KERONE

A CRISIL-NSIC RATED COMPANY
ISO-9001-2008 COMPANY

Member Of

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

In Association With

EMitech
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 for Drying of Solid Colour Pigments

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

MEMBER OF A.M.P.E.R.E (EUROPE)
MEMBER OF AIMCAL (USA)

IN ASSOCIATION WITH EMitech, ITALY

EMitech
ELECTRO MAGNETIC Innovative technologies

KERONE
A CRISIL-NSIC RATED COMPANY
ISO-9001-2008 COMPANY

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

Customer :	**M/s. KEM Colour International (Kohinoor Group)**
Process :	**Batch Convection Heat Treatment for Drying of Solid Colour Pigments**

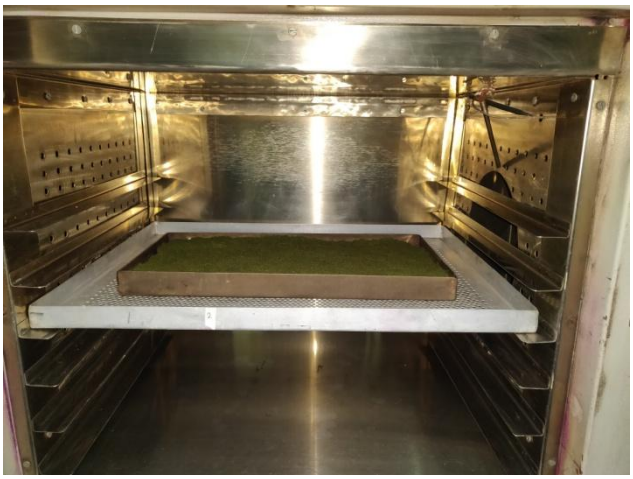
TEST REPORT No: 47/KRDC/LAB/18 Mum 10/09/2019

Date Sample reception : 10/09/2019
ID : 47/LAB/126

SAMPLE DESCRIPTION:

Sampling : As requested
Sample Condition : Acceptable
Quantity : 500 grams
Sampling date : 23/09/2019
Product : Soild colour pigments
Requirement : Final product must have moisture content less around 2%
Start Date test : 23/09/2019
End Date test : 24/09/2019

LABORATORY EXPERIMENTAL SET UP:



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

LAB BATCH DEHYDRATION 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
Centrifugal Exhaust Blower	1440 rpm
No. of trays	6
Tray size (width*height*depth)	560*25*435 mm

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	31°C (±5°C)
Humidity (%)	≤81% 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

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**

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

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**

SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on soild colour pigments without adding any additive to speed up the drying rate. For this experimental run, given sample on tray has been placed in such a manner that uniform layer(about 15 mm) of sample has been formed for air to circulate for achieving even drying characteristics. The observations are made after every half hour on the basis of LOD method by checking weight loss. Also, initial weight before drying, final weight after drying, initial moisture content and final moisture content after treatment has been taken.

ANALYTICAL RESULTS:

1. Trial No.1
Setting Temperature: 55^{o}C
Initial Sample Weight: 150 grams
Initial Moisture Content: 26.1%

Sr. No.	Time (hours)	Weight noted (grams)	Total weight loss (%)	Temperature on sample(^{o}C)	Remarks, if any
1.	After 1	136	9.33	45	Drying rate started
2.	After 2	124	17.33	47	Drying phase continue

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

3.	After 3	115	23.33	50	Variant of Drying rate
4.	After 4	109	27.33	51	Variant of Drying rate
5.	After 5	105	30	53	Variant of Drying rate
6.	After 6	103	31.33	54	Variant of Drying rate
7.	After 7	102	32	55	Variant of Drying rate
8.	After 8	102	32	55	Required Drying rate

Sample weight after drying: 102 grams
Total weight loss on drying: 32%
Final Moisture Content: 2.7%

