



Valspar Powder Coatings Ltd  
Goodlass Road  
Speke  
Liverpool  
L24 9UJ  
United Kingdom  
T +44 (0)151 486 0486  
F +44 (0)151 486 0484

12/11/2018

Dear Sir

We can confirm that syntha pulvin meets the requirements of SBI test NF EN 13501-1+A1:2013.

All products in the syntha pulvin range are rated as A2-s1, d0.

| Product Range                 | Product name | Fire Classification SBI Test | Report No   |
|-------------------------------|--------------|------------------------------|-------------|
| Syntha Pulvin Gloss           | PE/P/Q       | A2-s1, d0                    | ES541160174 |
| Syntha Pulvin Fine Texture    | PE/P/Q/FTX   | A2-s1, d0                    | ES541160174 |
| Syntha Pulvin Matt            | PE/P/M       | A2-s1, d0                    | ES541160174 |
| Syntha Pulvin SD Satin        | PE/P/HD      | A2-s1, d0                    | RC170036    |
| Syntha Pulvin SD fine texture | PE/P/HD/FTX  | A2-s1, d0                    | RC170036    |
| Syntha Pulvin SD matt         | PE/P/HDM     | A2-s1, d0                    | RC170036    |
| Anodite                       | PE/UM        | A2-s1, d0                    | RC180158    |

Please note that any organic material will have an A2 rating which means the material has limited combustibility, will not support a flame, but will generate heat when burnt.

Previously the classification widely used and is still valid:- The tests for building regulations which are:

Spread of Flame: BS 476 part 7- achieved class 1. This is then elevated up to a Class 0 if you achieve a good rating on BS476/6 which is the propagation of flame test. This is a pass fail rating which we pass. Within the pass there is a scale and if the value is low enough this is when the Class 0 is awarded.

All syntha pulvin meets the class 0 rating.

We have also carried out toxicity & smoke emission tests- BS6853 for LUL approval. Both these pass and meet the requirements of LUL approval.

I trust this meets with your requirements.

Yours faithfully

Craig Wilson

## **SYNTHA PULVIN FIRE RESISTANCE AND LONDON UNDERGROUND SMOKE EMISSIONS.**

The tests were performed to BS476 parts 6 and 7 at Warrington Fire Research, a BS certified independent test house. BS476 part 7 relates to the surface spread of flame and determines the ability of a coating to support flame propagation. The result depends on the extent of travel of the flame down the surface of the panel, class 1 being the best and class 4 the worst result. If class 1 is achieved in part 7 the coating can be submitted for class 6 which monitors the evolution of heat during the combustion process. If the material passes this test then an overall rating of class 0 is achieved.

### **FIRE RESISTANCE**

Fire Resistance: Building Material to BS476  
Part 7: 1987 Class 1 Surface Spread of Flame.  
Part 6: 1968 Class 0 Fire Propagation.  
Part 3: 1958 Class A External Fire Exposure Roof Test.

### **LONDON UNDERGROUND**

**Smoke Emission:** BS6853 1987: B.5.2. LUL Report C10404.  
Meets the requirements of LUL 'Code of Practice for Fire Safety of Materials used in the Underground'

**Toxic Fume Emission:** LUL Report C10404.  
Meets the requirements of LUL 'Code of Practice for Fire Safety of Materials used in the Underground'

# Fire Test Reports for Interpon D Powder Coatings

Explanations and collations of key reports and approvals for the UK market.

## 1. BS476

British Standard 476 refers to fire tests on building materials and structures. The parts of this standard that are of most relevance to powder coatings are Parts 6 and 7.

### Part 6 - Fire Propagation

The result of this test is a fire propagation index. It is a measure of the contribution to fire growth made by an essentially flat surface. The results of the test are specific to the test specimen i.e. the product on that particular substrate in the form in which it was tested. Therefore it cannot be used as a method for assessing the product in all situations.

### Part 7 - Surface Spread of Flame

This is a method of measuring flame spread along the surface of a specimen. Again the results of the test are specific to the test specimen i.e. the product on that particular substrate in the form in which it was tested. Therefore it cannot be used as a method for assessing the product in all situations. As defined in the UK Building Regulations 2000 - Fire Safety Approved Document B, the highest product performance classification for wall or ceiling linings is Class 0. This is achieved if a material; (a) Achieves a class 1 rating in BS476 Part 7, and (b) Achieves a fire propagation index of not more than 12 and sub-index of not more than 6 in BS476 Part 6.

### Test Results

Interpon D1000 series and D2000 Series have been tested to BS476 Parts 6 and 7 and have met the criteria for Class 0 building regulation approval. The test reports are included in this document.

## 2. Reaction to Fire Report EN 13501-1

A further classification used in the building industry is given by EN 13501.

This is arrived at by carrying out two tests:

- EN 13823
- EN ISO 1716

The EN ISO 1716 (Calorific value) test determines the potential maximum amount of energy release which can be generated by a product when complete combustion occurs. The test is relevant for classes A1 and A2. Specimens are prepared from each individual component of a product by grinding them into powder. Each component is then tested in an oxygen bomb calorimeter by placing the specimen in a crucible within a stainless steel vessel filled with oxygen and pressure. A spark is then introduced; exploding the mixture and the resultant temperature rise will be used to calculate the calorific value of the specimen.

The classification is split into 3 components.

1. Combustibility. A2 means limited combustibility.
2. Smoke Emission – s1 is best, s3 is worst
- 3. Release of droplets or particles – d0 is best, d2 is worst.

### Test Results

Interpon D polyester powders achieve A2-s1, d0

The full test report is included in this document.

### 3. London Underground Approval

Approval for use in London Underground is a good indicator of fire safety. The product has to be tested for:

- Smoke Emission
- Toxic Fume Emission
- Qualitative analysis (what is emitted)
- Quantitative analysis (how much is emitted)
- Flammability
- Fire propagation
- Surface spread of flame

The test report is appended, plus a screen grab showing that we are still approved.

Title:

CLASSIFICATION OF  
REACTION TO FIRE  
PERFORMANCE  
IN ACCORDANCE WITH  
EN 13501-1:2018

Notified Body No:

0833

Product Name:

"Super Durable PPC  
Aluminium"

Report No:

WF 419155

Issue No:

1

Prepared for:

AkzoNobel Powder  
Coatings  
Stoneygate Lane,  
Felling,  
Gateshead,  
Tyne and Wear,  
NE10 0JY

Date:

22<sup>nd</sup> October 2019

## 1. Introduction

This classification report defines the classification assigned to “Super Durable PPC Aluminium”, a powder coated solid aluminium panel, in line with the procedures given in EN 13501-1:2018.

## 2. Details of classified product

### 2.1 General

The product, “Super Durable PPC Aluminium”, a powder coated solid aluminium panel, is defined as being suitable for construction applications, excluding flooring and linear pipe thermal insulation.

### 2.2 Product description

The product, “Super Durable PPC Aluminium”, is fully described below and in the test reports provided in support of classification listed in Clause 3.1.

|                                            |                         |                                                                                                                        |
|--------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------|
| General description                        |                         | Powder coated solid aluminium panel                                                                                    |
| Product reference                          |                         | “Super Durable PPC Aluminium”                                                                                          |
| Name of manufacturer                       |                         | AkzoNobel Powder Coatings                                                                                              |
| Thickness of composite                     |                         | 1mm (Stated by sponsor)<br>1.1mm (determined by Warringtonfire)                                                        |
| Density of composite                       |                         | 0.25g/cm <sup>3</sup> (determined by Warringtonfire)                                                                   |
| Coating                                    | Generic type            | Polyester Powder Coating                                                                                               |
|                                            | Product reference       | “Interpon D2525”                                                                                                       |
|                                            | Name of manufacturer    | AkzoNobel Powder Coatings                                                                                              |
|                                            | Colour reference        | “Bronze”                                                                                                               |
|                                            | Number of coats         | One                                                                                                                    |
|                                            | Thickness               | 60-90 microns                                                                                                          |
|                                            | Weight per unit area    | 0.065-0.100kg/m <sup>2</sup>                                                                                           |
|                                            | Density                 | 1.3g/cm <sup>3</sup>                                                                                                   |
|                                            | Application method      | Automatic electrostatic spray                                                                                          |
|                                            | Curing process per coat | 20 minutes at 200°C                                                                                                    |
|                                            | Flame retardant details | See Note 1 below                                                                                                       |
| Substrate                                  | Generic type            | Aluminium solid panel                                                                                                  |
|                                            | Product reference       | No specific product reference assigned                                                                                 |
|                                            | Detailed description    | 1050 grade material                                                                                                    |
|                                            | Name of manufacturer    | See Note 2 below                                                                                                       |
|                                            | Thickness               | 1mm                                                                                                                    |
|                                            | Weight per unit area    | 2.7kg/m <sup>2</sup>                                                                                                   |
|                                            | Flame retardant details | This component is inherently flame retardant                                                                           |
| Mounting and fixing details                |                         | A 40mm ventilated cavity was situated between the reverse face of the specimens and the calcium silicate backing board |
| Brief description of manufacturing process |                         | See Note 3 below                                                                                                       |

Note 1: The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the product / component.

Note 2: The sponsor was unable to provide this information.

Note 3: The sponsor was unwilling to provide this information.

### 3. Test reports & test results in support of classification.

#### 3.1 Test reports.

| Name of Laboratory | Name of sponsor           | Test reports Nos. | Test method |
|--------------------|---------------------------|-------------------|-------------|
| Warringtonfire     | AkzoNobel Powder Coatings | WF 418986-ISSUE 2 | EN ISO 1716 |
| Warringtonfire     | AkzoNobel Powder Coatings | WF 418985         | BS EN 13823 |

#### 3.2 Test results

| Test method & test number | Parameter                                 | No. tests                | Results                             |                       |
|---------------------------|-------------------------------------------|--------------------------|-------------------------------------|-----------------------|
|                           |                                           |                          | Continuous parameter - Max/Mean (m) | Compliance parameters |
| BS EN 13823               | FIGRA <sub>0.2MJ</sub>                    | 3                        | 0.00 W/s                            | Compliant             |
|                           | FIGRA <sub>0.4MJ</sub>                    |                          | 0.00 W/S                            | Compliant             |
|                           | THR <sub>600s</sub>                       |                          | 0.38 MJ                             | Compliant             |
|                           | SMOGRA                                    |                          | 0.00 m <sup>2</sup> s <sup>2</sup>  | Compliant             |
|                           | TSP <sub>600s</sub>                       |                          | 34.96 m <sup>2</sup>                | Compliant             |
|                           | Lateral Flame Spread to End of Specimen?  |                          | None                                | Compliant             |
|                           | Fall of Flaming Drop/Particle?            |                          | None                                | Compliant             |
|                           | Flaming of Fallen Particle Exceeding 10s? |                          | None                                | Compliant             |
| EN ISO 1716               | Coating - PCS (b)                         | 3                        | 2.3051 MJ/m <sup>2</sup>            | Compliant             |
|                           | Substrate – PCS (a)                       | Deemed to satisfy (0.00) |                                     | Compliant             |
|                           | For the product as a whole – PCS (e)      | 3                        | 0.8233 MJ/kg                        | Compliant             |

#### 4. Classification and field of application

##### 4.1 Reference of classification

This classification has been carried out in accordance with clause 8 of EN 13501-1:2018.

