

Kerone Research & Development Centre (KRDC), B/47, Addl. MIDC. Anand Nagar, Ambarnath (East), Thane- 421 506, India
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Customer :	Laboratory Experimental Analysis
Process :	Batch Microwave Heat Treatment for Rubber curing

TEST REPORT No: 47/KRDC/LAB/17 Mum 03/04/2018

Date Sample reception : 03/04/2018
ID : 47/LAB/27

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 7 slabs
Sampling date : 05/04/2018
Product : Natural Rubber
Requirement : Rubber curing (Temperature on product after treatment must be between 70-80°C)
Start Date test : 05/04/2018
End Date test : 05/04/2018

LABORATORY EXPERIMENTAL SET UP:



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LAB BATCH MICROWAVE HEATING SYSTEM SPECIFICATIONS:

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

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	25°C (\pm 5°C)
Humidity (%)	\leq 45% RH
Pressure (kN/m ² 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
Compact Thermal Imaging Camera		Model: FLIR E-30 Resolution: 160 x 120 IR Thermal sensitivity of 0.10°C

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Thermo Hygrometer



Model No: HTC-2

Temperature accuracy: $\pm 1^\circ\text{C}$ (1.8°F)

Temperature resolution: 0.1°C (0.2°F)

Humidity range: 10%~99% RH

Humidity accuracy: $\pm 5\%$ RH

Humidity resolution: 1% RH

SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on bunch of rubber slabs in batch microwave heating system for rubber curing. For this, bunch of rubber slabs has been placed in trays of microwave system for various time period and temperature on sample has been noted after every 2 minutes.

ANALYTICAL RESULTS:

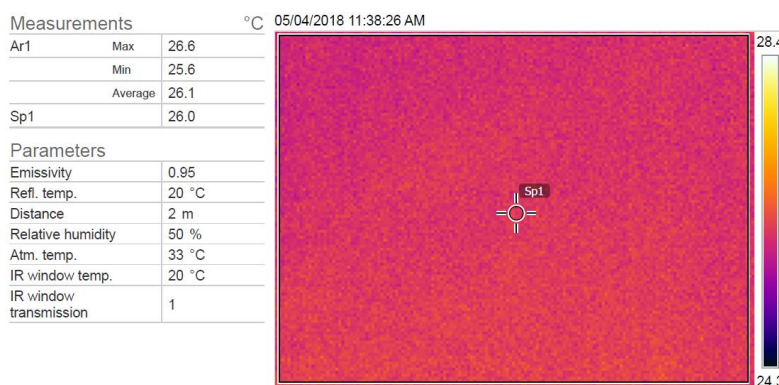
Thickness of slab: 10-12 mm

No. of slabs in a bunch: 3

Sr. No.	Microwave power (kW)	Convective Power (kW)	Time (minutes)	Temperature on sample ($^\circ\text{C}$)
1.	0.5	1.75	After 2	35-45
2.			After 4	45-55
3.			After 6	55-65
4.			After 8	65-75

THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

1. Before Heat Treatment



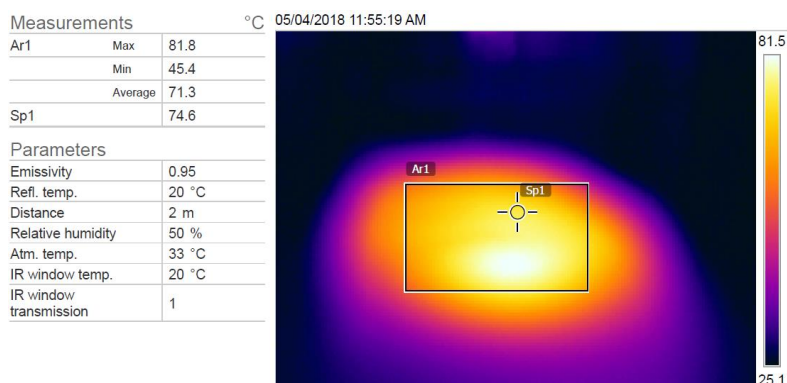
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2. After Heat Treatment:



BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:



OBSERVATIONS:

By the physical observation, it has been found that pre-curing of natural rubber (Latex), which is having low elastic properties, when exposed to microwave radiation, it get more resilience and elasticity. The strength and induced cross links of polymer chains of rubber slabs has to be analyzed.



Miss Komal Bhoite
Tested By



Dr. Uttam K. Goswami
Approved By

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