



July 25, 2014

Attn:

Company:

Address:

City/State: DELETE THE HEADINGS TO THE LEFT WHEN TYPING IN JOB INFO

RE: Project info  
CSI Job Number:

For your records, please note that we would like to use the following concrete mix design (self-consolidating) in manufacturing.

Proportion indicated is per cubic yard basis:

Cement (Type III) Dragon	527#
Fly Ash	225#
½" Crushed Stone (Dracut)	1,522#
Sand (Decato)	1,360#
Water	275#
Glennium 7710	85 oz
MBAE 90	7 oz
Maximum Slump Spread	23" to 26"
Entrained Air	6%±1%
Concrete Strength (28 days)	5,000 psi
Water/Cement Ratio	0.36 max.

Please call me if you have any questions.

Very truly yours,

A handwritten signature in blue ink that reads 'K Patel'.

Concrete Systems, Inc.

Mr. Kanti Patel

Quality Control Manager

✓ MX-FA5000SC30

9 Commercial Street Hudson, New Hampshire 03051 Phone (603) 889-4163

Fax Number: Precast Sales (603) 889-0039

Fax Number: Manhole Design and Engineering (603) 598-1344



P.O. Box 191, U.S. Route 1 • Thomaston, Maine 04861 • 207-594-5555

4-3-15

<b>MILL TEST RESULTS</b>	Date: January, 2015
Laboratory at Thomaston, Maine	Cement Type: III
	Silo Numbers: 16, 22 & 25

CHEMICAL DATA	Percent	PHYSICAL DATA	
Silicon Dioxide.....	20.2	Specific Surface.....	524
Aluminum Dioxide.....	3.6	Blaine (sq m /kg)	
Ferric Oxide.....	3.0	(Per ASTM C 204)	
Calcium Oxide.....	62.1	Percent Passing 325 Mesh	99.5
Magnesium Oxide.....	3.3	(Per ASTM C 430)	
Sulphur Trioxide.....	3.6	Compressive Strength (psi)	
Loss on Ignition.....	1.9	(Per ASTM C 109)	
Insoluble Residue.....	0.5	1 day.....	4180
		3 day.....	5460
Tricalcium Silicate.....	58	7 day.....	6230
Dicalcium Silicate.....	12	28 day.....	
Tricalcium Aluminate.....	4	Vicat Setting Time	
Sum of C3S + 4.75*C3A....	79	(Per ASTM C 191)	
Sum of C4AF + 2*C3A.....	18	Initial (min.).....	105
		Final (min.).....	195
Sodium Oxide.....	0.4	Air Content (%).....	7.6
Potassium Oxide.....	1.0	(Per ASTM C 185)	
Equivalent Alkalies.....	1.07	Autoclave Expansion (%)...	0.04
		(Per ASTM C 151)	
Limestone Addition	2.9	Expansion in water (%).....	0.012
CaCO <sub>3</sub> in Limestone	93	(Per ASTM C 1038)	

(Chemical Analysis all per ASTM C 114)

Certified by:  
  
 Jennifer K. Colburn

We hereby certify that this cement complies with current ASTM C 150, AASHTO M-85 and CSA A3001 Type HE specifications.

Testing was completed by Brian Secord and/or Richard Erickson.  
 This mill test report is generated for silos produced in the calendar month prior to the date upon this report.

# American Calibration & Testing Co., Inc.

49 Pollard Street N. Billerica, MA 01862-1333 (978) 670-2361 Fax (978) 671-6423

## Calibration Report

Date of Verification: Monday February 16, 2015

**Location**  
**Concrete Systems, Inc.**  
 14 Commercial Ave.  
 Hudson, NH 03051

### Environmental Conditions @ Time of Service

Temperature: 70 ± 2 °F Relative Humidity: 40% ± 15%

Report #: 150219-M1  
 MFG: Forney  
 Model: FT-40  
 Type: Compression

### Instrument Data

Instr. s/n: 83023 Condition: Good  
 Capacity: 250,000 lbf Loc./Dept: Lab  
 Verified Range: 25,000 - 240,000 lbf.

