CRANE Composites

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Test Request Number: 712 Project Number: 1045
Subject: Gardner Impact on Varietex STA 09 and STC 09
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Manager Approval:

PURPOSE

Gardner Impact test on Sandstone in class A and class C versions for Middle East Opportunity.

BACKGROUND

Small STA and STC panels were sourced from IFD and thickness measured before Gardner impact testing.

MATERIALS

General Sample Description	Production or Prototype/-Sample:	Manufacturer	Size: (WxL)	Thickness	Color(s)	History	Age	Condition	Source	Receipt Date	Remarks
STC class C	production	CCI FLO	4" x 6"	0.09" 2.3mm	almond breeze 866	IFD Sample	6 mo	new	IFD	8/12/20	rcd 5
STA class A			6" x 6"				7 mo				rcd 6

Table 1. Materials Tested

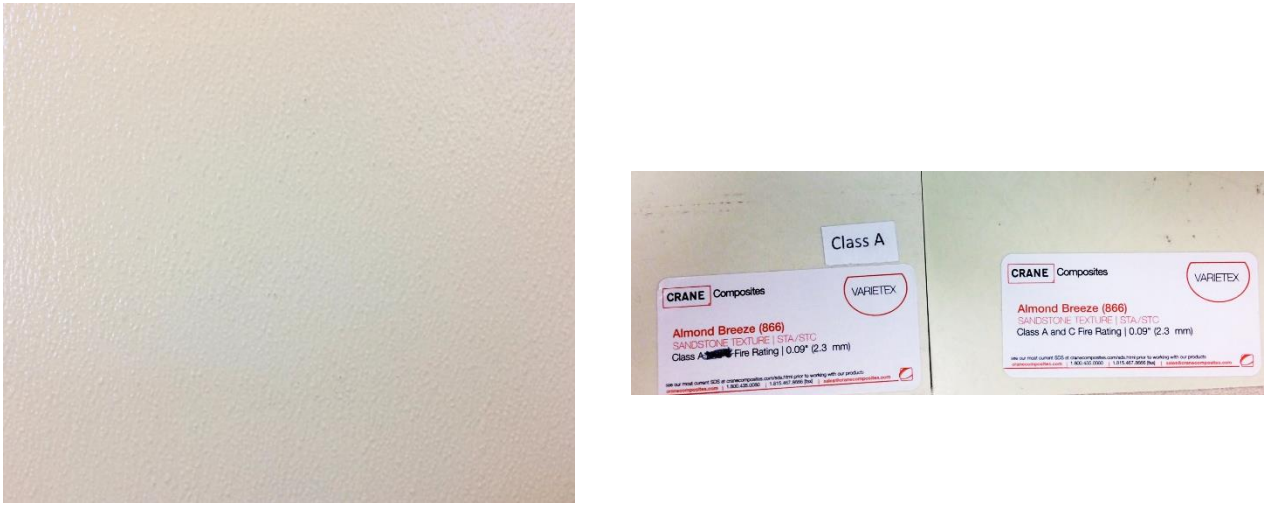

Photo 1. A-side sandstone texture and B-sides with label

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TESTS

Panel Properties	Sample Source
	Visual description
	Material thickness
Mechanical Properties	Gardner impact resistance

Table 2. Tests completed

TEST METHODS

Panel Properties:

- CCI 001 - Visual description: note color, gloss, surface texture, presence of surface film, fiber show, panel construction and difference between A & B-sides.
- CCI 002 - Material thickness: determine average panel thickness by measuring with micrometer (bench or disc) at a range of locations per panel size. Report as inches unless metric requested.

Mechanical Properties:

- CCI 015 - Gardner Impact resistance (ASTM D5420 Geometry GB). Using a Gardner SPI modified extra heavy-duty impact tester, an 8lb puncture weight is dropped from specific heights (in-lb) onto the surface of a panel. The height is increased using set graduations until the striker punctures through the panel.

RESULTS

	TEST		STA 090		STC 090	
	Procedure	**Method Description**	**Class A Varietex - sandstone almond breeze (866)**		**Class C Varietex - sandstone almond breeze (866)**	
			MEAN	*±SD*	MEAN	*±SD*
PANEL PROPERTIES	CCI 002	MATERIAL THICKNESS (in)	0.089	*0.002*	0.087	*0.002*
		MATERIAL THICKNESS (mm)	*2.26*	*0.038*	*2.22*	*0.051*
MECHANICAL PROPERTIES	CCI 015	GARDNER IMPACT RESISTANCE				
		Rating 3 - Load (in-lb) - A-side visual damage	15		15	
		Load (in-lb) / Thickness (in)	170		170	
		Rating 3 - Load (J) - A-side visual damage	*1.7*		*1.7*	
		Load (J) / Thickness (mm)	*0.76*		*0.76*	

Table 3. Test Results Summary

RESULTS AND DISCUSSION

The below photos of STA and STC are Gardner impact tested panels examples to show the range of testing loads and subsequent a-side and b-side damage. The first value is the in-lb load – then the rating value; 5-0 indicates a 5in-lb load and the – 0 is the rating. Blue chalk is used to enhance the damage cracking against the light colored panel.

Gardner Impact Rating Scale with Damage Description
0 - unable to see or feel damage to the A or B side of the panel.
1 - able to feel B-side break and unable to see any A-side damage.
2 - able to only feel, but not see A-side damage.
3 - obvious visible damage to A-side, but panel not broken through.
4 - panel broken through with cracks and reinforcement visible.

