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ISO-9001-2008 COMPANY

Member Of



AIMCAL (USA)



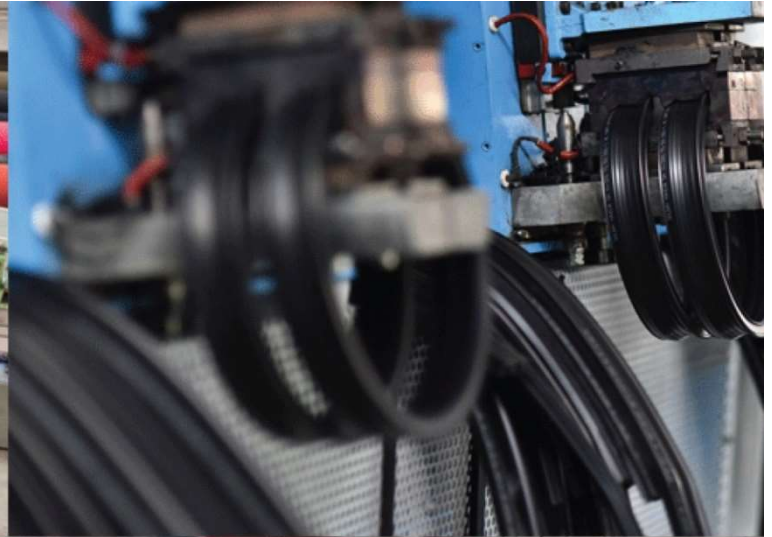
A.M.P.E.R.E (EUROPE)

In Association With



ELECTRO MAGNETIC (Innovative technologies)

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



**Continuous Infra-red Drying of
Fluorspar Yellow**

ISO 9001-2008 | ISO 9001-2015 | EMS 14001 | OHSAS 18001

In Association with SVCH-Technology, Moscow (Russia)



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Customer :	M/s. BHARAT TRADES LTD
Process :	Continuous IR Drying of Fluorspar yellow

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

Date Sample reception : 13/09/2021
ID : 47/LAB/31

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 5 kg
Sampling date : 13/09/2021
Product : Fluorspar yellow
Requirement : Must be dried up to <1% moisture
Start Date test : 13/09/2021
End Date test : 13/09/2021

LABORATORY EXPERIMENTAL SET UP:



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LAB CONTINUOUS INFRARED HEATING SYSTEM SPECIFICATIONS:

IR Medium Wave Emitters	6 Nos. (-each having 0.5 kW, 445 mm heating length)
Short Wave IR Emitter with special reflectors	6 Nos. (-each having 1 kW, 406 mm heating length)
IR Emitter to Object Distance	120 mm (- in medium wave zone)
IR Emitter to Object Distance	100 mm (- in short wave zone)
Overall IR Heating Zone length	1400 mm
Web width	400 mm
IR wavelength range	0.7 to 10 microns
Direct Exposure of MW IR	500 mm
Direct Exposure of SW IR	750mm
Temperature Range	0-400°C

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	27.1°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 120IR 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 Fluorspar yellow to speed up the drying rate. For this experimental run, given sample has been placed on a SS tray and then passed under Continuous IR heating system with suitable parameters set on the control panel. Observations are made on the final moisture content of sample, weight and appearance.



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ANALYTICAL RESULTS:

Initial weight: 1 kg
Initial Moisture Content: 35.9%
Setting Temperature: 200°C
Intensity of IR: 90%
Cycle Time of 1 pass: 4mins 30sec

Sr. No.	No. of passes	Total time	Product Temperature (°C)	Remark
1	After 1st pass	4 min 30sec	(50-52)°C	Drying started
2	After 2nd pass	9 min	(50-55)°C	Drying continues
3	After 3rd pass	13 min 30sec	(50-55)°C	Drying continues
4	After 4th pass	18 min	(55-65)°C	Drying continues
5	After 5th pass	22min 30sec	(70-77)°C	Drying continues
6	After 6th pass	27min	(75-85)°C	Drying continues
7	After 7th pass	31min 30sec	(75-85)°C	Drying continues
8	After 8th pass	36 min	(80-85)°C	Drying continues
9	After 9th pass	40min 30sec	(90-95)°C	Drying continues
10	After 10th pass	45 min	(90-95)°C	Drying continues
11	After 11th pass	49 min 30sec	(90-95)°C	Drying continues
12	After 12th pass	54 min	(90-105)°C	Drying continues
13	After 13th pass	58 min 30sec	(90-105)°C	Drying continues
14	After 14th pass	63 min	(110-120)°C	Drying continues
15	After 15th pass	67 min 30sec	(110-120)°C	Drying continues
16	After 16th pass	72 min	(110-125)°C	Drying continues
17	After 17th pass	76 min 30sec	(110-120)°C	Drying continues
18	After 18th pass	81 min	(110-120)°C	Drying continues
19	After 19th pass	85 min 30sec	(125-130)°C	Drying continues

