



Mill Test Report

Plant Location: Glens Falls., NY
 Mill Test Date: 2/22/2016

Cement Type: Type I/II
 Mill Test Month: Jan-16

ASTM C 114	Test Results Results	ASTM C150 / AASHTO M 85
		TYPE II Specifications
Silicon Dioxide (Si ₂ O ₃), %	19.69	
Aluminum Oxide (Al ₂ O ₃), %	3.85	6.0 Max
Iron Oxide (Fe ₂ O ₃), %	4.10	6.0 Max
Calcium Oxide (CaO), %	64.01	
Magnesium Oxide (MgO), %	2.12	6.0 Max
Sulfur Trioxide (SO ₃), %	3.05	3.0 Max*
Loss on Ignition (LOI), %	2.29	3.0 Max
Insoluble Residue, %	0.52	0.75 Max
Total Alkalies [Na ₂ O + 0.658*K ₂ O] (%)	0.66	0.60 Max
Tri-Calcium Silicate [C ₃ S] (%)	70.53	
Tri-Calcium Aluminate [C ₃ A] (%)	3.27	8 Max
C ₃ S + 4.75*C ₃ A <= 100	86.1	100 Max
ASTM C186 Heat of Hydration 7 Day (cal/g)	79.0	
Date Heat of Hydration Performed	8/17/2012	
CO ₂ (%)	1.66	
Limestone Addition (%)	4.04	5.0 Max
CaCO ₃ in Limestone (%)	95.3	70 Min

PHYSICAL REQUIREMENTS

Blaine Fineness ASTM C 204 (m ² /kg):	3811	280 Min/ 420Max* (* AASTHO Only)
325-Mesh Sieve Retained AS TM C 430(%):	5.09	
Time of Setting Vicat - Initial Set ASTM C 191 (min):	126	45 Min
Time of Setting Vicat - Final Set ASTM C 191 (min):	254	375 Max
Air Content ASTM C 185 (%):	5	12 Max
Paste False Set ASTM C 451 (%):	68.0	
Soundness-Autoclave Expansion ASTM C 151(%):	-0.02	0.80 Max
Expansion in Water ASTM C 1038 (%):	0.002	0.020 Max
Normal Consistency ASTM C 187 (%):	25	
Compressive Strengths 1 Day ASTM C109 (psi):	2520	
Compressive Strengths 3 Day ASTM C109 (psi):	4221	1450 Min
Compressive Strengths 7 Day ASTM C109 (psi):	4806	2470 Min
Compressive Strengths 28 Day ASTM C109 (psi):	5552	

The above test results are representative of cement from which the shipment was made.

The cement complies with the requirements of ASTM C 150 and AASHTO M 85 specifications.

Note *: ASTM and AASHTO refer to footnote "d" in cases where the optimum SQ (using ASTM C 563) of a particular cement is close to or in excess of the limit in this specification. In such cases where properties of a cement can be improved by exceeding the SO₃ limits in the table, it is permissible to exceed the limits provided it is demonstrated by ASTM C 1038 that the cement with the increased SO₃ will not develop expansion exceeding 0.020% at 14 days. The optimum SQ for GFLCC Type I/II cement exceeds the limit and therefore the ASTM C 1038 results are provided above.

Hermanus Potgieter, Quality Control Manager

ASTM C618 / AASHTO M295 Testing of Brayton Point Fly Ash

Sample Type: 3200-ton Report Date: 4/22/2016

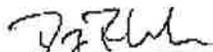
Sample Date: 2/22 - 3/10/16 MTRF ID: 568BP

Sample ID:

Chemical Analysis	ASTM / AASHTO Limits		ASTM Test Method
	Class F	Class C	
Silicon Dioxide (SiO ₂)	60.58 %		
Aluminum Oxide (Al ₂ O ₃)	26.56 %		
Iron Oxide (Fe ₂ O ₃)	4.97 %		
Sum of Constituents	92.11 %	70.0% min 50.0% min	D4326
Sulfur Trioxide (SO ₃)	0.17 %	5.0% max 5.0% max	D4326
Calcium Oxide (CaO)	1.39 %		D4326
Magnesium Oxide (MgO)	1.12 %		
Sodium Oxide (Na ₂ O)	0.98 %		
Potassium Oxide (K ₂ O)	2.44 %		
Moisture	0.05 %	3.0% max 3.0% max	C311
Loss on Ignition	2.47 %	6.0% max 5.0% max 6.0% max 5.0% max	C311 AASHTO M295
Physical Analysis			
Fineness, % retained on #325	20.85 %	34% max 34% max	C311, C430
Strength Activity Index - 7 or 28 day requirement			C311, C109
7 day, % of control	81 %	75% min 75% min	
28 day, % of control	79 %	75% min 75% min	
Water Requirement, % control	95 %	105% max 105% max	
Autoclave Soundness	-0.02 %	0.8% max 0.8% max	C311, C151
Density	2.36		C604

The strength activity index is not to be considered a measure of the compressive strength of concrete containing the fly ash.

Headwaters Resources certifies that pursuant to current ASTM C618 protocol for testing, the test data listed herein was generated by applicable ASTM methods and meets the requirements of ASTM C618.


Doug Rhodes, CET
Facility Manager





ATLANTIC TESTING LABORATORIES

Albany
22 Corporate Drive
Clifton Park, NY 12065
518-383-9144 (T)
atlantictesting.com

WBE certified company

March 7, 2016

J.P. Carrara & Sons, Inc.
167 N. Shrewsbury Road
North Clarendon, VT 05759

Attn: Mr. Robert Carrara

E/mail: bob@carraraconcrete.com

Re: Laboratory Test Results
Sand and Stone Samples
ATL Report No. AT2368SL-01-03-02-16

Ladies/Gentlemen:

On February 23, 2016, your representative delivered one sand and two stone samples (ATL Sample Nos. AT2368S01-AT2368S03) to our Clifton Park, New York facility for testing. Specific Gravity and Absorption of Coarse Aggregates in accordance with ASTM C 127, Specific Gravity & Absorption of Fine Aggregates in accordance with ASTM C 128, and Grain Size Analysis in accordance with ASTM C 136 / C 117, were performed on these samples. The laboratory test results follow:

Specific Gravity and Absorption of Fine Aggregate

ASTM C 128

Carrara Sand

ATL Sample Number	Client I.D.	Specific Gravity (OD)	Bulk Specific Gravity (SSD)	Apparent Specific Gravity	Absorption (%)
AT2368S01	Carrara Sand	2.64	2.67	2.72	1.1

Specific Gravity and Absorption of Coarse Aggregate

ASTM C 127

3/8 inch Stone

ATL Sample Number	Client I.D.	Specific Gravity (OD)	Bulk Specific Gravity (SSD)	Apparent Specific Gravity	Absorption (%)
AT2368S02	3/8 inch Stone	2.73	2.75	2.77	0.6

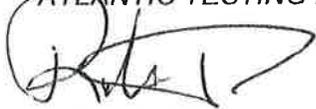
Specific Gravity and Absorption of Coarse Aggregate
ASTM C 127
¾ inch Stone

ATL Sample Number	Client I.D.	Specific Gravity (OD)	Bulk Specific Gravity (SSD)	Apparent Specific Gravity	Absorption (%)
AT2368S03	¾ inch Stone	2.74	2.75	2.77	0.4

The Grain Size Analysis curves are enclosed.

Please contact our office should you have any questions or if we may be of further service.