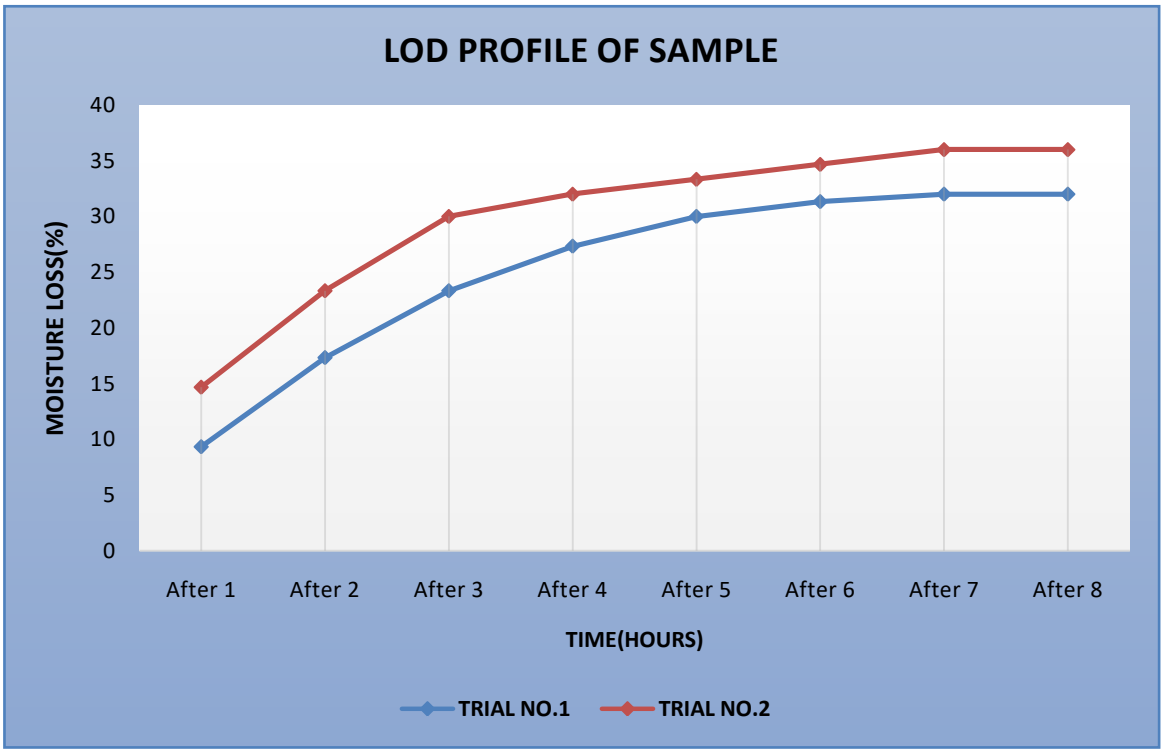
2. Trial No.2
Setting Temperature: 65°C
Initial Sample Weight: 150 grams
Initial Moisture Content: 26.1%

Sr. No.	Time (hours)	Weight noted (grams)	Total weight loss (%)	Temperature on sample(°C)	Remarks, if any
1.	After 1	128	14.67	57	Drying rate started
2.	After 2	115	23.33	60	Drying phase continue
3.	After 3	105	30	62	Variant of Drying rate
4.	After 4	102	32	63	Variant of Drying rate
5.	After 5	100	33.33	64	Variant of Drying rate
6.	After 6	98	34.67	65	Variant of Drying rate
7.	After 7	96	36	65	Variant of Drying rate
8.	After 8	96	36	65	Required Drying rate

Sample weight after drying: 96 grams
Total weight loss on drying: 36%
Final Moisture Content: 0.9%

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

GRAPHICAL REPRESENTATION OF DRYING PARAMETERS:

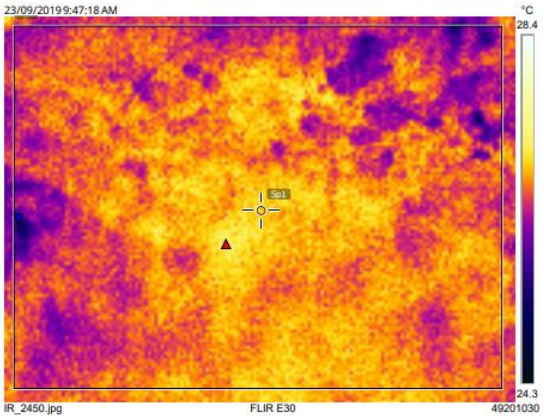


THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

1. **Before Heat Treatment:**

Measurements		
Bx1	Max	27.2 °C
	Min	25.0 °C
	Average	26.6 °C
Sp1		27.0 °C

Parameters	
Emissivity	0.95
Refl. temp.	20 °C

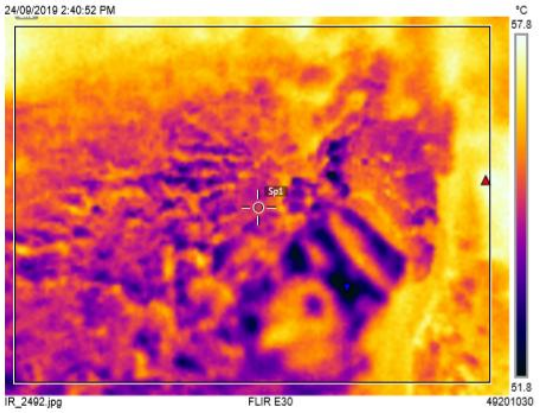


Kerone Research & Development Centre (KRDC)
B/47,Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India
Tel- +91-251-2620542/43/44/45/46, Email-info@kerone.com, www.kerone.com

2. After Heat Treatment: (Trial No.1)

Measurements		
Bx1	Max	57.8 °C
	Min	50.5 °C
	Average	55.3 °C
Sp1		54.9 °C

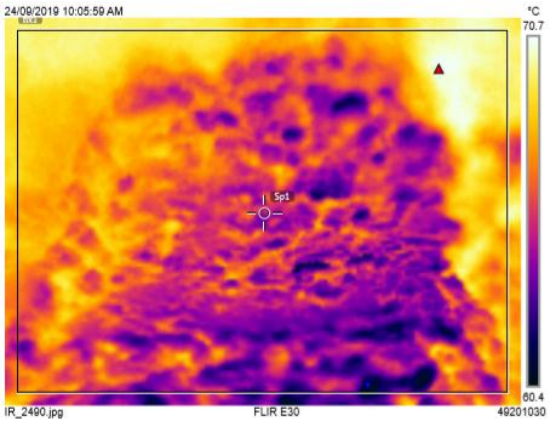
Parameters	
Emissivity	0.95
Refl. temp.	20 °C



