer
T. Kinder *
Senior Technical Officer



Authorised
T. Mort *
Senior Technical Officer


* For and on behalf of [Warringtonfire](#).

Report Issued: 31st October 2019

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CONTENTS	PAGE NO.
EXECUTIVE SUMMARY	2
SIGNATORIES.....	2
TEST DETAILS.....	4
DESCRIPTION OF TEST SPECIMENS.....	5
TEST RESULTS	6
APPENDIX A	7
REVISION HISTORY	8

Test Details

Purpose of test	<p>To assess the performance of a material when it is tested in accordance with BS EN ISO 4589 - 2: 2017 "Plastics - Determination of burning behaviour by oxygen index".</p> <p>The test was performed in accordance with the procedure specified in BS EN ISO 4589-2:2017 - Plastics - Determination of burning behaviour by oxygen index, and this report should be read in conjunction with that BS EN ISO Standard.</p>
Scope of test	<p>BS EN ISO 4589 – 2: 2017 specifies test methods for determining the minimum concentration of oxygen, in a mixture with nitrogen that will support combustion of small vertical test specimens under specified test conditions. The results are defined as oxygen index values.</p>
Instruction to test	<p>The test was conducted on the 23rd October 2019 at the request of Smart Products Service Co., Ltd., a representative of the sponsor of the test.</p>
Provision of test specimens	<p>The specimens were supplied by the sponsor of the test. Warringtonfire was not involved in any selection or sampling procedure.</p>
Conditioning of specimens	<p>The specimens were received on the 23rd September 2019.</p> <p>Prior to test the specimens were conditioned to equilibrium with air at $23 \pm 2^{\circ}\text{C}$ and a relative humidity of 50 ± 5 per cent for at least 88 hours.</p>
Condition of specimen edges	<p>Homogeneous product.</p>
Photograph of specimen	
Method of testing	<p>Specimens measuring nominally 151mm long by 9.94mm wide by 0.22mm thick were used. The thickness of the specimens used conforms with the requirements specified in Table 2 of the standard for test specimen Form III for sheet material, 'as received'. The specimens were tested in accordance with the test procedure specified in Clause 8 of the Standard using the Concept Equipment Limiting Oxygen Index apparatus.</p>
Ignition procedure	<p>Ignition procedure A - top surface ignition, was used to initiate burning on the top surface of the upper end of the specimen.</p>

Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the sponsor of the test. This information has not been independently verified by [Warringtonfire](#). All values quoted are nominal, unless tolerances are given.

Generic type	Stainless steel based cable tie
Product reference	"LH-SS-S/LH-SS-H/LH-SS-EH"
Detailed description	304/316 stainless steel
Name of manufacturer	Wenzhou Longhua Daily Electron Co., Ltd.
Thickness	0.25mm (stated by sponsor) 0.26mm (determined by Warringtonfire)
Density	7.87g/cm ³ (determined by Warringtonfire)
Colour reference	"Natural"
Flame retardant details	The product is inherently flame retardant
Brief description of manufacturing process	Stainless steel sheet-split into requested width-cut into requested length-punch with the hook (and head)-assembly the head and the body of the cable ties

Test Results

Applicability of test results

The test results relate only to the behaviour of the specimens under the particular conditions of this test, they should not be used to infer the fire hazards of the material in other forms or under other fire conditions.

The test results relate only to the specimens of the product in the form in which they were tested. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product which is supplied or used is fully represented by the specimens which were tested.

In accordance with Sections 8 and 9 of the Standard, the results obtained are given in appendix A.

Conclusion

When tested in accordance with the procedure specified in BS EN ISO 4589 - 2: 2017 the material shows an oxygen index of $>80 \pm 0.54\%$

The reported uncertainty is defined in ISO 4589-2: 2017 clause 9.4.2. The uncertainty reported is in accordance with UKAS requirements.

Validity

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over five years old should be considered by the user. Where this report is used to confirm compliance for use on European rolling stock as per the Technical Specification for Interoperability (LOC&PAS TSI (Commission Regulation (EU) No. 1302/2014)), all tests must have been conducted within the last 5 years or the test reports must have been reviewed within the last five years. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

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Appendix A

MATERIAL TESTED

During the test covered by this report the concentration of oxygen in a mixture with nitrogen referred to above, was increased to a level of 80% with no signs of combustion of the test specimen. It was considered that to continue the test in order to determine the minimum concentration required to support combustion, would have exposed the test operator to a potentially dangerous situation because of the high concentration of oxygen and the size of the test flame, and may have caused damage to the test equipment. The test was therefore terminated at this point and, as a result, it is not possible to report a specific oxygen index for the product tested.

As a consequence, the conclusion of this investigation is that when tested in accordance with the procedure specified in ISO 4589 - 2: 2017 the material shows an oxygen index of greater than 80%.

Part 3 – Burning characteristics of the material

No relevant ancillary characteristics or behaviour such as, charring, dripping, severe shrinkage, erratic burning, or after-glow were observed during the test.

Revision History

Issue No :	Issue Date:
Revised By:	Approved By:
Reason for Revision:	

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