Respectfully,
ATLANTIC TESTING LABORATORIES, Limited



Robert E. Field
Laboratory Manager
bfield@atlantictesting.com

REF/rf

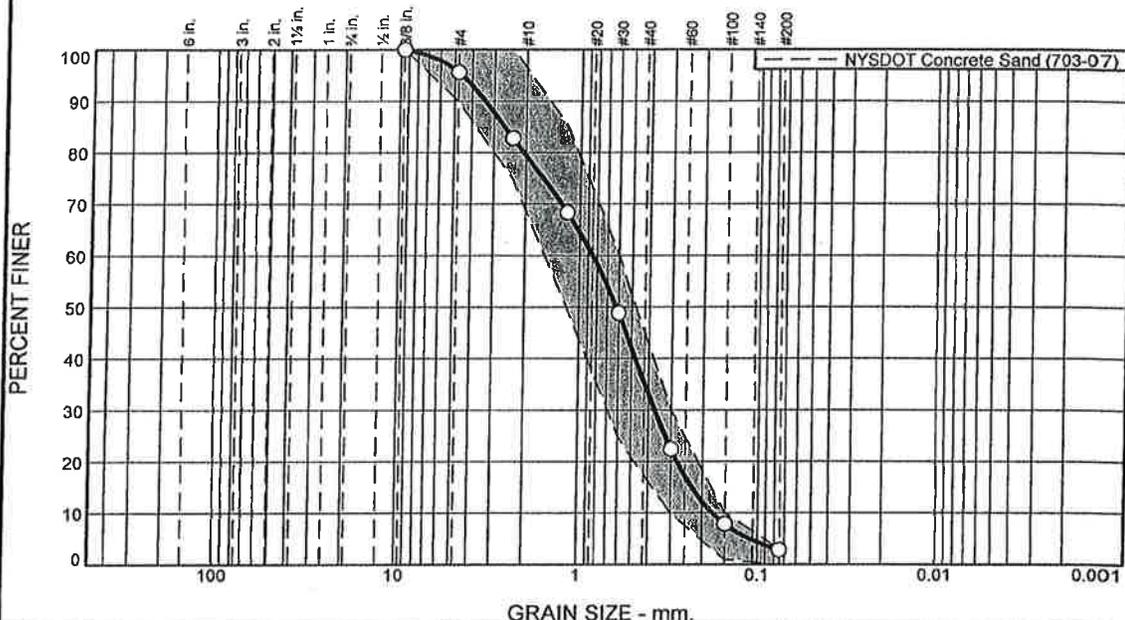
Enclosures



ATLANTIC TESTING LABORATORIES

WBE certified company

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	4	16	45	32	3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC (X)
.375	100	100	
#4	96	90 - 100	4
#8	83	75 - 100	17
#16	68	50 - 85	32
#30	49	25 - 60	51
#50	22	10 - 30	78
#100	8	1 - 10	92
#200	2.8	0.0 - 3.0	

PM = 2.74

Soil Description
Brown Concrete Sand

Atterberg Limits
PL= --- LL= --- PI= ---

Coefficients
 D₈₅= 2.6199 D₆₀= 0.8493 D₅₀= 0.6195
 D₃₀= 0.3710 D₁₅= 0.2287 D₁₀= 0.1755
 C_u= 4.84 C_c= 0.92

Classification
USCS= SP AASHTO=

Remarks
Sampled and delivered by the client on 2/23/2016
ASTM C 136 / C 117

* NYSDOT Concrete Sand (703-07)

Source of Sample: JP Carrara Depth: N/A
Sample Number: AT2368S01

ATLANTIC TESTING LABORATORIES, LIMITED Albany, New York	Client: J.P. Carrara & Sons, Inc.
	Project: Laboratory Testing
Report No: AT2368SL-01-02-16	Date: 3/7/2016

