



# KERONE

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ISO-9001-2008 COMPANY

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AIMCAL (USA)



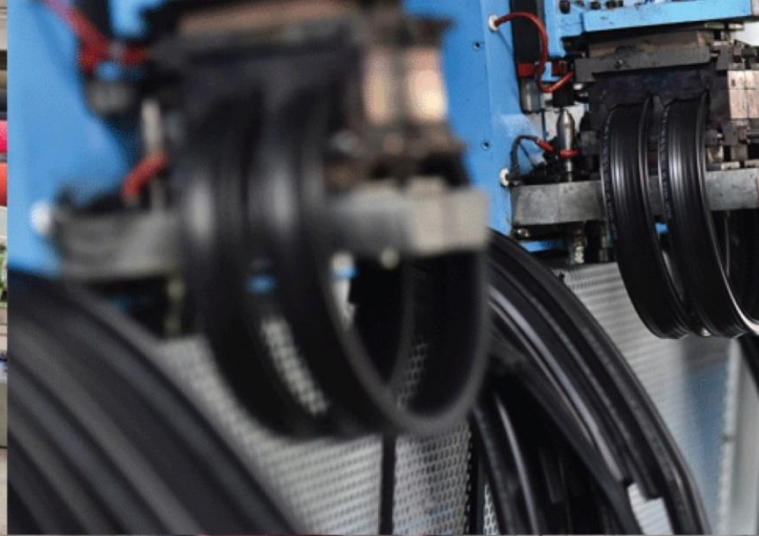
A.M.P.E.R.E (EUROPE)

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



**Continuous Infrared 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:	Continuous Infrared Heat Treatment for Drying of Fertilizer

**TEST REPORT No: 50/KRDC/LAB/48 Mum 01/02/2022**

Date Sample reception : 29/01/2022  
ID : 50/LAB/01

**SAMPLE DESCRIPTION:**

Sampling : As Requested  
Sample Condition : Acceptable  
Quantity : 1 kg  
Sampling date : 29 /01/2022  
Product : Fertilizer  
Requirement : Final Product must be dried fully and moisture content should be less than 8%  
Start Date test : 29/01/2022  
End Date test : 29/01/2022

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





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## EXPERIMENTAL SET UP:



## CONTINUOUS INFRARED HEATING SYSTEM SPECIFICATIONS:

Overall IR heating zone	4nos. (52 KW)
Web Width	1100mm
IR wavelength range	250mm
Type of IR heater	Medium Wave
IR Emitter to object distance	100mm (- in medium wave zone)
Temperature range	0-160°C

Format: E/R&D/01

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**ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:**

Temperature (°C)	30°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.

**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)
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 fertilizer to speed up the drying rate. For this experimental run, given sample has been placed on PTFE belt under infrared 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:**



### **ANALYTICAL RESULTS:**

Initial Wt. of Fertilizer: 1000g

Initial Moisture of Fertilizer: 37.5%

#### **TRIAL-A:**

Setting Temperature: 100°C

Intensity of IR: 70%

Cycle Time of 1 pass: 30mins

Final wt. of fertilizer – 627g

Final moisture of fertilizer –3.5%

Total Time taken for Drying – 30mins.



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No. of passes	Total time	Product Temperature (°C)	Remark
After 1ST pass	30 mins.	79°C	Dried as desired

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



a) UNTREATED



b) TREATED

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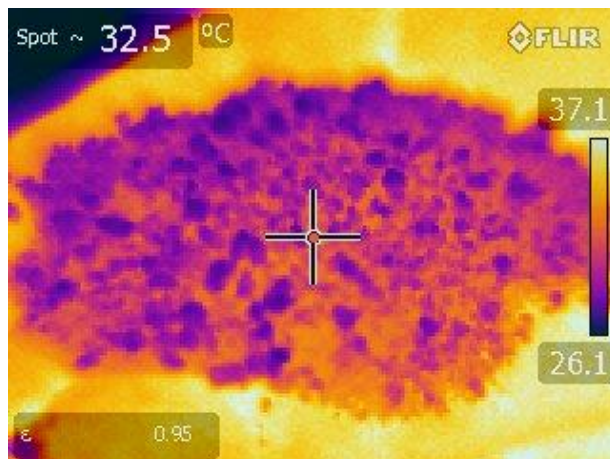
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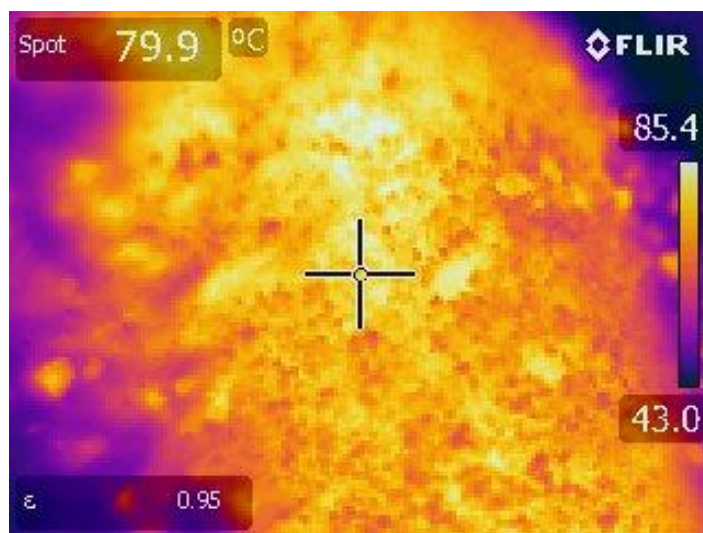
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### THERMAL ANALYSIS REPORTS:

#### BEFORE TREATMENT:



#### AFTER TREATMENT:



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### MOISTURE ANALYSIS REPORT:

29/1/22		Batch 1	
Drying started			
Date	: 29-01-2022	Date	: 29-01-2022
Time	: 13:09:06	Time	: 13:19:57
Model	: AGS200	Model	: AGS200
Serial number	: 138	Serial number	: 138
Drying parameters			
Product	:	Product	:
Drying temperature	: 105.0 °C	Drying temperature	: 105.0 °C
Drying profile	: standard	Drying profile	: standard
Mode	: Short mode	Mode	: Short mode
Calculation	: $((m0-m)/m0)*100\%$	Calculation	: $((m0-m)/m0)*100\%$
Finished	: 3 samples	Finished	: 3 samples
Initial weight	: 4.030 g	Initial weight	: 1.926 g
Final weight	: 2.515 g	Final weight	: 1.858 g
Drying time	: 00:24:00s	Drying time	: 00:05:40s
Sampling interval	: 20 sec	Sampling interval	: 20 sec
Moisture	: 37.6 %	Moisture	: 3.5 %
NOTE - initial moisture		NOTE - final moisture	
The analysis performed by:		The analysis performed by:	
Signature..... <i>Aravali</i>		Signature..... <i>Aravali</i>	

Format: F/R&D/01





### TRIAL-B:

Setting Temperature: 110°C

Intensity of IR: 70%

Cycle Time of 1 pass: 41mins

Initial Wt. of fertilizer- 2.136g

Initial moisture of fertilizer-37.5%

Final wt. of fertilizer – 1.281g

Final moisture of fertilizer –7.7%

Total Time taken for Drying – 41mins.

No. of passes	Total time	Product Temperature (°C)	Remark
After 1ST pass	41 mins.	79°C	Dried as desired

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



a) UNTREATED



b) TREATED



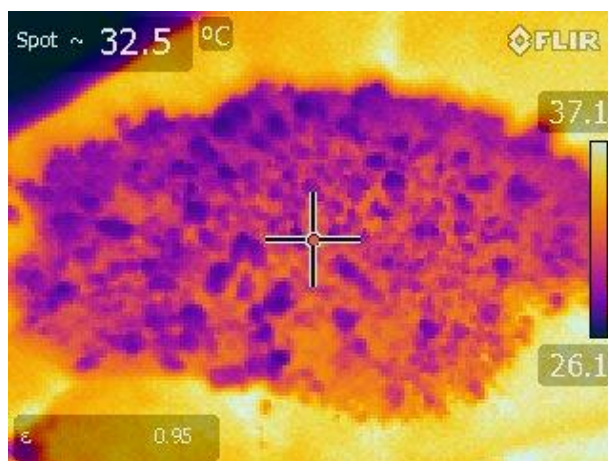
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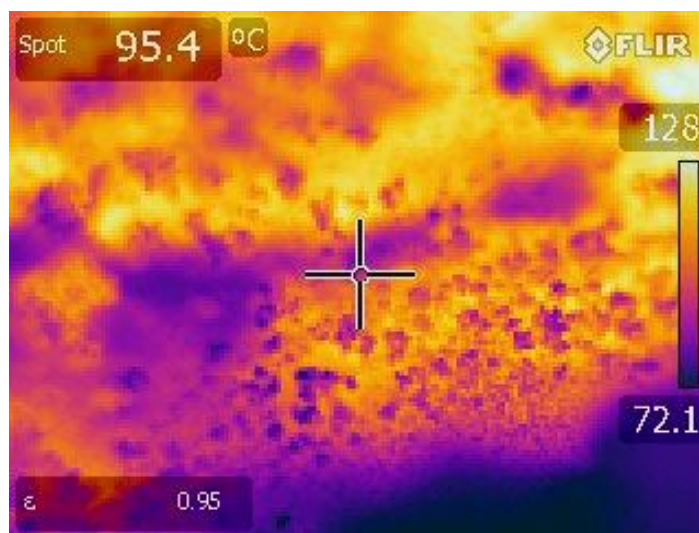
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### THERMAL ANALYSIS REPORTS:

#### BEFORE TREATMENT:



#### AFTER TREATMENT:



Format: F/R&D/01

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### MOISTURE ANALYSIS REPORT:

Batch 2

Drying started

Date : 29-01-2022

Time : 14:05:14

Model: AGS200

Serial number : 138

Drying parameters

Product :

Drying temperature : 105.0 °C

Drying profile : standard

Mode : Short mode

Calculation :  $((m0-m)/m0)*100\%$

Finished : 3 samples

Initial weight : 3.614 g

Final weight : 2.260 g

Drying time : 00:26:00s

Sampling interval : 20 sec

Moisture : 37.5 %

NOTE - Initial moisture

The analysis performed by:

Signature..... *Aradhya* .....

Drying started

Date : 29-01-2022

Time : 14:50:24

Model: AGS200

Serial number : 138

Drying parameters

Product :

Drying temperature : 105.0 °C

Drying profile : standard

Mode : Short mode

Calculation :  $((m0-m)/m0)*100\%$

Finished : 3 samples

Initial weight : 3.784 g

Final weight : 3.491 g

Drying time : 00:23:00s

Sampling interval : 20 sec

Moisture : 7.7 %

NOTE - final moisture

The analysis performed by:

Signature..... *Aradhya* .....



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### **OBSERVATION:**

The drying behavior of fertilizers has been investigated under the infrared 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 as desired without charring.

Miss Sayali Asole

(Tested By)