



TITLE	:	Report on the Fire Properties of the Harvey Thatch Tile Roofing System on a Treated Thatch Roof when tested in accordance with Clause 8 of the SANS 10177 – Part 12 test protocol
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CONTRACT No	:	FTC 19/076
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1. INTRODUCTION

Harvey Thatch Tile Roofing System is used in conjunction with newly built or existing treated thatch roofs. The purpose of the tests is to determine the fire properties of the “System” and to classify the Roof System in terms of the requirements as stipulated in **SANS 10400 – T, Clause 4.12**.

The **Harvey Thatch Tile Roofing System** has previously been tested in accordance with **SANS 10177 – 12; Clause 10 (Burning Brand Test)**. No sustained flaming of the system was observed during, or after, the **Class A** brand was completely consumed.

The roof system was exposed to the **Intermittent Flame Exposure Test** (classification of thatch roof protective system) based on the outcome of the Burning Brand test results (**Class A**).

The **Harvey Thatch Tile Roofing System** comprises the following:

A **Harvey Thatch Tile Roofing System** on a treated thatch roof, 1.5 m wide x 2.5 m long x 140 mm thick, was provided and installed on the **Intermittent Flame Exposure** apparatus.

The thatch roof was treated with **Micon Thatchsayf™**, applied to the Exterior ($\pm 0.9 \text{ L/m}^2$) and Interior ($\pm 0.4 \text{ L/m}^2$) of the thatch roof using a spray-on application method.

The Pine Timber Branding used for anchoring the Harvey Thatch Tiles was dip treated in **Micon's Flambor™**.

Pink Aerolite insulation blankets were placed over the thatch prior to the fixing of the timber bearers and a second layer over the Pine Timber Branding covering the entire exterior roof surface prior to the fixing of the **Harvey Thatch Tiles**.

2. SAMPLE DESCRIPTION

The **Harvey Thatch Tile Roofing System** used in conjunction with a treated thatch roof has the following characteristics:

Product information:

<i>Product code:</i>	H3016-16NBGU-0001
<i>Manufacturer:</i>	Macsteel
<i>Manufacturing date:</i>	February 2019
<i>Batch number:</i>	N/A

Physical Properties (Harvey Thatch Tile):

<i>Actual mass:</i>	$\pm 3\,600 \text{ g/m}^2$
<i>Thickness:</i>	0.45 mm
<i>Width:</i>	395 mm
<i>Length:</i>	1 675 m
<i>Density:</i>	7.85 kg/m^3

Roof Construction of the Harvey Thatch Tile System:

<i>Layer 9 (Top/Weather):</i>	Harvey Thatch Tile (See Annexure "A")
<i>Layer 8:</i>	Pink Aerolite
<i>Layer 7:</i>	Micon FLAMBOR treated Pine Branderling
<i>Layer 6:</i>	Micon FLAMBOR treated Pine Bearers
<i>Layer 5:</i>	Pink Aerolite
<i>Layer 4:</i>	Micon THATCHSAYF 0.9 L/m^2 (Spray-on)
<i>Layer 3:</i>	Thatch Layer
<i>Layer 2:</i>	Micon THATCHSAYF 0.4 L/m^2 (Spray-on)
<i>Layer (Bottom/Room) 1:</i>	Timber Support Structure (Bearers and Laths)

Annexure "A": Company detail

Annexure "B": Specimen information



Figure 2.1: **Harvey Thatch Tile Roofing System** on a treated thatch roof prior to test



Figure 2.2: **Harvey Thatch Tile System** as seen from the unexposed (Interior/Room) side

3. TEST PROCEDURES: SANS 10177 – 12, CLAUSES 8 & 10

3.1. BURNING BRAND TEST

The purpose of the **Burning Brand Test** is to determine the size of the ignition source required to ignite the roof specimen.

The **Burning Brand Test** protocol consists of three separate tests. A crib, made of SA pine representing the following dimensions, is classified as follows:

- 🔥 **Class A:** 305 mm x 305 mm x 57 mm
- 🔥 **Class B:** 152 mm x 152 mm x 57 mm
- 🔥 **Class C:** 38 mm x 38 mm x 19.8 mm

Before the tests, calibrations of the air velocity are done according to **SANS 10177 – 12, Section 5**.

At no time during or after the **Burning Brand Test** shall:

- 🔥 any portion of the roof covering material be blown or fall off the test deck in the form of flaming or glowing brands that continue to glow after reaching the floor;
- 🔥 there be any sustained flaming on the unexposed side of the specimen; or
- 🔥 the deck burn through to the underside of the specimen.

Each individual test is continued until the brand is totally consumed and there is no evidence of flaming, glowing and smoking on the exposed surface or the underside of the test deck or until failure occurs.