Tested by: EV
Reviewed by: REF

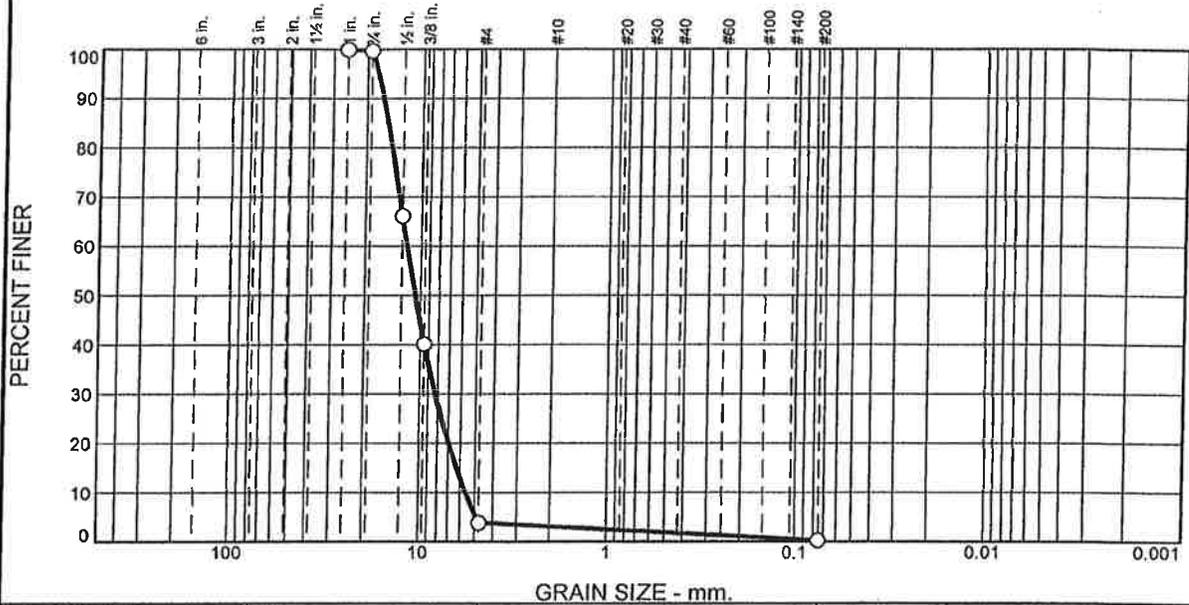
Date: 3/2/16
Date: 3/7/16



ATLANTIC TESTING LABORATORIES

WBE certified company.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	96	1	1	2	0	0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC (X)
1	100		
.75	100		
.5	66		
.375	40		
#4	4		
#200	0.2		

Soil Description
Grey 3/4 inch Stone

Atterberg Limits
 PL= --- LL= --- PI= ---

Coefficients
 D₈₅= 15.3673 D₆₀= 11.9437 D₅₀= 10.7235
 D₃₀= 8.2665 D₁₅= 6.2889 D₁₀= 5.6004
 C_u= 2.13 C_c= 1.02

Classification
 USCS= GP AASHTO=

Remarks
 Sampled and delivered by the client on 2/23/2016
 ASTM C 136 / C 117

* (no specification provided)

Source of Sample: JP Carrara Depth: N/A
 Sample Number: AT2368S03

ATLANTIC TESTING LABORATORIES, LIMITED Albany, New York	Client: J.P. Carrara & Sons, Inc.
	Project: Laboratory Testing
Report No: AT2368SL-03-02-16	Date: 3/7/2016

Tested by: EU
 Reviewed by: REF

Date: 3/2/16
 Date: 3/7/16

 Rev. 11/17/2014	SAMPLE TYPE:	RMS 905	DATE RECEIVED:	LAB NUMBER:
	VER	SAMPLE OF COARSE AGGREGATE (ASR)		

CEMENT	FLY ASH	SLAG	SILICA
90.0%	10.0%	0.0%	0.0%

PLANT, LABORATORY, AGGREGATE, AND MITIGATION SOURCES

Plant:	JP CARRARA	Location:	RUTLAND VT
Aggregate:	SLC	Location:	DANBY VT
Cement:	LEHIGH	Location:	GLENS FALLS, NY
Fly Ash:	HEADWATERS RESOURCES	Location:	SOMERSET, MA
Slag:		Location:	
Silica Fume:		Location:	

