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# Review of Fire Test Report



A Report To: L'Isolante K-Flex S.p.A.

Document Reference: 352532

**Date:** 1<sup>st</sup> June 2015

**Issue No.:** 1

Page 1

Testing  
Advising  
Assuring



## Executive Summary

**Objective** To review and extend the validity period of Exova Warringtonfire Test Report No: 191116 which details the method for measuring smoke density of the following product when tested in accordance with BS 6853:1999 Appendix D, Clause D.8.4.



Generic Description	Product reference	Thickness	Density
Acoustical insulation high mass material, polymer based, made from rubber, thermoplastics, fillers, flame retarders	"K-FONIK GV"	2±0.2 mm	2000±100 kg/m <sup>3</sup>
<b>Please see page 4 of this test report for the full description of the product tested</b>			

**Test Sponsor** L'Isolante K-Flex S.p.A., Via Leonardo da Vinci 36, 20877 Roncello (MB) Italy.

**Conclusion** With respect to test report WF No. 191116, its contents shall remain valid until 1<sup>st</sup> March 2020.  
This review should be read in conjunction with test report WF No. 191116.

**Date of Test** 2<sup>nd</sup> & 5<sup>th</sup> March 2010

## Signatories

	
Responsible Officer T. Kinder * Technical Officer	Authorised S. Deeming * Business Unit Head

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

Report Issued: 1<sup>st</sup> June 2015

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## Test Details

**Introduction** Test report WF No. 191116 relates to a test performed in accordance with the procedures defined in BS 6853:1999 Appendix D, Clause D.8.4, " Code Of Practice For Fire Precautions In The Design And Construction Of Passenger Carrying Trains Methods For Measuring Smoke Density ".

General description	Acoustical insulation high mass material, polymer based, made from rubber, thermoplastics, fillers, flame retarders
Product reference	"K-FONIK GV"
Detailed description / composition details	EPDM rubber, thermoplastics, mineral fillers and flame retarders
Name of manufacturer	L'Isolante K-Flex Srl Via Leonardo da Vinci, 36 20040 RONCELLO (MI) Italy
Density	2000±100 kg/m <sup>3</sup> (stated by sponsor) 2258.61kg/m <sup>3</sup> (determined by <b>Exova Warringtonfire</b> )
Thickness	2±0.2 mm (stated by sponsor) 1.58mm (determined by <b>Exova Warringtonfire</b> )
Colour	"Grey"
Trade name of flame retardant	<b>See Note 1 below</b>
Generic type of flame retardant	ATH, magnesium hydroxide
Amount of flame retardant	<b>See Note 1 below</b>
Brief description of manufacturing process	Masterbatch mixed in bambury, production in calender.

**Note 1: The sponsor of the test was unwilling to provide this information**

## Test Results

Test report WF No. 191116 contains the following results:

	Specimen No. 1	Specimen No. 2	Specimen No. 3	Average
A <sub>o</sub> (ON)	0.356 (X)*	0.630 (X)*	0.500 (X)*	0.495 (X)*
A <sub>o</sub> (OFF)	0.507 (X)*	0.840 (X)*	0.710 (X)*	0.686 (X)*

Standard Deviation

A<sub>o</sub> (ON) = 0.137

A<sub>o</sub> (OFF) = 0.168

Initially two specimens were tested. However due to the variation of the first two results exceeding 20%, a third specimen was tested as required by paragraph D.8.2 of BS 6853: 1999 Incorporating Amendment 1. The mean value of all three results is quoted above and should be used to establish the category of performance.

\* In the case of each specimen tested, a hole formed in the vicinity of the flames from the second minute of the test and as a result the flame from the fire source passed straight through the hole and did not impinge on the surface of the product. An 'X' suffix has been appended to the results as such behaviour is deemed to be unusual or unsatisfactory by Section D.8.9 of the test standard.

## Confirmation of Specification

Subsequent to the issue of the original test report, a representative of the sponsor of the test has stated that the sponsor has changed the name of the company. The correct name of the company is now L'Isolante K-Flex S.p.A.. The new company name is referred to in this review report.

It has been confirmed in writing by L'Isolante K-Flex S.p.A. that there have been no changes to the product description contained within test report WF No. 191116 and that the product which is currently being manufactured is identical in every respect to the specimens which were tested.