##### 4.2 Classification

The product, to “Super durable PPC Aluminium”, a Powder coated solid aluminium panel, in relation to its reaction to fire behaviour is classified:

A2

The additional classification in relation to smoke production is:

s1

The additional classification in relation to flaming droplets / particles is:

d0

The format of the reaction to fire classification for construction applications, excluding flooring and linear pipe thermal insulation is:

| Fire Behaviour |   | Smoke Production |   |   | Flaming Droplets |   |
|----------------|---|------------------|---|---|------------------|---|
| A2             | - | s                | 1 | , | d                | 0 |

i.e. A2 – s1 , d0

**Reaction to fire classification: A2 - s1, d0**

##### 4.3 Field of application

This classification is valid for the following end use applications:

- i) Construction applications applied over any substrate with a minimum density of  $870\text{kg/m}^3$ , having a minimum thickness of 11mm and a fire performance of A2-s1,d0 or better

This classification is also valid for the following product parameters:

|                          |                               |
|--------------------------|-------------------------------|
| Aluminium thickness      | 1mm and above                 |
| Coating colour           | No variation allowed          |
| Product density          | No variation allowed          |
| Product composition      | No variation allowed          |
| Product construction     | No variation allowed          |
| Coating application rate | Tested value or below allowed |
| Air gap details          | ≥0mm allowed                  |

## 5. Limitations

This document does not represent type approval or certification of the product.

SIGNED



.....  
Euan Gardner  
Junior Certification Engineer  
Technical Department

APPROVED



.....  
Matthew Dale  
Senior Certification Engineer  
Technical Department  
On behalf of Warringtonfire

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**Interscience Fire Laboratory**

Building 63  
Haslar Marine Technology Park  
Haslar Road, Gosport  
Hampshire PO12 2AG  
United Kingdom

Tel. : +44 (0) 20 8692 5050

Fax.: +44 (0) 20 8692 5155

Email:

[firetesting@intersciencecomms.co.uk](mailto:firetesting@intersciencecomms.co.uk)

**Evaluation of Reaction to Fire Properties**

Akzo Nobel Powder Coatings Ltd and Cromadex  
Unit 5 Redwood Business Park, Oldbury Road  
Smethwick, West Midlands . B66 1NJ

**Product Reference:** 2.2 mm thick Aluminum sheet coated on both faces with a light grey coloured coating referenced “**Interpon D1000 (Light Grey Matt)**”

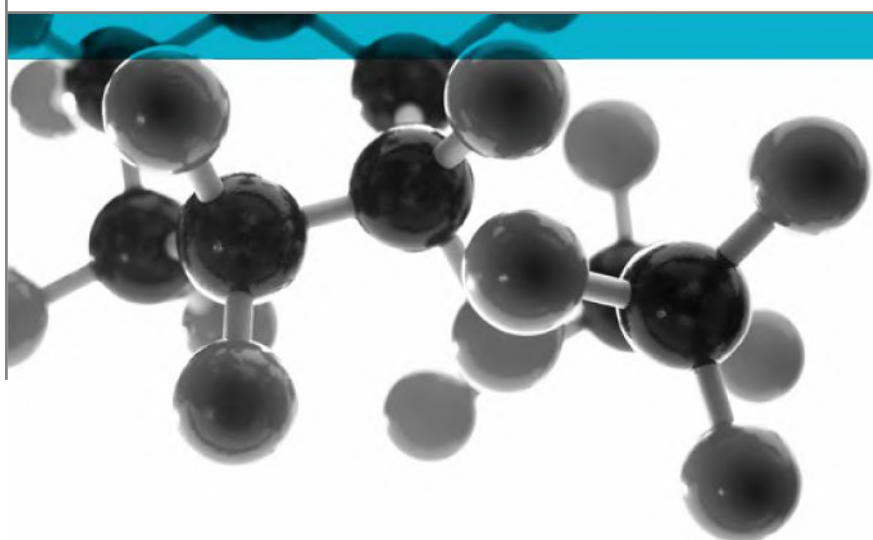
| BS 6853:1999 Table 2 for Category Ia. |              |                             |                                       |
|---------------------------------------|--------------|-----------------------------|---------------------------------------|
| Test Type                             | ICL Job No   | Test results                | BS 6853:1999 Category Ia Requirements |
| BS 476 Part 6                         | ICL/H13/2576 | $i_l = 0.1$<br>$I = 1.0$    | $i_l$ (max) 6<br>$I$ (max) 12         |
| BS 476 Part 7                         | ICL/H13/2580 | Class 1                     | Class 1 1                             |
| BS 6853:1999 Annex B.2                | ICL/H13/2584 | R Value: 0.103              | R (max) 1                             |
| BS 6853:1999 Annex D.8.4              | ICL/H13/2588 | Ao(on) 1.22<br>Ao(off) 1.37 | Ao(on) 2.6<br>Ao(off) 3.9             |

**Note :** The product satisfies the requirements given for category Ia in BS 6853:1999 Table 2 for vertical surfaces . Category Ia has the highest requirements.

| EN 45545-2 Table 5 for HL 3 for vertical surfaces R1 |              |                                         |                                       |
|------------------------------------------------------|--------------|-----------------------------------------|---------------------------------------|
| Test Type                                            | ICL Job No   | Test results                            | EN 45545-2 Requirements R1 (HL3)      |
| ISO 5658-2                                           | ICL/H13/2592 | CFE ( kW/m <sup>2</sup> ) 39.13         | CFE (minimum) 20                      |
| ISO 5660-1                                           | ICL/H13/2596 | MARHE(kW/m <sup>2</sup> ) 19.4          | MARHE (max) 60                        |
| ISO 5659-2 (EN 45545-2)                              | ICL/H13/2602 | $D_s(4)$ 89.52<br>VOF4 100.14           | $D_s(4)$ (max) 150<br>VOF 4 (max) 300 |
| EN 45545-2 Annex C                                   | ICL/H13/2603 | CITg (4mins) 0.003<br>CITg(8mins) 0.007 | CIT <sub>G</sub> (max) 0.75           |

**Note :** The product satisfies the requirements given in EN 45545-2 Table 5 for HL 3.  
In EN 45545-2 HL3 has the highest requirements.

# BS 476: Part 6: 1989+A1:2009



## Method Of Test For Fire Propagation For Products

A Report To: AkzoNobel Powder Coatings

Document Reference: 355372

Date: 13<sup>th</sup> August 2015

Issue No.: 1

Page 1

Testing  
Advising  
Assuring

## Executive Summary

**Objective** To determine the performance of the following product when tested in accordance with BS 476: Part 6: 1989+A1: 2009.

| Generic Description                                                                         | Product reference     | Thickness     | Weight per unit area or density |
|---------------------------------------------------------------------------------------------|-----------------------|---------------|---------------------------------|
| Polyester powder coating on an aluminium substrate                                          | "YW213G On Aluminium" | 2mm           | 2.48kg/m <sup>2</sup> *         |
| <b>Individual components used to manufacture composite:</b>                                 |                       |               |                                 |
| Coating (test face)                                                                         | "YW213G"              | 60-80 microns | Unwilling to provide            |
| Substrate                                                                                   | Unable to provide     | 2mm           | Unable to provide               |
| <b>*Determined by Exova Warringtonfire</b>                                                  |                       |               |                                 |
| <b>Please see page 5 of this test report for the full description of the product tested</b> |                       |               |                                 |

**Test Sponsor** AkzoNobel Powder Coatings, Stoneygate Lane, Felling, Gateshead, NE10 0JY.

**Test Results:**

|                                  |   |            |
|----------------------------------|---|------------|
| <b>Fire propagation index, I</b> | = | <b>1.7</b> |
| <b>Sub index, i<sub>1</sub></b>  | = | <b>0.0</b> |
| <b>Sub index, i<sub>2</sub></b>  | = | <b>1.6</b> |
| <b>Sub index, i<sub>3</sub></b>  | = | <b>0.1</b> |

**Date of Test** 11<sup>th</sup> August 2015

## Signatories



Responsible Officer  
C. Meachin \*  
Technical Officer



Authorised  
S. Deeming \*  
Business Unit Head

\* For and on behalf of **Exova Warringtonfire**.

