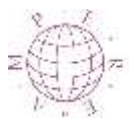




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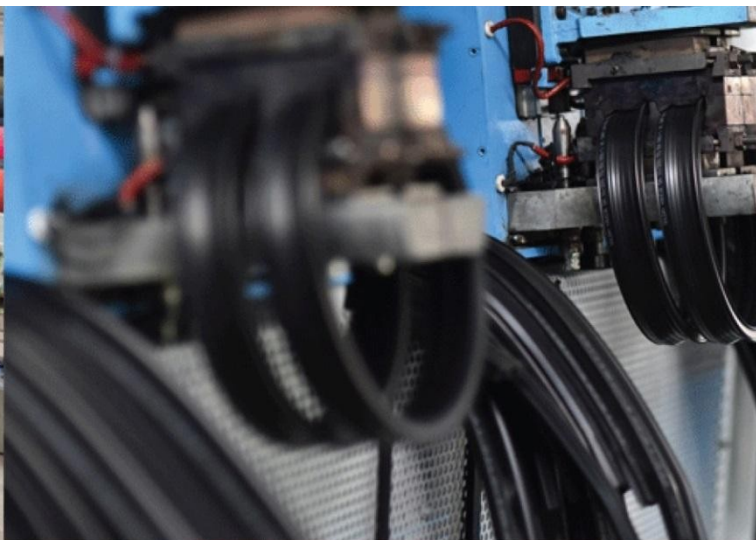
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**Drying of Fluorspar Briquette in
Batch Horizontal Convection Heater**



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Customer :	M/s. BHARAT TRADES
Process :	Drying of Fluorspar Briquette in Batch Horizontal Convection Heater

TEST REPORT No: 47/KRDC/LAB/17 Mum 13/09/2021

Date Sample reception : 13/09/2021

ID : 47/LAB/32

SAMPLE DESCRIPTION:

Sampling : As Requested

Sample Condition : Acceptable

Quantity : 5 kg

Samples opening date : 13/09/2021

Product : Fluorspar Briquette

Requirement : Final Product must be dried up to < 1% (d.b.)

Start Date test : 13/09/2021

End Date test : 13/09/2021

LABORATORY EXPERIMENTAL SETUP:

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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
No. of trays	6
Tray size (width*height*depth)	560 x 435 x25
Centrifugal Exhaust Blower	1440 rpm

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:




Temperature (°C)	27.5°C (±5°C)
Humidity (%)	≤70% 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: $\pm^{\circ}\text{C}$ (1.8°F) Temperature resolution: 0.1°C (0.2°F) Humidity range: 10%~99% RH Humidity accuracy: $\pm 5\%$ RH Humidity resolution: 1% RH

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SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on fluorspar briquette to speed up the drying rate. For this experimental run, given sample has been placed on a perforated tray and then placed in Batch Horizontal Convection Oven at certain decided temperature and time cycle. Observations are made on the final moisture content of sample, weight and appearance of product.

ANALYTICAL RESULTS:

Initial Wt. – 5 kg

Initial moisture – 15.2%

Setting Temperature: 150°C

Sr. No	Cycle Time (hr.)	Product Temp. (°C)	Moisture Content (%)	Remarks, if any
1	After 45 min	(70-80)°C	9.7%	Drying starts
2	After 1 hr 20 min	(100-120)°C	1.8%	Drying continues
3	After 1 hr 45min	(130-140)°C	0.8%	Dried as desired

Final Weight: 4.23 kg

Final Weight loss in %: 15.3%

Final Moisture content: 0.8 %

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AFTER PICTURES OF TREATED SPECIMEN SAMPLE:



a) UNTREATED



b) TREATED

THERMAL ANALYSIS REPORTS :

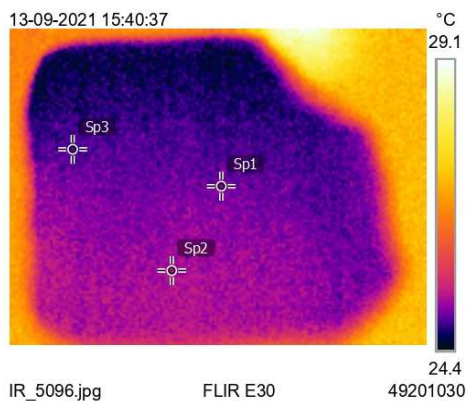
BEFORE TRIAL:

Measurements

Sp1	25.0 °C
Sp2	25.1 °C
Sp3	24.9 °C

Parameters

Emissivity	0.95
Refl. temp.	20 °C





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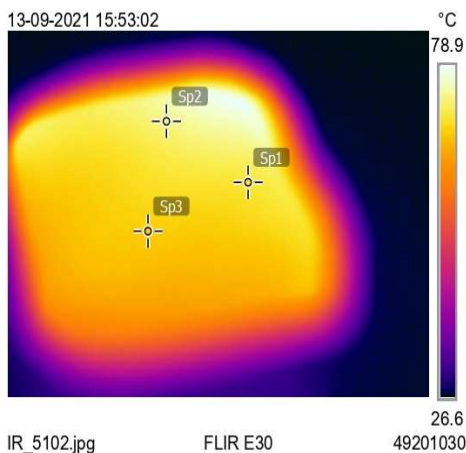
During 1st cycle:

Measurements

Sp1	72.1 °C
Sp2	74.1 °C
Sp3	69.7 °C

Parameters

Emissivity	0.95
Refl. temp.	20 °C



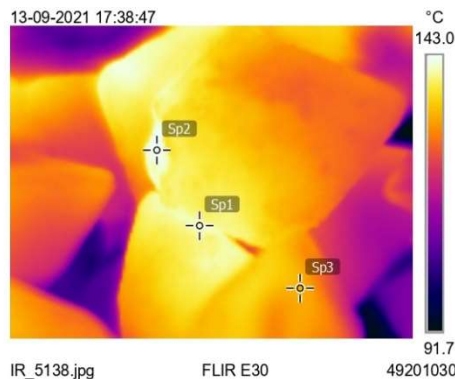
During 3rd cycle:

Measurements

Sp1	140.9 °C
Sp2	141.5 °C
Sp3	133.1 °C

Parameters

Emissivity	0.95
Refl. temp.	20 °C



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MOISTURE ANALYSIS REPORTS:

Drying started	Drying started	Drying started	Drying started
Date :13-09-2021 Time :15:46:31 Model:A05200 Serial number : 138	Date :13-09-2021 Time :18:10:55 Model:A05200 Serial number : 138	Date :13-09-2021 Time :17:45:27 Model:A05200 Serial number : 138	Date :13-09-2021 Time :17:49:49 Model:A05200 Serial number : 138
Drying parameters	Drying parameters	Drying parameters	Drying parameters
Product : 0	Product : 0	Product : 0	Product : 0
Drying temperature : 105.0 °C	Drying temperature : 105.0 °C	Drying temperature : 105.0 °C	Drying temperature : 105.0 °C
Drying profile : standard Mode : Short mode Calculation : $((w_0-s)/w_0)*100\%$ Finished : 3 samples	Drying profile : standard Mode : Short mode Calculation : $((w_0-s)/w_0)*100\%$ Finished : 3 samples	Drying profile : standard Mode : Short mode Calculation : $((w_0-s)/w_0)*100\%$ Finished : 3 samples	Drying profile : standard Mode : Short mode Calculation : $((w_0-s)/w_0)*100\%$ Finished : 3 samples
Initial weight : 2.134 g Final weight : 1.810 g	Initial weight : 4.026 g Final weight : 3.636 g	Initial weight : 2.673 g Final weight : 2.426 g	Initial weight : 3.235 g Final weight : 3.210 g
Drying time : 00:15:00s Sampling interval : 20 sec	Drying time : 00:14:20s Sampling interval : 20 sec	Drying time : 00:03:00s Sampling interval : 20 sec	Drying time : 00:02:20s Sampling interval : 20 sec
Moisture : 15.2 %	Moisture : 9.7 %	Moisture : 1.8 %	Moisture : 0.8 %
NOTE Initial moisture of fluorspar briquette.	NOTE After 45 mins.	NOTE After 1hr 20mins (fluorspar yellow).	NOTE Moisture of Briquettes after 1hr 40mins treated in Batch Horizontal Convection.
The analysis performed by: 0	The analysis performed by: 0	The analysis performed by: 0	The analysis performed by: 0
Signature: Komal	Signature: Komal	Signature: Komal	Signature: Komal

OBSERVATIONS:

The Drying behavior of fluorspar briquette has been investigated under the convection heating system. The drying rate is found to be increasing with respect to increase in drying temperature. It has been observed that the moisture content on dry basis (%) of product decreases with respect to increase in drying time. As Per physical investigation, the briquettes become hard on completion of drying process.

Komal

Ms. Komal Ingle
Tested By

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