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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 Jarosite Slurry

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

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Customer :	**M/s. Hindustan Zinc Limited**
Process :	**Batch Convection Heat Treatment for Drying of Jarosite Slurry**

TEST REPORT No: 47/KRDC/LAB/17 Mum 05/01/2019

Date Sample reception : 05/01/2019
ID : 47/LAB/81

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 5 liters
Sampling date : 15/01/2019
Product : Jarosite Slurry
Requirement : Final product must have moisture content less than 20%
Start Date test : 16/01/2019
End Date test : 17/01/2019

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)	27.5^{o}C (±5^{o}C)
Humidity (%)	≤62% 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 given Jarosite Slurry with adding additive of limewater to speed up the drying rate. For experimental run, lime solutions of having pH around 12 has been prepared and added in given jarosite slurry until it attains pH 7. The final slurry of pH 7 is then transferred in a tray with uniform thickness of 6 mm and heat treatment is given for drying. Initial moisture content and final moisture content has been noted.

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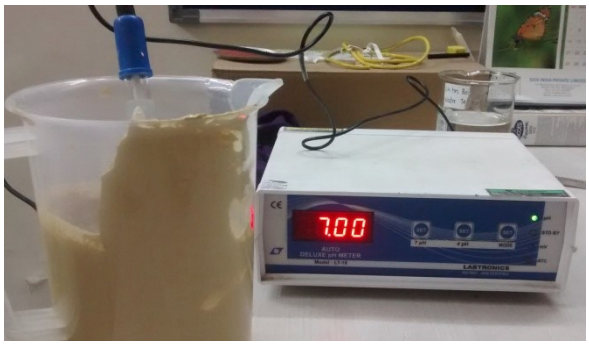
ANALYTICAL RESULTS:

pH of Limewater: 12.22 (10 grams of lime in 60 ml water)

pH of Jarosite Slurry: 7 (Whole solution mentioned above in 700 ml of Jarosite)



Initial Moisture Content: 63.2%
Initial Weight: 803 grams

Sr. No.	Time (minutes)	Weight noted (grams)	Weight loss (%)	Temp. on Product (°C)	Remarks, if any
1.	After 15	718	10.6	42.5	Drying rate started
2.	After 30	606	24.5	47.8	Drying phase continue
3.	After 45	599	25.4	53.1	Variant of Drying rate
4.	After 60	592	26.3	54.3	Required Drying Rate

Final Moisture Content: 8%

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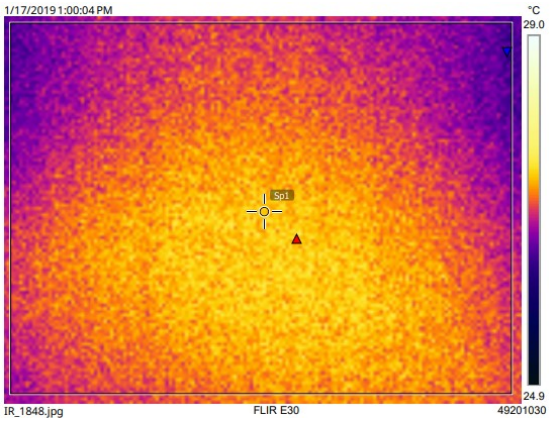
THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

1. **Before Heat Treatment:**

Measurements		
Bx1	Max	27.7 °C
	Min	26.1 °C
	Average	27.1 °C
Sp1		27.4 °C

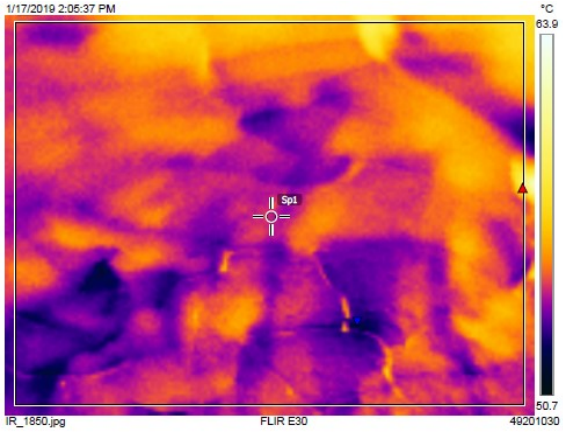
Parameters	
Emissivity	0.95
Refl. temp.	20 °C



