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ISO-9001-2008 COMPANY

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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 Convection Heat Treatment on  
Fertilizer**



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



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<b>Customer:</b>	<b>M/s. Zydex Industries Private Limited.</b>
<b>Process:</b>	<b>Batch Convection Heat Treatment for Drying of Fertilizer.</b>

**TEST REPORT No: 48/KRDC/LAB/17 Mum 01/12/2021**

Date Sample reception : 01/12/2021

ID : 48/LAB/01

**SAMPLE DESCRIPTION:**

Sampling : As Requested

Sample Condition : Acceptable

Quantity : 1 Kg

Samples opening date : 26/11/2021

Product : Fertilizer

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

Start test Date : 26/11/2021

End test Date : 26/11/2021

**LABORATORY EXPERIMENTAL SETUP:**



**Format: F/R&D/01**



### **LAB BATCH CONVECTION HEATING SYSTEM SPECIFICATIONS:**

Heating Zone (width*height*depth)	510*480*410 mm
No. of Heaters	6
Total Heater Power	6 kW
Motor	0.5 HP
No. of trays	6
Tray size (width*height*depth)	560 x 435 x25
Centrifugal Exhaust Blower	1440 rpm

### **ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:**

Temperature (°C)	26°C (±5°C)
Humidity (%)	≤74% RH
Pressure (kN/m <sup>2</sup> 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 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)
Thermo Hygrometer		Model No: HTC-2 Temperature accuracy: $\pm 0.1^{\circ}\text{C}$ ( $1.8^{\circ}\text{F}$ ) Temperature resolution: $0.1^{\circ}\text{C}$ ( $0.2^{\circ}\text{F}$ ) Humidity range: 10%~99% RH Humidity accuracy: $\pm 5\% \text{RH}$ Humidity resolution: 1%RH
Vertical Autoclave		Working Size: 12" dia x 12"ht Rating: 3.0K.W. Pressure Range: upto 2 kg/cm <sup>2</sup>

Format: F/R&D/01



### **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 in SS tray as shown in experimental set up picture and heating treatment has been given in 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.

### **ANALYTICAL RESULTS:**

Initial Wt. of fertilizer- 1000g

Initial moisture of untreated fertilizer- 31.7%

Setting Temperature: 85°C

Total time: 2Hrs 30min.

Cycle Time: 30mins each

Sr. No	Cycle Time (mins.)	Product Temp. (°C)	Remarks, if any
1	After 30 min	(61-65) °C	Drying starts
2	After 60 mins	(70) °C	Surface of layer is dried
3	After 90 mins	(77) °C	Drying continues
4	After 120 mins	(80) °C	Partially Dried.
5	After 150 mins	(80) °C	Drying completes



EUROPEAN ASSOCIATION OF FERTILIZER MANUFACTURERS



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Final Wt. of fertilizer: 721gm.

Final Moisture of fertilizer: 3.6%

### **BEFORE & AFTER PICTURES OF TREATED SPECIMEN SAMPLE:**

**Untreated Fertilizers**



**Treated Fertilizers**



**Format: F/R&D/01**



EUROPEAN ASSOCIATION OF METAL PROCESSING ENGINEERS

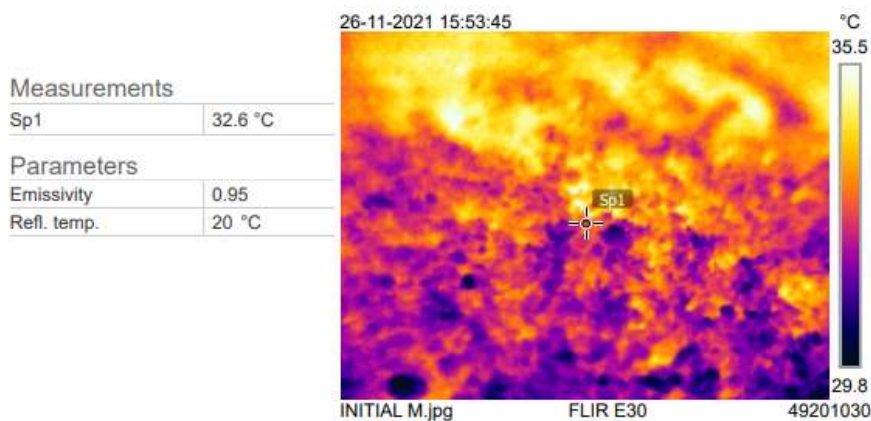
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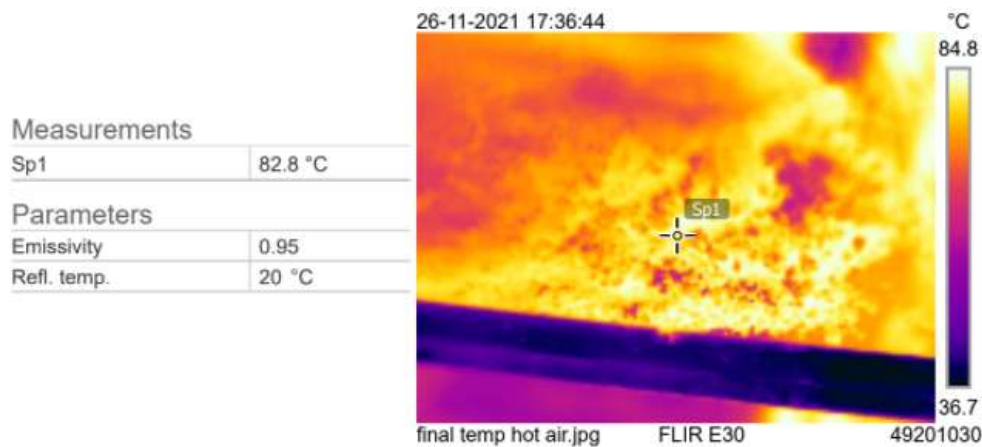
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## THERMAL ANALYSIS REPORTS:

### BEFORE TREATMENT:



### AFTER TREATMENT:





EUROPEAN ASSOCIATION OF METALLOGRAPHY



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## MOISTURE ANALYSIS REPORTS:

Drying parameters		Drying parameters	
Product	i	Product	i
Drying temperature	105.0 °C	Drying temperature	105.0 °C
Drying profile	standard	Drying profile	standard
Mode	Short mode	Mode	Short mode
Calculation	$((m_0 - m) / m_0) * 100\%$	Calculation	$((m_0 - m) / m_0) * 100\%$
Finished	3 samples	Finished	3 samples
Initial weight	1.534 g	Initial weight	1.378 g
Final weight	1.048 g	Final weight	1.329 g
Drying time	00:19:00s	Drying time	00:07:46s
Sampling interval	20 sec	Sampling interval	20 sec
Moisture	31.7 %	Moisture	3.6 %
NOTE Initial moisture		NOTE final moisture	
The analysis performed by:		The analysis performed by:	
P. Shinde		P. Shinde	
Signature.....		Signature.....	

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## **OBSERVATIONS:**

The drying behavior of fertilizers has been investigated under the 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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