### As Found and Final Run Data

Run 1				Run 2				Repeatability %	Readability lbf	V.D Code
Standard lbf	UUT lbf	Error lbf	Error %	Standard lbf	UUT lbf	Error lbf	Error %			
0	0	0	n/a	0	0	0	n/a	n/a	125	1&2
25,056	25,000	-56	-0.22	24,926	25,000	74	0.30	0.52	"	"
39,915	40,000	85	0.21	39,749	40,000	251	0.63	0.42	"	1&3
69,913	70,000	87	0.12	69,888	70,000	112	0.16	0.04	"	"
100,016	100,000	-16	-0.02	99,990	100,000	10	0.01	0.03	"	"
150,230	150,000	-230	-0.15	150,127	150,000	-127	-0.08	0.07	"	"
200,430	200,000	-430	-0.21	200,558	200,000	-558	-0.28	0.07	"	"
240,254	240,000	-254	-0.11	240,348	240,000	-348	-0.14	0.03	"	"
0	0	0	n/a	0	0	0	n/a	n/a	"	"

Comment:

### Verification Apparatus

VD Code	Type	mfg	s/n	Class "A" Range Upper & Lower Limits	Cal. Date / Due Date	Calibrated By	Report No.
1	Cal. Ind.	BLH	5070087	Digital Indicator	10-15-2013 / 10-15-2015	Morehouse Instrument Co.	5070087J1513
2	Load Cell	Revere	35568	30,000 lbf - 999.7 lbf	10-15-2013 / 10-15-2015	Morehouse Instr. Co.	35568J1513
3	Load Cell	Coti, Inc.	5072	240,000 lbf - 36,126 lbf	10-15-2013 / 10-15-2015	Morehouse Instr. Co.	5072H1513

### Calibration Data

Previous Cal. Date: 12/01/2014  
 Cal. Frequency: 6 Months  
 Cal. Due Date: 02/16/2016  
 Method Used: ASTM E4-13  
 Mode Verified: Compression

Calibr. Tech.: *G.W. Mooney*  
 G.W. Mooney

The calibration results in this certificate were obtained using equipment capable of producing results that are traceable to NIST and through NIST to the International System of Units (SI).

The uncertainty of measurement associated with the measurement result reported in this certificate is available from the organization upon request and was accounted for in making the decision of compliance or noncompliance with the relevant specification identified above.

This report shall not be reproduced except in full, without written approval from American Calibration & Testing Co., Inc.

# Calibration Report

Date of Verification: Monday February 16, 2015

**Location**  
**Concrete Systems, Inc.**  
 14 Commercial St.  
 Hudson, NH 03051

**Environmental Conditions @ Time of Service**

Temperature: 70 ± 2 °F      Relative Humidity: 40% ± 15%

**Instrument Data**

Report #: 150219-S1	Instr. s/n: 2588225-2XS	Condition: Good
MFG: Toledo	Capacity: 50 lb	Loc./Dept: Lab
Model: 8571	Verified Range: 1 - 50 lb	
Type: Digital Scale		

**As Found and Final Run Data**

Standard lb	As Found UUT lb	As Left UUT lb	Scale Error lb	Resolution lb	V.D Code
1	1.000	1.000	0.000	0.005	1&2
10	10.000	10.000	0.000	"	"
20	20.000	20.000	0.000	"	"
30	30.000	30.000	0.000	"	"
40	40.000	40.000	0.000	"	"
50	49.995	49.995	-0.005	"	"

Comment:

<b>As found Instrument Status</b>	Within mfg. Tolerance <input checked="" type="checkbox"/>	Out of mfg. Tolerance <input type="checkbox"/>	Needs Adjustment <input type="checkbox"/>
<b>Instrument final run Status</b>	Within mfg. Tolerance <input checked="" type="checkbox"/>	Out of mfg. Tolerance <input type="checkbox"/>	Needs Adjustment <input type="checkbox"/>

**Verification Apparatus**

VD Code	Type	mfg	s/n	Cal. Date / Due Date	Calibrated By	Report #
1	Dead Weights	Toledo, Inc.	123	7-15-11 / 7-15-16	American Calibration	205441
2	Dead Weights	Amcal, Inc.	A1070	07-15-11 / 07-15-16	American Calibration	205442

**Calibration Data**

Previous Cal. Date: 09-26-2014  
 Cal. Frequency: Annual  
 Cal. Due Date: 02-16-2016  
 Method Used: Standard Weights

Approved By:   
 Beau Mooney

The calibration results in this certificate were obtained using equipment capable of producing results that are traceable to NIST and through NIST to the International System of Units (SI). The uncertainty of measurement associated with the measurement result reported in this certificate is available from the organization upon request and was accounted for in making the decision of compliance or noncompliance with the relevant specification identified above.

