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Kerone Research & Development Centre (KRDC),
B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India
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Batch Convection Heat Treatment for Drying of Chalk Paste

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

MEMBER OF A.M.P.E.R.E (EUROPE)
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IN ASSOCIATION WITH EMitech, ITALY

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Customer :	**M/s. Kores India Ltd, Bhiwand**
Process :	**Batch Convection Heat Treatment for Drying of Chalk Paste**

TEST REPORT No: 47/KRDC/LAB/17 Mum 28/01/2019

Date Sample reception : 28/01/2019
ID : 47/LAB/87

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 1 packet of Chalk Powder and 1 bottle Glue
Sampling date : 30/01/2019
Product : Chalk Powder and Glue
Requirement : Final product must have moisture content less than 5%
Start Date test : 30/01/2019
End Date test : 30/01/2019

LABORATORY EXPERIMENTAL SET UP:

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

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (^{o}C)	28.3^{o}C (±5^{o}C)
Humidity (%)	≤64% 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 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

SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on Chalk powder with adding glue as an additive to speed up the drying rate. For experimental run, 250 grams of given powder has been mixed with 80 grams of water and 5 grams of glue and then this mixture has been manually shaped in chalk form. These chalks have been placed in perorated tray with paper on it, in such a manner that there is some space around each one for air to circulate for achieving even drying characteristics and the tray placed in heating system for drying. Observations are made after every 15 minutes by checking the weight loss on drying. Initial weight before drying, final weight after drying, initial moisture content and final moisture content has been taken.

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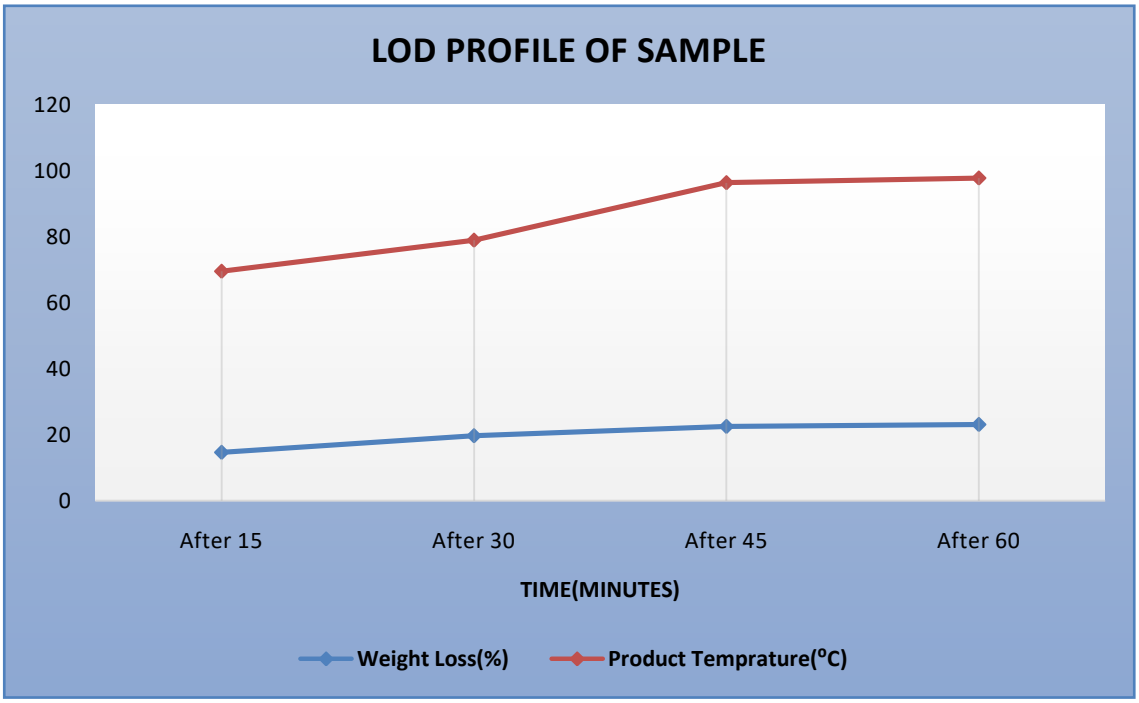
ANALYTICAL RESULTS:

Initial Moisture Content: 0.8%
Moisture Content of Chalk Mixture: 24%
Initial Weight: 320 grams
Setting Temperature: 100°C

Sr. No.	Time (minutes)	Weight noted (grams)	Weight loss (%)	Temp. On Product (°C)	Remarks, if any
1.	After 15	273	14.7	69.5	Drying rate started
2.	After 30	257	19.7	78.9	Drying phase continue
3.	After 45	248	22.5	96.3	Variant of Drying rate
4.	After 60	246	23.1	97.7	Required Drying rate

Final Moisture Content: 0.4%

GRAPHICAL REPRESENTATION OF DRYING PARAMETERS:



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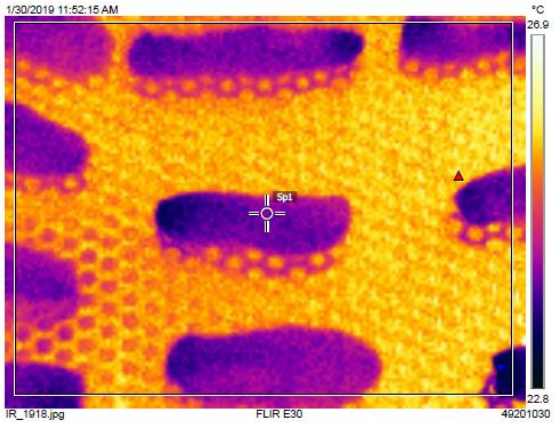
THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