Report Issued: 13<sup>th</sup> August 2015

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## Test Details

|                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose of test</b>                         | <p>To determine the performance of a product when it is subjected to the conditions of the test specified in BS 476: Part 6: 1989+A1: 2009, "Fire tests on building materials and structures, method for fire propagation for products".</p> <p>The test was performed in accordance with the procedure specified in BS 476: Part 6: 1989+A1: 2009, and this report should be read in conjunction with that British Standard.</p> |
| <b>Scope of test</b>                           | BS 476: Part 6: 1989+A1: 2009 specifies a method of test, the result being expressed as a fire propagation index, that provides a comparative measure of the contribution to the growth of fire made by an essentially flat material, composite or assembly. It is primarily intended for the assessment of the performance of internal wall and ceiling linings.                                                                 |
| <b>Fire test study group/EGOLF</b>             | Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.                                       |
| <b>Instruction to test</b>                     | The test was conducted on the 11 <sup>th</sup> August 2015 at the request of AkzoNobel Powder Coatings, the sponsor of the test.                                                                                                                                                                                                                                                                                                  |
| <b>Provision of test specimens</b>             | The specimens were supplied by the sponsor of the test. <b>Exova Warringtonfire</b> was not involved in any selection or sampling procedure.                                                                                                                                                                                                                                                                                      |
| <b>Conditioning of specimens</b>               | The specimens were received on the 4 <sup>th</sup> August 2015 and were conditioned to constant mass at a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$ prior to testing.                                                                                                                                                                                                                     |
| <b>Form in which the specimens were tested</b> | Composite - Combination of materials which are generally recognised in building constructions as discrete entities e.g. coated or laminated materials.                                                                                                                                                                                                                                                                            |
| <b>Exposed face</b>                            | The coated face of the specimens was exposed to the heating conditions of the test.                                                                                                                                                                                                                                                                                                                                               |

## Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the sponsor of the test. All values quoted are nominal, unless tolerances are given.

|                                            |                                |                                                                                   |
|--------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------|
| General description                        |                                | Polyester powder coating applied to an aluminium substrate                        |
| Product reference                          |                                | "YW213G On Aluminium"                                                             |
| Name of manufacturer                       |                                | Akzo Nobel Powder Coatings Ltd                                                    |
| Thickness                                  |                                | 2mm (stated by sponsor)<br>1.14mm (determined by <b>Exova Warringtonfire</b> )    |
| Weight per unit area                       |                                | 2.48kg/m <sup>2</sup> (determined by <b>Exova Warringtonfire</b> )                |
| Coating<br>(test face)                     | General description            | Interpon D2000 Brilliance Series polyester powder coating                         |
|                                            | Generic type                   | Polyester                                                                         |
|                                            | Product reference              | "YW213G"                                                                          |
|                                            | Name of manufacturer           | Akzo Nobel Powder Coatings                                                        |
|                                            | Colour reference               | "DBR201" (stated by sponsor)<br>"Grey" (observed by <b>Exova Warringtonfire</b> ) |
|                                            | Number of coats                | One                                                                               |
|                                            | Application thickness per coat | 60-80 microns                                                                     |
|                                            | Density                        | <b>See Note 1 Below</b>                                                           |
|                                            | Application method             | Electrostatic spray                                                               |
|                                            | Flame retardant details        | <b>See Note 2 Below</b>                                                           |
|                                            | Curing process per coat        | Heated to 180°C for 10 minutes                                                    |
| Substrate                                  | Generic type                   | Aluminium sheet                                                                   |
|                                            | Product reference              | <b>See Note 3 Below</b>                                                           |
|                                            | Name of manufacturer           | <b>See Note 1 Below</b>                                                           |
|                                            | Thickness                      | 2mm                                                                               |
|                                            | Density                        | <b>See Note 3 Below</b>                                                           |
|                                            | Colour reference               | "Mill Finish Grey"                                                                |
|                                            | Flame retardant details        | The component is inherently flame retardant                                       |
| Brief description of manufacturing process |                                | Cutting of aluminium sheet                                                        |

**Note 1: The sponsor was unwilling to provide this information.**

**Note 2: The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the component.**

**Note 3: The sponsor was unable to provide this information.**

## Test Results

### Results

A total of three specimens were tested. The laboratory record sheet relating to each of the test specimens is appended to this report (refer to Tables 1, 2 and 3).

Throughout the test on each specimen careful observation was made of the product's behaviour within the apparatus and special note was taken of any of the phenomena listed in clause 9.2 of the Standard. None of the listed phenomena was observed and the test results on all three specimens tested were valid.

**The following test results were obtained for the product.**

|                                    |          |            |
|------------------------------------|----------|------------|
| <b>Fire propagation index, I</b>   | <b>=</b> | <b>1.7</b> |
| <b>Sub index, <math>i_1</math></b> | <b>=</b> | <b>0.0</b> |
| <b>Sub index, <math>i_2</math></b> | <b>=</b> | <b>1.6</b> |
| <b>Sub index, <math>i_3</math></b> | <b>=</b> | <b>0.1</b> |

**NOTE:** If a suffix 'R' is included in the above fire propagation index, I, then this indicates that the results should be treated with caution.

### Applicability of test result

The test results relate only to the behaviour of the test specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

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.

### 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. 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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Table 1

Laboratory Record Sheet
**FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009**

Specimen No. : 1

Date : 11-Aug-15

| Time<br>mins<br>t            | Specimen<br>Temperature<br>Deg C<br>Ts | Calibration<br>Temperature<br>Deg C<br>Tc | Ts-<br>Tc/10t | Sub Index<br>Of<br>Performance |
|------------------------------|----------------------------------------|-------------------------------------------|---------------|--------------------------------|
| 0.50                         | 12                                     | 14                                        | 0.00          | 0.05                           |
| 1.00                         | 19                                     | 20                                        | 0.00          |                                |
| 1.50                         | 24                                     | 24                                        | 0.00          |                                |
| 2.00                         | 29                                     | 28                                        | 0.05          |                                |
| 2.50                         | 33                                     | 33                                        | 0.00          |                                |
| 3.00                         | 37                                     | 37                                        | 0.00          |                                |
| 4.00                         | 68                                     | 68                                        | 0.00          | 1.92                           |
| 5.00                         | 128                                    | 105                                       | 0.46          |                                |
| 6.00                         | 165                                    | 131                                       | 0.57          |                                |
| 7.00                         | 176                                    | 151                                       | 0.36          |                                |
| 8.00                         | 191                                    | 168                                       | 0.29          |                                |
| 9.00                         | 198                                    | 184                                       | 0.16          |                                |
| 10.00                        | 202                                    | 193                                       | 0.09          |                                |
| 12.00                        | 216                                    | 209                                       | 0.06          | 0.18                           |
| 14.00                        | 221                                    | 216                                       | 0.04          |                                |
| 16.00                        | 232                                    | 224                                       | 0.05          |                                |
| 18.00                        | 238                                    | 233                                       | 0.03          |                                |
| 20.00                        | 240                                    | 239                                       | 0.01          |                                |
| Total Index of Performance S |                                        |                                           | =             | 2.14                           |

SubIndex s1 0.05

SubIndex s2 1.92

SubIndex s3 0.18

Index of Performance S 2.14

Table 2

Laboratory Record Sheet**FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009****Specimen No. : 2****Date : 11-Aug-15**

| Time<br>mins<br>t                   | Specimen<br>Temperature<br>Deg C<br>Ts | Calibration<br>Temperature<br>Deg C<br>Tc | Ts-<br>Tc/10t | Sub Index<br>Of<br>Performance |
|-------------------------------------|----------------------------------------|-------------------------------------------|---------------|--------------------------------|
| 0.50                                | 13                                     | 14                                        | 0.00          | 0.00                           |
| 1.00                                | 18                                     | 20                                        | 0.00          |                                |
| 1.50                                | 24                                     | 24                                        | 0.00          |                                |
| 2.00                                | 28                                     | 28                                        | 0.00          |                                |
| 2.50                                | 32                                     | 33                                        | 0.00          |                                |
| 3.00                                | 37                                     | 37                                        | 0.00          |                                |
| 4.00                                | 64                                     | 68                                        | 0.00          | 0.62                           |
| 5.00                                | 104                                    | 105                                       | 0.00          |                                |
| 6.00                                | 148                                    | 131                                       | 0.28          |                                |
| 7.00                                | 162                                    | 151                                       | 0.16          |                                |
| 8.00                                | 177                                    | 168                                       | 0.11          |                                |
| 9.00                                | 187                                    | 184                                       | 0.03          |                                |
| 10.00                               | 196                                    | 193                                       | 0.03          |                                |
| 12.00                               | 207                                    | 209                                       | 0.00          | 0.00                           |
| 14.00                               | 214                                    | 216                                       | 0.00          |                                |
| 16.00                               | 223                                    | 224                                       | 0.00          |                                |
| 18.00                               | 230                                    | 233                                       | 0.00          |                                |
| 20.00                               | 234                                    | 239                                       | 0.00          |                                |
| <b>Total Index of Performance S</b> |                                        |                                           | <b>=</b>      | <b>0.62</b>                    |

**SubIndex s1                      0.00****SubIndex s2                      0.62****SubIndex s3                      0.00****Index of Performance S        0.62**

Table 3

Laboratory Record Sheet**FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009**

Specimen No. : 3

Date : 11-Aug-15

| Time<br>mins<br>t            | Specimen<br>Temperature<br>Deg C<br>Ts | Calibration<br>Temperature<br>Deg C<br>Tc | Ts-<br>Tc/10t | Sub Index<br>Of<br>Performance |
|------------------------------|----------------------------------------|-------------------------------------------|---------------|--------------------------------|
| 0.50                         | 13                                     | 14                                        | 0.00          | 0.03                           |
| 1.00                         | 19                                     | 20                                        | 0.00          |                                |
| 1.50                         | 22                                     | 24                                        | 0.00          |                                |
| 2.00                         | 24                                     | 28                                        | 0.00          |                                |
| 2.50                         | 33                                     | 33                                        | 0.00          |                                |
| 3.00                         | 38                                     | 37                                        | 0.03          |                                |
| 4.00                         | 75                                     | 68                                        | 0.18          | 2.20                           |
| 5.00                         | 131                                    | 105                                       | 0.52          |                                |
| 6.00                         | 162                                    | 131                                       | 0.52          |                                |
| 7.00                         | 184                                    | 151                                       | 0.47          |                                |
| 8.00                         | 194                                    | 168                                       | 0.33          |                                |
| 9.00                         | 196                                    | 184                                       | 0.13          |                                |
| 10.00                        | 199                                    | 193                                       | 0.06          |                                |
| 12.00                        | 209                                    | 209                                       | 0.00          | 0.00                           |
| 14.00                        | 216                                    | 216                                       | 0.00          |                                |
| 16.00                        | 222                                    | 224                                       | 0.00          |                                |
| 18.00                        | 228                                    | 233                                       | 0.00          |                                |
| 20.00                        | 233                                    | 239                                       | 0.00          |                                |
| Total Index of Performance S |                                        |                                           | =             | 2.23                           |

SubIndex s1 0.03

SubIndex s2 2.20

SubIndex s3 0.00

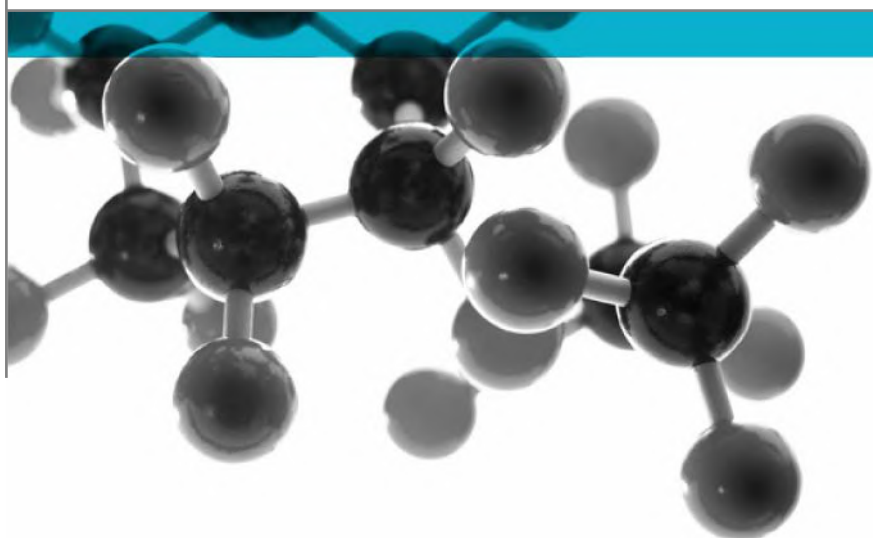
Index of Performance S 2.23

## Revision History

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|                      |                |
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# BS 476: Part 7: 1997