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# American Calibration & Testing Co., Inc. pg. 1 of 1

49 Pollard Street N. Billerica, MA 01862-1333

(978) 670-2361

Fax (978) 671-6423

## Calibration Report

Date of Verification: Monday February 16, 2015

**Location**  
**Concrete Systems, Inc.**  
 14 Commercial St.  
 Hudson, NH 03051

### Environmental Conditions @ Time of Service

Temperature: 70 ± 2 °F

Relative Humidity: 40% ± 15%

Report #: 150219-S2

### Instrument Data

MFG: AND

Instr. s/n: 14680178

Condition: Good

Model: GF-4000

Capacity: 4,100 g

Loc./Dept: Lab

Type: Digital Scale

Verified Range: 1 - 4,000 g

### As Found and Final Run Data

Standard g	As Found UUT g	As Left UUT g	Scale Error g	Resolution g	V.D Code
1	1.00	1.00	0.00	0.01	1
10	10.00	10.00	0.00	"	"
100	100.00	100.00	0.00	"	"
500	500.00	500.00	0.00	"	"
1,000	1,000.00	1,000.00	0.00	"	"
2,000	1,999.98	1,999.98	-0.02	"	"
4,000	3,999.96	3,999.96	-0.04	"	"

Comment:

As found Instrument Status

Within mfg. Tolerance

Out of mfg. Tolerance

Needs Adjustment

Instrument final run Status

Within mfg. Tolerance

Out of mfg. Tolerance

Needs Adjustment

### Verification Apparatus

VD Code	Type	mfg	s/n	Cal. Date / Due Date	Calibrated By	Report #
1	Dead Weights	Troemner, Inc.	20472	07-15-11 / 07-15-16	American Calibration	204604

### Calibration Data

Previous Cal. Date: 09-26-2014

Cal. Frequency: Annual

Cal. Due Date: 02-16-2016

Method Used: Standard Weights

Approved By:

*Beau Mooney*  
 Beau Mooney

The calibration results in this certificate were obtained using equipment capable of producing results that are traceable to NIST and through NIST to the International System of Units (SI).

The uncertainty of measurement associated with the measurement result reported in this certificate is available from the organization upon request and was accounted for in making the decision of compliance or noncompliance with the relevant specification identified above.

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# American Calibration & Testing Co., Inc.

34 Forest Park Ave. N. Billerica, MA 01862-1333

(978) 670-2361

Fax (978) 671-6423

pg. 1 of 1

## Calibration Report

Date of Verification: Monday February 16, 2015

### Location

**Concrete Systems, Inc.**

14 Commercial Avenue

Hudson, NH 03051

### Environmental Conditions @ Time of Service

Temperature: 68 ± 2 °F

Relative Humidity: 50% ± 15%

### Instrument Data

Report #: 150219-WH1

MFG: Cleco/Ricelake

Instr. s/n: 1597200034

Condition: Good

Model: Batchview 1500 IQ-710-2

Capacity: 4,000 lb

Loc./Dept: Batching

Type: Cement Hopper Scale

Verified Range: 300 - 2,400 lb

### As Found and Final Run Data

Verification Reading lb	Instrument Reading Run 1 lb	Instrument Reading Run 2 lb	Instrument Reading Average	Instrument Error lb	Repeatability lb	Resolution lb	Instrument Error %	V.D Code
0.00	0.00	0.00	0.00	0.00	0.00	2	0.00	1&2
300.00	300.00	300.00	300.00	0.00	0.00	"	0.00	"
600.00	600.00	600.00	600.00	0.00	0.00	"	0.00	"
900.00	900.00	900.00	900.00	0.00	0.00	"	0.00	"
1,200.00	1,200.00	1,200.00	1,200.00	0.00	0.00	"	0.00	"
1,500.00	1,500.00	1,500.00	1,500.00	0.00	0.00	"	0.00	"
1,800.00	1,800.00	1,800.00	1,800.00	0.00	0.00	"	0.00	"
2,100.00	2,104.00	2,102.00	2,103.00	3.00	2.00	"	0.14	"
2,400.00	2,406.00	2,404.00	2,405.00	5.00	2.00	"	0.21	"
0.00	0.00	0.00	0.00	0.00	0.00	"	0.00	"

Comment:

### Verification Apparatus

VD Code	Type	mfg	s/n	Class "A" Range Upper & Lower Limits	Cal. Date / Due Date	Calibrated By	Report No.
1	Cal. Ind.	BLH	5070087	Digital Indicator	10-15-2013 / 10-15-2015	Morehouse Instrument Co.	J1513
2	Load Cell	BLH	82655	12,000 lbf - 450.3 lbf	10-15-2013 / 10-15-2015	Morehouse Instrument Co	82655J1513