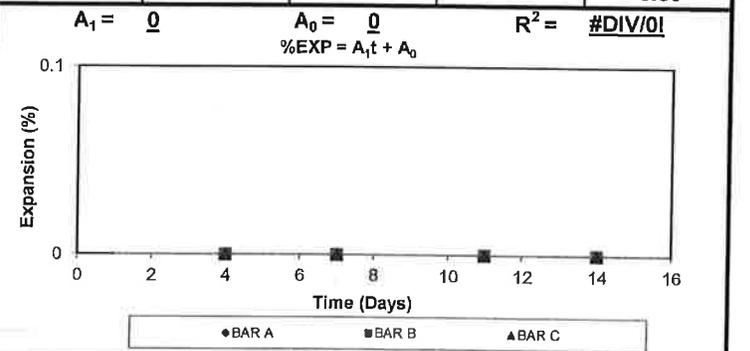
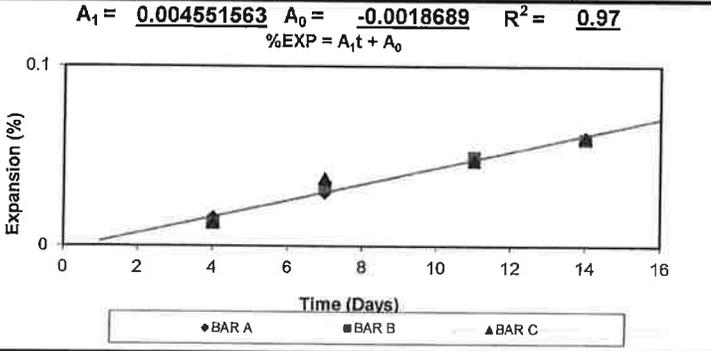
INDEPENDENT LABORATORY		MASSDOT LABORATORY	
Laboratory:	ATC ASSOCIATES	Laboratory:	RESEARCH & MATERIALS
Date Sampled:	1/23/2015	Date Sampled:	
Sampler:	JP CARRARA	Sampler:	

TIME (Days)	MORTAR BAR (UNIT OF LENGTH)			
	A	B	C	G
2	0.0970	0.0972	0.0817	10
6	0.0986	0.0985	0.0830	
9	0.1000	0.1005	0.0855	
13	0.1019	0.1022	0.0865	
16	0.1031	0.1032	0.0878	

TIME (Days)	MORTAR BAR (%)			
	A	B	C	AVERAGE
0				
4	0.016	0.013	0.013	0.01
7	0.030	0.033	0.038	0.03
11	0.049	0.050	0.048	0.05
14	0.060	0.059	0.061	0.06

TIME (Days)	MORTAR BAR (UNIT OF LENGTH)			
	A	B	C	G
2				
6				
9				
13				
16				

TIME (Days)	MORTAR BAR (%)			
	A	B	C	AVERAGE
0				
4	0.000	0.000	0.000	0.00
7	0.000	0.000	0.000	0.00
11	0.000	0.000	0.000	0.00
14	0.000	0.000	0.000	0.00



PASS

MassDOT: Please fill in all cells highlighted in green.

Tested by: ANTONIO RODRIGUES

Signature: *Antonio Rodriguez*

Date: 2/27/15

Reviewed by: KEVIN CAINE

Signature: *Kevin Caine*

Date: 3/2/2015

Comments:

Tested by:

Signature:

Date:

Reviewed by:

Signature:

Date:

Comments:

Note: Pass/Fail determination is based on MassDOT's expansion criteria of 0.08% maximum expansion for metamorphic aggregate or 0.10% maximum expansion for all other aggregates. A "12 Point Linear Regression" of 4, 7, 11, and 14 days is used to determine reliability of results and to develop $\%EXP = A_1 t + A_0$ plot. Repeat AASHTO T303 (Modified) if r^2 value is less than 0.95.

 <small>MassDOT Highway</small> Rev. 11/17/2014	SAMPLE TYPE: <h1 style="margin:0;">VER</h1>	RMS 905 SAMPLE OF FINE AGGREGATE (ASR)	DATE RECEIVED:	LAB NUMBER:
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CEMENT	FLY ASH	SLAG	SILICA
90.0%	10.0%	0.0%	0.0%

PLANT, LABORATORY, AGGREGATE, AND MITIGATION SOURCES

Plant:	JP CARRARA	Location:	RUTLAND VT
Aggregate:	PIKE INDUSTRIES	Location:	DANBY VT
Cement:	LEHIGH	Location:	GLENS FALLS, NY
Fly Ash:	HEADWATERS RESOURCES	Location:	SOMERSET, MA
Slag:		Location:	
Silica Fume:		Location:	

