FIRELAB

TITLE	:	Evaluation of the Small-scale Fire Properties of the **Industrial Cushion**
REQUESTED BY	:	**Perma Seating (Pty) Ltd** PO Box 35643 **FAUNASIG** 9325
CONTRACT No	:	FTC 23/219
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FIRELAB, Building 28, CSIR Campus, Meiring Naudé Road, Brummeria, Pretoria, SA +27 12 349 2929
www.firelab.co.za

SCOPE

Evaluation of the Small-scale Fire Properties of the **Industrial Cushion** when tested in accordance with the **Def Stan 02-713** and **SANS 10177 – 9** test protocols.

Section 1: Product information and photographic identification of the specimen

Section 2: Test methods used for evaluation

Section 3: Test results

Section 4: Conclusion

Annexure "A": Company information

Annexures "B": Product information and MSDS supplied by **Perma Seating**

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1. PRODUCT DESCRIPTION

The product has the following characteristics:

Product information:

Product name:	Industrial Cushion
Product code:	N/A
Manufacturer:	Perma Seating (Pty) Ltd
Manufacturing date:	N/A
Batch number:	N/A

***Physical Properties:**

Mass:	3.827 kg
Thickness:	Between 70 and 100 mm
Width:	400 mm
Length:	450 mm

Product Composition:

Layer 1:	Chem Kote HP(M) Polyal
Layer 2:	Integral Skin Polyurethane

Intended application or use:

Industrial seating.

*The mass and dimension of the specimen was measured by **FIRELAB**

Figure 1.1: Identification of the specimen received for testing

2. TEST PROCEDURES

2.1. TOXICITY: DEF STAN 02-713

One gram (1 g ± 5 mg) of the material was burned in a chamber with a volume of 1 m^3. The concentrations of certain specified gases were determined by means of colorimetric (Dräger) tubes. These concentrations were then used to calculate the quantities of gases given off should a 100 g of material burned in a cubic meter (1 m^3) of air.

The toxicity index is calculated from the summation of the ratios of these concentrations to the concentrations causing fatality to man after a 30-minute exposure time. Gases to be determined and their fatality limits are:

Gas	Chemical Formula	Conc. (*ppm*)	Gas	Chemical Formula	Conc. (*ppm*)
Carbon Dioxide	CO_2	100 000	Nitrous Oxides	NO_x	250
Carbon Monoxide	CO	4 000	Hydrogen Cyanide	HCN	150
Formaldehyde	CH_2O	500	Acrylonitrile	C_3H_3N	400
Hydrogen Fluoride	HF	100	Ammonia	NH_3	750
Hydrogen Chloride	HCl	500	Sulphur Dioxide	SO_2	400
Hydrogen Bromide	HBr	150	Hydrogen Sulphide	H_2S	750
Phenol	C_6H_5OH	250			

Table 2.1.1: Noxious gases with its lethal limits after 30 minutes of exposure

2.1.1. TEST EQUIPMENT

- Dräger tubes (various as per test protocol)
- Dräger pump
- Toxicity Test facility

2.2. BASIC FIRE PROPERTIES: SANS 10177 – PART 9

A specimen of 450mm long by 150 mm wide was secured in the vertical test frame. The frame was suspended in a 300 mm x 300 mm x 2.1 m high metal chimney along its length approximately 65 mm above the Bunsen burner.

A Bunsen burner with an oxidizing flame length of 200 mm was applied at an angle of 30°, 100 mm below the bottom edge of the sample for a period of 10 minutes. The self-extinguishing properties of the material are determined by removing the Bunsen burner at 12 and 24 seconds respectively.

The temperature near the top of the chimney was recorded with a single K-type thermocouple. This temperature was used to determine the heat contribution of the test specimen in comparison to the plot obtained from a "blank" run.

Other observations related to the presence of flaming droplets, the propensity to self-extinguish upon removal of the burner and rate of flame spread along the height of the specimen were also noted.

2.2.1. TEST EQUIPMENT

- Temperature recorder – Multi-meter
- Stopwatch
- Type K thermocouple
- **SANS 10177 – 9** Test facility chimney

3. TEST RESULTS

3.1. TOXICITY: DEF STAN 02-713

Perma Seating – Industrial Cushion

Gas detected	Chemical Formula	Conc./100 g (*ppm*)	Toxicity Index
Carbon Dioxide	CO_2	150 000	1.500
Carbon Monoxide	CO	1 392	0.348
Formaldehyde	CH_2O	20	0.040
Phenol	C_6H_5OH	10	0.040
Nitrous Oxides	NO_x	527	2.108
Hydrogen Cyanide	HCN	*Traces*	-
Acrylonitrile	C_3H_3N	18	0.045
	Total Toxicity Index		**4.081**

