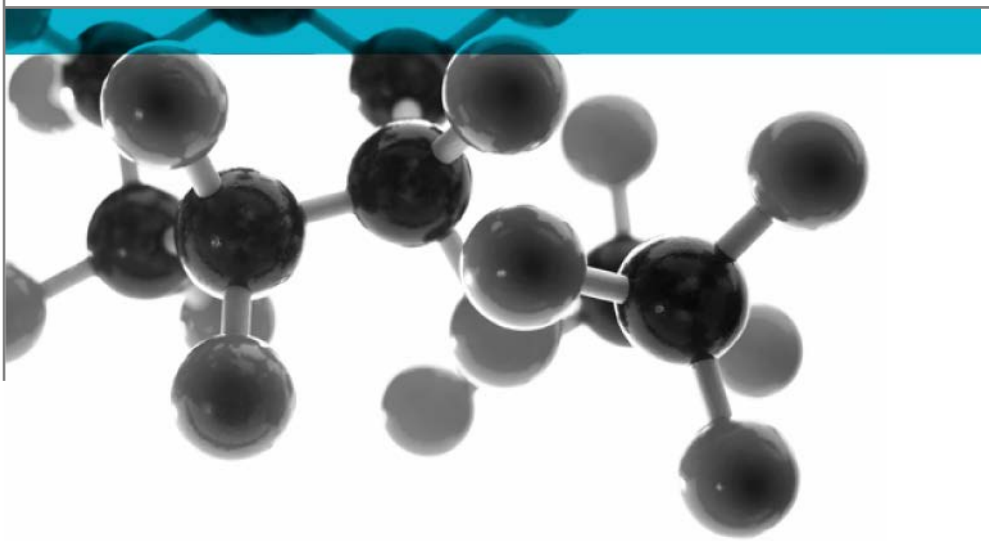
Warringtonfire
Holmesfield Road
Warrington
United Kingdom
T: +44 (0)1925 655116
W: www.warringtonfire.com

BS 6853: 1999: Annex D.8.6 (Withdrawn) / LUL S1085: 2015: Attachment B.7



Methods For Measuring Smoke Density – Flooring test

A Report To: Kernow Coatings Ltd.

Document Reference: 435039

Date: 25th November 2020

Issue No.: 1

Executive Summary

Objective

To determine the smoke density of the following product when tested in accordance with BS 6853: 1999 incorporating amendment No. 1 Annex D.8.6 (Withdrawn) / LUL S1085: 2015: Attachment B.7.

Generic Description	Product reference	Thickness	Weight per unit area
Textured floor graphic polyester film	"KernowJet FloorSharK 170TFG"	315 ± 6 microns	385 ± 8g/m²
Please see page 5 of this test report for the full description of the product tested			

Test Sponsor

Kernow Coatings Ltd., Penryn, Cornwall, TR10 9DQ

Test Results:

	Specimen No. 1	Specimen No. 2	Specimen No. 3	Average
A_O (max)	45.8	33.6	44.7	**41.4**

Date of Test

11th November 2020

Signatories

Responsible Officer
T. Kinder *
Senior Technical Officer

Authorised
T. Deluce *
Senior Technical Officer

* For and on behalf of Warringtonfire.

Report Issued: 25th November 2020

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Test Details

Purpose of test

To determine the performance of a specimen when it is subjected to the conditions of test specified in BS 6853: 1999, Incorporating Amendment No. 1, "Code of practice for fire precautions in the design and construction of passenger carrying trains" Annex D.8.6 (Withdrawn) / LUL S1085: 2015: Attachment B.7 "Flooring test".

The test was performed in accordance with the procedure specified in BS 6853: 1999 Annex D, Incorporating Amendment No. 1, Clause D.8.6 (Withdrawn) / LUL S1085: 2015: Attachment B.7 and this report should be read in conjunction with these and other related standards

Scope of test

BS 6853: 1999, Incorporating Amendment No. 1, Annex D.8.6 (Withdrawn) / LUL S1085: 2015: Attachment B.7 details a test procedure, the results being expressed as AO (max), for the measurement of the density of smoke emitted from a flooring material burning under the defined conditions of test. The results are used to determine compliance with the criteria given in BS 6853: 1999 incorporating amendment No. 1, Tables 1 & 4 (Withdrawn) and LUL S1085: 2015: Table 3.