It has also been confirmed in writing that no further fire testing of the previously fire tested specification has been performed since the issue of the test report, and no other individual or organisation has been asked to provide a technical review of the reports.

## Conclusions

The procedures adopted for the original test (BS 6853:1999 Annex D.8.4) have been re-examined and are identical in all respects to those currently in use (BS 6853:1999 Annex D.8.4), therefore, with respect to test report WF No. 191116; its contents shall remain valid until 1<sup>st</sup> March 2020.

This review should be read in conjunction with test report WF No. 191116.

## Validity

This review is based on information used in the original test report. No other information or data has been submitted by L'Isolante K-Flex S.p.A., which could affect this review.

## Revision History

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

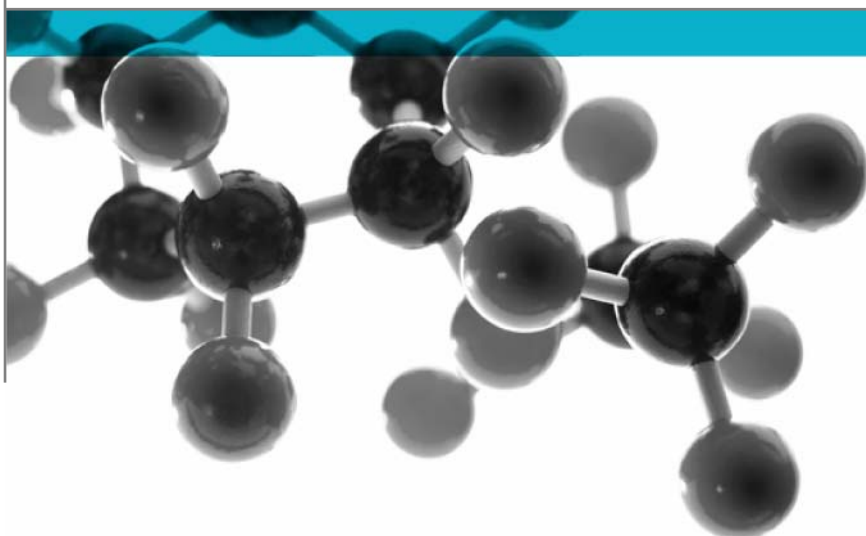
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# BS 6853: 1999 Appendix D, Clause D.8.4



## Methods For Measuring Smoke Density

A Report To: L'Isolante K-Flex Srl

Document Reference: 191116

Date: 16<sup>th</sup> March 2010

Issue No.: 1

Page 1

Testing  
Advising  
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**Exova Warringtonfire**

**Test Report No. 191116**

**BS 6853: 1999 Appendix D, Incorporating Amendment  
1, Clause D.8.4**

**Code Of Practice For Fire Precautions  
In The Design And Construction Of  
Passenger Carrying Trains**

**Methods For Measuring Smoke Density**

**Sponsored By**

**L'isolante K- Flex Srl  
Sede Legale, Uffici E Stabilimento:  
Via Leonardo Da Vinci 36  
20040 Roncello  
Milan  
Italy**

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Document No.: 191116

Page No.: 2 of 17

Author: T. Mort

Issue Date: 16<sup>th</sup> March 2010

Client: L'isolante K-Flex Srl

Issue No.: 1



0249



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## Test Details

<b>Purpose of test</b>	<p>To determine the performance of a specimen when it is subjected to the conditions of test specified in BS 6853: 1999, Incorporating Amendment 1, "Code of practice for fire precautions in the design and construction of passenger carrying trains" Annex D.8.4 "Panel test".</p> <p>The test was performed in accordance with the procedure specified in BS 6853: 1999, Incorporating Amendment 1, Appendix D, Clause D.8.4 and this report should be read in conjunction with that Standard. Restraining clips were used to prevent excessive movement of the test specimen.</p>
<b>Scope of test</b>	<p>BS 6853: 1999, Incorporating Amendment 1, Annex D.8.4 details a test procedure, the results being expressed as <math>A_{O}</math> (ON) and <math>A_{O}</math> (OFF) values, for the measurement of the density of smoke emitted from a panel burning under the defined conditions of test. The results are used to determine compliance with the criteria given in BS 6853: 1999, Incorporating Amendment 1, Table 2, 3, 5, 6 and 10 and the requirements specified in these tables are detailed in Appendix 3.</p>
<b>Fire test study group/EGOLF</b>	<p>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 has 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.</p>
<b>Instruction to test</b>	<p>The test was conducted on the 2<sup>nd</sup> and 5<sup>th</sup> March 2010 at the request of L'Isolante K-Flex Srl, the sponsor of the test.</p>
<b>Provision of test specimens</b>	<p>The specimens were supplied by the sponsor of the test. <b>Exova Warringtonfire</b> was not involved in any selection or sampling procedure.</p>
<b>Conditioning of specimens</b>	<p>The specimens were received on the 23<sup>rd</sup> February 2010.</p> <p>The test specimens were conditioned by maintaining them in indoor ambient conditions for 72 hours and then for a minimum of 16 hours at <math>23 \pm 2^{\circ}\text{C}</math> and a relative humidity of <math>50 \pm 5\%</math>.</p>
<b>Exposed face</b>	<p>One of two identical faces of the specimens was exposed to the flame.</p>