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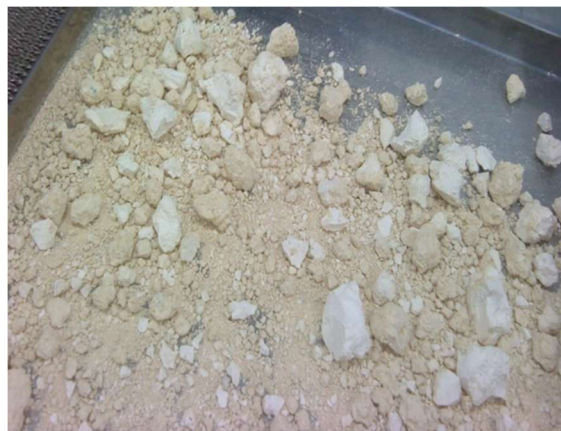
20	After 20th pass	90 min	(130-135)°C	Almost dried
21	After 21st pass	94 min 30sec	(140-150)°C	Dried as desired

Final Weight: 575 g
Final Weight loss in %: 42.5%
Final Moisture content: 0.29%

BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:



a) Untreated



b) Treated

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THERMAL ANALYSIS REPORTS:

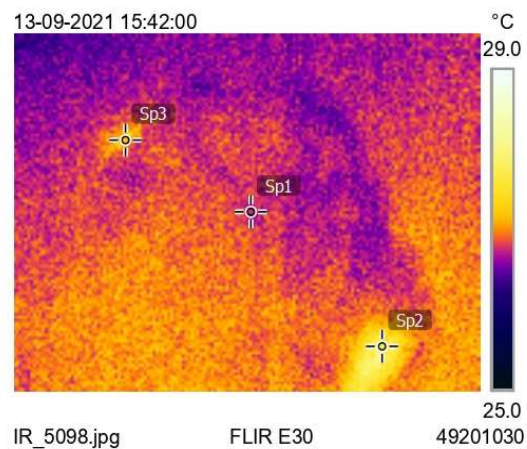
Before treatment-

Measurements

Sp1	26.9 °C
Sp2	27.8 °C
Sp3	27.4 °C

Parameters

Emissivity	0.95
Ref. temp.	20 °C



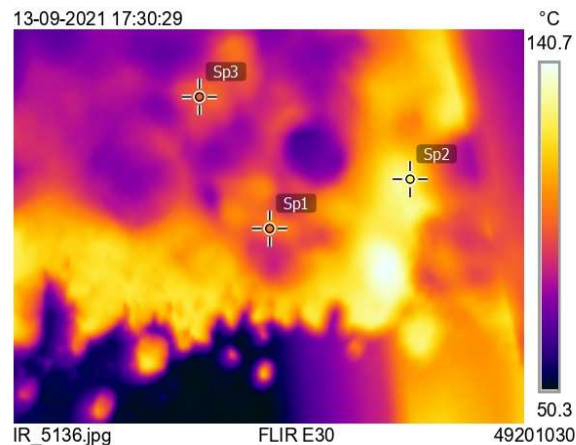
After treatment-

Measurements

Sp1	104.0 °C
Sp2	129.6 °C
Sp3	99.6 °C

Parameters

Emissivity	0.95
Ref. temp.	20 °C



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MOISTURE ANALYSIS REPORTS:

Drying started		Drying started	
Date :13-09-2021		Date :13-09-2021	
Time :16:52:47		Time :18:43:45	
Model:AGS200		Model:AGS200	
Serial number : 138		Serial number : 138	
Drying parameters		Drying parameters	
Product : 0		Product : 0	
Drying temperature : 105.0 °C		Drying temperature : 105.0 °C	
Drying profile : standard		Drying profile : standard	
Mode : Short mode		Mode : Short mode	
Calculation : $((m_0-m)/m_0)*100\%$		Calculation : $((m_0-m)/m_0)*100\%$	
Finished : 3 samples		Finished : 3 samples	
Initial weight : 2.609 g		Initial weight : 8.768 g	
Final weight : 1.673 g		Final weight : 8.743 g	
Drying time : 00:16:40s		Drying time : 00:03:00s	
Sampling interval : 20 sec		Sampling interval : 20 sec	
Moisture : 35.9 %		Moisture : 0.29 %	
NOTE Initial moisture of fluorspar yellow.		NOTE Final moisture of fluorspar yellow. (after 95mins)	
The analysis performed by: 0		The analysis performed by: 0	
Signature..... <i>Komal</i>		Signature..... <i>Komal</i>	

OBSERVATIONS:

The drying behavior of Fluorspar yellow has been investigated under the continuous IR heating system. The drying rate is found to be increasing with respect to increase in temperature. 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 wet lump of ochre coloured fluorspar turns to pale yellow after drying.

Ms. Komal Ingle
Tested By

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