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TITLE	:	Report on the evaluation of the fire propagation properties of **Supacool** under-roof insulation material as supplied by **Technopol** in accordance with **SANS 428** (large-scale) using the **SANS 10177 – 11 Horizontal** test protocol
REQUESTED BY	:	**Technopol SA (Pty) Ltd** PO Box 2445 **SPRINGS** 1560
CONTRACT No	:	FTC 16/208
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DATE	:	16 November 2016

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1. INTRODUCTION

The purpose of the investigation was to evaluate the fire propagation properties of the **Supacool** material supplied by **Technopol** for agricultural applications in terms of **SANS 428** using the **SANS 10177 – Part 11 Horizontal** test protocol.

2. SAMPLE DESCRIPTION

The **Supacool** has the following characteristics:

Product information:

Product code:	*Not supplied*
Manufacturer:	Technopol SA (Pty) Ltd
Manufacturing date:	17/10/2016
Batch number:	*Not supplied*

Physical Properties:

Actual mass:		*Not supplied*
Thickness:	50	mm
Width:	1200	mm
Length:	6	m
Joint Overlap:		*None*
Wire Spacing:		*None*

Product Composition:

Layer 1:	1 mm uPVC Facing	
Layer 2:	PU adhesive	± 200 g/m^2
Layer 3:	FR Cel 15DV (Fire retardant EPS)	± 90 g/m^2

Installation details:

Installation Type:	Over purlin
Joint Type:	Polystyrene ‘tongue’ inserted between two adjacent boards
Joint Overlap:	*None*
Purlin spacing:	Maximum 1.2 meter

Intended usage:

Chicken houses

Generic Identification:

White polystyrene faced with a white uPVC layer

Annexure “A”: Company and Product information as supplied by **Technopol**.

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3. TEST PROCEDURE: SANS 10177 – PART 11, HORIZONTAL (CLASSIFICATION)

The large-scale fire propagation properties of the system were evaluated by performing a test in the **FIRELAB**'s large-scale **SANS 10177 – 11** roof insulation test facility. A schematic diagram of the test facility with the specimen frames is shown in Figure 3.1.

The facility was equipped with a typical water sprinkler system to observe any obstructions during the event of testing; however, no water has been applied. The use of water during a test is dependent upon the client's request.

The ignition source for the under-roof evaluation was constructed from 60 kg dry 38 mm x 38 mm SA Pine sticks stacked in an open-crib configuration to form a 1 000 mm x 750 mm x 480 mm high crib. The pack was ignited with commercial firelighters at each corner, in order to simulate a fire with slow heat build-up. The maximum heat output of the fire source (approximately 2.5 MW based on previous research) occurred after approximately 12 minutes.

The fire source was located at one end of the facility, approximately 1.5 m from the front end, 1.5 m from the side and 1.5 m from the center line of the specimen frame. The position of the crib is indicated in Figure 3.1. No mass loss measurements were taken during the evaluations.

This test was performed simulating an over-purlin suspended wire insulation system. This evaluation investigated the fire propagation properties of the roof insulation with the purlins positioned across the width of the test facility. A schematic side view of a typical roof test installation is shown in Figure 3.2.

For this evaluation, the specimen frames were aligned in such a way that the roof slope was equal to 3 degrees. The distance between the top of the fire source and the roof directly above it was 2.7 metres.

Additional purlins were installed in the test facility for the purpose of this test with 1 meter spacings.