### Calibration Data

Previous Cal. Date: 12/3/2014

Cal. Frequency: 6 Months

Cal. Due Date: 8/19/2015

Method Used: NIST Traceable Load Cells

Calibration Technician:

G. W. Mooney

The above system (Instrument, Load Cell, Integral Software and Output Device(s), and accessories has been calibrated in accordance with handbook H 44 Standard Practices for Verification of Weighing Devices using apparatus and standards which are traceable to NIST (National Institute of Standards and Technology). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/ASQC Z540-1. Calibration Procedures used provide measurement uncertainty ratios of greater than or equal to 4:1 of the specification of the unit under test, with a coverage factor of k=2 at a confidence level of 95%, unless otherwise noted.

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SCWH04 REV. 0.1B

# American Calibration & Testing Co., Inc. pg. 1 of 1

34 Forest Park Ave. N. Billerica, MA 01862-1333

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## Calibration Report

Date of Verification: Monday February 16, 2015

### Location

**Concrete Systems, Inc.**

14 Commercial Avenue  
Hudson, NH 03051

### Environmental Conditions @ Time of Service

Temperature: 68 ± 2 °F      Relative Humidity: 50% ± 15%

### Instrument Data

Report #: 150219-WH2

MFG: Cleco/Rice Lake

Instr. s/n: 1597200037

Condition: Good

Model: Batchview 1500 IQ-710-2

Capacity: 20,000 lb

Loc./Dept: Batching

Type: Mixer scale

Verified Range: 1,000 - 12,000 lb

### As Found and Final Run Data

Verification Reading lb	Instrument Reading Run 1 lb	Instrument Reading Run 2 lb	Instrument Reading Average	Instrument Error lb	Repeatability lb	Resolution lb	Instrument Error %	V.D Code
0.00	0.00	0.00	0.00	0.00	0.00	10	0.00	1&2
1,000.00	1,000.00	1,000.00	1,000.00	0.00	0.00	"	0.00	"
2,000.00	2,000.00	2,000.00	2,000.00	0.00	0.00	"	0.00	"
4,000.00	4,000.00	4,000.00	4,000.00	0.00	0.00	"	0.00	"
6,000.00	5,995.00	5,995.00	5,995.00	- 5.00	0.00	"	- 0.08	"
8,000.00	7,990.00	7,990.00	7,990.00	- 10.00	0.00	"	- 0.13	"
10,000.00	9,980.00	9,980.00	9,980.00	- 20.00	0.00	"	- 0.20	"
12,000.00	11,970.00	11,970.00	11,970.00	- 30.00	0.00	"	- 0.25	"
0.00	0.00	0.00	0.00	0.00	0.00	"	0.00	"

Comment:

### Verification Apparatus

VD Code	Type	mfg	s/n	Class "A" Range Upper & Lower Limits	Cal. Date / Due Date	Calibrated By	Report No.
1	Cal. Ind.	BLH	5070087	Digital Indicator	10-15-2013 / 10-15-2015	Morehouse Instrument Co.	J1513
2	Load Cell	Revere	35568	30,000 lbf - 999.7 lbf	10-15-2013 / 10-15-2015	Morehouse Instrument Co	35568J1513

### Calibration Data

Previous Cal. Date: 12/3/2014

Cal. Frequency: 6 Months

Cal. Due Date: 8/19/2015

Method Used: NIST Traceable Load Cells

Calibration Technician:

*G.W. Mooney*  
G.W. Mooney

The above system (Instrument, Load Cell, Integral Software and Output Device(s)), and accessories has been calibrated in accordance with handbook H 44 Standard Practices for Verification of Weighing Devices using apparatus and standards which are traceable to NIST (National Institute of Standards and Technology). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/ASQC Z540-1. Calibration Procedures used provide measurement uncertainty ratios of greater than or equal to 4:1 of the specification of the unit under test, with a coverage factor of k=2 at a confidence level of 95%, unless otherwise noted.

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# American Calibration & Testing Co., Inc.

34 Forest Park Ave. N. Billerica, MA 01862-1333

(978) 670-2361

Fax (978) 671-6423

## Calibration Report

Date of Verification: Monday February 16, 2015

### Location

**Concrete Systems, Inc.**

14 Commercial Ave  
Hudson, NH 03051

### Environmental Conditions @ Time of Service

Temperature: 68 ± 2 °F

Relative Humidity: 50 ±15% RH

### Instrument Data

Report #: 150219-WM1

MFG: Badger Meter, Inc.