Table 3.1.1: Toxicity test results

Test conducted on 31/10/2023, ambient temperature prior to testing = 15.5 °C

3.2. BASIC FIRE PROPERTIES: SANS 10177 – PART 9

Perma Seating – Industrial Cushion

	Specimen 1	Specimen 2	Specimen 3
Time to Ignition/Flaming (mm:ss)	00:05	00:03	00:05
Specimen burning after removal of burner at 12 seconds	Yes	No	No
Specimen burning after removal of burner at 24 seconds	Yes	Yes	Yes
Molten/Flaming droplets	Yes	Yes	Yes
Flaming debris	Yes	Yes	Yes
Time to burn over entire length	02:08	01:41	01:51
Length of flame spread	-	-	-
Length of heat damage	-	-	-
Calibration temperature	11.0 °C	11.0 °C	11.0 °C
Heat Contribution over 10-minute period	14.11 °C/min	21.15 °C/min	24.06 °C/min
Maximum temperature in chimney (above calibration temperature)	141.1 °C	211.5 °C	240.6 °C

Additional Observations:

Each of the three specimens exhibited rapid flame spread.
Each of the three specimens were entirely consumed during the tests.

Specimen 1: Tested 02/11/2023, ambient temperature prior to testing = 23.0 °C

Specimen 2: Tested 02/11/2023, ambient temperature prior to testing = 24.8 °C

Specimen 3: Tested 02/11/2023, ambient temperature prior to testing = 24.4 °C

*Table 3.2.1: **SANS 10177 – 9** test results*

4. CONCLUSION

The **Industrial Cushion** supplied by **Perma Seating** was evaluated using the **Def Stan 02-713** and **SANS 10177 – Part 9** test protocols.

Results of evaluation:

- **DEF STAN 02-713**
  (TOXICITY TEST)

  Total Toxicity Index » 4.081

- **SANS 10177 – 9**
  (SMALL-SCALE FIRE PROPAGATION PROPERTIES)

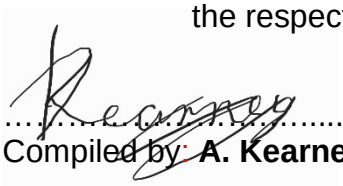
  - **Molten/Flaming Droplets:** Yes
  - **Flaming Debris:** Yes
  - **Maximum Flame Propagation:** Full length (450mm)
  - **Maximum Heat Damage:** Full length (450mm)
  - **Maximum Heat Contribution:** 24.06 °C/min

Notes:

» The Toxicity Index must be considered in conjunction with the material, the application of the material and the associated risk assessment that must be carried out by each mine. The use of material in large continued applications would present a higher risk than a material used in a confined application. The Toxicity Index will also vary depending on the ventilation requirements (dilution) applicable at each mine.

» The Toxicity Index result is only an indication and may differ from batch to batch; also depending on where the test sample was taken on the specimen.

» The material is combustible and therefore storage should be managed in accordance with the relevant safety requirements that may be applicable at the respective mines.



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Compiled by: **A. Kearney**

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Approved by: **J.S. Strydom**

ANNEXURE "A"

– Company Information –	FIRELAB
Company Name:	PERMA SEATING(PTY) LTD
Company Trading Name:	PERMA SEATING(PTY) LTD
Company Registration Nr.:	1998/021213/07
Company VAT Nr.:	405 018 6818
Core Business Activities:	MANUFACTURING OF SEATS FOR MINING AND MILITARY
Postal Address:	P O BOX 35643, FAUNASIG 9325
Physical Address:	58 TANNERY STREET, HAMILTON, BLOEMFONTEIN
Company contact number:	051 4354752 OR 083 5449266
Direct Contact Details	
Technical (name):	JOHAN BRITZ
Cell phone number:	083 5449266
Email address:	permas@mweb.co.za
Financial (name):	NELIA BRITZ
Cell phone number:	071 9918730
Email address:	permas@mweb.co.za

– Test & Sample Information –	
Test Required:	FIRE PROPERTIES OF MOULDED SEAT CUSHION
Sample/Product name:	CUSHIONS
Intended Use:	SEATS CUSHIONS FOR UNDERGROUND MINING AND MILITARY USE
Sample/Product Description: *(Short description of sample or product submitted for testing, and type of material to be tested)*	INDUSTRAIL MOULDED SEATING CUSHIONS POLYURETHANE

