

Kerone Research & Development Centre (KRDC), B/47, Addl. MIDC. Anand Nagar, Ambarnath (East), Thane- 421 506, India  
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Customer :	M/s. TAL, Nagpur
Process :	Infra-red Heat Treatment for curing Yellow Primer (BMS 10-11)

**TEST REPORT No: 47/KRDC/LAB/17 Mum 27/06/2018**

Date Sample reception : 27/06/2018  
ID : 47/LAB/45

**SAMPLE DESCRIPTION:**

Sampling : As Requested  
Sample Condition : Acceptable  
Quantity : 2 No.  
Sampling date : 27/06/2018  
Product : Carbon composite I bean with aluminium fitting  
Requirement : Temperature of the test specimen should be in range of 56-58°C with complete curing  
Start Date test : 27/06/2018  
End Date test : 27/06/2018

**LABORATORY EXPERIMENTAL SET UP:**



**LAB INFRARED HEATING SYSTEM SPECIFICATIONS:**

Short Wave IR Emitter with special reflectors	1 No( 01 kW, 570 mm heating length)
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### ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	27°C (±5°C)
Humidity (%)	≤ 91% RH
Pressure (kN/m <sup>2</sup> 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: 160 x 120 IR Thermal sensitivity of 0.10°C
Digital Thermometer with sensor		Model No: TM-902C Temperature range: -50~750°C Temperature accuracy: ±1°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

### SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on given sample to speed up the drying rate for curing of yellow primer. For this experimental run, primer has been applied at required location of given specimen

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sample and placed under infrared exposure for different time period and different temperature. Temperature at three different location has been taken with both contact and noncontact type thermometer and observations are made.

### ANALYTICAL RESULTS:

**T1: Temperature at Composite I-Beam**

**T2: Temperature at Aluminium fitting**

**T3: Temperature at Titanium Bolt**

#### Trial No. 1:

In this trial, temperature has been taken with the help of contact type thermometer. This trial has been taken for different time at same setting temperature with same exposure distance.

Setting Temperature: 60°C

Exposure distance: 185 mm

Sr. No.	Time	T1	T2	T3
1.	5 minutes	60	51	55
2.	10 minutes	70	55	54

#### Trial No. 2:

In this trial, temperature has been taken with the help thermal imaging camera. This trial has been taken for same time and setting temperature, but with two different exposure distance.

Setting Temperature: 57°C

Time: 10 minutes

Sr. No.	Exposure distance	T1	T2	T3
1.	185 mm	48.3	39.1	39
2.	110 mm	51.4	44.9	44.6

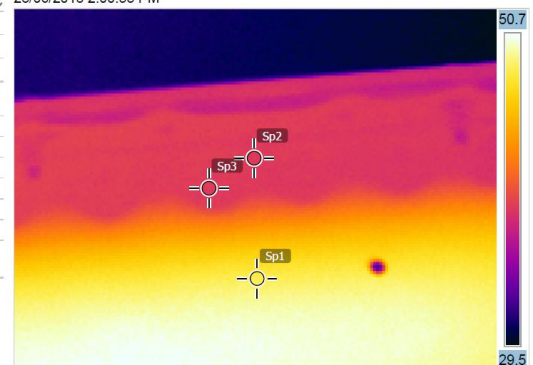
#### 1. With exposure distance 185 mm:

Measurements °C 28/06/2018 2:00:33 PM

Sp1	48.3
Sp2	39.1
Sp3	39.0

#### Parameters

Emissivity	0.95
Refl. temp.	20 °C
Distance	2 m
Relative humidity	50 %
Atm. temp.	33 °C
IR window temp.	20 °C
IR window transmission	1



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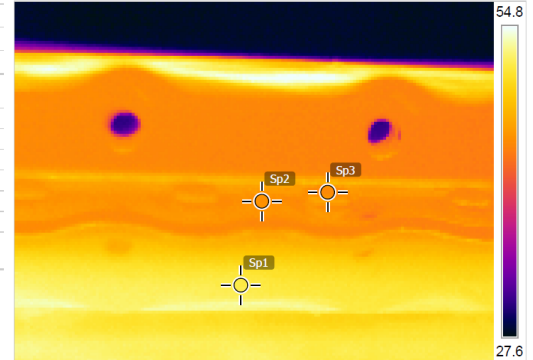
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## 2. With exposure distance 110 mm:

Measurements °C 28/06/2018 2:19:28 PM

Sp1	51.4
Sp2	44.9
Sp3	44.6

Parameters	
Emissivity	0.95
Ref. temp.	20 °C
Distance	2 m
Relative humidity	50 %
Atm. temp.	33 °C
IR window temp.	20 °C
IR window transmission	1



### OBSERVATIONS:

The drying behavior of Carbon composite I-beam has been investigated under the infra-red heating system for curing of yellow primer coating.

In First trial, it has been found that due to manual control switch temperature get sudden rise or fall.

In Second trial, while taking trial with feedback sensor 57°C, temperature achieved in 22 seconds but temperature increases with fluctuation up to 78°C and it requires 4 minutes to come at 57°C and then maintain itself at 57°C for next 6 minutes in 10 minutes cycle.



Miss Komal Bhoite  
Tested By

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