NATIONAL CONCRETE MASONRY ASSOCIATION
Sustainable Concrete Products for Structures and Hardscapes

13750 Sunrise Valley Drive
Herndon, VA 20171-4662
703.713.1900
Fax: 703.713.1910
www.ncma.org

December 9, 2016

Fred Dunand
Saturn Materials
350 Yorkville Park Square
Columbus, MS 39702

Mr. Dunand,

Enclosed please find a report of testing performed by the National Concrete Masonry Association Research and Development Laboratory on the following products:

Report Number	Unit Description
16-548-1A	8 x 8 x 16 Concrete Masonry Unit
16-548-1B	Fire Rating Certification

Please note that the contents of this report are not to be reproduced, except in full, without the written approval of the NCMA Research and Development Laboratory.

We are constantly improving our services and would greatly appreciate any feedback regarding your experience with NCMA's Research and Development Laboratory. We have set up an online survey which can be found at: http://www.surveymonkey.com/s/DDFPZT9. After taking the online survey, make use of the many resources available at our website, www.ncma.org, including the latest industry news and events, a searchable directory of products and services, a vast collection of literature on the design, implementation, and marketing of manufactured concrete products and hardscape systems, as well as a list of available laboratory services for future testing.

The National Concrete Masonry Association Laboratory is dedicated to the scientific testing and research of concrete masonry products and systems. We take pride in meeting your product certification and evaluation requirements and look forward to continuing to service your testing needs for years to come.

Thank you for choosing NCMA's Research and Development Laboratory. Please feel free to contact me directly with any comments or questions at 703-713-1900 or nlang@ncma.org.

Sincerely,

Nicholas R. Lang
Director of Research and Development

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December 9, 2016

Fred Dunand
Saturn Materials
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Columbus, MS 39702

Please find enclosed a copy of a test report that we performed at your request on the following product that you supplied to the NCMA Research and Development Laboratory:

8 x 8 x 16 Concrete Masonry Unit

NCMA Job Number: 16-548-1A

We are pleased to report that the tested properties from this report comply with the applicable requirements of ASTM C90-16 Standard Specification for Loadbearing Concrete Masonry Units.

The attached report includes the tested compressive strength of the concrete masonry unit. The compressive strength of masonry constructed using these units can be calculated using the Unit Strength Method as outlined in Section 1.4.B.2.b of Specification for Masonry Structures (TMS 602-13 / ACI 530.1-13 / ASCE 6-13). It should be noted that as a result of industry research, the Unit Strength Method was recalibratied in the 2013 edition of the Specification for Masonry Structures, reducing the conservatism in the calculated compressive strength of masonry that was present in previous editions. Because jurisdictions adopt model codes at different times, the calculated values using both the 2011 and the 2013 Specification for masonry structures is provided below.

In accordance with the Unit Strength Method, the compressive strength of masonry is a function of unit strength and mortar type. As shown in the attached test report...

Net Area Compressive Strength of 8 x 8 x 16 Concrete Masonry Unit	5010 psi

Therefore, the net area compressive strength of masonry when these units are used, can be considered to be the following:

	TMS 602-13/ ACI 530.1-13/ ASCE 6-13		*TMS 602-11/ ACI 530.1-11/ ASCE 6-11*	
	Net Area Compressive Strength		Net Area Compressive Strength	
When used with:	of Masonry		of Masonry	
Type M or S mortar	3000	psi	3000	psi
Type N mortar	2500	psi	2900	psi

The values provided above can be compared directly to the specified compressive strength of masonry, f'_m. If these values exceed f'_m, compliance has been documented.

As mentioned before, the Unit Strength Method is a conservative method for determining compliance with the specified compressive strength of masonry when compared against the alternative Prism Test Method that may also be used. The results from the Prism Test Method will likely exceed the values calculated values of the Unit Strength Method.

Sincerely,

Nicholas R. Lang
Director of Research and Development

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ASTM C140/C140M-16 Test Report
Sampling and Testing Concrete Masonry Units and Related Units

Job No.: 16-548-1A
Report Date: 12/9/2016

Client: Saturn Materials
Address: 350 Yorkville Park Square
Columbus, MS 39702

Testing Agency: National Concrete Masonry Association
Research and Development Laboratory
Address: 13750 Sunrise Valley Drive
Herndon, VA 20171-4662

Standard Specification: ASTM C90-16

Sampling Party: Saturn Materials

Unit Description:
8 x 8 x 16 Concrete Masonry Unit

Date Samples Received: 11/16/2016

Summary of Test Results

Physical Property	ASTM C90-16 Specified Values	Average Test Results		Physical Property	ASTM C90-16 Specified Values	Average Test Results	
Net Compressive Strength	2000 min	5010	psi	Min. Faceshell Thickness (t_{fs})	1.25 min	1.28	in.
Gross Compressive Strength	****	2740	psi	Min. Web Thickness (t_w)	0.75 min	1.21	in.
Density	****	130.7	pcf	Equivalent Web Thickness	****	2.79	in.
Absorption	13 max	7.9	pcf	Normalized Web Area (A_{wn})	6.5 min	30.9	$in.^2/ft^2$
Percent Solid	****	54.6	%	Equivalent Thickness	****	4.16	in.
Net Cross-Sectional Area	****	65.07	$in.^2$	Max. Var. from Spec. Dimensions	.125 max	0.070	in.
Gross Cross-Sectional Area	****	119.09	$in.^2$				

Individual Unit Test Results

Compression	Specimen	Received Weight	Cross-Sectional Area *		Max. Load	Compressive Strength	
			Gross	Net		Gross	Net
Units	No.	lb	in^2	in^2	lb	psi	psi
	#1	37.82	119.09	65.07	306680	2580	4710
	#2	38.14	119.09	65.07	317310	2660	4880
Date Tested:	#3	38.62	119.09	65.07	354620	2980	5450
12/1/2016	Average	38.19	119.09	65.07	326200	2740	5010

* Unit areas determined as the average of the three absorption units and are assumed to be the same as those units tested in compression.