APRIL 2018

– SANS 10177 – Part 9 & NES 713 (TOX) –
– Product Description –

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Product description:		
Product name:	INDUSTRIAL CUSHION	
Generic Identification:		
Proposed Application:	INDUSTRIAL SEATING	
Product Manufacturer:	PERMA SEATING(PTY) LTD	
Manufacturing Date:		
Product Code No.:		
Batch No.:		
Physical description:		
Actual Mass (g/m^2):	LAYER 1	LAYER 2
Thickness (mm):	2-3 mm	40mm – 150mm
Width (mm):	50mm -2 METER	
Length (mm):	50mm- 2METER	
Product composition:		
Layer 1:	CHEM KOTE HP(M) POLYAL; SEE ATTACHMENT	
Layer 2:	INTEGRAL SKIN POLYURETHANE: SEE ATTACHEMENT	
Layer 3:		
Layer 4:		
Layer 5:		

Additional Information:
(MSDS to be sent separately for all Toxicity tests)

MANUFACTURE DIFFERENT CUSHIONS FOR DIFFERENT APPLICATIONS: UNDERGROUND, MILITARY, AGRICULTURE AND CONSTRUCTION SEATING

OCTOBER 2018

TECHNICAL DATASHEET

Puranol Greenmate 3316

JIAHUA CHEM 佳化化学

Description and Application

Puranol Greenmate 3316 is initiated with glycerol, primary hydroxyl group ended containing 16% Greenmate Blowing Agent. Typical application Integral Skin Foam systems.

Specifications

Property	Unit	Value	Test Method
Color	APHA	≤100	GB/T 3143
Water	%	≤ 0.05	GB/T 22313
Hydroxyl value	mg KOH/g	28-31	GB/T 12008.3

Typical Properties and Analysis

Property	Unit	Value	Test Method
Appearance	--	Colorless liquid	Visual test
RelativeDensity	g/cm3	1.085-1.120	Gravimetric methods /25℃
Acid value	mg KOH/g	≤0.05	GB/T 12008.5
pH	--	5～7	GB/T 12008.2
Viscosity	mPa • s/25℃	630-800	GB/T 12008.7

Jiahua Chemicals Inc, Room No. 1201, Building No. 5, No. 258 Jinkang Road, Shanghai, China (200127), Tel:86-21-20670888

MSDS REPORT

PRODUCT NAME: Greenmate 3316

MODEL: 1

LOT NO.: ---

CUSTOMER NAME: Jiahua Chemicals (Shanghai) Co., Ltd

UNIT ADDRESS: 1201&1203 Building 5, No. 258, Jinkang Road, Pudong New Area, Shanghai City.

ZIP CODE: 200127

Add: Building 1, No.10 East Nanhuan Road , Suzhou, China
Fax: +86-512-62799167
Tel: +86-512-62797815
Http://www.asttek.com

Preparation of Safety Data Sheet

Section 1-Chemical Product and Company Identification

Product Name: Greenmate 3316
Company Identification: Shanghai Fujia Fine Chemical Co.Ltd
Add: No. 258, Haijin Road, Weiliu Road, Jinshan District, Shanghai City.
Contact: Mengru Zhang
Tel.: +86 15201997393

Section 2-Hazards Identification

Fatalness grade: Classification according to Regulation (EC) No 1272/2008:
Skin irritation (Category 2)
Eye irritation (Category 2)
Specific target organ toxicity - single exposure (Category 3)
Invasion route: Skin contact, eye contact, inhalation, ingestion.
Health Hazards: This product has a stimulating effect on the eyes, skin and respiratory tract.
Environment hazards: This product can not be directly discharged into the river.
Explosion hazard: This product does not belong to flammable dangerous goods.

Section 3-Composition/Information on Ingredients

Pure□ Admixture■

Composition:

Chemical Name	Content%	CAS No.	EC No.
Polyether polyol	84	---	---
Greenmate	16		

Section 4-First Aid Measures

Skin touch: Remove contaminated clothing, rinse with plenty of water.
Eyes touch: Did eyelid, mobile water or saline.
Inhalation: Rapidly from the scene to fresh air. Keep the airway patency. If breathing is difficult, give oxygen. Get medical aid.
Ingestion: Drink plenty of water. Get medical aid.

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Section 5-Fire Fighting Measures

Danger characteristic: This product does not belong to flammable dangerous goods.

Hazardous Combustion Products: Carbon monoxide, carbon dioxide, hydrogen chloride.

Fire-Fighting method & media: Firefighters must wear fire protective body suits. Possible to move containers from the scene empty Department. Water spray to cool fire Container, until the end of fire. At the scene of containers, if any discoloration or produce sound from the safety relief device must evacuate immediately. Extinguishing Media: Water, water spray, dry, sandy soil.