Should smoking, flaming or glowing on the exposed surface still be visible after 1 hour and 30 minutes, the test will be terminated.

Deviation: The **Burning Brand Test** has previously been performed and the **Harvey Thatch Tile Roofing System** did not sustain flaming during or after the **Class A** crib.

3.1.1. TEST EQUIPMENT

The following equipment was used in the execution of the **Burning Brand Test**;

- 🔥 **SANS 10177 – 12** Test Apparatus
- 🔥 Stopwatch
- 🔥 Electrical fan

3.2. INTERMITTENT FLAME EXPOSURE TEST

A thatch roof was built with the required incline onto the **Intermittent Flame Exposure** apparatus.




Prior to the test, the air velocity and the flame temperature are calibrated in accordance with **SANS 10177 – 12, Section 5**.

The flame is applied to the roof specimen for a certain period and number of cycles as seen in Table 3.2.1.

Application Class	Flame On (min)	Flame Off (min)	Number of test cycles
Class A	2	2	15
Class B	2	2	8
Class C	1	2	3

Table 3.2.1: **Intermittent Flame Exposure Test periods**





At no time during or after the **Intermittent Flame Exposure Test** shall:

-  any portion of the roof covering material be blown or fall off the test deck in the form of flaming or glowing brands that continue to glow after reaching the floor;
-  there be any sustained flaming on the unexposed side of the specimen; or
-  the deck burn through to the underside of the specimen.

The test period ends when no smoking, flaming or glowing is visible (after the last cycle) or when failure occurs.

3.2.1. TEST EQUIPMENT

The following equipment was used in the execution of the **Intermittent Flame Exposure Test**:

-  **SANS 10177 – 12** Test Apparatus
-  Stopwatch
-  Type K thermocouple
-  Electrical fan

4. TEST RESULTS

4.1. INTERMITTENT FLAME EXPOSURE TEST

Table 4.1.1 below contains all observations made during the **Intermittent Flame Exposure Test** conducted on 13 June 2019.

Macsteel – Harvey Thatch Tile on Treated Thatch Roof		
OBSERVATIONS DURING THE INTERMITTENT FLAME EXPOSURE TEST		
CYCLE	TIME (mm:ss)	DESCRIPTION
1	00:00	– Test Started – <i>Burner Ignited (Flame On)</i>
	00:20	Flaming on surface (Resin Ignition)
	01:30	All surface flaming out
	02:00	<i>Burner Shut Off (Flame Off)</i>
	02:05	Smoke release from exposed surface
	03:05	All smoking out
2	04:00	<i>Burner Ignited (Flame On)</i>
	05:40	Smoke release from exposed surface
	06:00	<i>Burner Shut Off (Flame Off)</i> – Smoke release continues
	06:15	Decomposition of Natural Stone coating
3	08:00	<i>Burner Ignited (Flame On)</i>
	10:00	<i>Burner Shut Off (Flame Off)</i>
4	12:00	<i>Burner Ignited (Flame On)</i>
	13:40	Tiles start deforming
	14:00	<i>Burner Shut Off (Flame Off)</i> – Smoke release from exposed surface
	14:10	All smoking on surface out
5	16:00	<i>Burner Ignited (Flame On)</i>
	18:00	<i>Burner Shut Off (Flame Off)</i>

Table 4.1.1: Observations recorded during the **Intermittent Flame Exposure Test**

Macsteel – Harvey Thatch Tile on Treated Thatch Roof (Cont.)

OBSERVATIONS DURING THE INTERMITTENT FLAME EXPOSURE TEST

CYCLE	TIME (mm:ss)	DESCRIPTION
6	20:00	<i>Burner Ignited (Flame On)</i>
	21:10	Sporadic flaming on exposed surface
	22:00	<i>Burner Shut Off (Flame Off)</i>
7	24:00	<i>Burner Ignited (Flame On)</i>
	26:00	<i>Burner Shut Off (Flame Off)</i>
8	28:00	<i>Burner Ignited (Flame On)</i>
	30:00	<i>Burner Shut Off (Flame Off)</i>
9	32:00	<i>Burner Ignited (Flame On)</i>
	34:00	<i>Burner Shut Off (Flame Off)</i>
10	36:00	<i>Burner Ignited (Flame On)</i>
	38:00	<i>Burner Shut Off (Flame Off)</i>
11	40:00	<i>Burner Ignited (Flame On)</i>
	42:00	<i>Burner Shut Off (Flame Off)</i>
12	44:00	<i>Burner Ignited (Flame On)</i>
	46:00	<i>Burner Shut Off (Flame Off)</i>
13	48:00	<i>Burner Ignited (Flame On)</i>
	50:00	<i>Burner Shut Off (Flame Off)</i>
14	52:00	<i>Burner Ignited (Flame On)</i>
	54:00	<i>Burner Shut Off (Flame Off)</i>
15	56:00	<i>Burner Ignited (Flame On)</i>
	58:00	<i>Burner Shut Off (Flame Off) – Test Terminated –</i>

