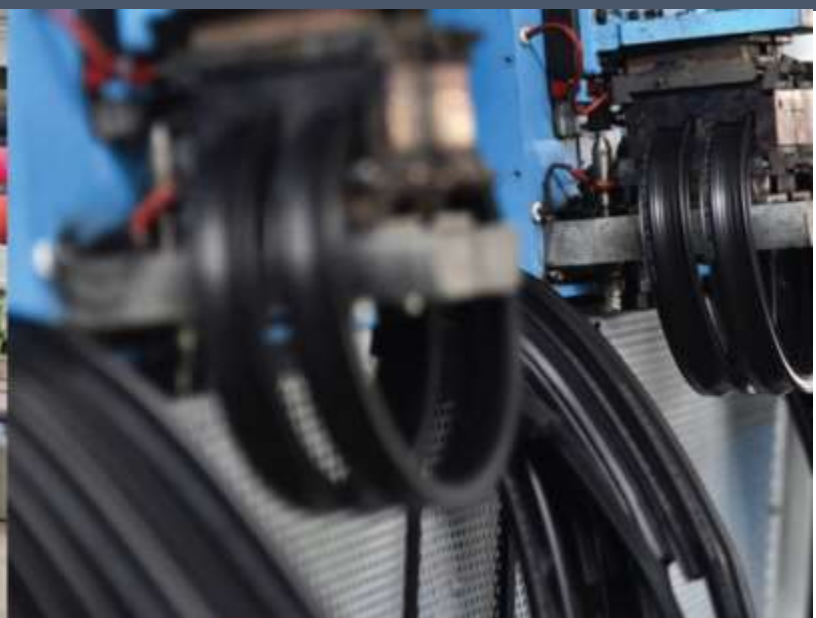


Kerone Research & Development Centre (KRDC)
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**Batch Microwave + Convection Heat
Treatment for Carbon Black**

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Customer :	M/s. PCBL Limited
Process :	Batch Microwave + Convection Heat Treatment for Carbon Black

Test Report No: 134/KRDC/LAB/17 Mum 05/09/2022

Date Sample reception : 25/06/2022
ID : 134/LAB/05

Sample Description:

Sampling : As Requested
Sample Condition : Acceptable
Sampling date : 05/09/2022
Product : Carbon Black (Liquid Mixed)
Requirement : Microwave treatment at 1 kW
Start Date test : 05/09/2022
End Date test : 05/09/2022

Laboratory Experimental System -



Format: F/R&D/01

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System Specifications -

Microwave Power	1.8 KW (CW)
Frequency	1850 MHz \pm 50
Convective Power	3.5 KW (airflow 350 I/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	1 HP
Tray size (width*height*depth)	450*950*50 mm

Laboratory's Environmental Conditions –




Temperature (degree C)	29.4°C (\pm 5°C)
Humidity (%)	\leq 50% 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

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Equipment Used -

Name of Equipment	Picture of Equipment	Specifications
Compact Thermal Imaging Camera		Model: FLIR E-30 Resolution: 160x 120IR Thermal sensitivity of 0.10°C
Thermo Hygrometer		Model No: HTC-2 Temperature accuracy: $\pm^{\circ}\text{C}$ (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
Moisture Analyzer		Make: Axis Balance Description: Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)

Format: F/R&D/01

The value obtained is already corrected for possible recover value stated, if applicable. This document may not be reproduced or disclosed wholly or partly in any part thereof without the written consent of the laboratory management or customer. This document relates only to the specimen samples processed. The processed sample will be kept in this laboratory for 7 days from the date of heat treatment.

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Procedure of the Experiment -

- The experiment was performed to speed up the heating rate.
- For this experimental run, the given sample was taken in the crucible and placed in MW + Convection heating system with suitable parameters.
- After the heating treatment, the sample was analyzed.

Analytical Results:

SAMPLE- D (Liquid Mixed)

Trials	Initial Weight	Specifications of Microwave	Cycle Time	Final Weight	Remarks.
1	20 g	Magnetron Power: 1 kW; Set temp.:150°C	1 min.	20 g	No weight loss. Grey spots were observed. On product temp- (132-197)°C
2	20 g	Magnetron Power: 1 kW; Set temp.:150°C	2 min.	20 g	No weight loss. Grey spots were observed. On product temp- (204-456)°C

Before and After the Sample:



Untreated

Format: E/R&D/01

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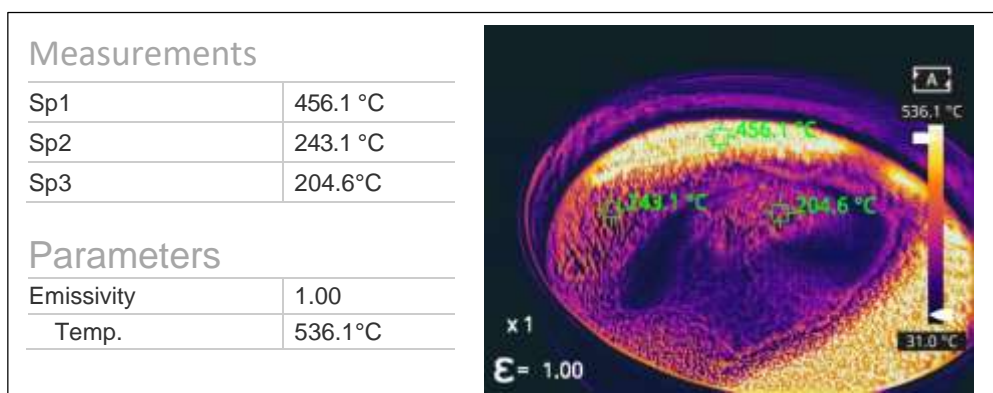
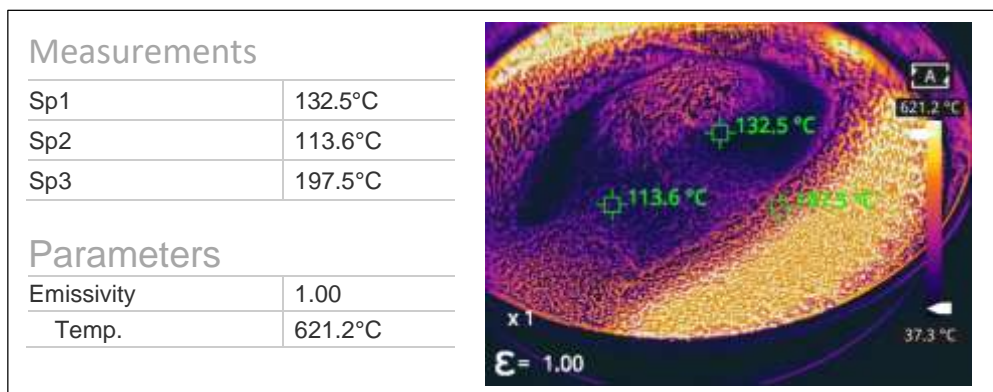


Trial 1 treated (Grey spots)



Trial 2 treated (Grey spots)

Thermal images:



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Observations:

The heating behavior of Carbon Black has been investigated under the Microwave + Convection heating system. The heating rate is found to be increasing with respect to an increase in time. As per the physical investigation, it has been observed that there is no weight loss after the treatment. Grey spots after heating the product were observed.



Ms. Sayali Asole
(Tested By)