



A CRISIL-NSIC RATED COMPANY
ISO-9001-2008 COMPANY

MemberOf



AIMCAL(USA)



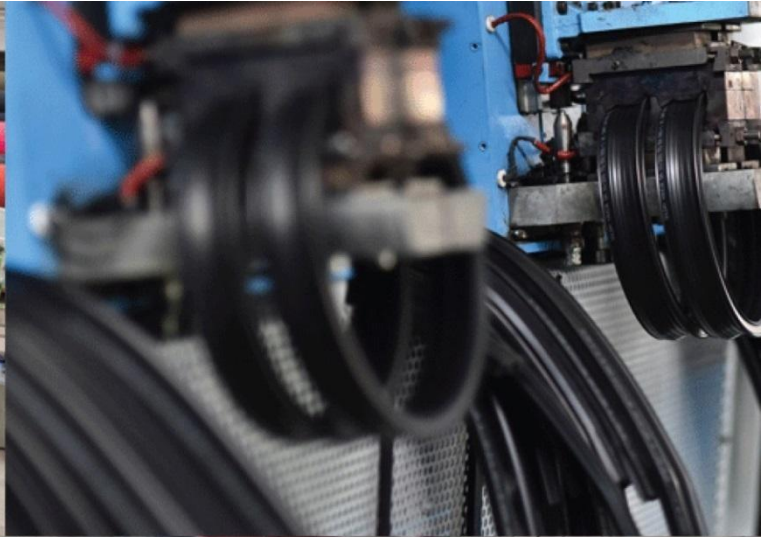
A.M.P.E.R.E(EUROPE)

In AssociationWith



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



**IR HEAT TREATMENT FOR DRYING OF
USV-DRUG SUBSTANCE 1**





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

Customer :	M/s. USV Pvt. Ltd.
Process :	IR heat treatment for drying of USV-Drug Substance-1

TEST REPORT No: 111/KRDC/LAB/17 Mum 13/07/2022

Date Sample reception : 11/07/2022
ID : 111/LAB/13

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Sampling date : 11/07/2022
Product : USV-Drug Substance - 1
Start test Date : 11/07/2022
End test Date : 11/07/2022

LAB IR HEATING SYSTEM:



Format: F/R&D/01



LAB IR 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)	30°C (±5°C)
Humidity (%)	≤67% 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.



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
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
Moisture Analyzer		Make: Axis Balance Description: Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)

SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on given sample i.e. Drug material for drying treatment. For this experimental run, sample were places on the perforated tray and treated Batch IR heating system. The observations are made on the basis of moisture content and physical changes in product samples.



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

ANALYTICAL RESULTS:

Trial No. 1:

Initial Weight: 30g
Initial Moisture: 17.7%
Setting temperature: 80°C
Intensity of IR: 80%
Belt speed: 0 rpm

Sr. No.	Cycle Time (minutes)	Product Temp. (°C)	Moisture Content. %	Remarks.
1.	After 240 min.	(90-91) °C	2.8	Dried as desired.

Final weight: 25g
Final Moisture: 2.8%
Total cycle time: 4 hours.

Format: F/R&D/01

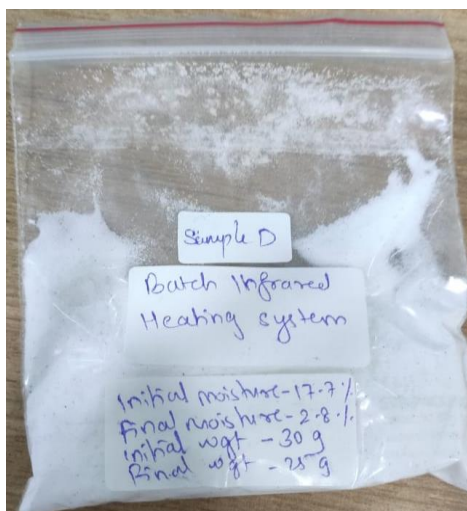


Kerone Research & Development Centre (KRDC)
B/47, Addl. MIDC. Anand Nagar, Ambarnath (East), Thane- 421 506, India
Tel- +91-251-2620542/43/44/45/46, Email-info@kerone.com, www.kerone.com

BEFORE AND AFTER PICTURES OF TREATED SAMPLE:

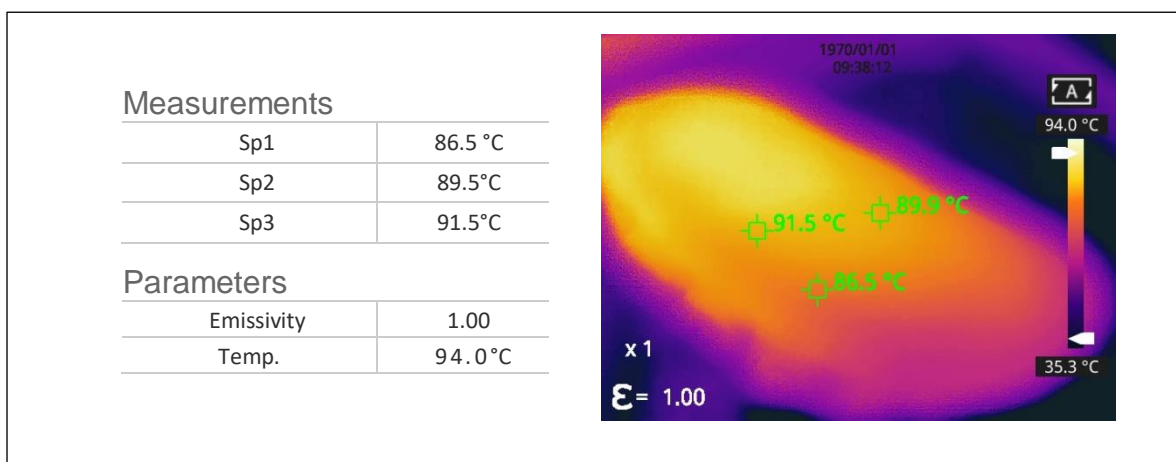


a) Untreated



b) Treated

THERMAL IMAGE HEAT TREATMENT



Format: F/R&D/01

The value obtained is already corrected for possible recover value stated, if applicable. This document may not be reproduced or disclosed wholly or partly in any part thereof without the written consent of the laboratory management or customer. This document relates only to the specimen samples processed. The processed sample will be kept in this laboratory for 7 days from the date of heat treatment.



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

MOISTURE ANALYSIS REPORTS:

Drying started		Drying started	
Date	: 11-07-2022	Date	: 11-07-2022
Time	: 10:51:41	Time	: 16:43:35
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	: $\frac{(m0-m)/m0}{100}$	Calculation	: $\frac{(m0-m)/m0}{100}$
Finished	: 3 samples	Finished	: 3 samples
Initial weight	: 0.543 g	Initial weight	: 0.823 g
Final weight	: 0.447 g	Final weight	: 0.800 g
Drying time	: 00:03:00s	Drying time	: 00:02:00s
Sampling interval	: 20 sec	Sampling interval	: 20 sec
Moisture	: 17.7 %	Moisture	: 2.8 %
NOTE	<i>Initial moisture</i>	NOTE	<i>Final moisture.</i>
The analysis performed by:		The analysis performed by:	
Signature	<i>Anand</i>	Signature	<i>Anand</i>

Format: F/R&D/01

The value obtained is already corrected for possible recover value stated, if applicable. This document may not be reproduced or disclosed wholly or partly in any part thereof without the written consent of the laboratory management or customer. This document relates only to the specimen samples processed. The processed sample will be kept in this laboratory for 7 days from the date of heat treatment.

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

MEMBER OF AIMCAL (USA)

IN ASSOCIATION WITH EMitech, ITALY



ELECTRO MAGNETIC innovative technologies



A CRISIL-NSIC RATED
COMPANY ISO-9001-2008

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

OBSERVATIONS:

The heating behavior of USV-Drug Substance has been investigated under the Batch IR Heating System. The heating rate is found to be increasing with respect to increasing cycle time. As per the physical investigation, the material after treatment is in acceptable condition without charring. The requirement of less than 5% moisture content in the sample material has been successfully achieved.

A handwritten signature in black ink, appearing to read "Sayali" with a star-like symbol below it.

Ms. Sayali Asole

Tested By

Format: F/R&D/01

The value obtained is already corrected for possible recover value stated, if applicable. This document may not be reproduced or disclosed wholly or partly in any part thereof without the written consent of the laboratory management or customer. This document relates only to the specimen samples processed. The processed sample will be kept in this laboratory for 7 days from the date of heat treatment.