



CLARK
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Mr. James Miller
Standard Bent Glass
136 Lincoln Avenue
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EL:8754
May 21, 2009

Subject: Results of 73mm Transparent Armor Defrost Tests SAE J381 (ANT:4689)

The purpose of this test program was to provide thermal defrost proof testing for prototype Transparent Armor 73mm Windshield provided by Standard Bent Glass. The following pages provide the test logbook and a summary of tests performed. The testing was performed on May 11, 2009 at the Clark Dynamic Test Laboratory under Standard Bent Glass Purchase Order 90123-4.

DEFROSTING TEST -25°F (Figure 1):

The chamber was ramped to -25°F (+5°F -0°F) in thirty (30) minutes and stabilized at -25°F for one (1) hour. One (1) transparent armor windshield was set on a cart in the center of the environmental chamber. The transparent armor windshield was soaked at -25°F (+5°F -0°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 fifteen (15) minutes. The internal windshield heaters were energized with 24VDC after letting the ice soak on the windshield for thirty-five (35) minutes. Thirty (30) minutes after energizing the heaters the transparent armor windshield heated area was clear (center of the windshield) and the edges of the windshield were easily cleared with a scraper. Page 4 contains the details of the defrost test. Figure 3 contains the circular chart for the -25°F temperature defrosting test.

The results of the test satisfy the technical requirements of the 73mm 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, Manager
Clark Dynamic Test Laboratory



Figure 1. Transparent Armor Windshield in the Environmental Chamber



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Traceability Report

Mcbee #	Status	Location	Instrument	Manufacturer	Model #	Serial #
3275	9/11/2009	Clark Dynamic	RH/Temp Control	J C Controls	520DP-200FLIN-R	5322
3326	9/11/2009	Clark Dynamic	RH/Temp Recorder	Honeywell	AR100	3333
3580	6/20/2009	Clark Dynamic	Power Supply	Hewlett Packard	6218A	1148A03586
3874	6/25/2009	Clark Dynamic	Thermocouple	Clark Dynamic	Type K wire	20 N/A

Figure 2. Equipment Calibration List

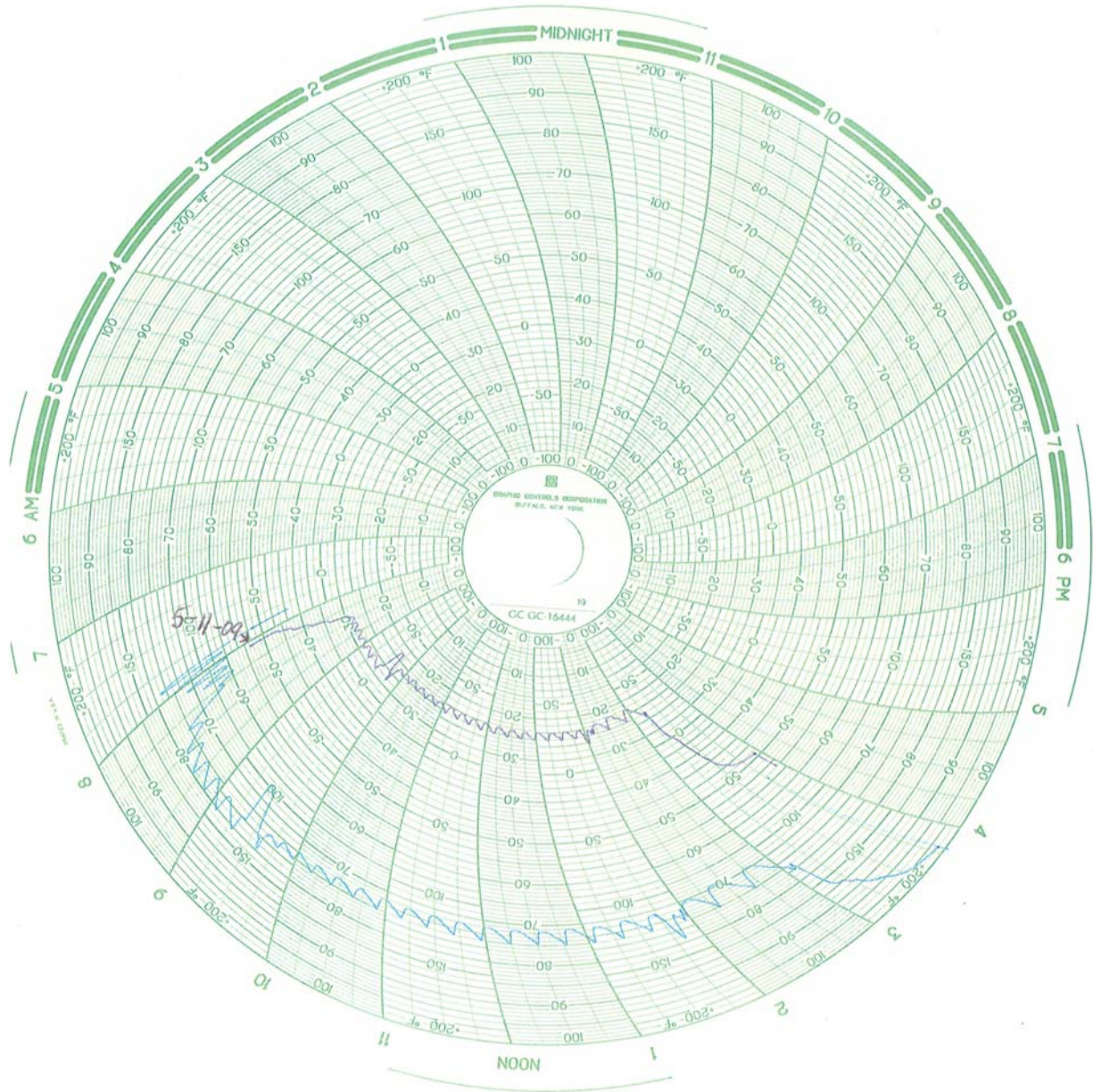


Figure 3. Defrosting Test -25°F Chamber Temperature Chart

5-11-09

8:00 AM RAMP CHAMBER TO -25°F IN 30 MINUTES

9:30 AM PLACED UNIT IN CHAMBER TO SOAK FOR 4 HOURS

2:00 PM TO 2:25 PM SPRAYED WINDOW WITH 4 OZ OF WATER.

2:50 PM APPLIED POWER TO WINDOW HEATER

3:05 PM CHECKED WINDOW FOR DEFROSTING - NO CHANGE.

3:20 PM CHECKED WINDOW FOR DEFROSTING - THE HEATED AREA WAS COMPLETELY CLEAR AND THE ICE AROUND THE PERIMETER WAS EASILY SCRAPPED OFF.

EQUIPMENT LIST

ITEM	MCR#	DUE DATE
THERMOCOUPLE	3874	6-25-09
TC CONTROLLER	3275	9-11-09
HONEYWELL	3326	"
POWER SUPPLY	3580	6-20-09

Subject:

Signature(s) person making entry:

Frank Collins

Date: 5-11-09

Read and understood by - witness

JR Antensen

Date: 5/21/09

CLARK DYNAMIC TEST LAB

CONTRACT NO.: T4689

CUSTOMER: Standard Beat Glass

TEST SPECIFICATION: SAE J381

TEST STEPS COMPLETED: One (1) -25° F
Defrost Test of 73mm Trans. Armor

Authorized Customer Representative / Date

Reviewed by Quality Assurance / Date

[Signature] 5/21/09

Read and understood by John R. Antenucci witness Date: