



# KERONE

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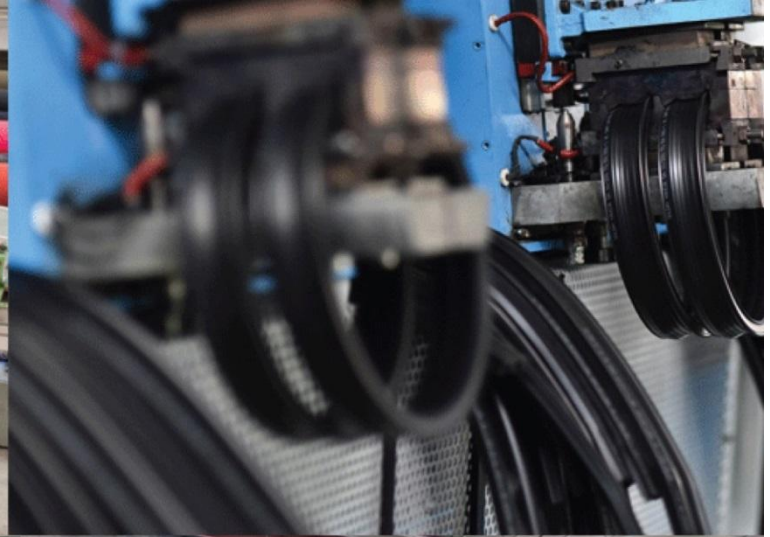
A.M.P.E.R.E (EUROPE)

In Association With



ELECTRO MAGNETIC innovative technologies

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



**Batch Microwave Heat Treatment for Drying  
of Wooden sheets and blocks**

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



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Customer :	M/s. Decent Honest
Process :	Batch Microwave Heat Treatment for Drying of Wooden sheets and blocks

**TEST REPORT No: 47/KRDC/LAB/17 Mum 11/12/2019**

Date Sample reception : 11/12/2019  
ID : 47/LAB/146

**SAMPLE DESCRIPTION:**

Sampling : As Requested  
Sample Condition : Acceptable  
Quantity : 4 sheets, 1 big block, 4 small blocks  
Sampling date : 11/12/2019  
Product : Wooden sheets and blocks  
Requirement : Final moisture content should be less than or equal to 10%  
Start Date test : 11/12/2019  
End Date test : 11/12/2019

**LABORATORY EXPERIMENTAL SET UP:**



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#### LAB BATCH MICROWAVE+CONVECTION HEATING SYSTEM SPECIFICATIONS:

<b>Microwave Power</b>	2 kW(CW)
<b>Frequency</b>	2450 MHz $\pm$ 50
<b>Convective Power</b>	3.5 kW (air flow 350 l/min at 20°C)
<b>Microwave Exposure Zone (cavity)</b>	1 cubic meter
<b>Mode Stirrer</b>	One
<b>Thermal Monitoring System</b>	Single Channel Fiber Optic: Range -40 to 250°C
<b>Exhaust Power</b>	1HP
<b>Tray Size</b>	450x950x50 mm

#### ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

<b>Temperature (degree C)</b>	33°C ( $\pm$ 5°C)
<b>Humidity (%)</b>	$\leq$ 58% RH
<b>Pressure (kN/m<sup>2</sup> or kPa)</b>	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		NA
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

### SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on given sample of Wooden sheets and blocks to speed up the drying rate. For this experimental run, given sample has been placed in microwave heating system for different setting parameters to achieve drying treatment. The observations are made on the basis of temperature on product and any damage to sample and moisture content.

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### ANALYTICAL RESULTS:

	Trial No. 1	Trial No. 2	Trial No. 3	Trial No. 4	Trial No. 5
Sample type	Single sheet	Single sheet	2 sheet (one above other)	Single big block	4 small blocks (some space around each block)
Mw Power(kW)	1	1	1	1.5	1
Cycle Time (minutes)	2+2+4=8(interval)	10(continuous)	10	10	10
Temp. on Product (°C)	50-55	55-60	50-55	70-80	80-90
Initial Weight (grams)	257	288	a)302 ; b)347	2282	a)374 ; b)360 c)444 ; d)368
Final Weight (grams)	158	222	a)257 ; b)301	2246	a)337 ; b)342 c)419 ; d)350
Avg. Initial Moisture (%)	41	40	37	37	a)41 ; b)35 c)28 ; d)40
Avg. Final Moisture (%)	20	19	20	19	a)20 ; b)20 c)10 ; d)10

### THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

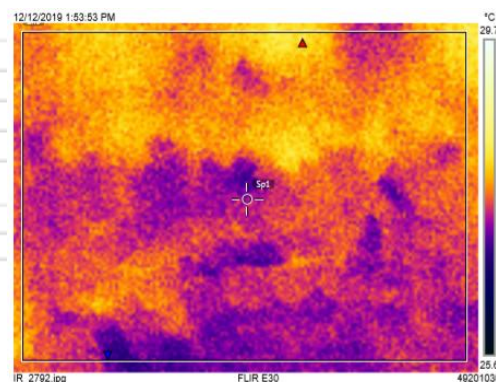
#### 1. Before Heat Treatment:

#### Measurements

Bx1	Max	28.5 °C
	Min	26.8 °C
	Average	27.6 °C
Sp1		27.4 °C

#### Parameters

Emissivity	0.95
Ref. temp.	20 °C



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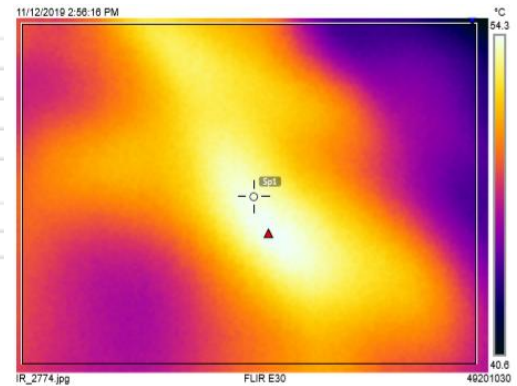
## 2. After Heat Treatment:

### Measurements

Bx1	Max	54.4 °C
	Min	41.2 °C
	Average	49.5 °C
Sp1		54.0 °C

### Parameters

Emissivity	0.95
Refl. temp.	20 °C



## BEFORE AND AFTER PICTURES OF TREATED SPCIMEN SAMPLE:

### 1. Sheet:



### 2. Big block:



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### 3. Small Block:



### OBSRVATIONS:

The Drying behavior of Wooden sheets and blocks have been investigated under the microwave irradiation mode dryer. 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 in drying time. As per physical investigation, it has been observed that there is no change in any of the sample with nearby required moisture content in product.

*K Komal*

Miss. Komal Bhoite  
Tested By