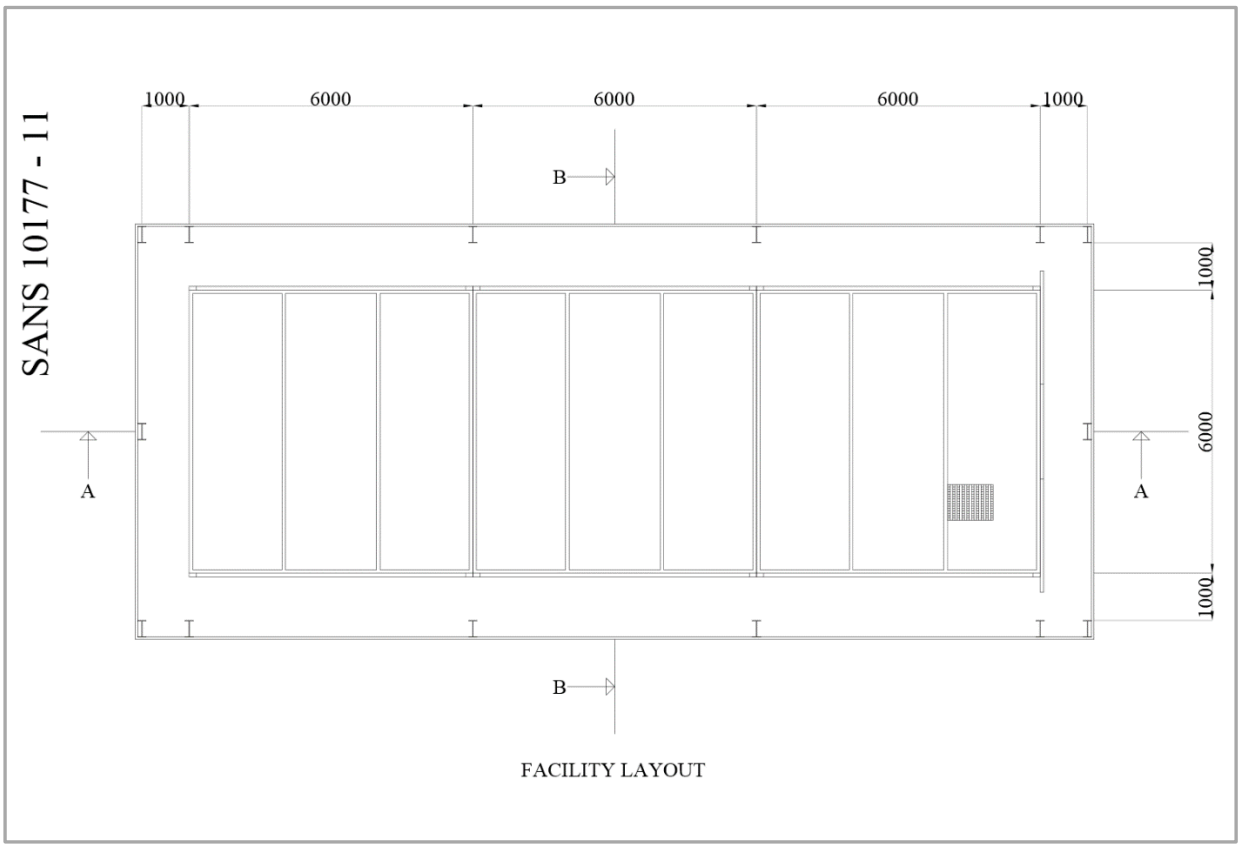

*Figure 3.1: **SANS 10177 – 11** test facility with specimen frames*

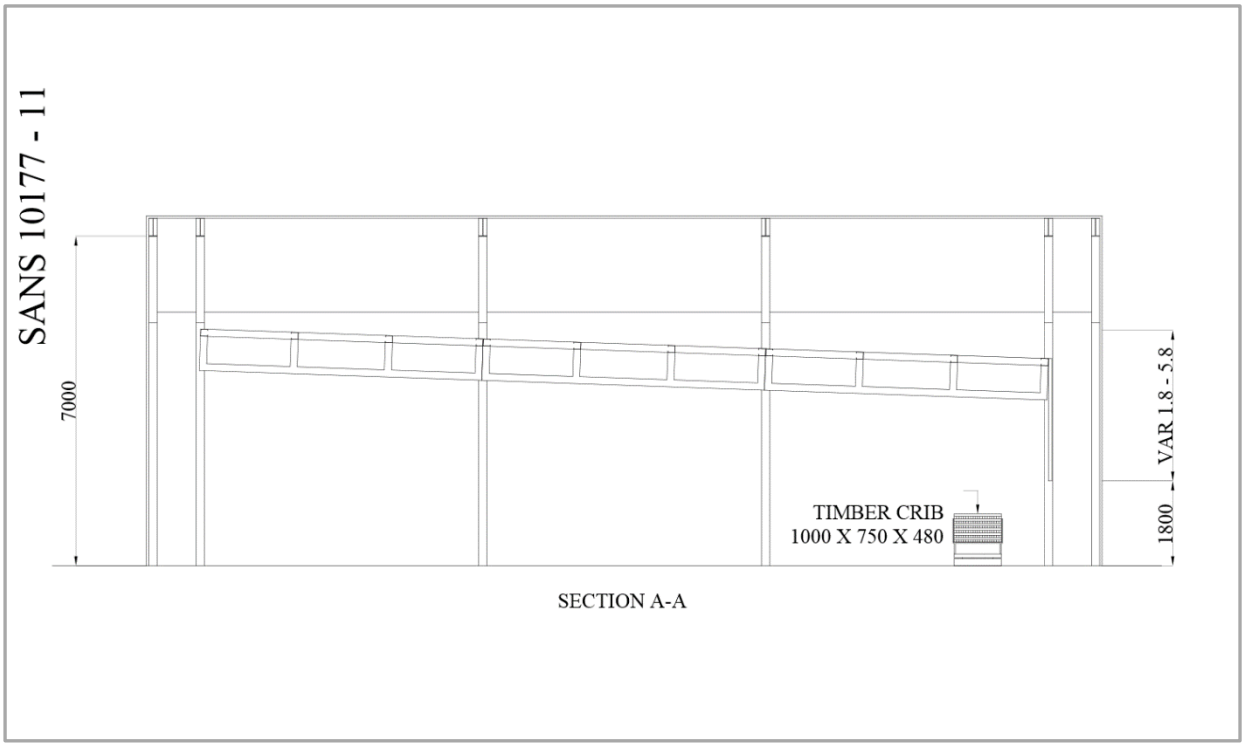

*Figure 3.2: Typical roof test installation in the **SANS 10177 – 11** facility*

4. TEST RESULTS

Technopol – Supacool

OBSERVATIONS DURING THE **SANS 10177 – PART 11** TEST

TIME	OBSERVATION
00:00	– Test Started –
04:50	Material softening (uPVC skin)
05:10	Discolouration on joint
05:50	Material start draping A.F.S. (above Fire Source)
06:30	Debris dropping down A.F.S.
07:30	Ignition of draped uPVC A.F.S.
08:55	Flaming debris dropping down A.F.S.
13:30	Crib starting to collapse
	All flaming out on specimen
14:25	Crib collapses
17:35	Crib starting to decay
23:20	Crib completely collapsed
28:00	Crib consumed **– Test end –**

Note(s): Material draped over sprinklers.
Flaming debris and molten droplets fell onto the floor.

*Table 4.1: Observations made during the **SANS 10177 – 11** test*

The test installation in the **SANS 10177 – 11 Horizontal** facility prior to ignition of the Fire Source crib and after the test was concluded is shown in Figure 4.1 and 4.10 respectively. The temperatures recorded by the thermocouples (TC) during the test are depicted graphically in Figures 4.13 and 4.14.