Section 6-Accidental Release Measures

Emergency treatment: Rapid evacuation of contaminated area personnel to a safe area, and isolation, strict restrictions on access. Cut off the fire source. Recommended emergency personnel wearing self-contained positive pressure breathing apparatus, wear protective clothing. As far as possible, cut off the source of leakage. To prevent the inflow of sewers, flood trenches and other restrictive space. Leakage: Use sand or other non-combustible materials to absorb or absorb. A large number of leaks: build embankment or trenching asylum. Cover with foam to reduce vapor hazard. With the pump transferred to the tanker or special collector, recycling or transport to the disposal of waste disposal sites.

Section 7-Handling and Storage

Handling: Provide adequate ventilation. The operator must go through specialized training, strict adherence to rules. Proposed operators wear masks, wear overalls, gloves. Away from fire, heat source, water source, smoking is prohibited in the workplace. Use explosion-proof ventilation systems and equipment. Avoid contact with oxidizing agents and strong acids. Equipped with the appropriate variety and quantity of firefighting equipment and leakage emergency treatment equipment.

Storage: Store in a cool, ventilated warehouse. Keep away from fire and heat. Should be stored separately with oxidants and acids, avoid mixing reservoir. Corresponding with the variety and quantity of fire equipment. Storage areas should be equipped with spill response equipment and materials suitable host.

Section 8-Exposure Controls, Personal Protection

Maximum admissible concentration: Not established.

Monitoring Methods: None.

Engineering controls: Provide adequate ventilation.

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Respiratory protection: It is recommended to wear self-absorption filter respirators.
Eyes protection: Recommended to wear protective glasses.
Body protection: Wear usual working clothes.
Hands protection: Wear protective gloves.
Other protection: No smoking, dining and drinking water in the workplace. Keep good habit of hygiene.

Section 9-Physical and Chemical Properties

Appearance: Colorless transparent liquid..
Melting point: 57-61℃.
Absorption wavelength: No data.
Boiling point: ＞200℃.
Relative density (water =1): 1.09g/ml.
PH: 6-7.
Solubility: Insoluble in water.
Ignition temperature: No data.
Pressure: No data.
Flash point: ＞230℃.

Section 10-Stability and Reactivity

Stability: Stable under normal temperature.
Avoid contact conditions: Fire, Heat.
Hazardous polymerization: None.
Decomposition products: Under normal use, no harmful substances.

Section 11-Toxicological Information

Acute toxicity: Polyether polyol: LD50: 2000 mg / kg (rat oral).
Dichloromethane: LD50: 1600-2000 mg / kg (rat oral),
LC50: 88000 mg / m^3 for 1/2 hours (rat inhalation).
Sub-acute and chronic toxicity: None.
Irritation: Dichloromethane: rabbit eyes: 162mg, moderate stimulation. Rabbits percutaneous: 810mg / 24 hours, severe stimulation..
Mutagen city: None.

Section 12-Ecological Information

Eco-toxicity: None.
Biodegradable: Not applicable.

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Non-biodegradable: Not applicable.

Other harmful effects: Other adverse reactions were not determined.

Section 13-Disposal Considerations

Waste disposal methods: Disposal of the former should refer to the relevant national and local laws and regulations.

Section 14- Transport Information

Dangerous goods number: Not applicable.

UN number: No data.

Packaging mark: No data.

Packaging method: Use plastic bottles for packaging.

Transport attentions: Transport containers should be preceded by check is complete, sealed during transportation to ensure that the container does not leak, did not fall; do not fall, no damage. Non-oxidants, acids and other mixed operation. Transportation travel must be thoroughly cleaned, disinfected; you may not ship the other items. During transport to prevent exposure, rain, high temperature. Stopovers should be away from fire and heat. When shipping, equipped with location should be away from the bedroom, kitchen, and isolated from the cabin, fire and other parts.

Section 15-Regulatory Information

Regulatory information: Dangerous Chemicals Regulations (February 16, 2011 the State Council issued), the Regulations Dangerous Chemicals Regulations, the workplace safe use of chemicals and other regulations for the safe use of hazardous chemicals, production, storage, transport, handling, etc. are made corresponding provisions. ISO11014-2009 chemical contents of the table and the order section IMDG Code International Maritime Dangerous Goods (IMDG) with safety information. Regulation (EC) No.1272/2008 substances and mixtures classification, labeling and packaging regulations.

Section 16-Additional Information

References: None.

Other information: The above information is based on accurate data basis, because this information may be beyond our control case is applied or modified, and we do not bear any responsibility. This information in the recipient decided to material exclusive objective circumstances and configuration.

**********END**********

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