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Mr. James Miller
Standard Bent Glass
136 Lincoln Avenue
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EL:8873
September 22, 2009

Subject: Results of 32"x 16"x 4" Transparent Armor Defrost Tests SAE J381 (ANT:4785)

The purpose of this test program was to provide thermal defrost proof testing for prototype Transparent Armor 32"x 16"x 4" Windshield provided by Standard Bent Glass. The following pages provide the test logbook and a summary of tests performed. The testing was performed on August 13 and 14, 2009 at the Clark Dynamic Test Laboratory under Standard Bent Glass Purchase Order 90814.

DEFROSTING TEST -50°F (Figure 1):

One (1) transparent armor windshield was set on a cart in the center of the environmental chamber. The chamber was ramped to -50°F (+5°F -0°F) in fifteen (15) minutes. The transparent armor windshield was soaked at -50°F for a period of four (4) hours prior to coating with approximately 0.4 to 0.8 mm of ice in a time period of ten (10) minutes. The windshield was soaked at -50°F for thirty-five (35) minutes. The internal windshield heaters were energized with 24VDC. Thirty (30) minutes after energizing the heaters the transparent armor windshield was clear and there was no ice on the windshield. Pages 4 and 5 contain the details of the defrost test. Figure 3 contains the circular chart for the -50°F temperature defrosting test.

The results of the test satisfy the technical requirements of the 32"x 16"x 4" transparent armor windshield defrost test in SAE J381. Figure 2 contains the list of all test equipment, which shows the equipment was of recent calibration and traceable to NIST. Thank you for the opportunity to perform this testing service for you.

Sincerely,

John R. Antenucci

John R. Antenucci, Manager
Clark Dynamic Test Laboratory

Figure 1. Transparent Armor Windshield in the Environmental Chamber

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Traceability Report

Mcbee #	Status	Location	Instrument	Manfacturer	Model #	Serial #
2313	3/4/2010	Clark Dynamic	Temp Recorder	Honeywell	AR 100	N/A
2812	3/4/2010	Clark Dynamic	RH/Temp Controle	J C Controls	520DP-200FLIN-R	4011
4034	10/22/2009	Clark Dynamic	Digital Multimeter	Data Precision	2480R	12417
3276	9/12/2009	CLARK DYNAMIC	Humidity/Tempera	Rotronics	HT 220	14923
0008	10/22/2009	Clark Dynamic	DVM	Data Precision	2480R	9512