1. **Before Heat Treatment:**

Measurements		
Bx1	Max	26.7 °C
	Min	23.1 °C
	Average	25.1 °C
Sp1		24.2 °C

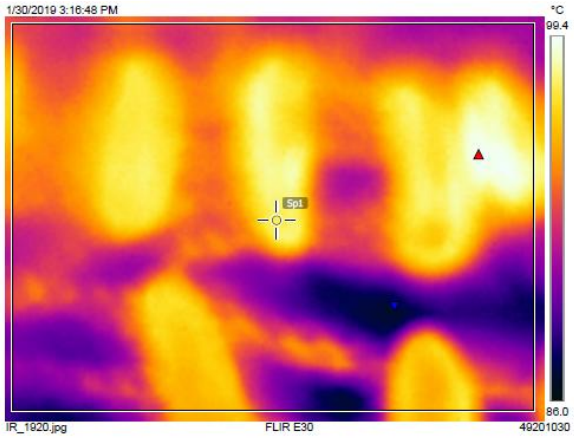
Parameters	
Emissivity	0.95
Refl. temp.	20 °C



2. **After Heat Treatment:**

Measurements		
Bx1	Max	99.4 °C
	Min	86.7 °C
	Average	93.9 °C
Sp1		97.7 °C

Parameters	
Emissivity	0.95
Refl. temp.	20 °C



BEFORE AND AFTER PICTURES OF TREATED SPCIMEN SAMPLE:

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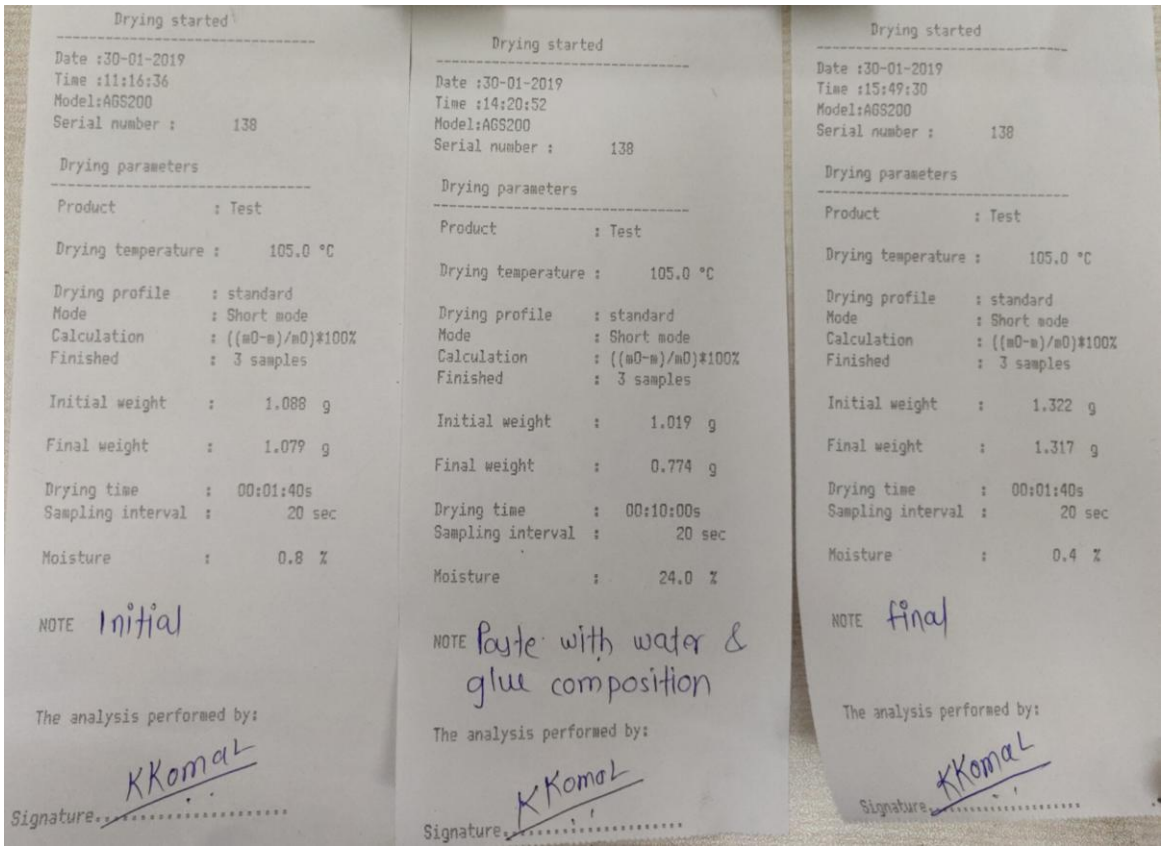
MOISTURE ANALYSIS REPORTS:



Drying started

Date :30-01-2019
Time :11:16:36
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 : 1.088 g
Final weight : 1.079 g
Drying time : 00:01:40s
Sampling interval : 20 sec
Moisture : 0.8 %

NOTE Initial

The analysis performed by:
Signature: K Komal

Drying started

Date :30-01-2019
Time :14:20:52
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 : 1.019 g
Final weight : 0.774 g
Drying time : 00:10:00s
Sampling interval : 20 sec
Moisture : 24.0 %

NOTE Paste with water & glue composition

The analysis performed by:
Signature: K Komal

Drying started

Date :30-01-2019
Time :15:49:30
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 : 1.322 g
Final weight : 1.317 g
Drying time : 00:01:40s
Sampling interval : 20 sec
Moisture : 0.4 %

NOTE final

The analysis performed by:
Signature: K Komal

OBSERVATIONS:

The Drying behavior Chalk powder 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 drying time. As per physical investigation, it has been observed that there is no colour change in the final product with required moisture content.

K Komal

Miss Komal Bhoite
Tested By