Note(s):



Figure 4.1.1: Start of *Intermittent Flame Exposure Test*



Figure 4.1.2: Close-up of decomposition of *Natural Stone Coating*



Figure 4.1.3: Deformation of **Harvey Thatch Tiles** (Buckling downwards)



Figure 4.1.4: **Harvey Thatch Tile Roofing System** during final cycle of **Intermittent Flame Exposure Test**



Figure 4.1.5: Exposed surface of **Harvey Thatch Tile Roofing System** after conclusion of test



Figure 4.1.6: Unexposed interior surface of thatch roof after conclusion of test



Figure 4.1.7: System with eave tiles removed – Slight discolouration to **Pink Aerolite**



Figure 4.1.8: Condition of the **Pink Aerolite** covering **Pine Brander** below **Harvey Thatch Tiles**



Figure 4.1.9: Bottom layer of **Pink Aerolite** under **Pine Brandering** and Bearers

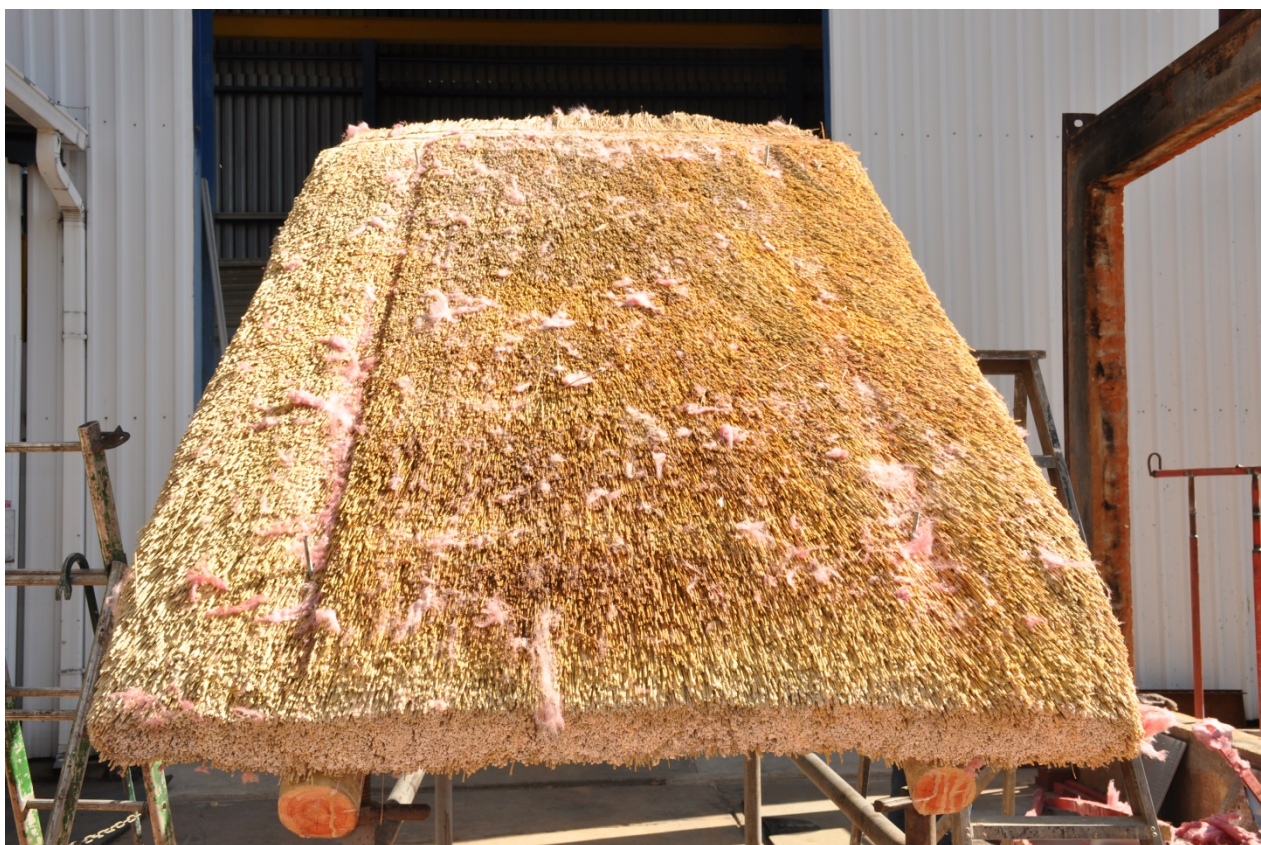


Figure 4.1.10: Condition of thatch roof – Slight discolouration of thatch surface

5. DISCUSSION AND RECOMMENDATIONS

The **Intermittent Flame Exposure Test** was continued for 15 cycles (**Class A**) in order to determine the extent of the fire propagation as depicted in **Section 3** above.