## 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	Acoustical insulation high mass material, polymer based, made from rubber, thermoplastics, fillers, flame retarders
Product reference	"K-FONIK GV"
Detailed description / composition details	EPDM rubber, thermoplastics, mineral fillers and flame retarders
Name of manufacturer	L'Isolante K-Flex Srl Via Leonardo da Vinci, 36 20040 RONCELLO (MI) Italy
Density	2000±100 kg/m <sup>3</sup> (stated by sponsor) 2258.61kg/m <sup>3</sup> (determined by <b>Exova Warringtonfire</b> )
Thickness	2±0.2 mm (stated by sponsor) 1.58mm (determined by <b>Exova Warringtonfire</b> )
Colour	Grey
Trade name of flame retardant	<b>See Note 1 below</b>
Generic type of flame retardant	ATH, magnesium hydroxide
Amount of flame retardant	<b>See Note 1 below</b>
Brief description of manufacturing process	Masterbatch mixed in bambury, production in calender.

**Note 1. The sponsor of the test was unwilling to provide this information**

## Test Results

**Applicability of test results** of 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.

	Specimen No. 1	Specimen No. 2	Specimen No. 3	Average
A <sub>0</sub> (ON)	0.356 (X)*	0.630 (X)*	0.500 (X)*	0.495 (X)*
A <sub>0</sub> (OFF)	0.507 (X)*	0.840 (X)*	0.710 (X)*	0.686 (X)*

Standard Deviation

A<sub>0</sub> (ON) = 0.137

A<sub>0</sub> (OFF) = 0.168

**Initially two specimens were tested. However due to the variation of the first two results exceeding 20%, a third specimen was tested as required by paragraph D.8.2 of BS 6853: 1999 Incorporating Amendment 1. The mean value of all three results is quoted above and should be used to establish the category of performance.**

**\* In the case of each specimen tested, a hole formed in the vicinity of the flames from the second minute of the test and as a result the flame from the fire source passed straight through the hole and did not impinge on the surface of the product. An 'X' suffix has been appended to the results as such behaviour is deemed to be unusual or unsatisfactory by Section D.8.9 of the test standard.**

Visual observations made during the test are given in Appendix 1, 2 and 3.

The changes in A<sub>0</sub> with time and % Transmittance with time were continuously recorded and graphs are presented in Figures 1, 2 and 3.

## 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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## Signatories

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Responsible Officer  
T. Mort \*  
Senior Technical Officer



Authorised  
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Operations Manager

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

*Report Issued: 16<sup>th</sup> March 2010*

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**Appendix 1**

## Observations during test of Specimen 1

- 00:01 Ignition of fire source, test commenced.
- 00:25 Blistering occurred on the surface of the specimen.
- 00:38 The specimen began to sag on the exposed surface.
- 00:58 The surface of the specimen began to discolour.
- 01:09 A hole formed in the vicinity of the flames measuring approximately 500mm x 400mm.
- 01:15 All of the flames are passing through the hole formed.
- 10:00 No change, the fire source continued to flame.
- 20:00 No change, the fire source continued to flame.
- 29:27 Fire source consumed. All flaming ceased.
- 40:00 Test terminated.