## Method For Classification Of The Surface Spread Of Flame Of Products

A Report To: AkzoNobel Powder Coatings

Document Reference: 354569

Date: 27<sup>th</sup> July 2015

Issue No.: 1

Page 1

Testing  
Advising  
Assuring

## Executive Summary

**Objective** To determine the surface spread of flame classification of the following product when tested in accordance with BS 476: Part 7: 1997.

| Generic Description                                                                         | Product reference | Thickness     | Weight per unit area or density |
|---------------------------------------------------------------------------------------------|-------------------|---------------|---------------------------------|
| Polyester powder coating on a steel substrate                                               | "YLM01E On Steel" | 3.2mm         | 8.33kg/m <sup>2</sup> *         |
| <b>Individual components used to manufacture composite:</b>                                 |                   |               |                                 |
| Coating (test face)                                                                         | "YLM01E"          | 60-80 microns | Unwilling to provide            |
| Substrate                                                                                   | Unable to provide | 3.2mm         | Unable to provide               |
| <b>*Determined by Exova Warringtonfire</b>                                                  |                   |               |                                 |
| <b>Please see page 5 of this test report for the full description of the product tested</b> |                   |               |                                 |

**Test Sponsor** AkzoNobel Powder Coatings, Stoneygate Lane, Felling, Gateshead, NE10 0JY.

**Test Results:** **Class 1**

**Date of Test** 21<sup>st</sup> July 2015

## Signatories

|                                                                                     |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |
| Responsible Officer<br>C. Meachin *<br>Technical Officer                            | Authorised<br>S. Deeming *<br>Business Unit Head                                     |

\* For and on behalf of **Exova Warringtonfire**.

Report Issued: 27<sup>th</sup> July 2015

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## Test Details

|                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose of test</b>                         | To determine the performance of a product when it is subjected to the conditions of the test specified in BS 476: Part 7: 1997, "Fire tests on building materials and structures, method for classification of the surface spread of flame of products". This test was therefore performed in accordance with the procedure specified in BS 476: Part 7: 1997 and this report should be read in conjunction with that British Standard.         |
| <b>Scope of test</b>                           | BS 476: Part 7: 1997 specifies a method of test for measuring the lateral spread of flame along the surface of a specimen of a product orientated in the vertical position, and a classification system based on the rate and extent of flame spread. It provides data suitable for comparing the performances of essentially flat materials, composites, or assemblies, which are used primarily as the exposed surfaces of walls or ceilings. |
| <b>Fire test study group/EGOLF</b>             | Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.                                                     |
| <b>Instruction to test</b>                     | The test was conducted on the 21 <sup>st</sup> July 2015 at the request of AkzoNobel Powder Coatings, the sponsor of the test.                                                                                                                                                                                                                                                                                                                  |
| <b>Provision of test specimens</b>             | The specimens were supplied by the sponsor of the test. <b>Exova Warringtonfire</b> was not involved in any selection or sampling procedure.                                                                                                                                                                                                                                                                                                    |
| <b>Conditioning of specimens</b>               | The specimens were received on the 9 <sup>th</sup> July 2015 and were conditioned to constant mass at a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$ prior to testing.                                                                                                                                                                                                                                     |
| <b>Form in which the specimens were tested</b> | Composite - Combination of materials which are generally recognised in building constructions as discrete entities e.g. coated or laminated materials. Each specimen was tested in direct contact with a nominally 12mm thick non-combustible backing board.                                                                                                                                                                                    |
| <b>Exposed face</b>                            | The coated face of the specimens was exposed to the heating conditions of the test.                                                                                                                                                                                                                                                                                                                                                             |

## Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the sponsor of the test. All values quoted are nominal, unless tolerances are given.

|                                            |                                |                                                                                     |
|--------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| General description                        |                                | Polyester powder coating on a steel substrate                                       |
| Product reference                          |                                | "YLM01E On Steel"                                                                   |
| Name of manufacturer                       |                                | Akzo Nobel Powder Coatings Ltd                                                      |
| Thickness                                  |                                | 3.2mm (stated by sponsor)<br>3.2mm (determined by <b>Exova Warringtonfire</b> )     |
| Weight per unit area                       |                                | 8.33kg/m <sup>2</sup> (determined by <b>Exova Warringtonfire</b> )                  |
| Coating<br>(test face)                     | Generic type                   | Interpon D2000 Series polyester powder coating                                      |
|                                            | Product reference              | "YLM01E"                                                                            |
|                                            | Name of manufacturer           | Akzo Nobel Powder Coatings                                                          |
|                                            | Colour reference               | "RAL 7016" (stated by sponsor)<br>"Grey" (observed by <b>Exova Warringtonfire</b> ) |
|                                            | Number of coats                | One                                                                                 |
|                                            | Application rate per coat      | 60-80 microns                                                                       |
|                                            | Density / specific gravity     | <b>See Note 1 below</b>                                                             |
|                                            | Application method             | Electrostatic spray                                                                 |
|                                            | Flame retardant details        | <b>See Note 2 below</b>                                                             |
|                                            | Curing process per coat        | Heated to 180°C for 10 minutes                                                      |
| Substrate                                  | Generic type                   | Mild steel                                                                          |
|                                            | Product reference              | <b>See Note 3 below</b>                                                             |
|                                            | Name of manufacturer           | Main Road Sheet Metal Limited                                                       |
|                                            | Thickness                      | 3.2mm                                                                               |
|                                            | Density / weight per unit area | <b>See Note 3 below</b>                                                             |
|                                            | Colour reference               | "Steel Grey"                                                                        |
|                                            | Flame retardant details        | This component is inherently flame retardant                                        |
| Brief description of manufacturing process |                                | <b>See Note 3 below</b>                                                             |

**Note 1: The sponsor was unwilling to provide this information.**

**Note 2: The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the component.**

**Note 3: The sponsor was unable to provide this information.**

## Test Results

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Results and observations</b>     | The test results for the individual specimens, together with observations made during the test and comments on any difficulties encountered during the test are given in Appendix 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Classification</b>               | <b>In accordance with the class definitions given in BS 476: Part 7: 1997; the specimens tested are classified as Class 1.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Criteria for classification</b>  | If the prefix 'D' or suffix 'R' or 'Y' is included in the classification, this indicates that the results should be treated with caution. An explanation of the reason for the prefix and suffixes is given in Appendix 2, together with the classification limits specified in the Standard.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Applicability of test result</b> | <p>The test results relate only to the behaviour of the test specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.</p> <p>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.</p>                                                  |
| <b>Validity</b>                     | <p>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. 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.</p> <p>This report may only be reproduced in full. Extracts or abridgements shall not be published without permission of <b>Exova Warringtonfire</b>.</p> |

## Appendix 1 – Test Results

| SPECIMEN No.                                   | 1                                                        | 2    | 3    | 4    | 5    | 6    |
|------------------------------------------------|----------------------------------------------------------|------|------|------|------|------|
| Maximum distance travelled at 1.5 minutes (mm) | <50                                                      | <50  | <50  | <50  | <50  | <50  |
| Distance (mm)                                  | Time to travel to indicated distance (minutes : seconds) |      |      |      |      |      |
| 75                                             |                                                          |      |      |      |      |      |
| 165                                            |                                                          |      |      |      |      |      |
| 190                                            |                                                          |      |      |      |      |      |
| 215                                            |                                                          |      |      |      |      |      |
| 240                                            |                                                          |      |      |      |      |      |
| 265                                            |                                                          |      |      |      |      |      |
| 290                                            |                                                          |      |      |      |      |      |
| 375                                            |                                                          |      |      |      |      |      |
| 455                                            |                                                          |      |      |      |      |      |
| 500                                            |                                                          |      |      |      |      |      |
| 525                                            |                                                          |      |      |      |      |      |
| 600                                            |                                                          |      |      |      |      |      |
| 675                                            |                                                          |      |      |      |      |      |
| 710                                            |                                                          |      |      |      |      |      |
| 750                                            |                                                          |      |      |      |      |      |
| 785                                            |                                                          |      |      |      |      |      |
| 825                                            |                                                          |      |      |      |      |      |
| Time to reach maximum distance travelled       | 1:00                                                     | 1:00 | 1:00 | 1:00 | 1:00 | 1:00 |
| Maximum distance travelled in 10 minutes (mm)  | <50                                                      | <50  | <50  | <50  | <50  | <50  |

Note: Six specimens are usually tested. If the test on any specimen is deemed to be invalid, as defined in the Standard, it is permissible for up to a maximum of nine specimens to be tested in order to obtain the six valid test results.

### Observations made during test and comments on any difficulties encountered during the test:

None.

## Appendix 2 – Classification criteria

| Classification of spread of flame                                           | Spread of Flame at 1.5 min |                                                                                                                                                                                                             | Final Spread of Flame       |                             |
|-----------------------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------|
|                                                                             | Classification             | Limit (mm)                                                                                                                                                                                                  | Limit for one specimen (mm) | Limit for one specimen (mm) |
|                                                                             | Class 1                    | 165                                                                                                                                                                                                         | 165 + 25                    | 165                         |
|                                                                             | Class 2                    | 215                                                                                                                                                                                                         | 215 + 25                    | 455                         |
|                                                                             | Class 3                    | 265                                                                                                                                                                                                         | 265 + 25                    | 710                         |
|                                                                             | Class 4                    | Exceeding the limits for class 3                                                                                                                                                                            |                             |                             |
| Explanation of prefix and suffixes which may be added to the classification | 1.                         | A suffix R is added to the classification if more than six specimens are required in order to obtain six valid test results (e.g. class 2R).                                                                |                             |                             |
|                                                                             | 2.                         | A prefix D is added to the classification of any product which does not comply with the surface characteristics specified in the Standard and has therefore been tested in a modified form (e.g. class D3). |                             |                             |
|                                                                             | 3.                         | A suffix Y is added to the classification if any softening and/or other behaviour that may affect the flame spread occurs (e.g. class 3Y).                                                                  |                             |                             |

For example, a classification of D3RY could be achieved indicating (a) a modified surface has been used; (b) a class 3 result has been obtained; (c) additional specimens have been used to obtain 6 valid results and; (d) softening and/or other behaviour has occurred which is considered to have affected the test result.