*Figure 4.1: The **SANS 10177 – 11** test installation prior to ignition of the Fire Source*

Figure 4.2: Discolouration on joint

Figure 4.3: Material starting to drape

Figure 4.4: Material draping

Figure 4.5: Debris dropping down

Figure 4.6: First ignition

Figure 4.7: Material continues to drape

Figure 4.8: All flaming out on specimen

Figure 4.9: Debris dropped down up to 3rd bay (4 - 6 m distance)

Figure 4.10: Fire Source decaying

Figure 4.11: Test installation at conclusion of test

Figure 4.12: Material draped over sprinkler

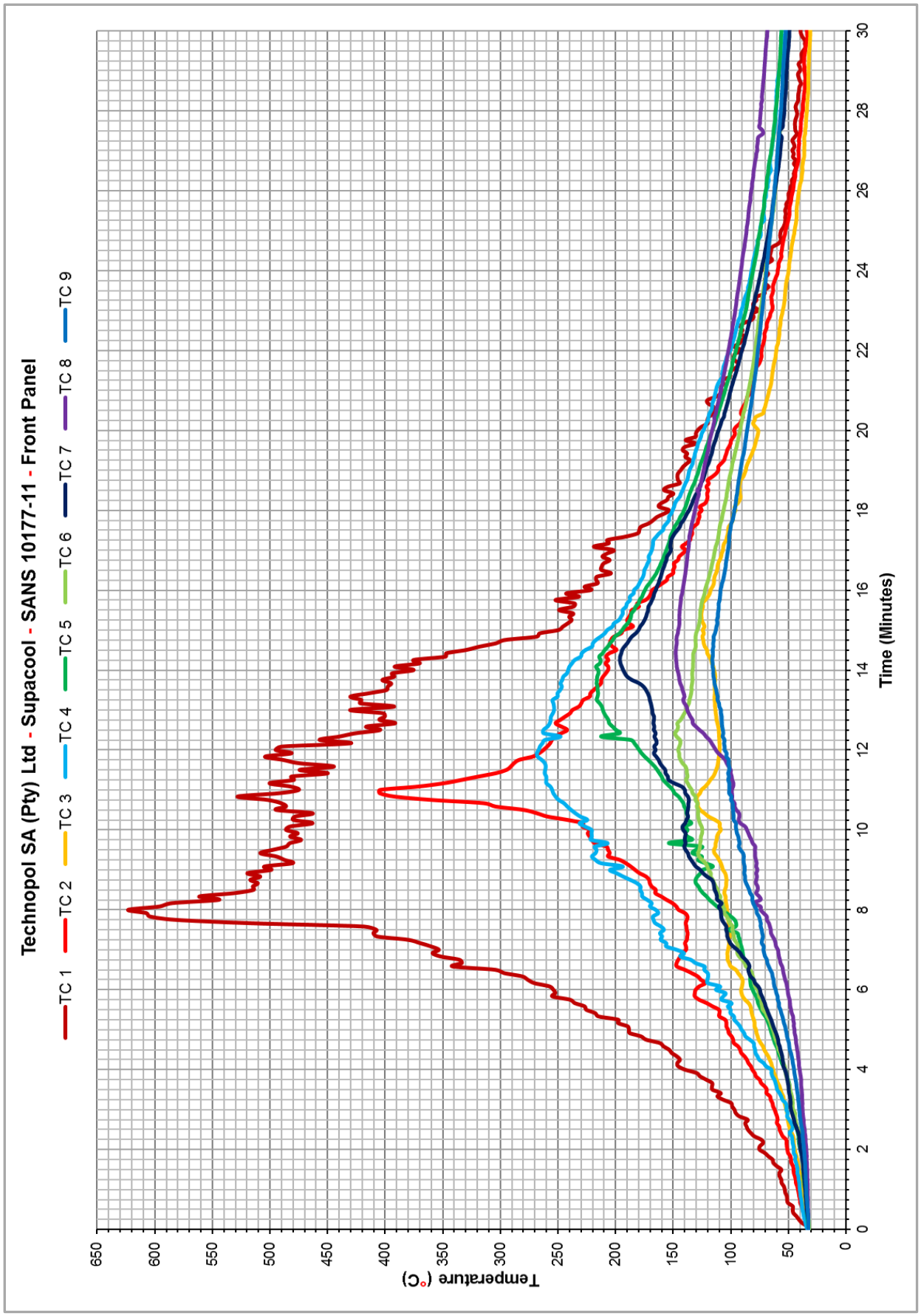

*Figure 4.13: Temperatures recorded on the front sample frame during the **SANS 10177 – 11** test*

