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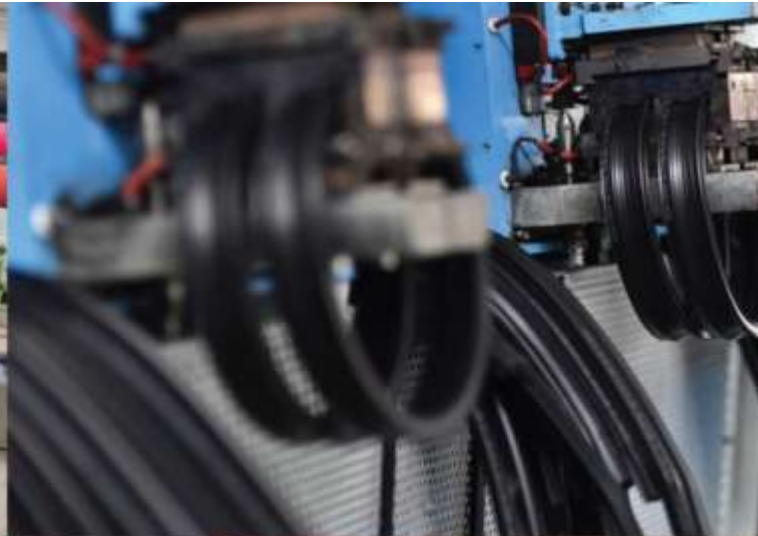
A.M.P.E.R.E (EUROPE)

In Association With



ELECTRO MAGNETIC Innovative Technologies

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



**Batch Microwave+Convection Heat Treatment
For Drying of Fertilizer**



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

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Customer :	M/s. Zydex Industries Private Limited.
Process :	Batch Microwave + Convection Heat Treatment for Drying of Fertilizer

TEST REPORT No: 48/KRDC/LAB/48 Mum 01/12/2021

Date Sample reception : 01/12/2021

ID : 48/LAB/02

SAMPLE DESCRIPTION:

Sampling : As Requested

Sample Condition : Acceptable

Quantity : 1 kg

Sampling date : 26/11/2021

Product : Fertilizer

Requirement : Final Product must be dried fully and moisture content should be less than 5%

Start Date test : 26/11/2021

End Date test : 26/11/2021

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LABORATORY EXPERIMENTAL SET UP:



LAB BATCH MICROWAVE+CONVECTION HEATING SYSTEM SPECIFICATIONS:

Microwave Power	2 KW (CW)
Frequency	2450 MHz \pm 50
Convective Power	3.5 KW (airflow 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	1 HP
Tray size (width*height*depth)	450*950*50 mm

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ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (°C)	30°C (±5°C)
Humidity (%)	≤74% 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
Moisture Analyzer		Make: Axis Balance Description: Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)



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Thermo Hygrometer		Model No: HTC-2 Temperature accuracy: $\pm^{\circ}\text{C}$ (1.8$^{\circ}\text{F}$) Temperature resolution: 0.1$^{\circ}\text{C}$ (0.2$^{\circ}\text{F}$) Humidity range: 10%~99% RH Humidity accuracy: $\pm 5\%$ RH Humidity resolution: 1% RH
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SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on fertilizer to speed up the drying rate. For this experimental run, given sample has been placed on PTFE trolley in MW + Convection heating system with suitable parameters. Observations are made after decided time period on the basis of weight of the product, moisture content and appearance.

PICTURES DURING TREATMENT OF SPECIMEN SAMPLE:


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ANALYTICAL RESULTS:

Initial Wt. of Fertilizer: 1000g

Cycles	Specifications of Microwave	Cycle Time (min.)	Product Temp.(°C)
C1	Magnetron Power: 1.2 kW; Set temp. of Heater: 70°C; Fan speed: 100%	30	(61-65) °C
C2	Magnetron Power: 1.2 kW; Set temp. of Heater: 70°C; Fan speed: 100%	30	(71) °C
C3	Magnetron Power: 1.2 kW; Set temp. of Heater: 70°C; Fan speed: 100%	20	(74-75) °C
C4	Magnetron Power: 1.2 kW; Set temp. of Heater: 70°C; Fan speed: 100%	20	(77) °C
C5	Magnetron Power: 1.2 kW; Set temp. of Heater: 70°C; Fan speed: 100%	20	(80) °C

Final wt. of fertilizer – 721g

Final moisture of fertilizer –3.3%

Total Time taken for Drying – 2 Hrs.