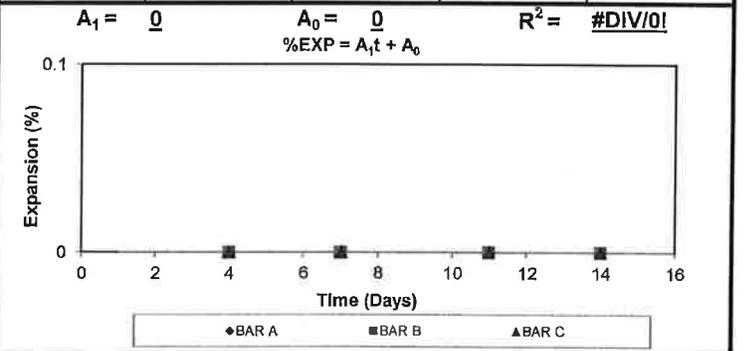
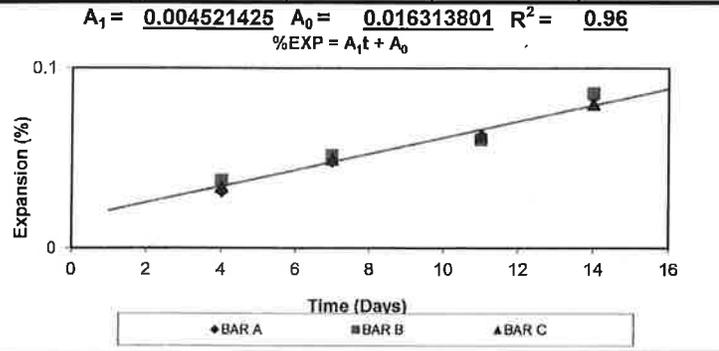
INDEPENDENT LABORATORY	MASSDOT LABORATORY
Laboratory: ATC ASSOCIATES	Laboratory: RESEARCH & MATERIALS
Date Sampled: 1/23/2015	Date Sampled:
Sampler: JP CARRARA	Sampler:

TIME (Days)	MORTAR BAR (UNIT OF LENGTH)			
	A	B	C	G
2	0.0989	0.0934	0.0850	10
6	0.1021	0.0972	0.0884	
9	0.1038	0.0986	0.0900	
13	0.1052	0.0995	0.0913	
16	0.1074	0.1021	0.0931	

TIME (Days)	MORTAR BAR (UNIT OF LENGTH)			
	A	B	C	G
2				
6				
9				
13				
16				

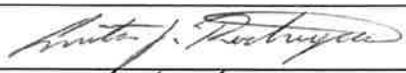
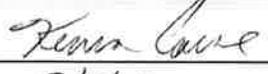
TIME (Days)	MORTAR BAR (%)			
	A	B	C	AVERAGE
0				
4	0.032	0.038	0.034	0.03
7	0.049	0.052	0.050	0.05
11	0.062	0.060	0.062	0.06
14	0.084	0.086	0.080	0.08

TIME (Days)	MORTAR BAR (%)			
	A	B	C	AVERAGE
0				
4	0.000	0.000	0.000	0.00
7	0.000	0.000	0.000	0.00
11	0.000	0.000	0.000	0.00
14	0.000	0.000	0.000	0.00



PASS

MassDOT: Please fill in all cells highlighted in green.

Tested by: ANTONIO RODRIGUES	Tested by:
Signature: 	Signature:
Date: 2/27/15	Date:
Reviewed by: KEVIN CAINE	Reviewed by:
Signature: 	Signature:
Date: 3/2/15	Date:
Comments:	Comments:

Tested by:	Tested by:
Signature:	Signature:
Date:	Date:
Reviewed by:	Reviewed by:
Signature:	Signature:
Date:	Date:
Comments:	Comments:

Note: Pass/Fail determination is based on MassDOT's expansion criteria of 0.08% maximum expansion for metamorphic aggregate or 0.10% maximum expansion for all other aggregates. A "12 Point Linear Regression" of 4, 7, 11, and 14 days is used to determine reliability of results and to develop %Expansion = $A_1t + A_0$ plot. Repeat AASHTO T303 (Modified) if r^2 value is less than 0.95.