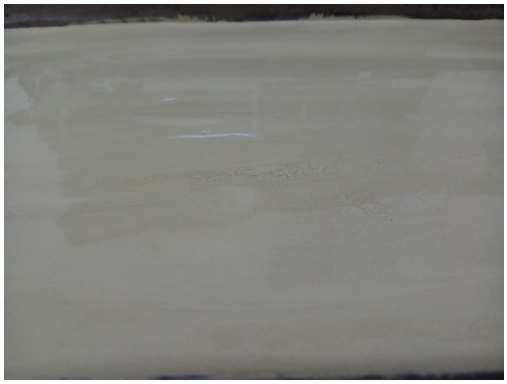
2. **After Heat Treatment:**

Measurements		
Bx1	Max	59.5 °C
	Min	51.5 °C
	Average	54.8 °C
Sp1		54.5 °C

Parameters	
Emissivity	0.95
Refl. temp.	20 °C



BEFORE AND AFTER PICTURES OF TREATED SPCIMEN SAMPLE:



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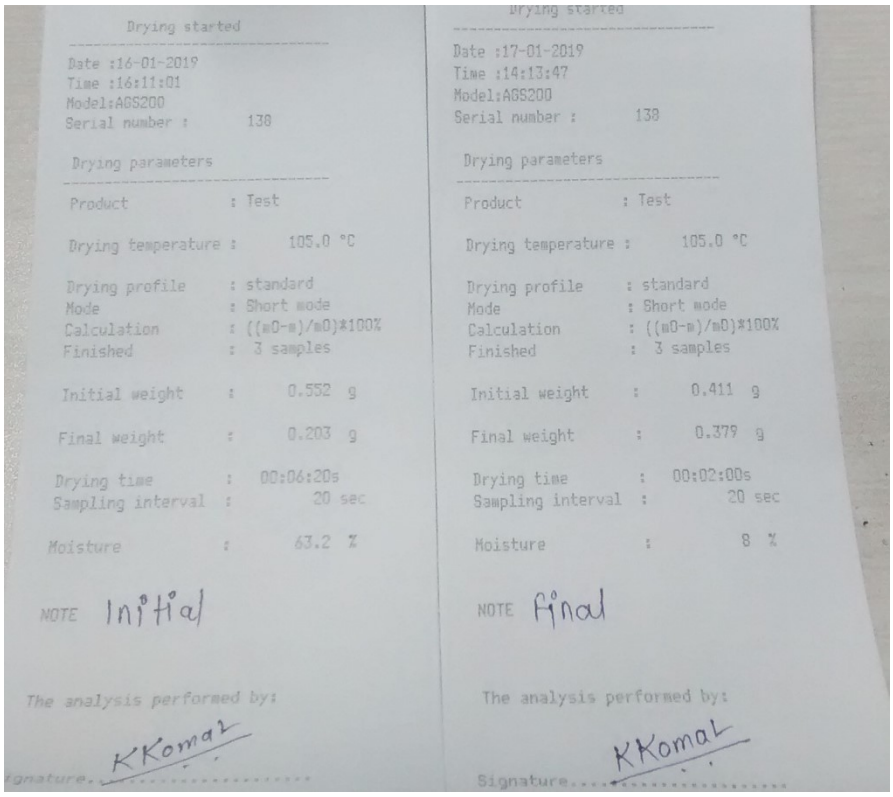
MOISTURE ANALYSIS REPORTS:



Drying started

Date :16-01-2019
Time :16:11:01
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 : 0.552 g
Final weight : 0.203 g
Drying time : 00:06:20s
Sampling interval : 20 sec
Moisture : 63.2 %

NOTE Initial

The analysis performed by:

Signature K Komal

Drying started

Date :17-01-2019
Time :14:13:47
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 : 0.411 g
Final weight : 0.379 g
Drying time : 00:02:00s
Sampling interval : 20 sec
Moisture : 8 %

NOTE final

The analysis performed by:

Signature K Komal

OBSERVATIONS:

The Drying behavior Jarosite slurry 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 with free flowing texture.

K Komal

Miss Komal Bhoite
Tested By