No burning or glowing debris dropped down during the entire test period and only slight discolouration of the top thatch surface was observed after disassembly of the **Harvey Thatch Tile Roofing System**. Slight charring of the Pine Brandering with no flaming and only discolouration of the thatch roof occurred during the **Intermittent Flame Exposure Test**.

The **Harvey Thatch Tile Roofing System** on a Treated Thatch Roof therefore achieved a **Class A** rating, and the roof system is considered to be a Low Fire Load in terms of **SANS 10400 – T**.

Note:

*Ensure that all ridges, eaves and bottom edges are covered with **Pink Aerolite** and that the **Harvey Thatch Tiles** fully extend over the eaves and the bottom edge of the roof.*

Treatment of both the thatch and the timber is essential to the effectiveness of the system.

6. CONCLUSION

The **Harvey Thatch Tile Roofing System** installed on the Thatch Roof treated with **Micon Thatchsayf™** was supplied by **Macsteel Service Centres SA (Pty) Ltd** and satisfied the requirements for a **Class A** roof system when tested using **Clauses 8** and **10** of the **SANS 10177 – Part 12** test protocol.


The results for the **Harvey Thatch Tile Roofing System** on a Treated Thatch Roof (Yellow thatching grass) are as follows:

 Burning Brand	»	Class A*
 Intermittent Flame Exposure	»	Class A*

*** Note:**


Class A equals a roof of Low Fire Load in terms of **SANS 10400 – T** for safety distance calculations.

ANNEXURE “A”

– Company Information –		
Company Name:	MACSTEEL SERVICE CENTRES SA (PTY) LTD	
Company Trading Name:	HARVERY ROOFING PRODUCTS	
Company Registration Nr.:	2005/016292/07	
Company VAT Nr.:	4430224206	
Core Business Activities:	STEEL TILE MANUFACTURER	
Postal Address:	PO BOX 420 BRAKPAN 1540	
Physical Address:	Cnr HELIUM & MOLECULE ROADS VULCANIA BRAKPAN	
Company contact number:	011 741 5600	
Direct Contact Details		
Technical (name):	ALBIE JORDAAN	
Cell phone number:	082 554 7023	
Email address:	albie.jordaan@macroofing.co.za	
Financial (name):	ASHIK BEDASIE	
Cell phone number:	NA	
Email address:	Asik.Bedasie@hrp.co.za	
– Test & Sample Information –		
Test Required:	INTERMITTENT FLAME EXPOSURE TEST	
Sample/Product name:	HARVEY THATCH TILE	
Intended Use:	ROOFING	
Sample/Product Description:	1 x samples for Standard Harvey Thatch Tilef	
<i>(Short description of sample or product submitted for testing, and type of material to be tested)</i>		

APRIL 2018

ANNEXURE “B”

– GENERAL – – Product Information –		
Product description:		
Product name:	HARVEY THATCH TILE	
Generic Identification:	HARVEY	
Proposed Usage:	ROOFING NEW OR RE ROOF	
Manufacturer:	MACSTEEL	
Manufacturing date:	FEBRUARY 2019	
Product Code No.:	H3016-16NBGU-001	
Batch No.:	N/A	
Physical description:		
Actual Mass (g/m ²):	3600 g/m	
Thickness (mm):	0.45mm TCT GALVANIZED SUBSTRATE	
Width (mm):	395mm	
Length (mm):	1675mm	
Density (kg/m ³):	7.85	
Product composition:		
Layer 1:	TIMBER TRUSS / SUPPORT FRAME	
Layer 2:	THATCH CAPE READ LAYER / NATURAL THATCH	
Layer 3:	MICON THATCHSAYF (APPLIED INTERIOR & EXTERIOR - P 0.2L per m /2 interior & 0.7L per m2 exterior	
Layer 4:	PINK AEROLITE	
Layer 5:	FLAMBOR TREATED TIMBER PINE BRANDERING	
Layer 6:	PINK AEROLITE	
Layer 7:	HARVEY THATCH TILE – galv Substrate coated with natural stone	
Additional Information		

OCTOBER 2018