## Appendix 2

### Observations during test of Specimen 2

- 00:01 Ignition of fire source, test commenced.
- 00:22 Blistering occurred on the surface of the specimen.
- 00:40 The specimen began to sag on the exposed surface.
- 00:50 The surface of the specimen began to discolour.
- 01:16 A hole formed in the vicinity of the flames measuring approximately 500mm x 400mm.
- 01:17 All of the flames are passing through the hole formed.
- 10:00 No change, the fire source continued to flame.
- 20:00 No change, the fire source continued to flame.
- 29:31 Fire source consumed. All flaming ceased.
- 40:00 Test terminated.



**Appendix 3**

## Observations during test of Specimen 3

- 00:01 Ignition of fire source, test commenced.
- 00:23 Blistering occurred on the surface of the specimen.
- 00:34 The specimen began to sag on the exposed surface.
- 01:15 A hole formed in the vicinity of the flames measuring approximately 500mm x 400mm.
- 01:16 All of the flames are passing through the hole formed.
- 10:00 No change, the fire source continued to flame.
- 20:00 No change, the fire source continued to flame.
- 29:52 Fire source consumed. All flaming ceased.
- 40:00 Test terminated.

**Appendix 4**
**Table 2 of BS 6853:1999 – Interior Vertical Surfaces**

Test	Parameter	Pass / Fail Criteria		
		Vehicle Cat 1a	Vehicle Cat 1b	Vehicle Cat 2
BS 476: Part 6	Index I1 (max) Index I (max)	6 (VL surfaces: nc) 12 (VL surfaces: nc)	6 (VL surfaces: nc) 12 (VL surfaces: nc)	nc nc
BS 476: Part 7	Worst permissible Class	Class 1 (VL surfaces Class 2)	Class 1 (VL surfaces Class 2)	Class 1 (VL surfaces Class 2)
Annex D Panel Smoke test	A <sub>0</sub> (ON)	2.6	4.2	9.4
	A <sub>0</sub> (OFF)	3.9	6.3	14
Annex B Toxicity test	R (max)	1.0	1.6	3.6

Nc: no criterion, Note, values of A<sub>0</sub> are maxima

**Table 3 of BS 6853:1999 – Interior Horizontal Prone Surfaces**

Test	Parameter	Pass / Fail Criteria		
		Vehicle Cat 1a	Vehicle Cat 1b	Vehicle Cat 2
BS 476: Part 6	Index I1 (max) Index I (max)	6 (HPL surfaces: nc) 12 (HPL surfaces: nc)	6 (HPL surfaces: nc) 12 (HPL surfaces: nc)	nc nc
BS 476: Part 7	Worst permissible Class	Class 1 0mm <sup>a</sup> (HPL surfaces Class 1)	Class 1	Class 1
Annex D Panel Smoke test	A <sub>0</sub> (ON)	2.6	4.2	9.4
	A <sub>0</sub> (OFF)	3.9	6.3	14
Annex B Toxicity test	R (max)	1.0	1.6	3.6

Nc: no criterion, <sup>a</sup> No spread of flame, Note, values of A<sub>0</sub> are maxima

**Table 5 of BS 6853:1999 Exterior Vertical Surfaces**

Test	Parameter	Pass / Fail Criteria		
		Vehicle Cat 1a	Vehicle Cat 1b	Vehicle Cat 2
BS 476: Part 7	Worst permissible Class	Class 1 (VL surfaces Class 2)	Class 1 (VL surfaces Class 2)	Class 2
Annex D Panel Smoke test	A <sub>0</sub> (ON)	4.4	7.0	nc
	A <sub>0</sub> (OFF)	6.6	10.5	nc
Annex B Toxicity test	R (max)	1.7	2.7	nc