## Revision History

|                      |                |
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# Transfire Services Limited

3, Flowers Industrial Estate  
Latimer Road  
Luton  
Bedfordshire LU1 3XA  
Telephone: +44 (0) 1582 483 007  
Facsimile: +44 (0) 1582 483 073  
Email: info@transfire.com

Reference: TSL0108-GP-R17895

Prepared for: Akzo Nobel Powder Coatings Ltd  
Stoneygate Lane  
Felling, Gateshead  
Tyne & Wear. NE10 0JY

Issue Date: 14<sup>th</sup> July 2004

Prepared by: G Patel

Signature: .....

Certified by: Hush J Patel (Senior Consultant)

Signature: .....

## TEST REPORT

**TSL No. R17895**

Fire testing of "Interpon  
D36 Polyester Powder  
Coating", in accordance  
with the London  
Underground Limited  
Engineering Standard 2-  
01001-002: Issue A1:  
December 2003.

---

**Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.**

---



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**Fire testing of "Interpon D36 Polyester Powder Coating", in accordance  
with the London Underground Limited Engineering Standard  
2-01001-002: Issue A1: December 2003.**



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**Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.**

---



## **1. INTRODUCTION**

Sample panels of aluminium coated with polyester powder coating were submitted on 4<sup>th</sup> May 2004, by Mr A Moseley of Akzo Nobel Powder Coatings Limited, for smoke emission, toxic fume emission and flammability testing, in accordance with London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.

## **2. MATERIAL DESCRIPTION**

1mm thick, aluminium panels, coated with 'SA210E Interpon D36 Polyester Powder coating', supplied by Akzo Nobel Powder Coatings Limited.

No additional information was submitted by the client.

*Laboratory sample reference is TSL0108.*

## **3. TEST METHOD**

### **3.1 SMOKE EMISSION**

The above specimen was tested for smoke emission on 12<sup>th</sup> May 2004, in accordance with BS6853: 1999: D8.6 – "Code of Practice for Fire Precautions in the design and construction of passenger carrying trains".

### **3.2 TOXIC FUME EMISSION**

#### **3.2.1 QUALITATIVE ANALYSIS**

The above specimen was tested on 18<sup>th</sup> May 2004 for qualitative analysis using scanning electron microscopy and energy dispersive X-Rays.

#### **3.2.2 QUANTITATIVE ANALYSIS**

The above specimen was tested on 18<sup>th</sup> May 2004, for quantitative determination of Nitrogen, Carbon and Sulphur using Carlo Erba EA1108 Elemental analyser'.

### **3.3 FLAMMABILITY**

#### **3.3.1 FIRE PROPAGATION**

The above specimen boards were tested to determine the fire propagation index of specimens of a product when tested in accordance with BS476: Part 6: 1989 "Fire tests on building materials and structures, method of test for fire propagation for products".

**Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.**



### 3.3.2 SURFACE SPREAD OF FLAME

The above specimen boards were tested to determine the classification of specimens of a product when tested in accordance with BS476: Part 7: 1997 "Fire tests on building materials and structures, method of test to determine the classification of the surface spread of flame of products".

## 4. RESULTS

The tests relate to the behaviour of test specimens of the products under particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use. In particular, differences in the thickness, orientation or design may significantly affect fire performance and care should be taken to ensure that any differences between the test conditions and application conditions are not adversely significant.

### 4.1 SMOKE EMISSION

The measured absorbance  $A_m$  is calculated in accordance with the Beer-Lambert Law as follows:

$$A_m = \log_{10} (I_o / I_t)$$

Where:  $I_o$  = Initial Luminous intensity  
 $I_t$  = transmitted Luminous intensity

$A_m$  is converted to Standard absorbance  $A_o$  (Figures 1-3; Page 11-12), using the equation:

$$A_o = (A_m \times V) / (n \times L)$$

Where:  $V$  = volume of the cube (  $27m^3$  )  
 $L$  = optical path length ( 3m )  
 $N$  = is the number of units comprising the specimen.

The calculated results are as follows:

| Sample Reference | Test    | Result<br>Ao abs (m <sup>2</sup> /burn area) |         |
|------------------|---------|----------------------------------------------|---------|
|                  |         | Ao(ON)                                       | Ao(OFF) |
| TSL0108          | 1       | 0.538                                        | 0.698   |
|                  | 2       | 0.445                                        | 0.651   |
|                  | Average | 0.492                                        | 0.675   |
|                  | S.D.    | 0.0658                                       | 0.0332  |

**Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.**



REQUIREMENTS:

The requirements for smoke emission as stated in the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003 for category ST/SU/v & p "Station/Surface/vertical & prone is:

$$A_o(ON) < 3.6 \text{ m}^2/\text{burn area} \text{ \& } A_o(OFF) < 5.4 \text{ m}^2/\text{burn area}$$

The test data show that the referenced specimen meets the smoke emission criterion for category ST/SU/v & p application.

**4.2 TOXIC FUME EMISSION**

**4.2.1 QUALITATIVE ANALYSIS**

The qualitative analysis of the sample shows the following elements (Figure 4; Page 14)

| Sample reference | Elements detected                                      |
|------------------|--------------------------------------------------------|
| TSL0108          | Carbon, Oxygen, Silicon, Aluminium, Titanium, Sulphur. |

**4.2.2 QUANTITATIVE ANALYSIS**

| Sample reference | % Nitrogen | % Carbon | % Sulphur |
|------------------|------------|----------|-----------|
| TSL0108          | 0.19       | 36.02    | 1.88      |

The above results are expressed as a percentage wt/wt.

**Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.**



REQUIREMENTS

The Engineering Standard states that "For unrestricted use of a material, covered by Standard 2-01001-002: Issue A1: December 2003, neither it nor its constituents shall have deliberately incorporated by selection, addition or modification any significant amounts of organically bound halogens, nitrogen, sulphur or phosphorus; typical chemical groups proscribed are:-

C-X (where X = Halogen)  
C-N  
C-P  
C-O-P  
C-S  
C-O-S

Trace levels of such chemical groups are acceptable – the criterion for "trace level" shall be that the summation of the weight for weight percentage of the chemical group divided by the atomic weight for the group shall not exceed 0.015".

Thus, applying the 'Trace level' i.e.

$$\sum \frac{w / w\% \text{ of Chemical Group}}{\text{Atomic weight of Group}} \leq 0.015$$

The calculated value for the specimen gives a value of 0.0723, based on 0.19% Nitrogen and 1.88% Sulphur content.

Hence, the specimen material under this category fails to meet the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003, due to the presence of nitrogen and sulphur above the required limit.

However, considering that the respective standard calls for keeping the concentrations of any toxic gases below the relevant IDLH levels (Immediately Dangerous to Life or Health), it is therefore possible to calculate the potential toxic hazard presented by this material. Such calculations would need to assume that the *dispersal volume in which the product is installed is 700m<sup>3</sup> for Stations*.

Following assumptions would also need to be made:

*The single material is the sole contributor to the fire atmosphere.*

*All of the Nitrogen and sulphur in the material would convert to Hydrogen cyanide, i.e. 100% conversion of nitrogen to hydrogen cyanide.*

*Size of Fire region is 1.25m<sup>2</sup> fixed locations (stations).*

*The specific density of the material is 1.68g/cm<sup>3</sup>*

**Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.**



Hence, the expected concentrations of hydrogen cyanide and sulphur dioxide is calculated, according to "Users Guide to the LUL Code of Practice - Fire Safety of Materials Used in the Underground - Issue 1; 1994", which gives the following expected concentration of Hydrogen cyanide.

| Sample  | Expected concentration (ppm) | Location (ST/SU/v & p) |
|---------|------------------------------|------------------------|
| TSL0108 | HCN                          | 0.78                   |
|         | SO2                          | 7.73                   |

The total expected toxicity,  $T_x$ , is given by the equation:

$$T_{Total} = \sum \frac{C_N}{H_N}$$

Where,  $C_N$  = Concentration of any one toxic species, and  
 $H_N$  = IDLH for value for that toxic species.

The calculated values and the requirements are:

| Sample  | Total expected toxicity, $T_x$ | Requirements |
|---------|--------------------------------|--------------|
| TSL0108 | 0.09                           | <1.0         |

### 4.3 FLAMMABILITY

#### 4.3.1 FIRE PROPAGATION

| Sample reference | Fire propagation index, I | Subindex, $i_1$ | subindex, $i_2$ | Subindex, $i_3$ |
|------------------|---------------------------|-----------------|-----------------|-----------------|
| TSL0108          | 0                         | 0               | 0               | 0               |

See Appendix A for full results.

Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.



#### 4.3.2 SURFACE SPREAD OF FLAME

| Sample reference | Result  |
|------------------|---------|
| TSL0108          | Class 1 |

See Appendix A for full results

#### REQUIREMENTS:

| Requirements for Category:                      | Fire Propagation<br>(BS476: Part 6:<br>1989) | Surface Spread of<br>Flame (BS476:<br>Part 7: 1997) |
|-------------------------------------------------|----------------------------------------------|-----------------------------------------------------|
| ST/SU/v&p<br>(Station/Surface/vertical & prone) | $I < 12; i_1 < 6$                            | Class 1                                             |

The material, therefore, meet the flammability requirements for LUL Engineering Standard 2-01001-002: Issue A1: December 2003

## 5. CONCLUSION

The material described in Section 2.0 of this report meets the smoke emission, toxic fume emission and flammability requirements for Category ST/SU/v&p "Station/Surface/vertical & prone" of the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.

Fire testing of "Interpon D36 Polyester Powder Coating", in accordance  
with the London Underground Limited Engineering Standard  
2-01001-002: Issue A1: December 2003.