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BEFORE & AFTER PICTURES OF TREATED SPECIMEN SAMPLE:



a) UNTREATED



b) TREATED

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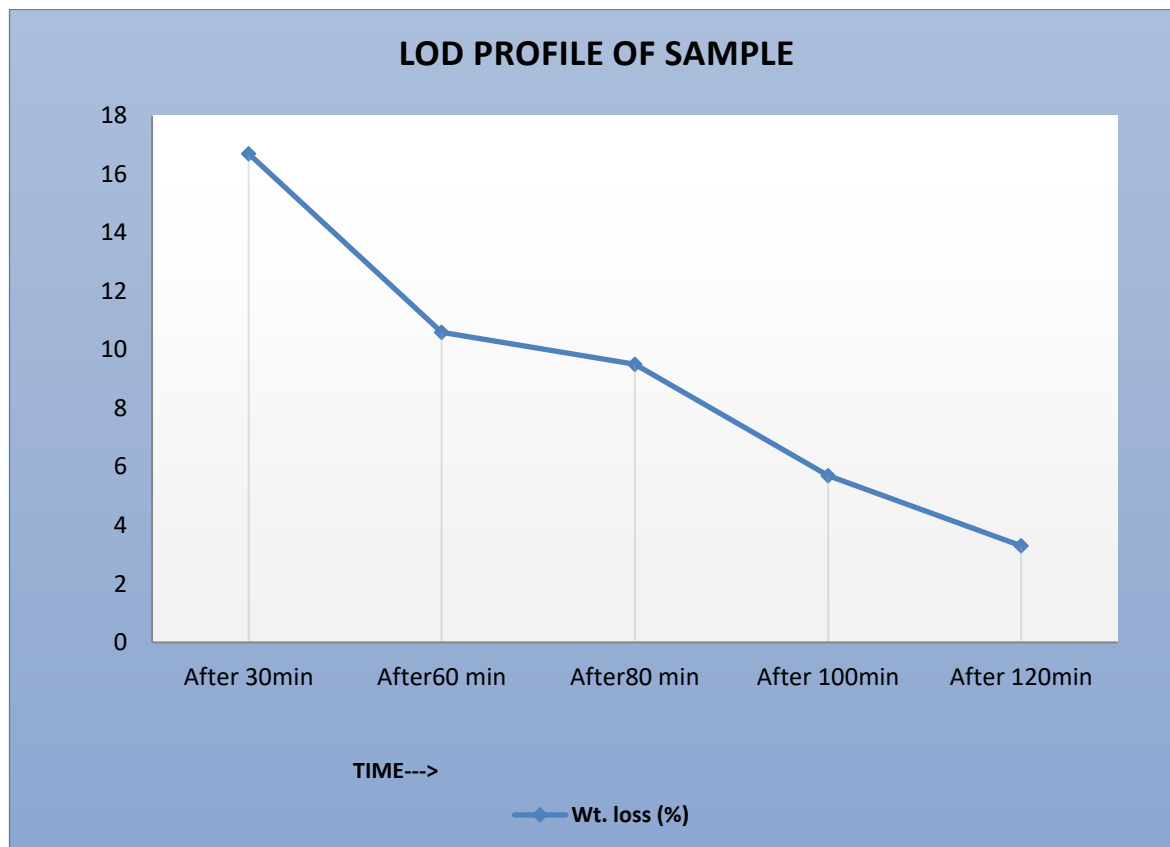
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GRAPHICAL REPRESENTATION OF DRYING PARAMETERS:



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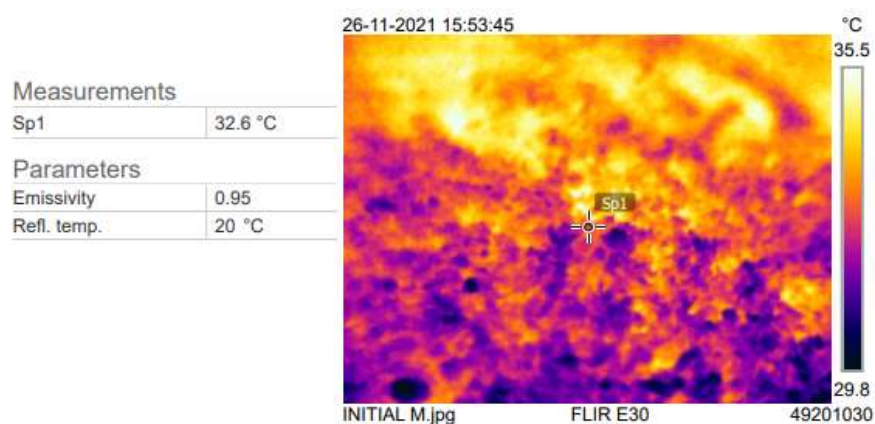
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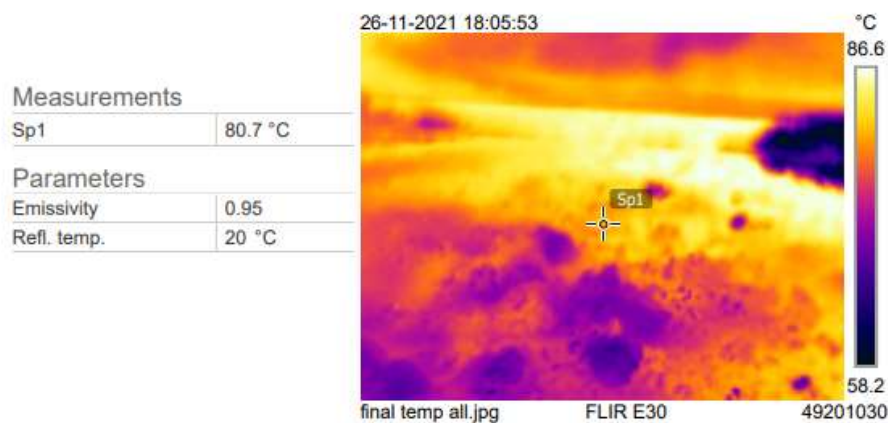
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THERMAL ANALYSIS REPORTS:

BEFORE TREATMENT:



AFTER TREATMENT:



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MOISTURE ANALYSIS REPORT:

Drying parameters		Product	
Product	1	Product	1
Drying temperature	105.0 °C	Drying temperature	105.0 °C
Drying profile	standard	Drying profile	standard
Mode	Short mode	Mode	Short mode
Calculation	$((w0-w)/w0)*100$	Calculation	$((w0-w)/w0)*100$
Finished	3 samples	Finished	3 samples
Initial weight	1.534 g	Initial weight	0.828 g
Final weight	1.048 g	Final weight	0.793 g
Drying time	00:19:00s	Drying time	00:04:20s
Sampling interval	20 sec	Sampling interval	20 sec
Moisture	31.7 %	Moisture	3.3 %

Initial Moisture

NOTE Final Moisture.

analysis performed by:

P. Shinde

Signature.....

The analysis performed by:

P. Shinde

Signature.....

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OBSERVATION:

The drying behavior of fertilizers has been investigated under the Microwave + Convection heating system. The drying rate is found to be increasing with respect to increase in time. It has been found that the product's weight decreases with respect to increase in setting temperature. As per physical investigation, it has been observed that the product is dried without charring.

Miss. Rucha Shinde

(Tested By)

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