Figure 2. Equipment Calibration List

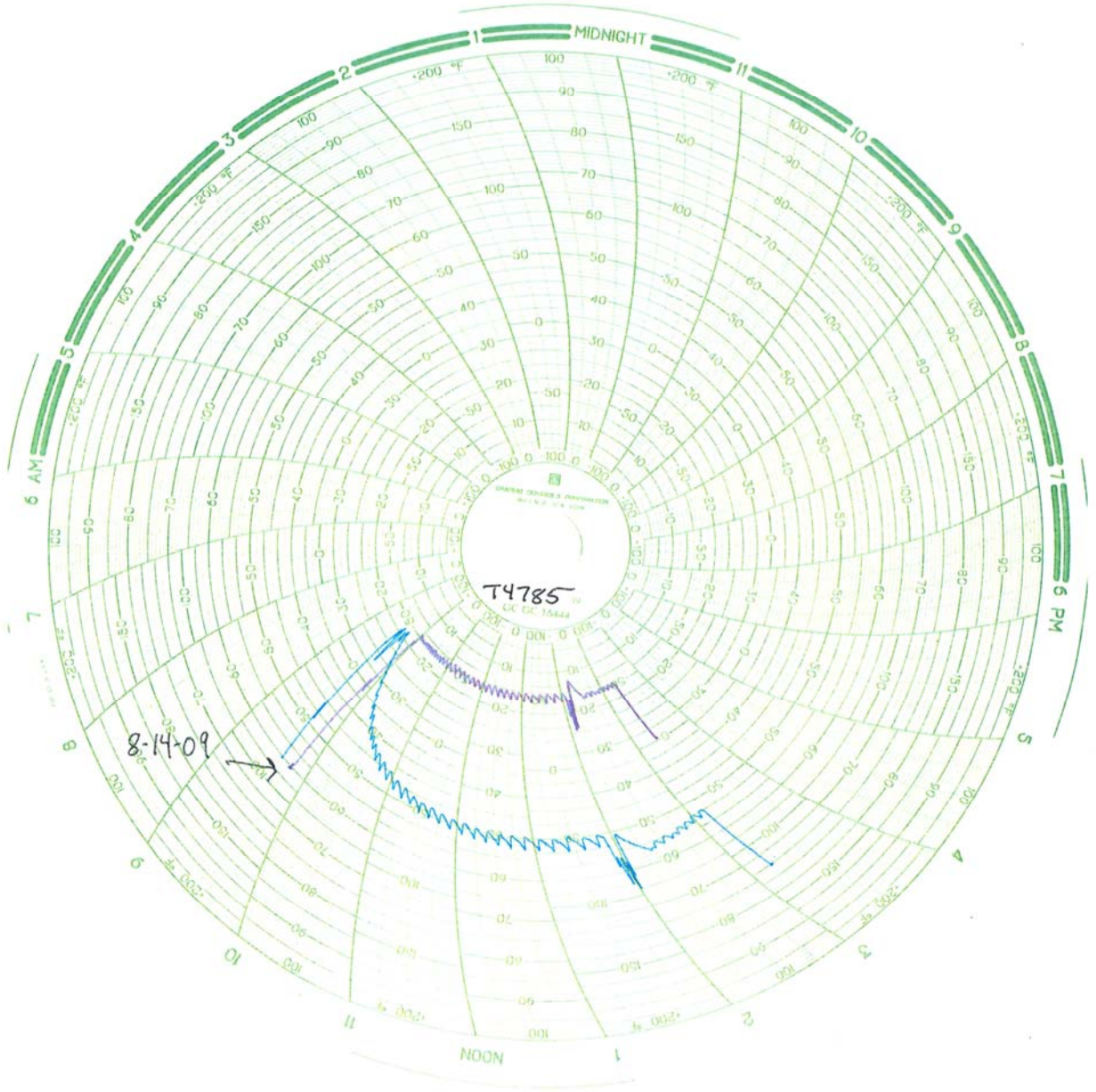

Figure 3. Defrosting Test -50°F Chamber Temperature Chart

Page

8-13-09

Received window for Environmental Chamber Testing.

Customer Label # 5685/3124

Window Size 32" x 16" x 4"

Mounted window up right on test table in Chamber.

Printed Two sets of letters & applied to Back of window To be viewed during defrosting.

Culculated that we Need to apply 8 oz of water on window to get 0.8 mm of ice.

Set up Power supply to apply 24 vdc to window heater.

Window resistance approx. 1.2 Ω @ 24 vdc will draw 20 Amps.

Equipment List

Item	Mcbee	Due Date
Jc controller	2812	3-4-10
Honewell	2313	3-4-10
Retronics	3276	9-12-09
DVM	0008	10-22-09
↓	4034	10-22-09

Photos were taken of test set up file: 114

Subject:

Signature(s) person making entry: Mark Jacinto Date: 8-13-09

Read and understood by – witness JR Antunes Date: 9/11/09

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8-14-09

With the heater turned off to window started ramping chamber to -50° f.

Completed ramp to -50 will now soak for 4 hours.

Completed soak for 4 hours @ -50°f entered chamber and sprayed 8 oz of water in 10 minutes on front of window.

Window will now soak for 35 minutes @ -50° f.

After soaking for 35 minutes. heater was turned on 24.0 vdc @ 25 amps.

After soaking @ -50°f heater has been on for 30 minutes. Customer entered chamber for inspection.

1) lettering was viewable through window.

2) NO Ice on window just water.

3) Heater voltage was @ 24.0vdc, 21.9 Amps.

Test was shut down.

Subject:

Signature(s) person making entry: Mark Iacovino Date: 8-14-09

Read and understood by – witness JR Antenucci Date: 9/11/09

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CLARK DYNAMIC TEST LAB

CONTRACT NO.: T4785

CUSTOMER: Standard Beat Glass

TEST SPECIFICATION: SAE 381, De-Icing Test

TEST STEPS COMPLETED: (1) De Icing Test

Authorized Customer Representative / Date

Reviewed by Quality Assurance / Date

9/11/09

Read and understood by – witness

Date: 9/11/09