Instr. s/n: S-0106137

Condition: Good

Model: PFT-4E

Loc./Dept: Batch Plant

Type: Water Meter

### Instrument Readings At Time of Service/Calibration

#### As Found and As Left Data

Counter Reading Gal.	Verification Reading Run 1 Gal.	Verification Reading Run 2 Gal.	Verification Reading Average	Instrument Error Gal.	Repeatability Gal.	Resolution Gal.	Tolerance
25.00	25.25	25.25	25.25	0.25	0.00	0.25	± 1%
50.00	50.50	50.50	50.50	0.50	0.00	"	

Comment: Weight of Water = 8.3356 lbs/gal.

As found Instrument Status    Within mfg. Tolerance     Out of mfg. Tolerance     Needs Adjustment

Instrument final run Status    Within mfg. Tolerance     Out of mfg. Tolerance     Needs Adjustment

This is to certify that the above described unit was calibrated by us in the proper prescribed manner and the test range was found to be within the tolerance set by the original manufacturer's specifications.

This Certification was performed using standards maintained by the standards laboratory which are periodically certified traceable to the National Institute of Standards and Technology (N.I.S.T.)

Note: All mechanical parts were inspected and found to be in good condition.

### Calibration Data

Date of Calibration: 02/16/2015

Previous Cal. Date: 12/03/2014

Cal. Frequency: 6 Months

Cal. Due Date: 08/17/2015

Calibrated By:

*G. W. Mooney*  
G. W. Mooney

The above system (Instrument, Load Cell, Integral Software and Output Device(s), and accessories) has been calibrated in accordance with ASTM Standards and which are traceable to NIST (National Institute of Standards and Technology). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/ASQC Z540-1. The uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, which provides a confidence level of approximately 95%.

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4-1-15

**ASTM C618 / AASHTO M295 Testing of  
 Brayton Point Fly Ash**

<b>Sample Type:</b> 3200-ton	<b>Report Date:</b> 2/19/2015
<b>Sample Date:</b> 12/10 - 1/8/15	<b>MTRF ID:</b> 78BP
<b>Sample ID:</b>	

Chemical Analysis	ASTM / AASHTO Limits		ASTM Test Method
	Class F	Class C	
Silicon Dioxide (SiO <sub>2</sub> )	58.75 %		
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> )	27.64 %		
Iron Oxide (Fe <sub>2</sub> O <sub>3</sub> )	5.02 %		
Sum of Constituents	91.41 %	70.0% min 50.0% min	D4326
Sulfur Trioxide (SO <sub>3</sub> )	0.15 %	5.0% max 5.0% max	D4326
Calcium Oxide (CaO)	1.23 %		D4326
Magnesium Oxide (MgO)	1.04 %		
Sodium Oxide (Na <sub>2</sub> O)	0.60 %		
Potassium Oxide (K <sub>2</sub> O)	2.38 %		
Moisture	0.06 %	3.0% max 3.0% max	C311
Loss on Ignition	2.55 %	6.0% max 5.0% max 6.0% max 5.0% max	C311 AASHTO M295
Available Alkalies, as Na <sub>2</sub> O When required by purchaser	0.92 %	not required 1.5% max 1.5% max	C311 AASHTO M295
<b>Physical Analysis</b>			
Fineness, % retained on #325	13.96 %	34% max 34% max	C311, C430
Strength Activity Index - 7 or 28 day requirement			C311, C109
7 day, % of control	88 %	75% min 75% min	
28 day, % of control	94 %	75% min 75% min	
Water Requirement, % control	96 %	105% max 105% max	
Autoclave Soundness	-0.02 %	0.8% max 0.8% max	C311, C151
Density	2.35		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



**Materials Testing & Research Facility**  
 2650 Old State Highway 113  
 Taylorsville, Georgia 30178  
 P: 770.684.0102  
 F: 770.684.5114  
 www.headwaters.com

# MasterLife® CI 30

## Corrosion-Inhibiting Admixture

Formerly Rheocrete CNI\*

### Description

MasterLife CI 30 calcium nitrite based corrosion-inhibiting admixture is used for reinforced concrete. MasterLife CI 30 admixture contains a minimum of 30% active ingredients by mass and meets ASTM C 494/C 494M requirements for Type C, accelerating admixtures.