3. After Heat Treatment: (Trial No.2)

Measurements		
Bx1	Max	70.8 °C
	Min	60.0 °C
	Average	66.2 °C
Sp1		64.8 °C

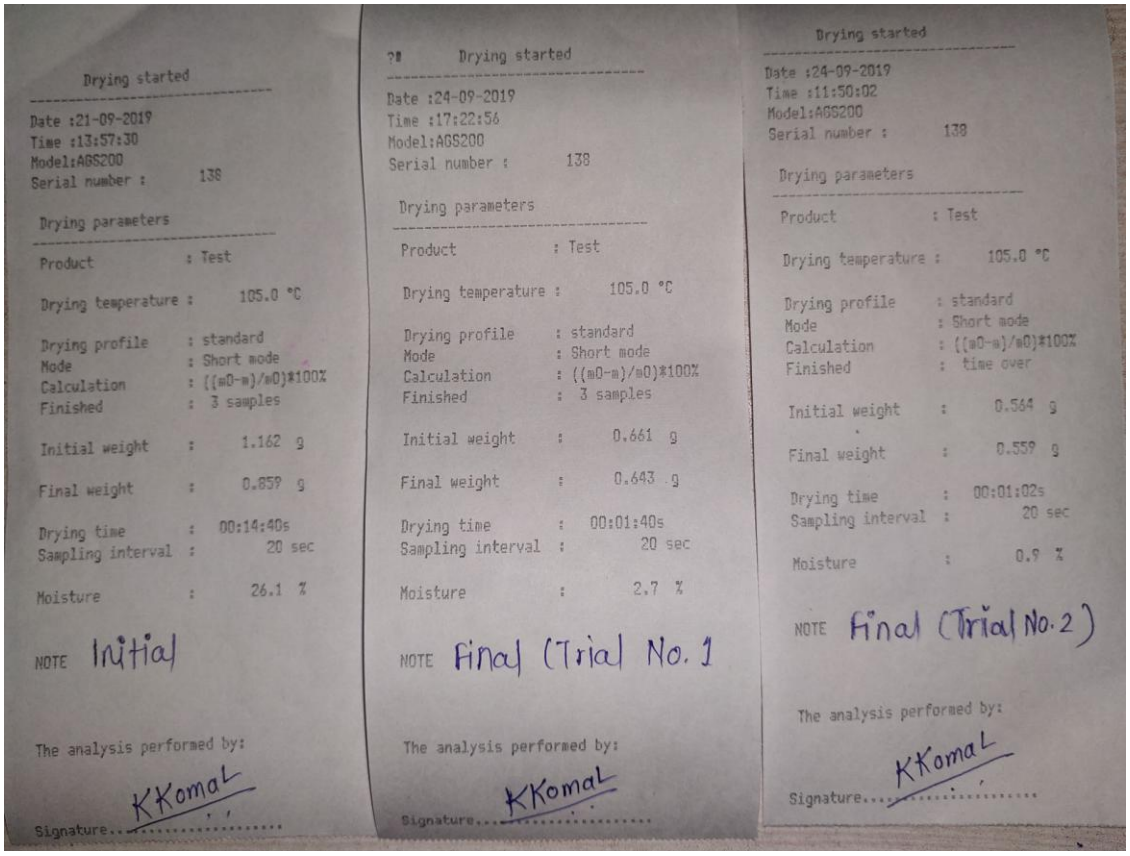
Parameters	
Emissivity	0.95
Refl. temp.	20 °C



BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:

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

MOISTURE ANALYSIS REPORTS:



Drying started
Date :21-09-2019
Time :13:57:30
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 : 1.162 g
Final weight : 0.859 g
Drying time : 00:14:40s
Sampling interval : 20 sec
Moisture : 26.1 %
NOTE Initial
The analysis performed by:
Signature.....

Drying started
Date :24-09-2019
Time :17:22:56
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 : 0.661 g
Final weight : 0.643 g
Drying time : 00:01:40s
Sampling interval : 20 sec
Moisture : 2.7 %
NOTE Final (Trial No. 1
The analysis performed by:
Signature.....

Drying started
Date :24-09-2019
Time :11:50:02
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 : time over
Initial weight : 0.564 g
Final weight : 0.559 g
Drying time : 00:01:02s
Sampling interval : 20 sec
Moisture : 0.9 %
NOTE Final (Trial No. 2)
The analysis performed by:
Signature.....

OBSERVATIONS:

The Drying behavior of soild colour has been investigated under the convection heating system. The drying rate is found to be increasing with respect to increasing drying time. It has been found that the moisture content on the dry basis (%) decreases with respect to increase in drying time. As per physical investigation, it has been observed that there is colour change of sample without any damage.

Miss. Komal Bhoite
Tested By