The requirements specified in these tables are detailed in Appendix 2.

Instruction to test

The test was conducted on the 11th November 2020 at the request of Kernow Coatings Ltd., the sponsor of the test.

Provision of test specimens

The specimens were supplied by the sponsor of the test. Warringtonfire was not involved in any selection or sampling procedure. The results stated in this report apply to the samples as received.

Conditioning of specimens

The specimens were received on the 2nd November 2020.

The test specimens were conditioned by maintaining them in indoor ambient conditions for 72 hours and then for a minimum of 16 hours at 23 ± 2°C and a relative humidity of 50 ± 5%.

Exposed face

The textured face of the specimens was exposed to the flame.

Ignition source

Fire source No. 2, charcoal, as detailed in LUL S1085: 2015: clause B.3.2 was used.

Description of Test Specimens

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

General description	Textured floor graphic polyester film
Product reference	"KernowJet FloorSharK 170TFG"
Detailed description	PET (Polyethylene terephthalate) film with proprietary textured ink jet receptive coating
Name of manufacturer	Kernow Coatings Ltd
Thickness	315 ± 6 microns (stated by sponsor) 0.27mm (determined by Warringtonfire)
Weight per unit area	385 ± 8g/m² (stated by sponsor) 365g/m² (determined by Warringtonfire)
Colour	White (upper surface)
Flame retardant details	**See Note 1 below**
Brief description of manufacturing process	**See Note 1 below**

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

Test Results

Applicability of test results

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.

Test results

	Specimen No. 1	Specimen No. 2	Specimen No. 3	Average
A_O (max)	45.8	33.6	44.7	**41.4**

Standard Deviation = 6.73

Visual observations made during the test are given in Appendix 1.

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 (Withdrawn) / LUL S1085: 2015: clause B.4. The mean value of all three results is quoted above and should be used to establish the category of performance.

The changes in A_O 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.

Appendix 1

Observations during test of Specimen 1

00:01 Ignition of charcoal, test commenced.

00:19 The surface of the specimen ignited.

06:46 The flames on the surface of the specimen ceased.

27:00 All flaming ceased, the charcoal and specimen continued to smoulder.

40:00 Test terminated.

Damaged area: 350mm Length x 350mm width x 0.27mm thickness

Observations during test of Specimen 2

00:01 Ignition of charcoal, test commenced.

00:17 The surface of the specimen ignited.

06:35 The flames on the surface of the specimen ceased.

30:00 All flaming ceased, the charcoal and specimen continued to smoulder.

40:00 Test terminated.

Damaged area: 500mm Length x 400mm width x 0.27mm thickness

Observations during test of Specimen 3

00:01 Ignition of charcoal, test commenced.

00:19 The surface of the specimen ignited.

07:14 The flames on the surface of the specimen ceased.

30:00 All flaming ceased, the charcoal and specimen continued to smoulder.

40:00 Test terminated.

Damaged area: 500mm Length x 400mm width x 0.27mm thickness

Appendix 2

Table 1 of BS 6853:1999 (Withdrawn) – Interior Horizontal Supine Surfaces

Test	Parameter	Pass / Fail Criteria		
		Vehicle Cat 1a	Vehicle Cat 1b	Vehicle Cat 2
BS 476 Part 7 OR BS ISO 9239-1	Worst permissible class C.F.E (min)	Class 2 7.5 kW/m²	Class 2 7.5 kW/m²	Class 2 7.5 kW/m²
Annex D Smoke test	Ao (max.)	220	350	nc[a]
Annex B Toxicity test	R (max.)	5.0	8.0	18.0
nc: no criterion.				
[a] The permissible level is outside the measuring range of the method. The value is so high that it has been decided not to offer a numerical criterion.				

Table 4 of BS 6853:1999 (Withdrawn) – Exterior Horizontal Supine Surfaces

Test	Parameter	Pass / Fail Criteria		
		Vehicle Cat 1a	Vehicle Cat 1b	Vehicle Cat 2
BS 476 Part 7 OR BS ISO 9239-1	Worst permissible class C.F.E (min)	Class 2 7.5 kW/m²	Class 2 7.5 kW/m²	Class 2 7.5 kW/m²
Annex D Smoke test	Ao (max.)	370	590	nc
Annex B Toxicity test	R (max.)	8.5	13.5	nc
nc: no criterion.				

