KERONE

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Kerone Research & Development Centre (KRDC),
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Batch Microwave+Convection Heat Treatment for Drying of Chemical granules

ISO 9001-2008 | ISO 9001-2015 | EMS 14001 | OHSAS 18001
In Association with SVCH-Technologii, Moscow (Russia)

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Customer :	**Laboratory Experimental Analysis**
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 ± 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 (±5°C)
Humidity (%)	≤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: ±°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

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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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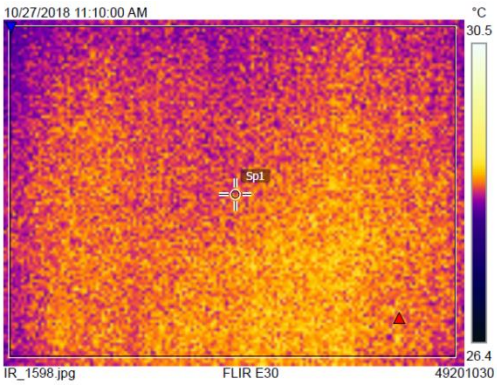
THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

1. Before Heat Treatment:

Measurements		
Bx1	Max	29.0 °C
	Min	28.0 °C
	Average	28.5 °C
Sp1		28.4 °C

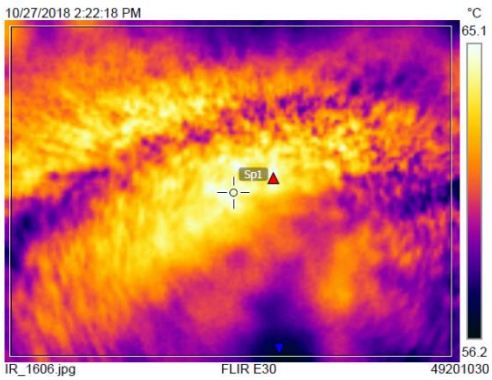
Parameters	
Emissivity	0.95
Refl. temp.	20 °C



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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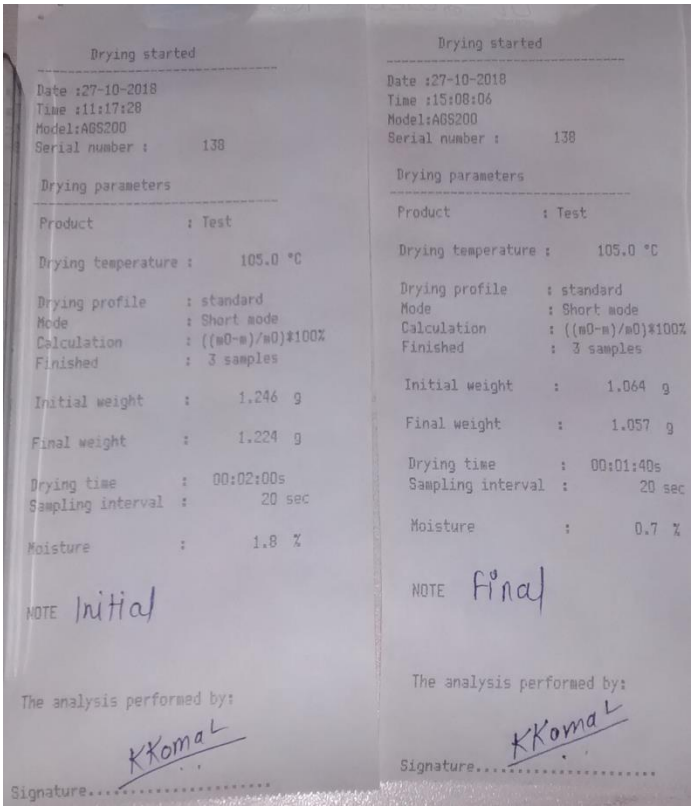
MOISTURE ANALYSIS REPORTS:



Drying started

Date :27-10-2018
Time :11:17:28
Model:AGS200
Serial number : 138

Drying parameters

Product : Test
Drying temperature : 105.0 °C
Drying profile : standard
Mode : Short mode
Calculation : ((m0-m)/m0)*100%
Finished : 3 samples
Initial weight : 1.246 g
Final weight : 1.224 g
Drying time : 00:02:00s
Sampling interval : 20 sec
Moisture : 1.8 %

NOTE Initial

The analysis performed by:
K Komal
Signature.....

Drying started

Date :27-10-2018
Time :15:08:06
Model:AGS200
Serial number : 138

Drying parameters

Product : Test
Drying temperature : 105.0 °C
Drying profile : standard
Mode : Short mode
Calculation : ((m0-m)/m0)*100%
Finished : 3 samples
Initial weight : 1.064 g
Final weight : 1.057 g
Drying time : 00:01:40s
Sampling interval : 20 sec
Moisture : 0.7 %

NOTE Final

The analysis performed by:
K Komal
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.

K Komal

Miss Komal Bhoite
Tested By