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9th of August, 2021

M.S.T.C. TEST REPORT T21-00457/0001

Company:	JSIS Engineering Pty. Ltd.	
Sample Description:	E95A Duro polyurethane – no pigment	
Intended Use:	Minor Conveyor Accessories	[Refer to MDG3608, Sect. 3.3]
	Ventilating Sheet	[Refer to MDG3608, Sect. 4.2]
	Non-Defined Applications	[Refer to MDG3608, Sect. 7]
Sample No.:	T21-00457/0001	



Fig.1: Sample material

SUMMARY

The material **complied** with the Ignitability and Flame Propagation Characteristics (Finger Burn Test) requirements of MDG3608, 3.3.1.1 and 7.2.1.1.

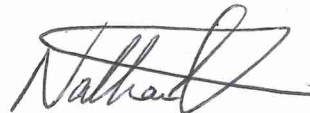
The material **complied** with the Fire Resistance requirements of MDG3608, 4.2.1.

The material **complied** with the Oxygen Index requirements of MDG3608, 3.3.1.2 and 7.2.1.3.

The material **complied** with the Electrical Resistivity requirements of MDG3608, 3.3.1.3, the Electrical Resistance requirements of MDG3608, 4.2.2.1, and with the Antistatic Properties (Electrical Resistivity) requirements of MDG3608, 7.2.2.1 for 'General applications' and of MDG3608, 7.2.2.3 for 'Discharge between two surfaces'. (- samples 15 mm thick).

Analysed by: A.Thompson, C.Teasdale

Checked by:



Authorised by:



G. Slater
Manager, Mine Safety Technology Centre



Endorsed tests indicated by logo on test page

Clause 3.1.2 of MDG3608 states that all conveyor belting (Grade S) and conveyor accessories must be re-tested at least every 5 years and whenever a change in the formulation, raw-material supply, manufacturing process or manufacturing location occurs.

IGNITION & FLAME PROPAGATION CHARACTERISTICS (Finger Burn test)

Sample:

E95A Duro polyurethane – no pigment

Test Date:

4th of August, 2021

Method of Analysis:

AS 1334.10-1994: *Methods of testing conveyor and elevator belting – Method 10: Determination of ignitability and flame propagation characteristics of conveyor belting.*

Results:

TABLE 1

Test	Persistence of Flame (s)	Persistence of After Glow (s)	Extent of Melting (mm)
1	4	0	36
2	4	0	35
3	2	0	38
4	8	0	41
5	2	0	36
6	7	0	44
7	0	0	41
8	0	0	33
9	5	0	38
10	0	0	43
Mean	3 s	0 s	39 mm

Notes:

- These test results on their own do not indicate the fire hazard of the material or product under actual fire conditions and consequently should not be applied to the assessment of fire hazard without taking into account supportive information.
- Bunsen flame temperature: approx. 988°C.
- Sample dimensions: approx. 15 mm x 12.5 mm x 136.5 mm.



Figs. 2a – 2d: Sample ‘fingers’ before and during testing

Any variation from Standard/Test Method: None.

Requirements:

When tested in accordance with AS 1334.10–1994:

- the average duration of the visible flame shall be ≤ 30 s for ‘Minor Conveyor Accessories’ materials, and shall be ≤ 10 s for ‘Non-Defined Applications’; the average duration of the visible after glow shall be ≤ 120 s for ‘Minor Conveyor Accessories’ materials.
- the visible flame duration of any test piece shall be ≤ 45 s for ‘Minor Conveyor Accessories’, and shall be ≤ 15 s for ‘Non-Defined Applications’; the visible afterglow duration of any test piece shall be ≤ 180 s for ‘Minor Conveyor Accessories’ materials.

Sample Status:

The material **complied** with the requirements for Ignitability and Flame Propagation Characteristics (Finger Burn test) of MDG3608, 3.3.1.1 for ‘Minor Conveyor Accessories’, and of MDG3608, 7.2.1.1 for ‘Non-Defined Applications’.

FIRE RESISTANCE – 1kW Burner Flame Test

Sample:

E95A Duro polyurethane – no pigment

Test Date:

6th of August, 2021

Method of Analysis:

MDG3608, Appendix C2.1 – One Kilowatt Burner Flame Test

(– adapted from NCB Specification 245:1985, Appendix 2 – Spirit Burner Flame Test procedure)