## OBSERVATIONS

SAMPLE REFERENCE TSL0108

TEST: BS6853: 1999: APPENDIX D8.6

### TEST 1.

| Time (min.sec) | Observations         |
|----------------|----------------------|
| 0.00 - 40.00   | Nothing significant. |

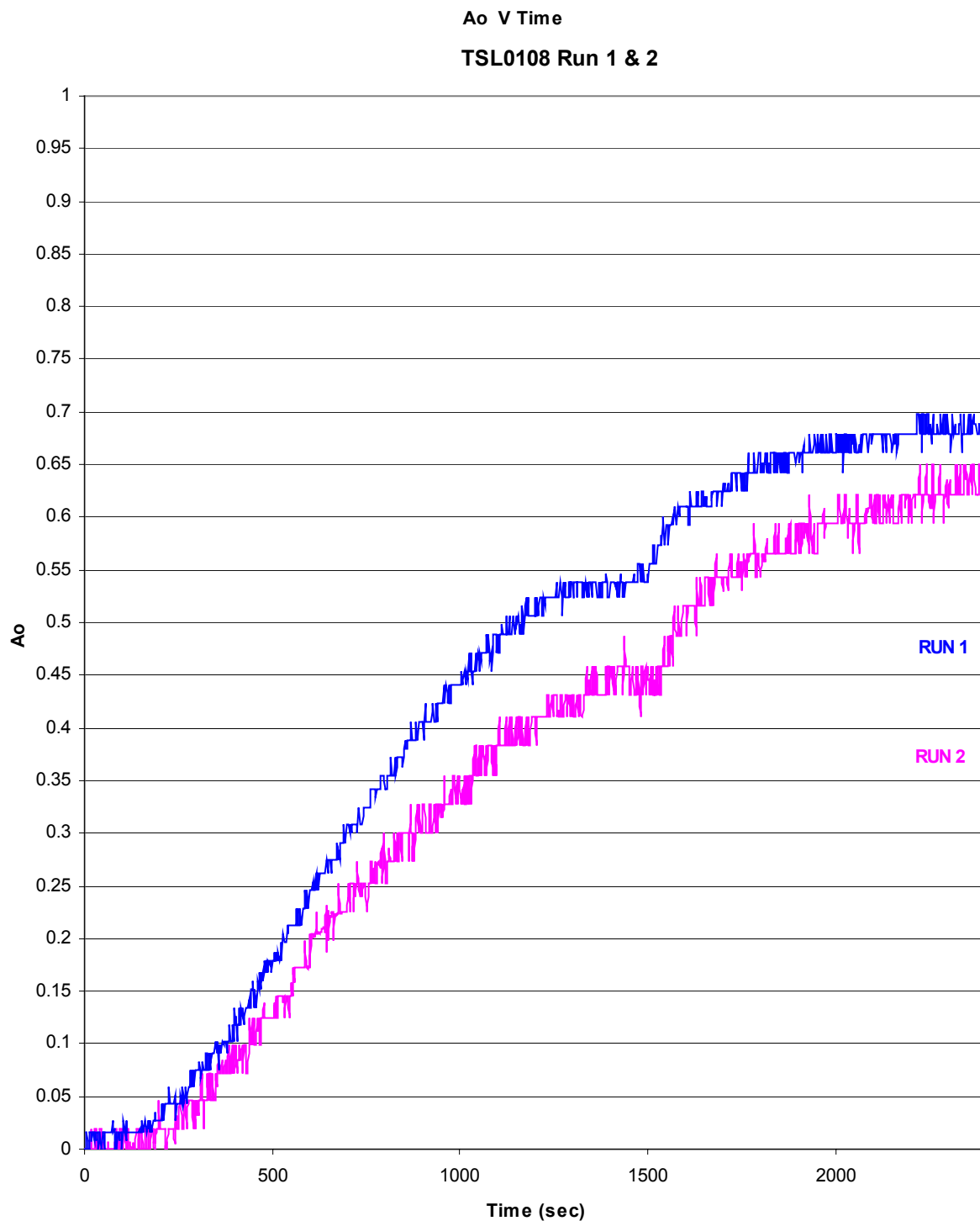
### TEST 2.

| Time (min.sec) | Observations         |
|----------------|----------------------|
| 0.00 - 40.00   | Nothing significant. |

Fire testing of "Interpon D36 Polyester Powder Coating", in accordance  
with the London Underground Limited Engineering Standard  
2-01001-002: Issue A1: December 2003.



Figure 1: Variation of Absorbance (Ao) with two specimens  
(Specimen No.2)



Fire testing of "Interpon D36 Polyester Powder Coating", in accordance  
with the London Underground Limited Engineering Standard  
2-01001-002: Issue A1: December 2003.



Figure 2: Variation of Absorbance ( $A_o$ ) with time (specimen No: 2)

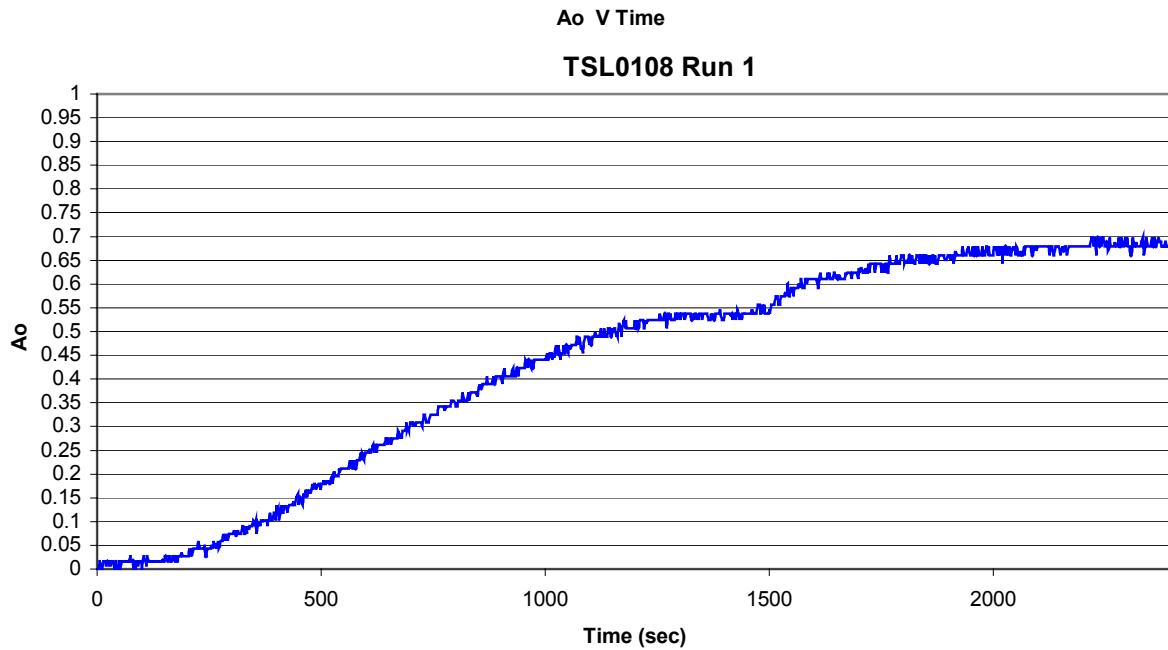


Figure 3: Variation of Absorbance ( $A_o$ ) with time (specimen No: 2)

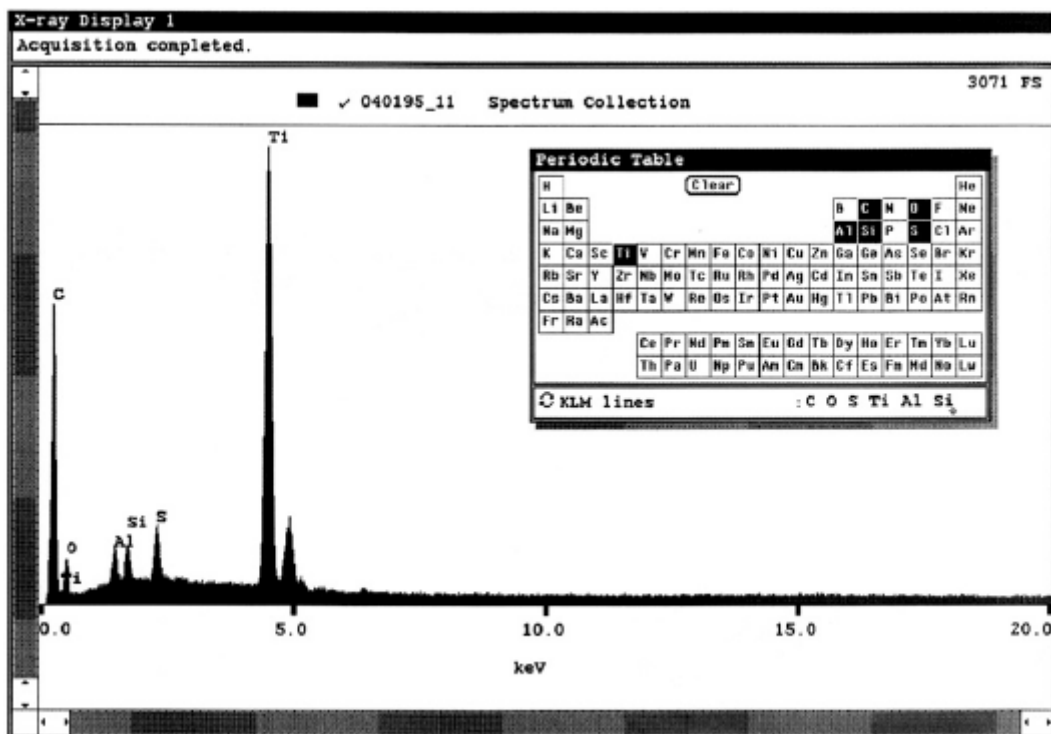


Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.



Figure 4: X-ray spectrum for 'Interpon D36 Polyester Powder Coating'.

Laboratory sample reference TSL0108



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**Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.**

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## **Appendix A**

### **Test Data**

**(BS476: Part 6 : 1987 and BS476: Part 7: 1997)**

Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.