Nc: no criterion, Note, values of A<sub>0</sub> are maxima

**Table 6 of BS 6853:1999 Exterior Horizontal Prone Surfaces**

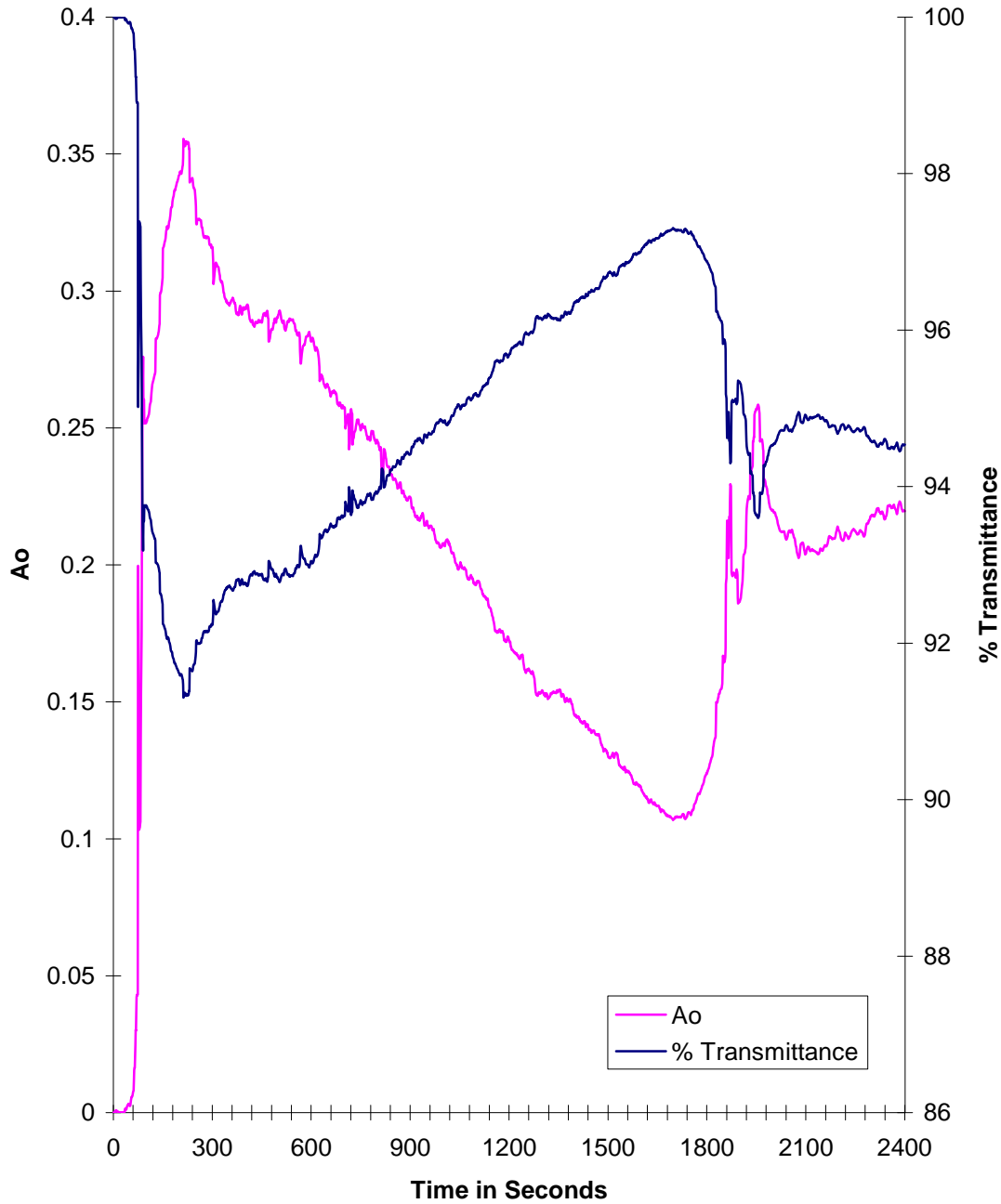
Test	Parameter	Pass / Fail Criteria		
		Vehicle Cat 1a	Vehicle Cat 1b	Vehicle Cat 2
BS 476: Part 7	Worst permissible Class	Class 1, 0mm <sup>a</sup> (HPL surfaces Class 1)	Class 1 (HPL surfaces Class 2)	Class 1 (HPL surfaces Class 2)
Annex D Panel Smoke test	A <sub>0</sub> (ON)	4.4	7.0	nc
	A <sub>0</sub> (OFF)	6.6	10.5	nc
Annex B Toxicity test	R (max)	1.7	2.7	nc
Nc: no criterion, <sup>a</sup> No spread of flame				

**Table 10 of BS 6853:1999 Seat Shell (Back and Base)**

Test	Parameter	Pass / Fail Criteria		
		Vehicle Cat 1a	Vehicle Cat 1b	Vehicle Cat 2
BS 476: Part 6	Index I1 (max)	6 (VL and HPL surfaces: nc)	6 (VL and HPL surfaces: nc)	nc
	Index I (max)	12 (VL and HPL surfaces: nc)	12 (VL and HPL surfaces: nc)	nc
BS 476: Part 7	Worst permissible Class	Class 1 (VL and HPL surfaces Class 2)	Class 1 (VL and HPL surfaces Class 2)	Class 1 (VL and HPL surfaces Class 2)
Annex D Panel Smoke test	A <sub>0</sub> (ON)	2.6	4.2	9.4
	A <sub>0</sub> (OFF)	3.9	6.3	14.0
Annex B Toxicity test	R (max)	1.0	1.6	3.6
Nc: no criterion, NOTE Values of A <sub>0</sub> are maxima				