WR Grace Company

W. R. Grace & Co.-Conn.
62 Whittemore Avenue
Cambridge, MA 02140

T 617-498-4555
F 617-234-7576
E Denise.i.white@grace.com
W www.graceconstruction.com

April 6, 2011

J P Carrara & Sons
2464 Case Street, Rte. 116
Middlebury, Vermont 05753

Project Name: All

This is to certify that **DAREX® II AEA**, an air-entraining admixture, as manufactured and supplied by Grace Construction Products, W. R. Grace & Co.-Conn., is formulated to comply with the Standard Specification for Air-Entraining Admixtures for Concrete, ASTM C 260 (AASHTO M 154).

DAREX II AEA does not contain calcium chloride or chloride containing compounds as a functional ingredient. Chloride ions may be present in trace amounts contributed from the process water used in the manufacturing.

GRACE



Denise White
Technical Service Support

WR Grace Company

W. R. Grace & Co.-Conn.
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Cambridge, MA 02140

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E Denise.i.white@grace.com
W www.graceconstruction.com

April 6, 2011

J P Carrara & Sons
2464 Case Street, Rte. 116
Middlebury, Vermont 05753

Project Name: All

This is to certify that DARATARD® 17, a Water-Reducing and Retarding, as manufactured and supplied by Grace Construction Products, W. R. Grace & Co.-Conn., is formulated to comply with the Standard Specification for Chemical Admixtures for Concrete, ASTM C 494, Type D (AASHTO M 194, Type D).

DARATARD 17 does not contain calcium chloride or chloride containing compounds as a functional ingredient. Chloride ions may be present in trace amounts contributed from the process water used in the manufacturing.



Denise White
Technical Service Support

GRACE

WR Grace Company

W. R. Grace & Co.-Conn.
62 Whittemore Avenue
Cambridge, MA 02140

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W www.graceconstruction.com

April 6, 2011

J P Carrara & Sons
2464 Case Street, Rte. 116
Middlebury, Vermont 05753

Project Name: All

This is to certify that **ADVA® 405**, a high-range, water-reducing admixture, as manufactured and supplied by Grace Construction Products, W. R. Grace & Co.-Conn., is formulated to comply with the Standard Specification for Chemical Admixtures for Concrete, ASTM C 494, Type F (AASHTO M 194, Type F) and complies with the Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete, ASTM C 1017.

ADVA 405 does not contain calcium chloride or chloride containing compounds as a functional ingredient. Chloride ions may be present in trace amounts contributed from the process water used in the manufacturing.

GRACE



Denise White
Technical Service Support

W.R. Grace
62 Whittemore Avenue
Cambridge, MA 02140-1692
T 617-876-1400
grace.com/construction

Date: 5/4/2016

**Benjamin Cota
J.P. Carrara & Sons
2464 Case Street
Middlebury, VERMONT 05753**

Project Name: **VAOT HPC Rapid Set**
Product Selected: **Daraset® 400**

This is to certify that **Daraset 400**, a **Accelerator**, as manufactured and supplied by Grace Construction Products, W.R. Grace & Co. - Conn., is formulated to comply with the Specifications for Chemical Admixtures for Concrete, ASTM: **C494, Type C**, AASHTO: **M194, Type C**.

Daraset 400 does not contain calcium chloride or chloride containing compounds as a functional ingredient. Chloride ions may be present in trace amounts contributed from the process water used in manufacturing.



G. Terry Harris
Manager of Technical Services, North America Concrete

W.R. Grace
62 Whittemore Avenue
Cambridge, MA 02140-1692
T 617-876-1400
grace.com/construction

Date: 5/4/2016

**Benjamin Cota
J.P.Carrara & Sons
2464 Case Street
Middlebury, VERMONT 05753**

**Project Name: VAOT HPC Rapid Set
Product Selected: Eclipse® 4500**

This is to certify that **Eclipse 4500**, a **Shrinkage Reducing Admixture**, as manufactured and supplied by Grace Construction Products, W.R. Grace & Co. - Conn., is formulated to comply with the Specifications for Chemical Admixtures for Concrete, ASTM: **C494, Type S**, AASHTO: .

Eclipse 4500 does not contain calcium chloride or chloride containing compounds as a functional ingredient. Chloride ions may be present in trace amounts contributed from the process water used in manufacturing.



G. Terry Harris
Manager of Technical Services, North America Concrete