Table 3 of LUL S1085: 2015: – Smoke emission requirements for floor composites

Location	Test method	Requirement
Option 1		
Flooring surfaces in tunnels	S1085: 2015: Attachment B.7	Ao < 250 m^2/m^2
Flooring surfaces in stations	S1085: 2015: Attachment B.7	Ao < 350 m^2/m^2
Option 2		
Flooring surfaces	EN ISO 5659-2: 25 kWm^{-2}, with pilot flame	*Ds* maximum, dimensionless, ≤ 150

Figure 1

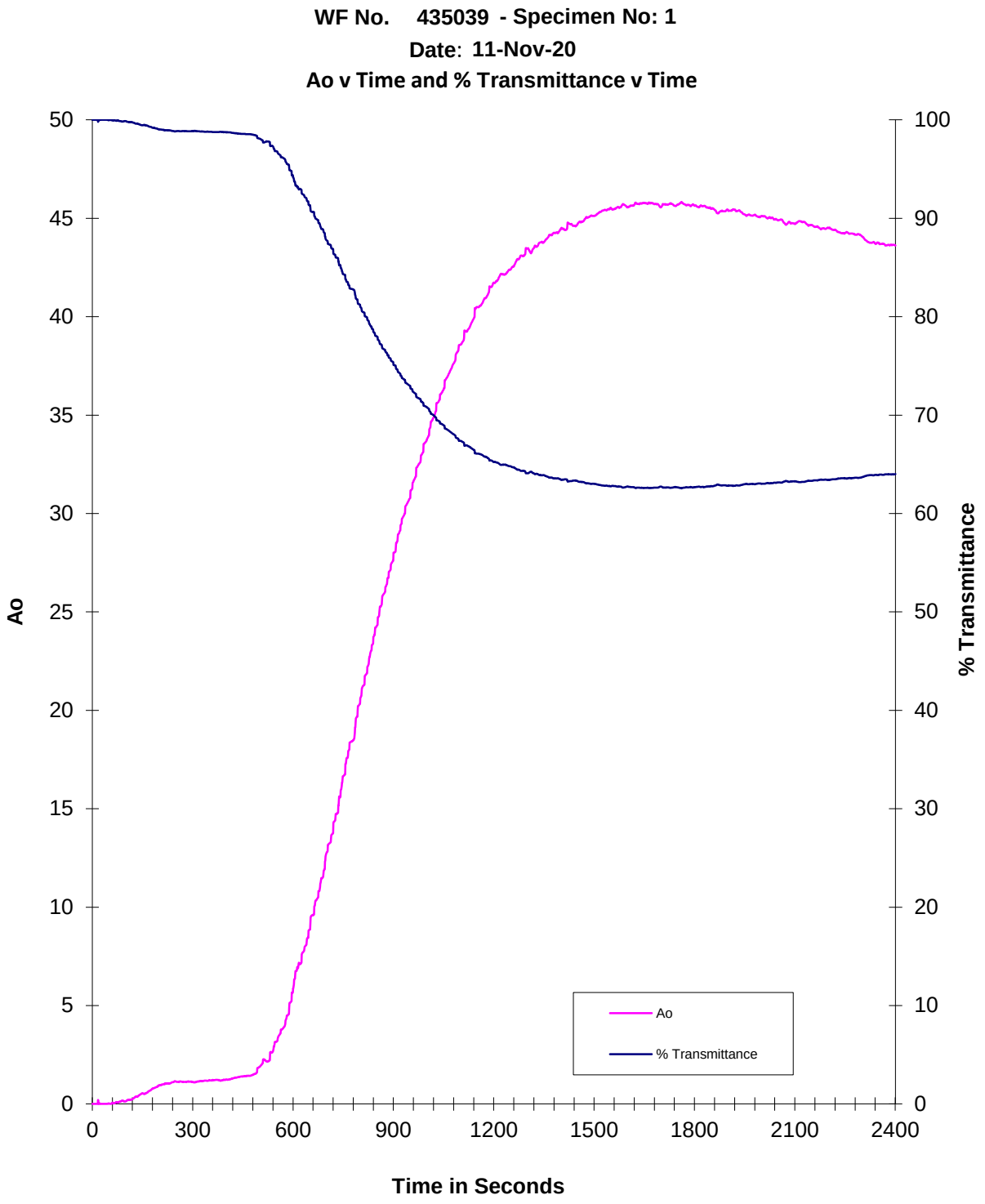
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Figure 2

