KERONE

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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
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## Spray Drying Heat Treatment for Drying of Silica Solution

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

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| | |
|---|---|
| **Customer :** | **M/s. BEE CHEMS** |
| **Process :** | **Spray Drying Heat Treatment for Drying of Silica solution** |

## TEST REPORT No: 83/KRDC/LAB/59 Mum 14/06/2022

Date Sample reception : 25/03/2022
ID : 83/LAB/14

## SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 500g
Sampling date : 13/06/2022
Product : **Silica Solution**
Requirement : Dried upto powder formation
Start Date test : 13/06/2022
End Date test : 13/06/2022

## LAB ELECTRIC SPRAY DRYING SYSTEM SPECIFICATIONS:

| | |
|---|---|
| **Drying chamber Installed Power** | 4.5 KW |
| **Drying chamber Heat Load** | 400°C maximum |
| **Pneumatic Air Pressure** | 6 bar |
| **Dossing pump** | 6-7 rpm min. |

## ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

| | |
|---|---|
| **Temperature (degree C)** | 33°C (±5°C) |
| **Humidity (%)** | ≤65% RH |
| **Dehumidifier Set Parameters** | Temp. 50°C & RH- 10.0% |
| **Pressure (kN/m2 or kPa)** | Not recorded |

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**Note for recommendation:** Environmental conditions have a direct impact on test results. Accuracy and consistency of test data is affected by the plant surrounding conditions.

## EQUIPMENTS USED:

| Name of Equipment | Picture of Equipment | Specifications |
|---|---|---|
| **Compact Thermal Imaging Camera** |  | **Model: FLIR E-30**<br>**Resolution: 160x 120**<br>**IR Thermal sensitivity of 0.10°C** |
| **Moisture Analyzer** |  | **Make: Axis Balance**<br>**Description:**<br>**Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)** |
| **Thermo Hygrometer** |  | **Model No: HTC-2**<br>**Temperature accuracy: ±°C (1.8°F)**<br>**Temperature resolution: 0.1°C (0.2°F)**<br>**Humidity range: 10%~99% RH**<br>**Humidity accuracy: ±5% RH**<br>**Humidity resolution: 1% RH** |

## SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on given sample of Silica solution to speed up the drying rate. For this experimental run, given sample has been treated in spray drying system under different setting parameters. The observations are made on the basis final moisture content and physical appearance of final powder.

## ANALYTICAL RESULTS:

**Initial Moisture Content: 63.1 %**
**Initial Weight: 500g**

| Input Main Source Temperature (°C) | Cycle Mode | Dossing Pump (rpm) | Out Chamber Temperature (°C) | Remark, if any |
|---|---|---|---|---|
| **300** | **Continuous** | **1.0** | **150** | **Dried as desired** |

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**Time req. to reach 300°C: 20min.**
**Total cycle time: 60 min.**
**Final Weight: 6g**
**Final Moisture Content: 3.6%**

**To remove excess moisture from the final powder, the sample was dried in dehydrator at 150°C for 5 mints.**

## ANALYTICAL RESULTS: DEHYDRATOR

**Initial Moisture Content: 3.6 %**
**Initial Weight: 6g**

| Set Temperature (°C) | Cycle time | Remark, if any |
|---|---|---|
| 150 | 5 min | Dried as desired |

**Time req. to reach 150°C: 10min.**
**Total cycle time: 5 min.**
**Final Moisture Content: 0.9%**
**Final sample recovered: 5g**