Figure 1

**WF No: 191116 - Specimen No: 1**  
**Ao v Time and % Transmittance v Time**



**Figure 2**

**WF No: 191116 - Specimen No: 2**  
**Ao v Time and % Transmittance v Time**

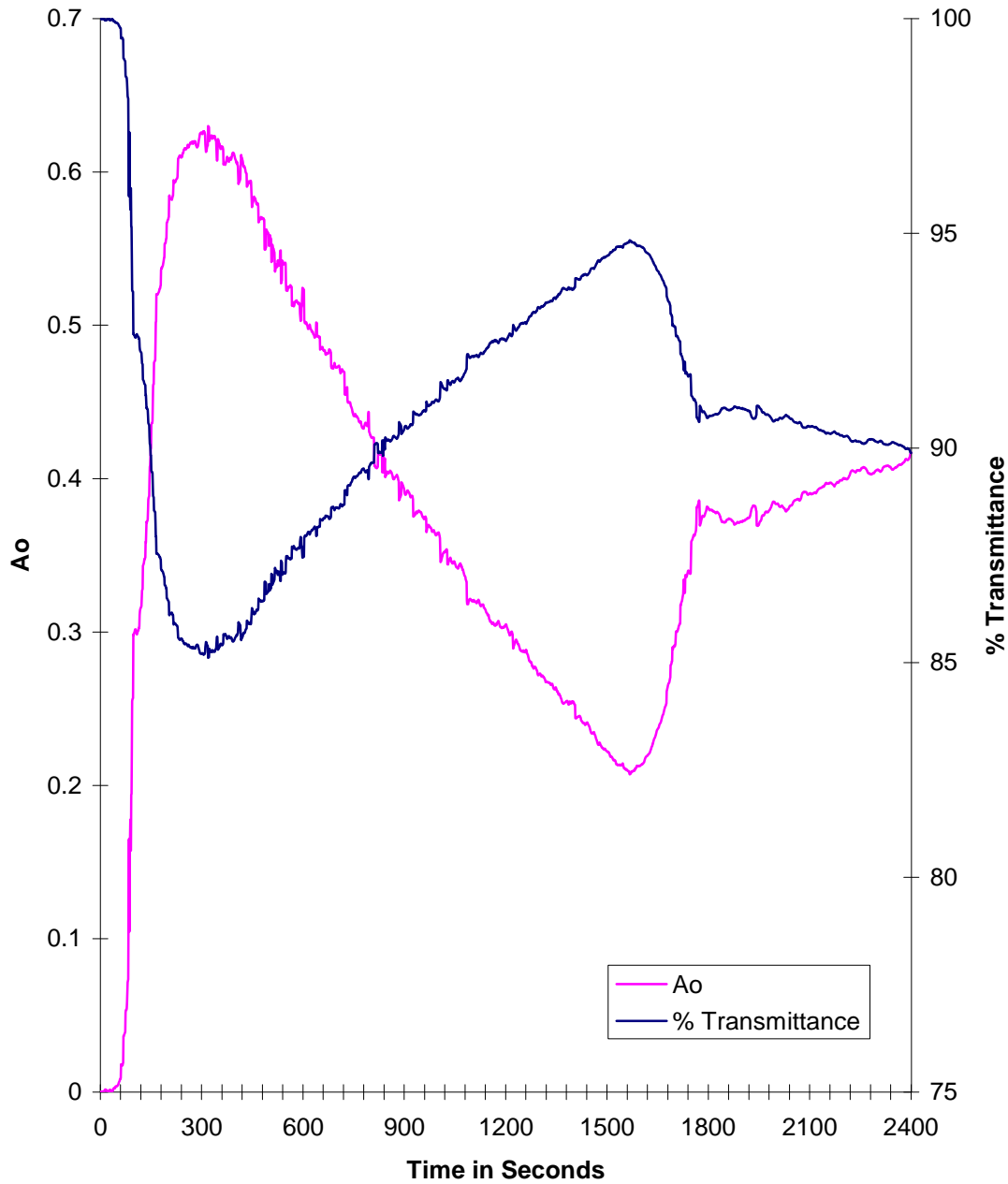