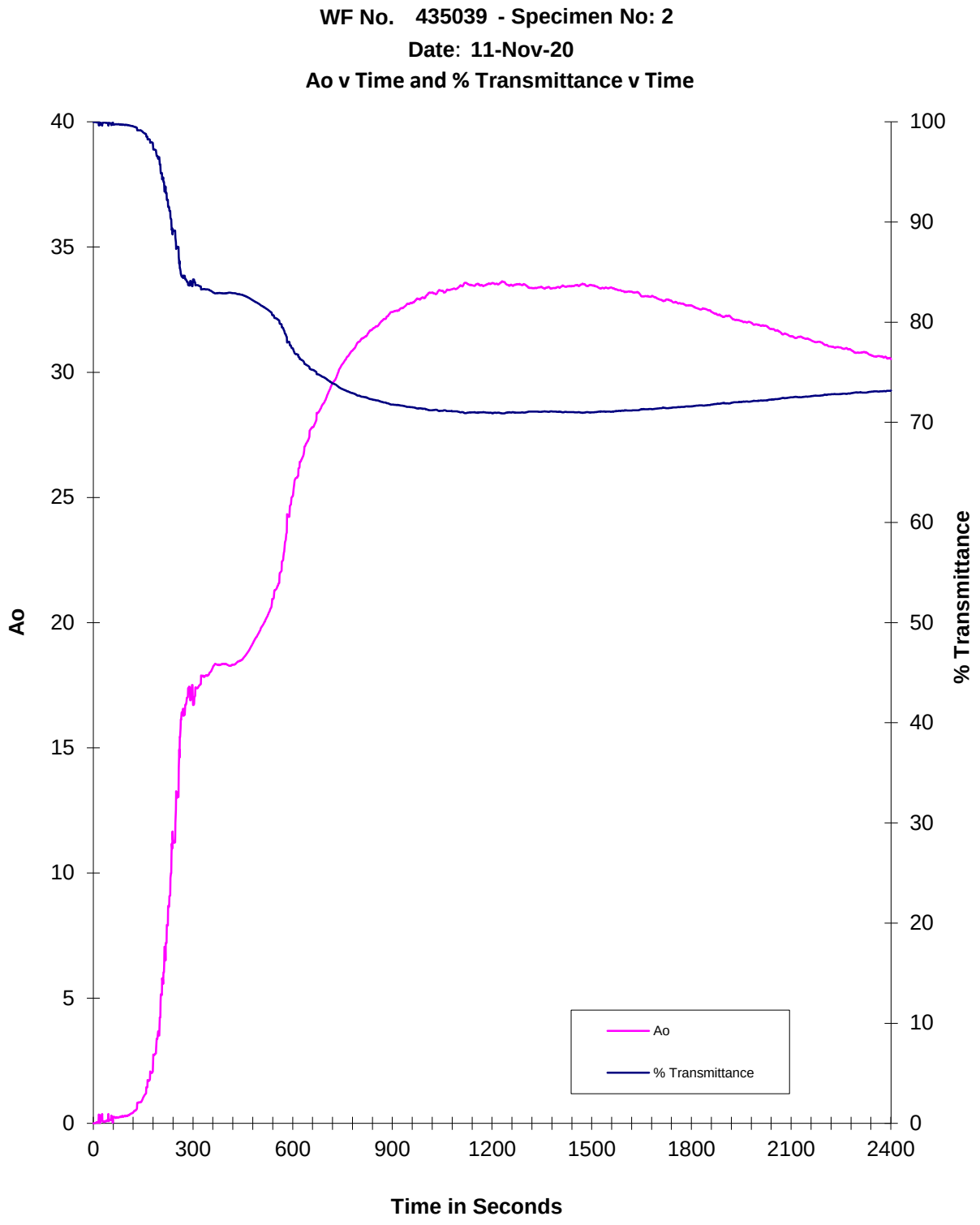
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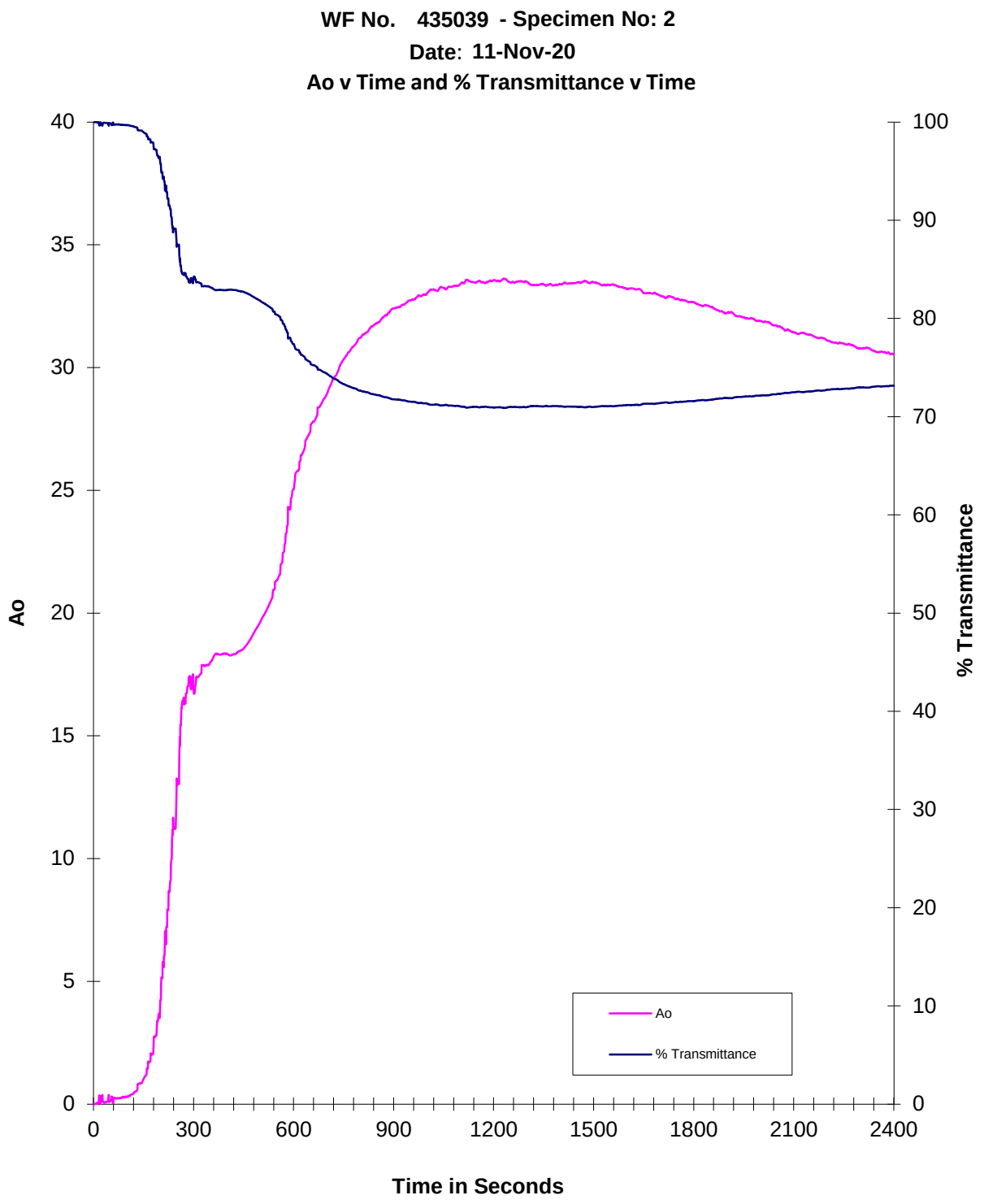
Figure 3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Revision History

Issue No :	Issue Date:
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Reason for Revision:	

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