## TEST DATA

### FIRE PROPAGATION TEST – BS476: PART 6: 1989

#### SPECIMEN No. 1

| TIME/MINS<br>INDEX OF<br>PERFORMANCE | SPECIMEN         | CALIBRATION<br>TEMPERATURE | TEMPERATURE                 | SUB    |
|--------------------------------------|------------------|----------------------------|-----------------------------|--------|
| (t)                                  | DEG C $\Theta_s$ | Deg C $\Theta_c$           | $\Theta_s - \Theta_c / 10t$ |        |
| 0.50                                 | 12.1             | 13.9                       | -0.4                        |        |
| 1.00                                 | 17.6             | 19.9                       | -0.2                        |        |
| 1.50                                 | 22.2             | 26.1                       | -0.3                        |        |
| 2.00                                 | 27.4             | 30.8                       | -0.2                        |        |
| 2.50                                 | 30.6             | 34.7                       | -0.2                        |        |
| 3.00                                 | 34.4             | 38.1                       | -0.1                        | S1 = 0 |
| 4.00                                 | 54.6             | 61.0                       | -0.2                        |        |
| 5.00                                 | 82.4             | 90.9                       | -0.2                        |        |
| 6.00                                 | 105.2            | 114.0                      | -0.1                        |        |
| 7.00                                 | 126.1            | 136.2                      | -0.1                        |        |
| 8.00                                 | 143.3            | 154.6                      | -0.1                        | S2 = 0 |
| 9.00                                 | 156.8            | 169.4                      | -0.1                        |        |
| 10.00                                | 172.9            | 180.5                      | -0.1                        |        |
| 12.00                                | 193.8            | 201.4                      | -0.1                        |        |
| 14.00                                | 209.8            | 212.5                      | 0.0                         |        |
| 16.00                                | 215.9            | 221.1                      | 0.0                         |        |
| 18.00                                | 224.5            | 227.2                      | 0.0                         |        |
| 20.00                                | 228.2            | 232.2                      | 0.0                         | S3 = 0 |
|                                      |                  |                            |                             | S = 0  |
|                                      | SUB INDEX S1 =   | 0                          |                             |        |
|                                      | SUB INDEX S2 =   | 0                          |                             |        |
|                                      | SUB INDEX S3 =   | 0                          |                             |        |
| INDEX OF PERFORMANCE =               |                  | 3.14                       |                             |        |

Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.



# TEST DATA

## FIRE PROPAGATION TEST – BS476: PART 6: 1989

### SPECIMEN No. 2

| TIME/MINS<br>INDEX OF<br>PERFORMANCE | SPECIMEN               | CALIBRATION<br>TEMPERATURE | TEMPERATURE                 | SUB    |
|--------------------------------------|------------------------|----------------------------|-----------------------------|--------|
| (t)                                  | DEG C $\Theta_s$       | Deg C $\Theta_c$           | $\Theta_s - \Theta_c / 10t$ |        |
| 0.50                                 | 12.6                   | 13.9                       | -0.3                        |        |
| 1.00                                 | 17.7                   | 19.9                       | -0.2                        |        |
| 1.50                                 | 23.0                   | 26.1                       | -0.2                        |        |
| 2.00                                 | 27.4                   | 30.8                       | -0.2                        |        |
| 2.50                                 | 31.6                   | 34.7                       | -0.1                        |        |
| 3.00                                 | 34.2                   | 38.1                       | -0.1                        | S1 = 0 |
| 4.00                                 | 54.9                   | 61.0                       | -0.2                        |        |
| 5.00                                 | 82.1                   | 90.9                       | -0.2                        |        |
| 6.00                                 | 105.4                  | 114.0                      | -0.1                        |        |
| 7.00                                 | 127.5                  | 136.2                      | -0.1                        |        |
| 8.00                                 | 146.0                  | 154.6                      | -0.1                        | S2 = 0 |
| 9.00                                 | 162.0                  | 169.4                      | -0.1                        |        |
| 10.00                                | 175.6                  | 180.5                      | 0.0                         |        |
| 12.00                                | 197.7                  | 201.4                      | 0.0                         |        |
| 14.00                                | 210.0                  | 212.5                      | 0.0                         |        |
| 16.00                                | 217.4                  | 221.1                      | 0.0                         |        |
| 18.00                                | 222.3                  | 227.2                      | 0.0                         |        |
| 20.00                                | 228.5                  | 232.2                      | 0.0                         | S3 = 0 |
|                                      |                        |                            |                             | S = 0  |
|                                      | SUB INDEX S1 =         | 0                          |                             |        |
|                                      | SUB INDEX S2 =         | 0                          |                             |        |
|                                      | SUB INDEX S3 =         | 0                          |                             |        |
|                                      | INDEX OF PERFORMANCE = | 0                          |                             |        |

Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.



## TEST DATA

### FIRE PROPAGATION TEST – BS476: PART 6: 1989

#### SPECIMEN No. 3

| TIME/MINS<br>INDEX OF<br>PERFORMANCE | SPECIMEN               | CALIBRATION<br>TEMPERATURE | TEMPERATURE                 | SUB    |
|--------------------------------------|------------------------|----------------------------|-----------------------------|--------|
| (t)                                  | DEG C $\Theta_s$       | Deg C $\Theta_c$           | $\Theta_s - \Theta_c / 10t$ |        |
| 0.50                                 | 12.2                   | 13.9                       | -0.3                        |        |
| 1.00                                 | 17.2                   | 19.9                       | -0.3                        |        |
| 1.50                                 | 22.3                   | 26.1                       | -0.3                        |        |
| 2.00                                 | 26.7                   | 30.8                       | -0.2                        |        |
| 2.50                                 | 29.9                   | 34.7                       | -0.2                        |        |
| 3.00                                 | 33.8                   | 38.1                       | -0.1                        | S1 = 0 |
| 4.00                                 | 55.7                   | 61.0                       | -0.1                        |        |
| 5.00                                 | 85.0                   | 90.9                       | -0.1                        |        |
| 6.00                                 | 107.9                  | 114.0                      | -0.1                        |        |
| 7.00                                 | 128.8                  | 136.2                      | -0.1                        |        |
| 8.00                                 | 147.2                  | 154.6                      | -0.1                        | S2 = 0 |
| 9.00                                 | 163.2                  | 169.4                      | -0.1                        |        |
| 10.00                                | 171.9                  | 180.5                      | -0.1                        |        |
| 12.00                                | 202.6                  | 201.4                      | 0.0                         |        |
| 14.00                                | 212.5                  | 212.5                      | 0.0                         |        |
| 16.00                                | 216.2                  | 221.1                      | 0.0                         |        |
| 18.00                                | 221.1                  | 227.2                      | 0.0                         |        |
| 20.00                                | 228.5                  | 232.2                      | 0.0                         | S3 = 0 |
|                                      |                        |                            |                             | S = 0  |
|                                      | SUB INDEX S1 =         | 0                          |                             |        |
|                                      | SUB INDEX S2 =         | 0                          |                             |        |
|                                      | SUB INDEX S3 =         | 0                          |                             |        |
|                                      | INDEX OF PERFORMANCE = | 0                          |                             |        |

Fire testing of "Interpon D36 Polyester Powder Coating", in accordance with the London Underground Limited Engineering Standard 2-01001-002: Issue A1: December 2003.



## TEST DATA

### SURFACE SPREAD OF FLAME TEST – BS476: PART 7: 1997

| Specimen No.                                  | 1 | 2 | 3 | 4 | 5 | 6 |
|-----------------------------------------------|---|---|---|---|---|---|
| Maximum distance at 1.5 minutes (mm)          | 0 | 0 | 0 | 0 | 0 | 0 |
| Distance (mm)                                 |   |   |   |   |   |   |
| 75                                            |   |   |   |   |   |   |
| 165                                           |   |   |   |   |   |   |
| 190                                           |   |   |   |   |   |   |
| 215                                           |   |   |   |   |   |   |
| 240                                           |   |   |   |   |   |   |
| 265                                           |   |   |   |   |   |   |
| 290                                           |   |   |   |   |   |   |
| 375                                           |   |   |   |   |   |   |
| 455                                           |   |   |   |   |   |   |
| 500                                           |   |   |   |   |   |   |
| 525                                           |   |   |   |   |   |   |
| 600                                           |   |   |   |   |   |   |
| 675                                           |   |   |   |   |   |   |
| 710                                           |   |   |   |   |   |   |
| 750                                           |   |   |   |   |   |   |
| 785                                           |   |   |   |   |   |   |
| 825                                           |   |   |   |   |   |   |
| 900                                           |   |   |   |   |   |   |
| Maximum distance travelled in 10 minutes (mm) | 0 | 0 | 0 | 0 | 0 | 0 |

**Observations made during test and comments on any difficulties encountered during the test.**

No ignition was observed.

Workflow Commands:

Edit/Display Options: 

Print

Product Description

ProductID=1902; Status=Authorised For Use; Title=Interpon D1036

Displaying

ProductID: 1902

Status: Authorised For Use

Supersedes ProductID:

Superseded By ProductID:

Uniclass 2015 Code: P100000000

Uniclass Description: Legacy Product - Authorised before Uniclass2015 implementation

Product Title: Interpon D1036

Primary Use: Architectural grade powder coating for general use within stations, above and below ground.

Additional Info/KeyWords: Alzo Powder Coatings Ltd, Stonegate Lane, Felling, Tyne & Wear, NE10 0JY. Tel: 0191 489 8111.  
www.interpon.co.uk Complies with LU Standard 1-385 'Fire Safety Performance of Materials'. Potential use includes cladding and metal ceilings.

Asset Classification: Premises

Manufacturer: Alzo Nobel Powder Coatings Ltd

Manufacturers Version No:

APR Version No: 0

Is Undergoing Trial: No

Proposer: Derek McGovern (derek.mcgovern@tube.tfl.gov.uk)

Sponsor: Sam Sambasivan (sam.sambasivan@tube.tfl.gov.uk)

Acceptance Manager: Sam Sambasivan (sam.sambasivan@tube.tfl.gov.uk)

Date Authorised For Use: 19 Sep 2012

Allocated To:

Requirements

| Requirement ID         | Requirement Description | Status | Is Trailing | Allocated To |
|------------------------|-------------------------|--------|-------------|--------------|
| No records to display. |                         |        |             |              |

Conditions

| ConditionID            | ReqID | Condition Description |
|------------------------|-------|-----------------------|
| No records to display. |       |                       |

Evidence

| EvidenceItemID         |      | RequirementID | EvidenceType  | EvidenceText                             | EvidenceType                          | IsPublic        |
|------------------------|------|---------------|---------------|------------------------------------------|---------------------------------------|-----------------|
| No records to display. |      |               |               |                                          |                                       |                 |
| Available Files        |      |               |               |                                          |                                       |                 |
| Download               | 6071 | RequirementID | User Guide    | Technical Data Sheet - Gloss             | InterponD1036GLOSS.pdf                | application/pdf |
| Download               | 6072 | RequirementID | User Guide    | Technical Data Sheet - Satin             | InterponD1036SATIN.pdf                | application/pdf |
| Download               | 6073 | RequirementID | User Guide    | Technical Data Sheet - Matt              | InterponD1036Matt_30_IssueAug2011.pdf | application/pdf |
| Download               | 6080 | RequirementID | Specification | British Board of Agreement Certification | BSAInterponD1036Dec07.pdf             | application/pdf |