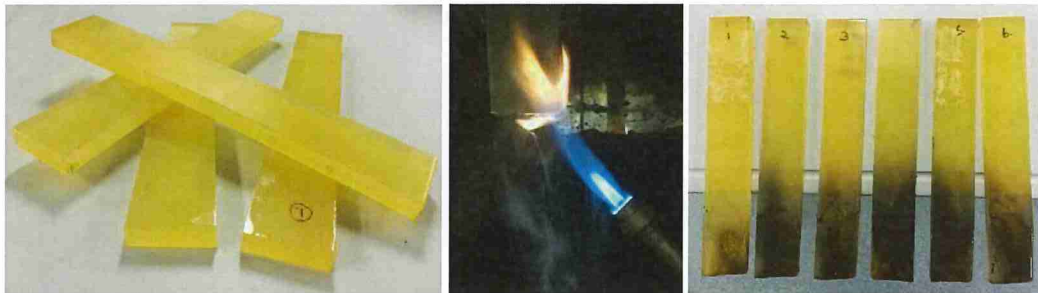
Results:

TABLE 2

Test	Persistence of Flame (s)	Persistence of After Glow (s)	Shriveled out-of-contact with Ignition Flame during application?
1	0	0	No
2	< 1	0	No
3	0	0	No
4	0	0	No
5	0	0	No
6	0	0	No
Mean:	< 1 s	0 s	

Note:

- Approx. sample sizes: 318 mm x 50.5 mm (samples cut from supplied sheeting).
- 20 s flame duration.
- Each sample remained in contact with ignition source during entire flame application.



Figs. 3a & 3b: Samples before, during, and after testing

Any variation from Standard/Test Method:

A 1kW burner conforming to the requirements of IEC 60695-11-2 was used; sample lengths as received.

Requirements:

The material shall fail the test if any of the following occur:

- a) If at any time:
 - (i) a flame on two or more test pieces extends above the marker, or
 - (ii) a glow on two or more test pieces extends above the marker.
- b) If after the burner flame has been removed:
 - (i) the mean persistence time of the flame of the six test pieces exceeds 3 seconds, or the persistence time of the flame on any test piece exceeds 10 seconds, or
 - (ii) the mean persistence time of the glow of the six test pieces exceeds 10 seconds, or if the persistence time of the glow on any test piece exceeds 30 seconds.

Sample Status:

The material complied with the Fire Resistance requirements of MDG3608, 4.2.1.1.

Clause 3.1.2 of MDG3608 states that all conveyor belting (Grade S) and conveyor accessories must be re-tested at least every 5 years and whenever a change in the formulation, raw-material supply, manufacturing process or manufacturing location occurs.

FIRE RESISTANCE – Spirit Lamp Test

Sample:

E95A Duro polyurethane – no pigment

Test Date:

4th of August, 2021

Method of Analysis:

MDG3608, Clause C3.1 (– adapted from *NCB Spec. 245:1985, Appendix 3 - Spirit Lamp Test* procedure).

Results:

TABLE 3

Test No.	Persistence of Flame (s)	Persistence of After Glow (s)	Shriveled out-of-contact with Ignition Flame during application?
1	0	0	No
2	0	0	No
3	0	0	No
4	0	0	No
5	0	0	No
6	0	0	No
Mean	0 s	0 s	

Notes:

- Duration of flame application: 10 s.
- Approx. sample sizes: 318 mm x 76 mm (samples cut from supplied sheeting).

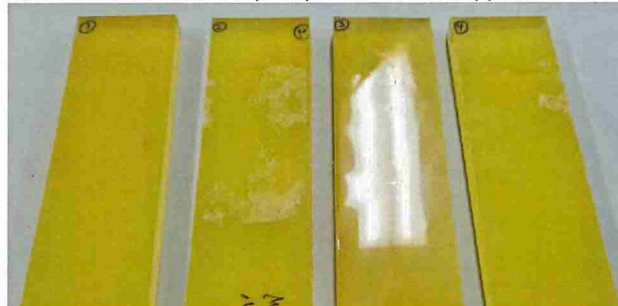


Fig. 4: Samples pieces before testing

Any variation from Standard/Test Method:

None.

Requirements:

The material shall fail the test where any of the following occur:

- (1) the mean persistence time of the flame of the six test pieces exceeds 6 seconds, or the persistence time of the flame on any single test piece exceeds 12 seconds; or
- (2) the mean persistence time of the glow of the six test pieces exceeds 10 seconds, or if the persistence time of the glow on any single test piece exceeds 30 seconds.

Sample Status:

The material complied with the Fire Resistance requirements of MDG3608, 4.2.1.2.

The material **complied** with the Fire Resistance requirements of MDG3608, 4.2.1.

OXYGEN INDEX

Sample:

E95A Duro polyurethane – no pigment

Test Date:

6th of August, 2021

Method of Analysis:

ISO 4589-2:1996(E) Determination of Burning Behaviour by Oxygen Index – Part 2 Ambient-temperature test.

