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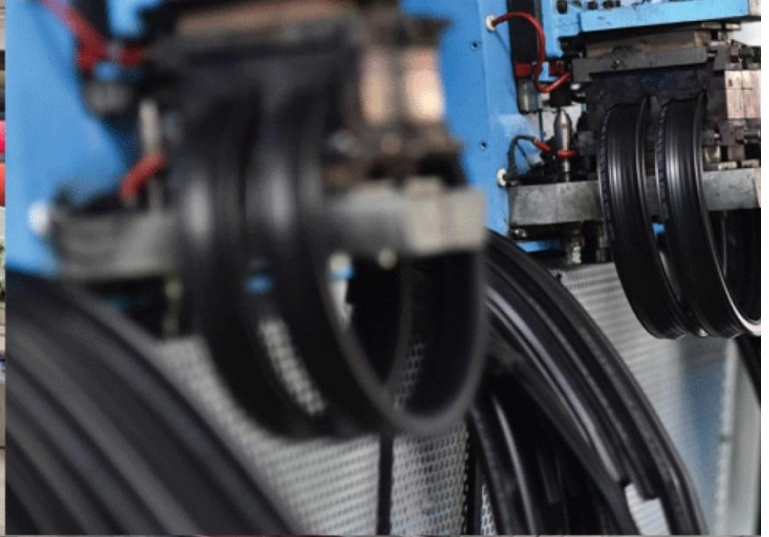
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In Association With



ELECTRO MAGNETIC innovative technologies

Kerone Research & Development Centre (KRDC),
B/47, Addl. MIDC. Anand Nagar, Ambarnath (East), Thane- 421 506, India
Tel- +91-251-2620542/13/44/45/46, Email-info@kerone.com, www.kerone.com



**Batch Microwave+Convection Heat
Treatment for Drying of Chemical granules**



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Customer :	M/s JB Chemicals
Process :	Batch Microwave+Convection Heat Treatment for Drying of Chemical Granules

TEST REPORT No: 47/KRDC/LAB/17 Mum 27/10/2018

Date Sample reception : 27/10/2018
ID : 47/LAB/63

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 1 kg
Sampling date : 27/10/2018
Product : Chemical Granules
Requirement : Inner solvent should evaporate from granules without change in it
Start Date test : 27/10/2018
End Date test : 27/10/2018

LABORATORY EXPERIMENTAL SET UP:



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LAB BATCH MICROWAVE+CONVECTION 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)	25.5°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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EQUIPMENTS 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
Moisture Analyzer		Make: Axis Balance Description: Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)
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

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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.



SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on given chemical granules without adding any additive to speed up the drying rate. For this experimental run, the given sample of granules has been placed on tray with uniform thickness of about 12-15 mm and placed in heating system with suitable setting parameters. The observations are made after every 1 hour. Also, initial moisture content and final moisture content after heat treatment has been noted.

ANALYTICAL RESULTS:

Setting Temperature: 50°C

Microwave Power: 0.5 kW

Thickness of layer: 12-15 mm

Initial Moisture Content: 1.8%

Sr. No.	Time (hours)	Moisture Content (%)	Temperature on sample(°C)	Remarks, if any
1.	After 1	1.1	61.1	Drying rate started
2.	After 2	0.7	62.1	Drying phase continue
3.	After 3	0.7	63.5	Variant of Drying rate
4.	After 3.5	0.7	64.4	Variant of Drying rate

Final Moisture Content: 0.7%



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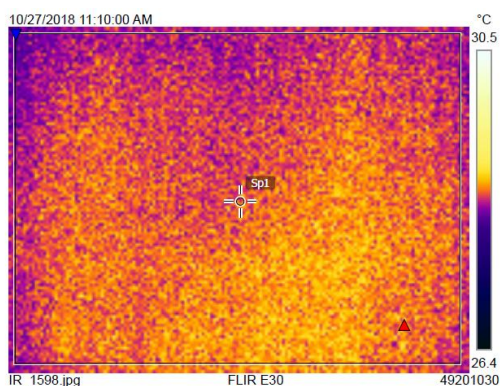
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THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

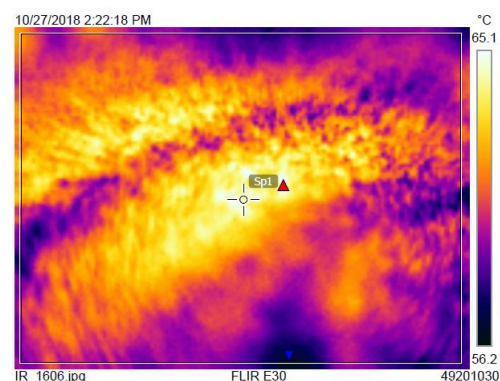
1. Before Heat Treatment:

Measurements		
Bx1	Max	29.0 °C
	Min	28.0 °C
	Average	28.5 °C
Sp1		28.4 °C
Parameters		
	Emissivity	0.95
	Refl. temp.	20 °C



2. After Heat Treatment:

Measurements		
Bx1	Max	65.4 °C
	Min	56.5 °C
	Average	60.9 °C
Sp1		64.4 °C
Parameters		
	Emissivity	0.95
	Refl. temp.	20 °C



BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:



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MOISTURE ANALYSIS REPORTS:

Drying started		Drying started	
Date :27-10-2018		Date :27-10-2018	
Time :11:17:28		Time :15:08:06	
Model:AGS200		Model:AGS200	
Serial number : 138		Serial number : 138	
Drying parameters		Drying parameters	
Product : Test		Product : Test	
Drying temperature : 105.0 °C		Drying temperature : 105.0 °C	
Drying profile : standard		Drying profile : standard	
Mode : Short mode		Mode : Short mode	
Calculation : $\frac{(w_0 - w)}{w_0} \times 100\%$		Calculation : $\frac{(w_0 - w)}{w_0} \times 100\%$	
Finished : 3 samples		Finished : 3 samples	
Initial weight : 1.246 g		Initial weight : 1.064 g	
Final weight : 1.224 g		Final weight : 1.057 g	
Drying time : 00:02:00s		Drying time : 00:01:40s	
Sampling interval : 20 sec		Sampling interval : 20 sec	
Moisture : 1.8 %		Moisture : 0.7 %	
NOTE Initial		NOTE Final	
The analysis performed by:		The analysis performed by:	
<i>KKomal</i>		<i>KKomal</i>	
Signature.....		Signature.....	

OBSRVATIONS:

The Drying behavior of chemical granules has been investigated under the microwave+convection heating system. The drying rate is found to be increasing with respect to increasing drying time. As per physical investigation, it has been observed that there is no change in given sample after microwave treatment.

Miss Komal Bhoite
Tested By

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