Absorption	Specimen	Avg Width	Avg Height	Avg Length	Avg./Min. Face Shell Thickness	Min. Web Thickness	Minimum Web Area	Normalized Web Area
Units	No.	in.	in.	in.	in.	in.	$in.^2$	$in.^2/ft^2$
	#4	7.59	7.56	15.62	1.27	1.21	27.39	30.8
	#5	7.64	7.59	15.63	1.28	1.21	27.56	31.0
Date Tested:	#6	7.64	7.58	15.63	1.28	1.21	27.52	31.0
11/29/2016	Average	7.62	7.57	15.63	1.28	1.21	27.49	30.9

**Where the thinnest points of opposite face shells differ in thickness by less than 0.125 inches, their measurements are averaged.

	Specimen	Received Weight	Immersed Weight	Saturated Weight	Oven-Dry Weight	Absorption	Density	Net Volume	Percent Solid
Date Tested:	No.	lb	lb	lb	lb	pcf	pcf	ft^3	%
12/1/2016	#4	37.32	21.38	39.06	36.66	8.5	129.4	0.2833	54.7
to	#5	38.50	22.12	40.02	37.80	7.7	131.8	0.2869	54.7
12/5/2016	#6	38.00	21.77	39.58	37.40	7.6	131.0	0.2854	54.5
	Average	37.94	21.76	39.55	37.29	7.9	130.7	0.2852	54.6

Comments: 1) These units meet or exceed the compression strength, absorption and dimensional requirements of ASTM C90-16.

Nicholas R. Lang
Director of Research and Development

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Fire Resistance Rating Test Report

Job No.: 16-548-1B
Report Date: 12/9/2016

Manufacturer:	Saturn Materials	Testing Agency:	National Concrete Masonry Association Research and Development Laboratory
Address:	350 Yorkville Park Square Columbus, MS 39702	Address:	13750 Sunrise Valley Drive Herndon, VA 20171-4662
Unit Description:	8 x 8 x 16 Concrete Masonry Unit	Date Samples Received:	11/16/2016
		Date Tested:	12/6/2016

AGGREGATE INFORMATION **********

Aggregate	Type	Batch Wt (lb)	Unit Wt (pcf)	Volume (ft^3)	% Volume
Sand	4	890	100.0	8.90	100.00
Totals		890		8.90	100.00

CALCULATIONS **********

Calculated values used to determine performance values:

Avg Width	8.00 in.	Gross Volume	0.593 ft^3
Avg Height	8.00 in.	Net Volume	0.2851 ft^3
Avg Length	16.00 in.	% Solid	48.1 %
		Equivalent Thickness	3.85 in.
Avg Min FS	1.28 in.		
Avg Min Web	1.21 in.		

CERTIFICATIONS ISSUED **********

Fire: ACI/TMS 216.1-14 **1.7 hr**
Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies

Note: The fire rating shown above was calculated based on information provided by the producer regarding the types of aggregates, and their proportions, used to manufacture the units.

Nicholas R. Lang
Director of Research and Development

Fire Resistance Rating

Certificate Number: *16-548-1B* Certificate Valid from *12/9/2016* through *12/9/2017*

The concrete masonry unit submitted by the manufacturer listed has been evaluated by the National Concrete Masonry Association Research and Development Laboratory for fire resistance in accordance with the code, standard, or procedure cited. The National Concrete Masonry Association certifies to the manufacturer that concrete masonry constructed in accordance with the cited code, standard, or procedure, using units representative of the submitted unit, has the fire resistance stated.

Fire Resistance Rating *1.7* Hour(s)

determined in accordance with
ACI/TMS 216.1-14, *Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies*

Note: The fire rating shown above was calculated based on information provided by the producer regarding the types of aggregates, and their proportions, used to manufacture the units.

Manufacturer: *Saturn Materials*
Plant: -
Unit Description: *8 x 8 x 16 Concrete Masonry Unit*

Equivalent Thickness: ***3.8*** *inches*
Aggregate Type(s): *Sand*

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CERTIFICATION AUTHORIZATION

Signature:
Name: Nicholas R. Lang
Title: Director of Research and Development

Fire Resistance Rating
Certificate of Compliance
Saturn Materials

certifies that concrete masonry constructed in accordance with the code, standard or procedure cited, using units from the shipment listed, has the fire resistance stated. Units in the shipment are representative of the unit evaluated by the National Concrete Masonry Association for fire resistance in accordance with the cited code, standard or procedure, as provided on the NCMA Product Certification Certificate.

Fire Resistance Rating ***1.7*** **Hour(s)**

determined in accordance with
ACI/TMS 216.1-14, *Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies*

Certificate Number: *16-548-1B*
Manufacturer: *Saturn Materials*
Plant: -
Unit Description: *8 x 8 x 16 Concrete Masonry Unit*

Shipment: _____

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CERTIFICATION AUTHORIZATION

Signature: _____
Mfg. Representative: _____
Title: _____
Date: _____