Results:

	% O ₂
Oxygen Index	31.7

Notes:

- a) Oxygen concentrations are percentage by volume.
- b) Top surface ignition [ISO4589-2:1996 ignition 'Procedure A'].
- c) The estimated standard deviation of the Oxygen Index concentration measurements is 0.11.
- d) The material exhibited flaming combustion, with the Oxygen Index being determined by the extent of flame propagation along the sample length.
- e) Sample size: approx. 13 mm x 15 mm x 136 mm.
- f) The result relates only to the behaviour of the test specimens under the conditions of the test and these results shall not be used to infer the fire hazards of the materials in other or under other fire conditions.
- g) Tested in ambient 22°C, 51% relative humidity.
- h) Samples conditioned at 22°C and 50% relative humidity for > 88 hours.



Figs. 5a & 5b: Sample 'fingers' before and during testing

Any variation from Standard/Test Method:

Sample sizes as received (- sized with reference to AS4606:2012).

Requirements:

- i. The calculated oxygen index shall not be less than 28.0%
- ii. When the material is re-tested at a later stage, the result shall be within ± 3 points of that originally obtained, but in no case shall be less than 28.0%.

Sample Status:

The material **complied** with the Oxygen Index requirements of MDG3608, 3.3.1.2 and 7.2.1.3.

ELECTRICAL RESISTIVITY

Electrical Resistance of Flat Surfaces

Antistatic Properties (Electrical Resistivity) – ‘General Applications’

Sample:

E95A Duro polyurethane – no pigment

Test Date:

29th of July, 2021

Method of Analysis:

MDG3608, Clause C5 – *Electrical Resistance of Flat Surfaces Test* [– adapted from NCB Specification 245:1985, Appendix 5 - *Electrical Resistance of Flat Surfaces Test.*]

Results:

TABLE 4

Test Piece	Electrical Resistance (MΩ)	
	Upper Surface	Lower Surface
1	90.7	108.1
2	100.2	83.9
Mean	95.5 MΩ	96.0 MΩ

Notes:

- Conditioned (for > 2 hours) at 22°C and 50% relative humidity.
- Tested in atmosphere of 22°C with 52% relative humidity.
- No conductivity solution was applied between the sample surface and the electrodes.
- Approx. sample sizes: 317 mm x 317 mm.



Fig. 6: Sample piece under test

Any variation from Standard/Test Method:

Conditioning & testing undertaken in atmospheres with relative humidity < (65±5)%.

Requirements:

The mean value for the Electrical Resistance on both upper and lower surfaces of the material shall not be greater than 300 MΩ (300 x 10⁶ ohms).

Sample Status:

The material **complied** with the requirements for surface Electrical Resistivity of MDG3608, 3.3.1.3, the Electrical Resistance requirements of MDG3608, 4.2.2.1, and with the Antistatic Properties (Electrical Resistivity) requirements for ‘General Applications’ of MDG3608, 7.2.2.1.

ELECTRICAL RESISTIVITY
Through Resistance
Discharge between two surfaces

Sample:

E95A Duro polyurethane – no pigment
Approx. 15 mm thick sample pieces

Test Date:

30th of July, 2021

Method of Analysis:

ISO 2878:2011 (*Rubber, vulcanized or thermoplastic - Antistatic and conductive products – Determination of electrical resistance*), Clause 8.2

Results:

TABLE 5

Test Piece	'Through' Electrical Resistance (MΩ)
1	45.0
2	48.5
Mean	46.8 MΩ

Notes:

- Conditioned at $(23 \pm 2)^\circ\text{C}$ and $(50 \pm 5)\%$ relative humidity for > 16 hours.
- Tested at ambient temperature of 22°C with 53% relative humidity.
- Electrodes had approx. 15 mm separation through sample.
- No conductivity solution was applied between the electrodes and the sample surfaces.
- Resistance readings taken (5 ± 1) s after application of voltage between electrodes.

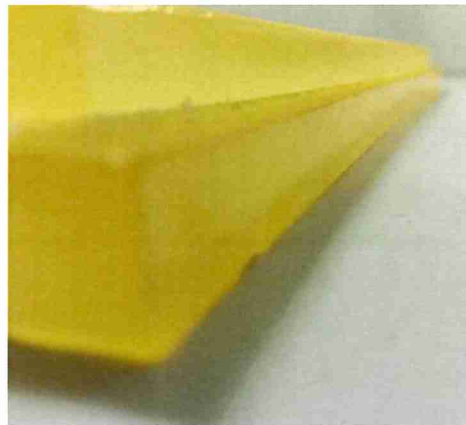


Fig. 7: Sample pieces before testing

Any variation from Standard/Test Method:

Clause 8.2 ('Test Between Two Surfaces') performed only.

Requirements:

Where the normal electrical discharge path is between two surfaces, the average of two resistance measurements shall not exceed 300 MΩ (300 megohm; 300×10^6 ohms).

Sample Status:

15 mm thick material samples **complied** with the 'Through resistance' Electrical Resistivity requirements of MDG3608, 3.3.1.3 and the 'Discharge between two surfaces' requirements of MDG3608, 7.2.2.3.