Event Log

| Date/Time           | Person                                          | Status             | Type                     | Data                                          |
|---------------------|-------------------------------------------------|--------------------|--------------------------|-----------------------------------------------|
| 19/09/2012 10:20:13 | Terry Price (terry.price@tube.tfl.gov.uk)       | Authorised For Use | Authorise New Product    |                                               |
| 19/09/2012 10:16:30 | Sam Sambasivan (sam.sambasivan@tube.tfl.gov.uk) | Accepted           | Accept Product           |                                               |
| 19/09/2012 10:15:05 | Terry Price (terry.price@tube.tfl.gov.uk)       | Waiting            | Start Acceptance Project |                                               |
| 18/09/2012 16:56:49 | Sam Sambasivan (sam.sambasivan@tube.tfl.gov.uk) | With Admin Manager | Support Proposal         |                                               |
| 04/09/2012 13:42:09 | Derek McGovern (derek.mcgovern@tube.tfl.gov.uk) | With Sponsor       | Submit Proposal          |                                               |
| 04/09/2012 13:25:46 | Derek McGovern (derek.mcgovern@tube.tfl.gov.uk) | Updated            | Updated EvidenceItem     | EvidenceItemID=6082 (File Contents Unchanged) |
| 04/09/2012 13:24:54 | Derek McGovern (derek.mcgovern@tube.tfl.gov.uk) | Updated            | Updated EvidenceItem     | EvidenceItemID=6081 (File Contents Unchanged) |

# RAPPORT DE CLASSEMENT EUROPEEN DE REACTION AU FEU

## REACTION TO FIRE EUROPEAN CLASSIFICATION REPORT

**N° RA18-0083**

Selon l'Arrêté du 21 novembre 2002 modifié relatif à la Réaction au Feu  
des produits de construction et d'aménagement  
Laboratoire pilote agréé par le ministère de l'intérieur (Arrêté du 5 février 1959 modifié)  
*According to the modified Ordinance dated November 21<sup>st</sup>, 2002 as regards the Reaction to Fire performance  
of construction and installation products  
Pilot laboratory approved by the Ministry of the Interior (Ordinance of February 5<sup>th</sup>, 1959 modified)*

**Valable 5 ans à compter du 16 février 2018**  
*Valid 5 years from February 16<sup>th</sup>, 2018*

**A la demande de :**  
*Owner:*

**AKZO NOBEL POWDER COATINGS SNC**  
Zone Industrielle de la Gaudrée  
91410 DOURDAN  
FRANCE

**Marque(s) commerciale(s) :**  
*Commercial brand(s):*

**INTERPON POLYESTER Coatings**

**Description sommaire :**  
*Brief description:*

**Peinture appliquée sur support tôle d'aluminium**  
*Paint applied on aluminium sheet substrate*

**Date du rapport :**  
*Date of issue:*

**19 avril 2018**  
*April 19<sup>th</sup>, 2018*

Ce rapport de classement atteste uniquement des caractéristiques de l'objet soumis aux essais et ne préjuge pas des caractéristiques de produits similaires. Il ne constitue pas une certification de produits au sens du code de la consommation. Seul le rapport électronique signé avec un certificat numérique valide fait foi en cas de litige. Ce rapport électronique est conservé au CSTB pendant une durée minimale de 10 ans. La reproduction de ce rapport électronique n'est autorisée que sous sa forme intégrale. Seule la version française fait foi. Il comporte 5 pages.

*This classification report certifies only the characteristics of the object submitted for testing but does not prejudice the characteristics of similar products. So it does not constitute a product certification in the sense of the Consumer Code. Only the electronic report signed with a valid digital certificate is taken in the event of litigation. The electronic report is kept at CSTB for a minimum period of 10 years. The reproduction of this electronic report is only authorized in its integral form. Only the French version is authentic. It comprises 5 pages.*

## Rapport de classement / Classification report n° RA18-0083

### 1. Introduction / Introduction

Ce rapport de classement définit le classement attribué au(x) produit(s) précité(s) conformément aux procédures données dans la norme NF EN 13501-1+A1:2013.

*This classification report defines the classification assigned to the above-mentioned product(s) in accordance with the procedures given in the NF EN 13501-1+A1:2013 standard.*

### 2. Description du produit / Product description

Peinture en poudre thermodurcissable à base de résine polyester et de charges minérales, essayée appliquée sur support tôle en aluminium classée A1 d'épaisseur 0,8 mm.

*Thermosetting powder paint made of polyester resin and mineral fillers, tested applied on A1 class aluminium sheet substrate with a thickness of 0,8 mm.*

|                                                      |                                                                                                                         |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Densité sèche nominale<br><i>Nominal dry density</i> | 1200 à 1700 kg/m <sup>3</sup> (selon le coloris)<br><i>From 1200 to 1700 kg/m<sup>3</sup> (according to the colour)</i> |
| Epaisseur nominale<br><i>Nominal thickness</i>       | 60 à 90 µm<br><i>From 60 to 90 µm</i>                                                                                   |
| Extrait sec nominal<br><i>Nominal dry extract</i>    | 100 %                                                                                                                   |
| Coloris / colours                                    | Divers / Various                                                                                                        |

## Rapport de classement / Classification report n° RA18-0083

### 3. Rapports d'essais et résultats d'essais en appui du classement Test reports and test results in support of classification

#### 3.1 Rapports d'essais / Test reports

| Nom du laboratoire<br><i>Name of laboratory</i> | Nom du demandeur<br><i>Name of sponsor</i>                                                   | Identification de l'essai<br><i>Test identification</i> | N° du rapport d'essai<br><i>Test report No.</i> | Méthode d'essai<br><i>Test method</i>      |
|-------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------|--------------------------------------------|
| CSTB                                            | AKZO NOBEL POWDER COATINGS SNC<br>Zone Industrielle de la Gaudrée<br>91410 DOURDAN<br>FRANCE | ES541170363                                             | RA18-0083                                       | NF EN 13823+A1:2015<br>NF EN ISO 1716:2013 |

#### 3.2 Résultats d'essais / Test results

| Méthode d'essai<br><i>Test method</i> | Produit<br><i>Product</i>                                   | Nombre d'épreuves<br><i>Number of tests</i> | Paramètres<br><i>Parameters</i>                                                                 | Résultats / <i>Results</i>                                               |                                                       |
|---------------------------------------|-------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------|
|                                       |                                                             |                                             |                                                                                                 | Paramètres continus Moyennes<br><i>Continuous parameters Mean values</i> | Paramètres conformité<br><i>Compliance parameters</i> |
| NF EN 13823+A1                        | INTERPON POLYESTER Coatings                                 | 3                                           | FIGRA <sub>0,2MJ</sub> (W/s)<br>FIGRA <sub>0,4MJ</sub> (W/s)<br>LFS<br>THR <sub>600s</sub> (MJ) | 76,3<br>30,2<br>-<br>0,9                                                 | -<br>-<br>Non atteint<br>Not reached<br>-             |
|                                       |                                                             |                                             | SMOGRA(m <sup>2</sup> /s <sup>2</sup> )<br>TSP <sub>600s</sub> (m <sup>2</sup> )                | 3,5<br>26,5                                                              | -<br>-                                                |
|                                       |                                                             |                                             | Gouttelettes ou particules enflammées<br><i>Flaming droplets or debris</i>                      | -                                                                        | Aucune<br>None                                        |
| NF EN ISO 1716                        | Produit dans son intégralité<br><i>Product on its whole</i> | 3                                           | Q <sub>PCS</sub> (MJ/m <sup>2</sup> )                                                           | 3,1                                                                      | -                                                     |

Le (-) signifie : non applicable / (-) means: not applicable

## Rapport de classement / Classification report n° RA18-0083

### 4. Classement et domaine d'application / Classification and direct field of application

#### 4.1 Référence du classement / Reference of the classification

Le classement est prononcé suivant la norme NF EN 13501-1+A1:2013.

*This classification has been carried out in accordance with the NF EN 13501-1+A1:2013 standard.*

#### 4.2 Classement / Classification

| Comportement<br>au feu<br><i>Fire behaviour</i> |   | Production de fumées<br><i>Smoke production</i> |   | Gouttes ou particules<br>enflammées<br><i>Flaming droplets or debris</i> |
|-------------------------------------------------|---|-------------------------------------------------|---|--------------------------------------------------------------------------|
| <b>A2</b>                                       | - | <b>s1</b>                                       | , | <b>d0</b>                                                                |

**Classement / Classification : A2 - s1, d0**

#### 4.3 Domaine d'application / Field of application

Le classement est valable pour les paramètres produits suivants :

*This classification is valid for the following product parameters:*

|                                                      |                                                                                                                         |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Densité sèche nominale<br><i>Nominal dry density</i> | 1200 à 1700 kg/m <sup>3</sup> (selon le coloris)<br><i>From 1200 to 1700 kg/m<sup>3</sup> (according to the colour)</i> |
| Epaisseur nominale<br><i>Nominal thickness</i>       | 60 à 90 µm<br><i>From 60 to 90 µm</i>                                                                                   |
| Extrait sec nominal<br><i>Nominal dry extract</i>    | 100 %                                                                                                                   |
| Coloris / <i>colours</i>                             | Divers / <i>Various</i>                                                                                                 |

Le classement est valable pour les conditions d'utilisation finales suivantes :

*This classification is valid for the following end use conditions:*

|                            |                                                                                                                                                                                                                                                                                                              |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Support / <i>Substrate</i> | Le produit appliqué sur tout substrat métallique classé A1 de masse volumique $\geq 2025$ kg/m <sup>3</sup> et d'épaisseur $\geq 0,8$ mm<br><i>The product applied on any A1 class metal substrate with a density <math>\geq 2025</math> kg/m<sup>3</sup> and with a thickness <math>\geq 0.8</math> mm.</i> |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Rapport de classement / Classification report n° RA18-0083

### 5. Limitations / Limitations

Le présent document de classement n'est pas une approbation ni une certification de type du produit.  
*The present document does not represent type approval or certification of the product.*

Fait à Champs-sur-Marne, le 19 avril 2018  
*Prepared at Champs-sur-Marne, April 19<sup>th</sup>, 2018*

**Le Responsable de l'activité  
Réaction au Feu**  
***The Head of Reaction to Fire Activity***

**Martial BONHOMME**

Fin de rapport / End of the report