Kerone Research & Development Centre (KRDC), B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India
Tel- +91-251-2620542/43/44/45/46, Email-info@kerone.com, www.kerone.com

Customer :	**Laboratory Experimental Analysis**
Process :	**Batch Microwave Heat Treatment for Rubber Tire**

TEST REPORT No: 47/KRDC/LAB/17 Mum 29/05/2018

Date Sample reception : 29/05/2018
ID : 47/LAB/41

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 1 No.
Sampling date : 07/06/2018
Product : Parts of different layers of Rubber tire
Requirement : After treatment, temperature inside the four layers of tire should be uniform around 90-95^{o}C
Start Date test : 07/06/2018
End Date test : 07/06/2018

LABORATORY EXPERIMENTAL SET UP:

Format: F/R&D/01

Kerone Research & Development Centre (KRDC), B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India
Tel- +91-251-2620542/43/44/45/46, Email-info@kerone.com, www.kerone.com

LAB BATCH MICROWAVE HEATING SYSTEM SPECIFICATIONS:

Microwave Power	2 kW(CW)
Frequency	2450 MHz ± 50
Convective Power	3.5 kW (air flow 350 l/min at 20^{o}C)
Microwave Exposure Zone (cavity)	1 cubic meter
Mode Stirrer	One
Thermal Monitoring System	Single Channel Fiber Optic: Range -40 to 250^{o}C
Exhaust Power	1HP
Tray Size	450x950x50 mm

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	28.1^{o}C (±5^{o}C)
Humidity (%)	≤ 61% RH
Pressure (kN/m2 or kPa)	Not recorded

Note for recommendation: Environmental conditions have a direct impact on test results. Accuracy and consistency of test data are affected by the laboratory conditions

EQUIPMENTS USED:

Name of Equipment	Picture of Equipment	Specifications
K-Type Thermometer		**Make: FLUKE** **Model: 51 II**

Format: F/R&D/01

Kerone Research & Development Centre (KRDC), B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India
Tel- +91-251-2620542/43/44/45/46, Email-info@kerone.com, www.kerone.com

Thermo Hygrometer		**Model No: HTC-2** **Temperature accuracy: ±°C (1.8°F)** **Temperature resolution: 0.1°C (0.2°F)** **Humidity range: 10%~99% RH** **Humidity accuracy: ±5% RH** **Humidity resolution: 1% RH**

SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on rubber tire in batch microwave heating system for heating purpose. For this, given tire has been placed in microwave system for various time period, power and temperature. Temperature inside the four layers of tire has been noted.

ANALYTICAL RESULTS:

OD before trials: 630 mm
ID before trials: 295 mm
Initial Temperature of Tire: 31.2°C

Trial No.	Parameters	Temperature inside the Layers (°C)			
		L1	L2	L3	L4
T1	Power: 1.8 kW; Temperature: 90°C; Time: 15 minutes; Fan speed: 50%	68	94	62	66
T2	Power: 1.8 kW; Temperature: 100°C; Time: 15 minutes; Fan speed: 50%	64	71	56	66
T3	Power: 2 kW; Temperature: 100°C; Time: 35 minutes; Fan speed: 50%	100	100	68	69
T4	Power: 2 kW; Temperature: 100°C; Time: 45 minutes; Fan speed: 50%	105	100	72	61

OD after trials: 640 mm
ID after trials: 290 mm

Kerone Research & Development Centre (KRDC), B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India
Tel- +91-251-2620542/43/44/45/46, Email-info@kerone.com, www.kerone.com

BEFORE AND AFTER PICTURES OF TREATED SAMPLE:

OBSERVATIONS:

By the physical observation, multimode cavity with microwave heads required to achieve temperature on inner layer, throughout evenness in rubber tire mass.
Suggested microwave power is 6 kW (2 kW*3 nos).

K Komal

Miss. Komal Bhoite
Tested By

Format: F/R&D/01