## BEFORE AND AFTER TREATMENT PICTURES OF SPECIMEN SAMPLE:


**Untreated**

**Treated**

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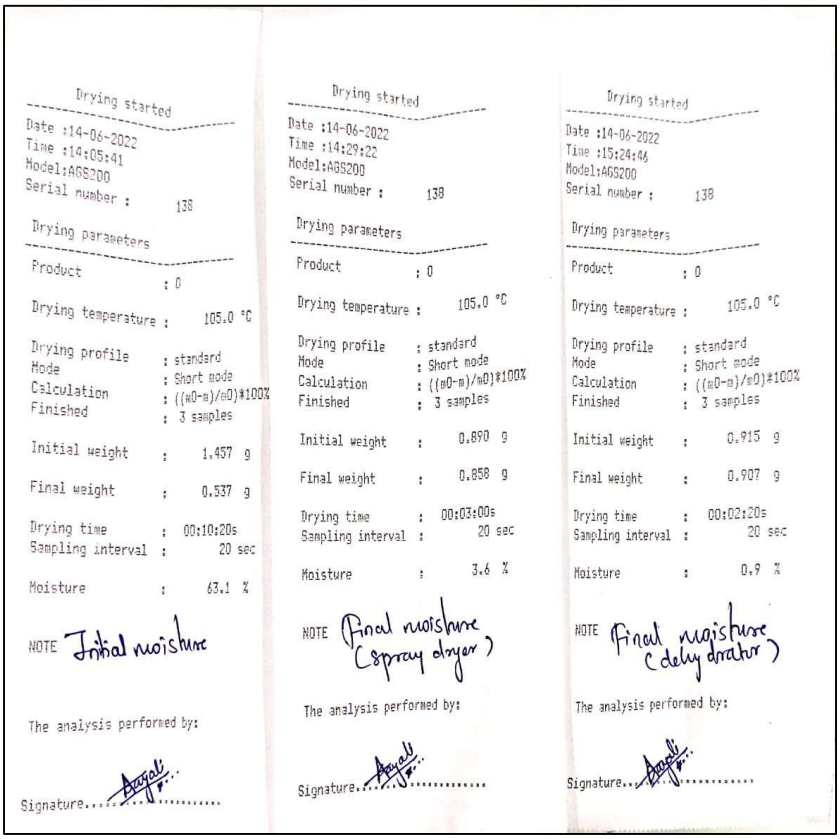
## MOISTURE ANALYSIS REPORT:



Drying started
Date :14-06-2022
Time :14:05:41
Model:AGS200
Serial number : 138

Drying parameters
Product : 0
Drying temperature : 105.0 °C
Drying profile : standard
Mode : Short mode
Calculation : ((m0-m)/m0)*100%
Finished : 3 samples
Initial weight : 1.457 g
Final weight : 0.537 g
Drying time : 00:10:20s
Sampling interval : 20 sec
Moisture : 63.1 %
NOTE Initial moisture
The analysis performed by:
Signature.....

Drying started
Date :14-06-2022
Time :14:29:22
Model:AGS200
Serial number : 138

Drying parameters
Product : 0
Drying temperature : 105.0 °C
Drying profile : standard
Mode : Short mode
Calculation : ((m0-m)/m0)*100%
Finished : 3 samples
Initial weight : 0.890 g
Final weight : 0.858 g
Drying time : 00:03:00s
Sampling interval : 20 sec
Moisture : 3.6 %
NOTE Final moisture (Spray dryer)
The analysis performed by:
Signature.....

Drying started
Date :14-06-2022
Time :15:24:46
Model:AGS200
Serial number : 138

Drying parameters
Product : 0
Drying temperature : 105.0 °C
Drying profile : standard
Mode : Short mode
Calculation : ((m0-m)/m0)*100%
Finished : 3 samples
Initial weight : 0.915 g
Final weight : 0.907 g
Drying time : 00:02:20s
Sampling interval : 20 sec
Moisture : 0.9 %
NOTE Final moisture (Belly drator)
The analysis performed by:
Signature.....

## OBSERVATION:

**The drying behavior of Silica Solution has been investigated under the Spray drying system. It has been found that the moisture content on the dry basis (%) decreases with respect to increase in input heating & dwell time. As per physical investigation, the solution become white coloured powder on drying. And the desired moisture content is obtained.**

**Tested By,**
**Ms. Sayali Asole**