Table 4. Guide to Gardner Impact Rating to Damage Description

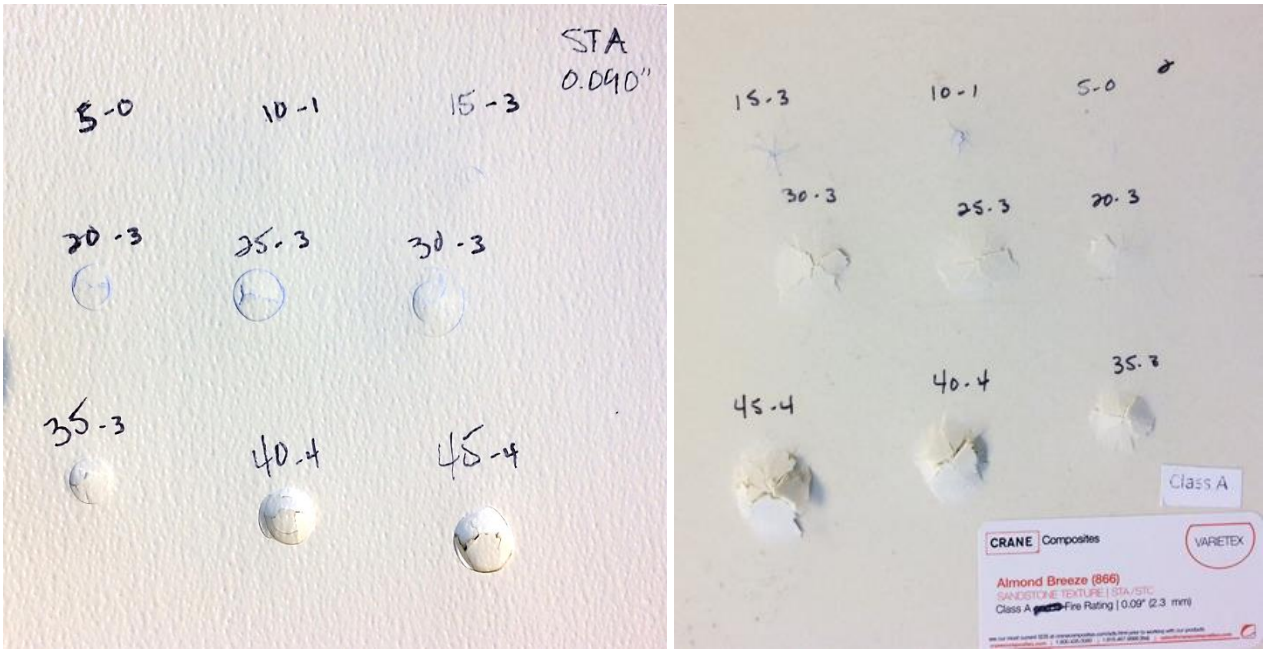

Photo 2. STA Gardner Impact with labels (ex: 5 – 0 is a test at 5 in-lb and the result is a 0 rating).

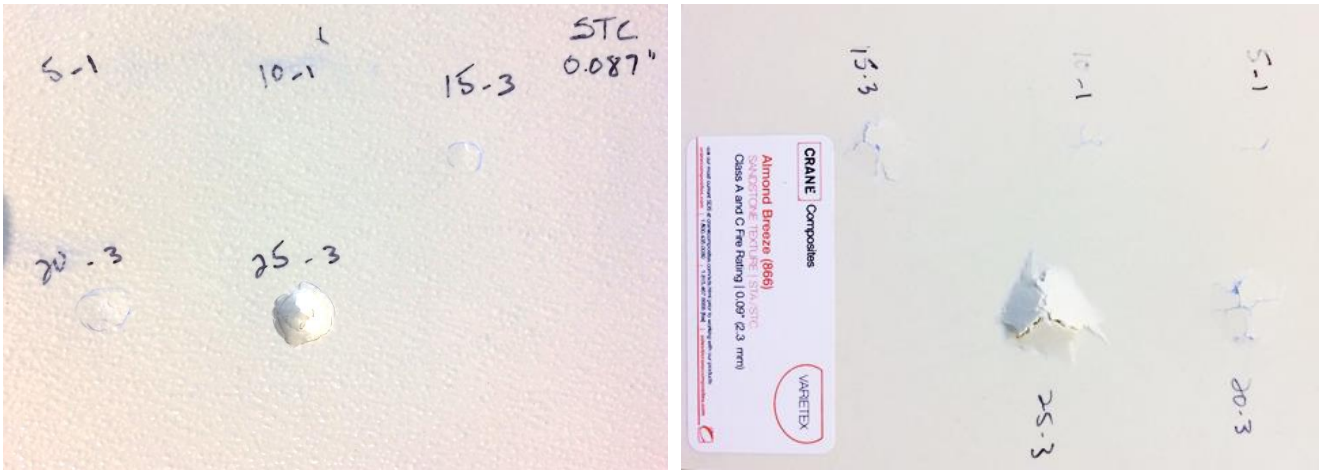

Photo 3. STC Gardner Impact with labels (ex: 5 – 1 is a test at 5 in-lb and the result is a 1 rating).

Tested panels are available for review and will be saved for 6 months.