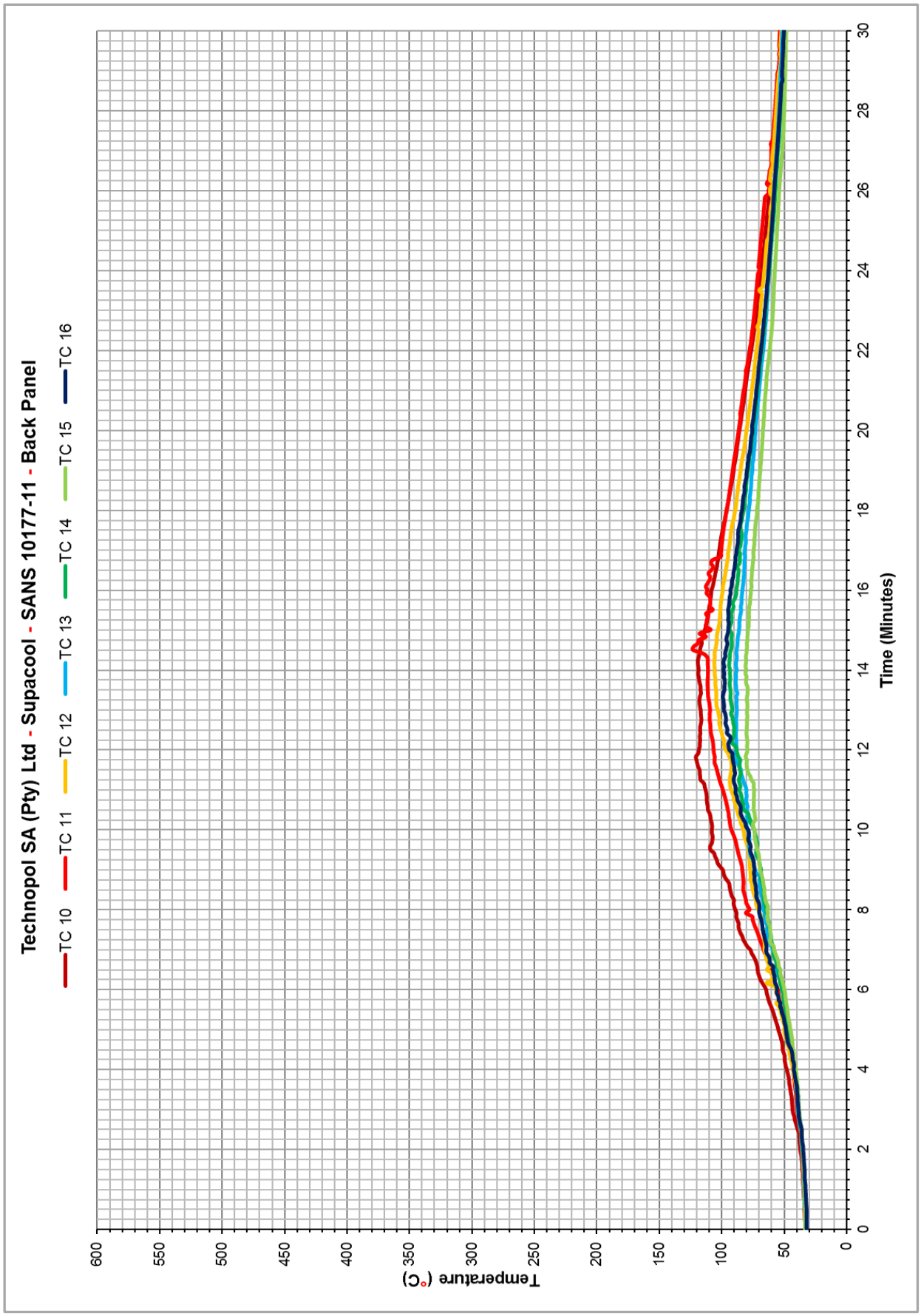

*Figure 4.14: Temperatures recorded on the rear sample frame during the **SANS 10177 – 11** test*

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5. DISCUSSION OF RESULTS

During the large-scale **SANS 10177 – 11** test, the following were observed:

- Draped material over the purlin ignited but did not spread flames
- Flaming debris was only observed in the Fire Source Area (0 – 2 m distance)
- Molten droplets and debris dropped down up to the 3rd bay (4 – 6 m distance)
- The material draped over the dry sprinkler installation.

6. CONCLUSIONS

The product was tested within the **SANS 10177 – Part 11 Horizontal** facility without functional sprinklers (Worst case scenario).

The classifications for the **Supacool** material as supplied by **Technopol** in terms of **SANS 428** are as follows:

- **SANS 10177 – 5 » B (Combustible) –** *Not tested*
- **SANS 10177 – 11 » B/ B3/ Agricultural Application / H**

In general, provision of adequate roof ventilation for each individual installation would need to be considered based on the size, slope and configuration of the roof and should be part of the fire safety design of the building to satisfy the requirements as contemplated by **SANS 10400 – T**.

The installation system will affect the operation of a Fixed Water Suppression (Sprinkler) system; therefore **Supacool** is not suitable for use in commercial buildings with sprinkler installations **(SP)**.

The above results does not relate to fire resistance. In instances where fire resistance is a requirement, this property needs to be determined in terms of **SANS 10177 – 2**.

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ANNEXURE "A"

– Company Information –	FIRELAB
Company Name:	Technopol SA (Pty)Ltd
Company Registration Nr.:	1999/019612/07
Company VAT Nr.:	4320139613
Core Business Activities:	Manufacture & Supply of Expanded Polystyrene Insulation systems
Physical Address:	9 Wright road ext. Nuffield Springs 1560
Postal Address:	P.O. Box 2445 Springs 1560
Contact details	Hardus vd Westhuizen
Telephone number:	0113632780
Facsimile number:	0113632752
Cellphone number:	0745675555
Email address:	hardus@technopol.co.za
Name of Contact Person	Hardus vd Westhuizen
Technical:	
Financial:	Lammie de Beer

– Test information & Sample/Product Description –	
Type of Test:	SANS 10177-11
Sample/Product Name:	Supacool
Manufacturing Date:	17/10/2016
Batch/Product Number:	
Sample/Product Description: *(Short description of sample or product submitted for testing)*	White Polystyrene faced with a white UPVC layer

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– SANS 10177 – PART 5, 10 and 11 –
– Product Information –

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Product Trade Name:	Supacool	
Product Manufacturer:	Technopol SA (Pty) Ltd	
Product Code No.:		
Proposed Usage:	Chicken houses	
Generic Identification:	White Polystyrene faced with a white UPVC layer	
Manufacturing Date:	17/10/2016	
Batch No.:		
Actual Mass *(g/m²)*:		
Thickness *(mm)*:	50mm	
Width *(mm)*:	1200mm	
Length *(mm)*:	6000mm	
Product Composition	*Layer Description / Composition (Including bonding layers):*	*Mass (g/m²)*
Layer 1:	1mm UPVC Facing	
Layer 2:	PU adhesive	±200g/m²
Layer 3:	FR Cel 15DV – (Fire Retarded Expanded Polystyrene)	±90g/m²
Layer 4:		
Layer 5:		
Layer 6:		
Layer 7:		
Layer 8:		
Layer 9:		
Layer 10:		
Wire Spacing *(mm)*:		
Joint Overlap *(mm)*:		
Installation Details	EPS Supacool Boards to be installed in an over purlin type of configuration. A Polystyrene "tongue" is inserted into the grooves of two adjacent boards to join the boards together.	