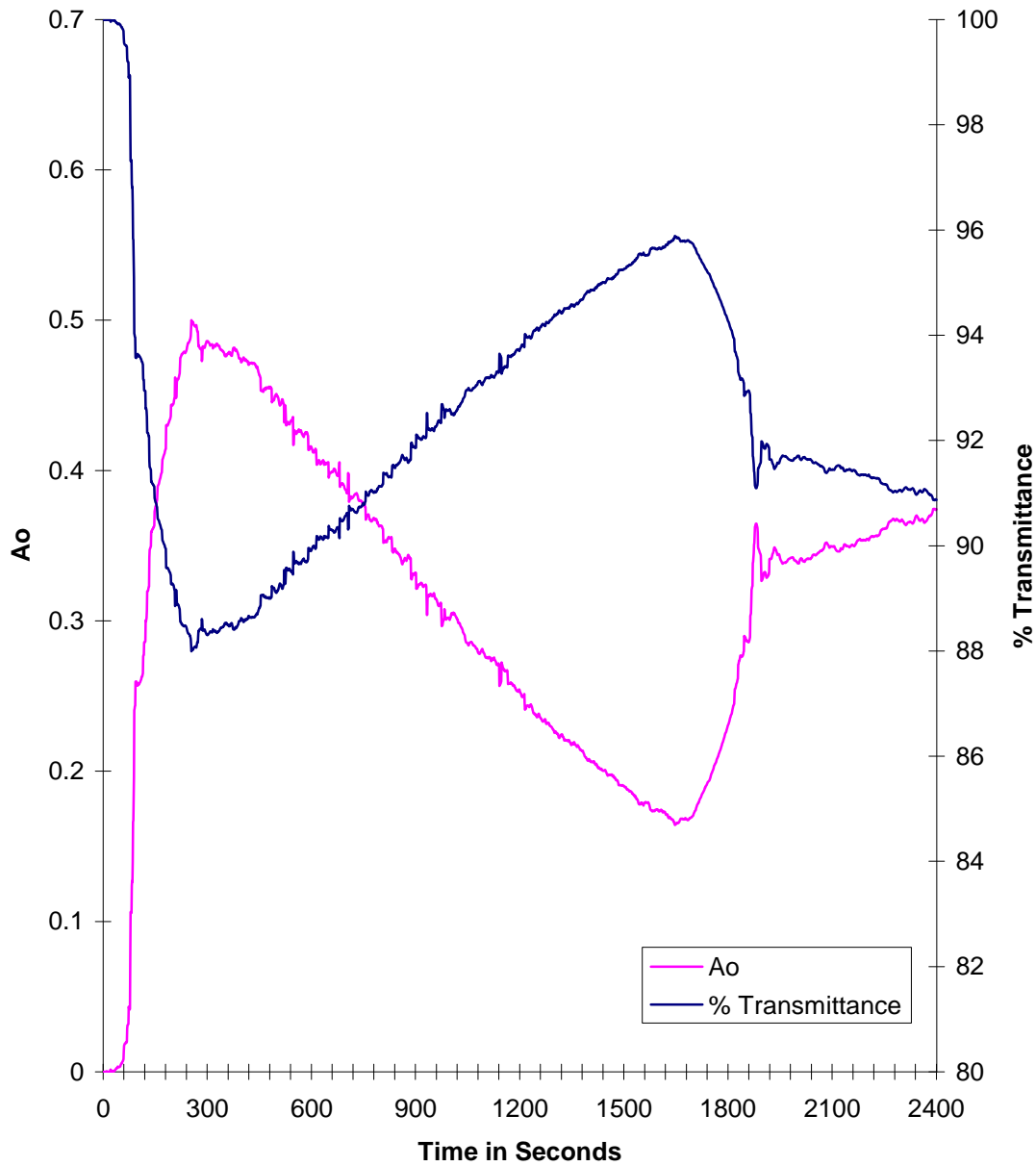


Figure 3

**WF No: 191116 - Specimen No: 3**  
**Ao v Time and % Transmittance v Time**



## Revision History

Issue No :	Issue Date:
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