### Applications

Recommended for use in:

- All types of steel reinforced concrete, including precast/prestressed and post-tensioned concrete applications
- Parking garages, bridge decks, marine structures, slabs, floors and other reinforced concrete applications requiring corrosion protection against chlorides from de-icing salts or marine exposure
- Strength-on-demand concrete, such as 4x4 concrete

### Features

- Effective corrosion protection against chlorides in concrete

### Benefits

- Extended service life of reinforced concrete structures
- Set acceleration, which may be desirable in cold weather applications

### Performance Characteristics

In the alkaline environment of concrete, a natural passive ferric oxide layer forms on the surface of embedded reinforcing steel and protects the steel from corrosion. This passive oxide layer may break down in the presence of chlorides and moisture resulting in corrosion of the steel.

MasterLife CI 30 admixture delays corrosion by re-passivating defects on the steel surface. These defects are ferrous oxide ions that are susceptible to chloride attack. When chloride ions attack the ferrous ions, they combine to create a ferrous chloride complex (rust) and initiate pitting corrosion on the reinforcing steel. If untreated, chloride ions continue to attack newly exposed ferrous ions and form additional expansive corrosion products leading to staining, cracking and spalling of the concrete.

Nitrite ions contained in MasterLife CI 30 admixture are effective in preventing ferrous chloride complex formation by reacting with defective ferrous oxide ions prior to chloride attack and stabilizing the passive layer. Nitrite ions surround the defective ferrous oxide ion and convert it to a more stable ferric ion species less susceptible to corrosion. This oxidation reaction serves to re-passivate the reinforcing steel and re-establish the barrier between the steel and chlorides that initiate corrosion.

**Concrete Setting Time:** Concrete setting times may be accelerated with the use of MasterLife CI 30 admixture. In most applications a retarding or hydration control admixture must be added to the concrete mixture to offset the acceleration effects of MasterLife CI 30 admixture. Please contact your local sales representative for additional information on the proper choice of retarding admixture for concrete to be treated with MasterLife CI 30 admixture.

## Guidelines for Use

**Dosage:** MasterLife CI 30 admixture is recommended for use within a dosage range of 1.0-6.0 gal/yd<sup>3</sup> (5.0-30.0 L/m<sup>3</sup>) of concrete, depending upon the severity of the corrosion environment and the anticipated chloride loading of the structure.

The dosage of MasterLife CI 30 admixture for a given application may be selected from the table below or computed by using the following expression:

$$\text{Dosage (gal/yd}^3\text{)} = 0.441 \times \frac{\text{Anticipated Chloride Loading (lb/yd}^3\text{)}}{\text{Chloride-to-Nitrite Ratio}}$$

$$\text{Dosage (L/m}^3\text{)} = 3.69 \times \frac{\text{Anticipated Chloride Loading (kg/m}^3\text{)}}{\text{Chloride-to-Nitrite Ratio}}$$

MasterLife CI 30 admixture may be used to offset the potentially corrosive effects of chloride-bearing concrete ingredients and in applications where the initial chloride ion content of the concrete may exceed code requirements or other specified chloride limits.

Chloride protection limits for MasterLife CI 30 admixture are as given in the dosage table.

The limits for applications involving the use of chloride-bearing materials are based on a critical chloride-to-nitrite ratio of 0.90 in accordance with the recommendations of the Federal Highway Administration (FHWA). These limits may also be used in very severe corrosion environments for enhanced protection, if desired. The chloride protection limits given for all other applications, such as parking structures and bridges, are based on critical chloride-to-nitrite ratios that range from 1.20 to 1.50. Please contact your local sales representative for additional information regarding the dosage of MasterLife CI 30 admixture for your application.

### Chloride Protection Limit, lb/yd<sup>3</sup> (kg/m<sup>3</sup>)

MasterLife CI 30 Dosage gal/yd <sup>3</sup> (L/m <sup>3</sup> )	With Chloride- Bearing Materials	All Other Applications
1.0 (5.0)	2.1 (1.2)	—
2.0 (10.0)	4.1 (2.4)	6.0 (3.6)
3.0 (15.0)	6.1 (3.6)	9.9 (5.9)
4.0 (20.0)	8.1 (4.8)	13.0 (7.7)
5.0 (25.0)	10.1 (6.0)	15.0 (8.9)
6.0 (30.0)	12.1 (7.2)	16.0 (9.5)

BASF recommends that steel reinforced concrete structures that will be exposed to chlorides in service should be designed in accordance with ACI 318 (318M), ACI 357R, CSA, AASHTO or other applicable codes and standards.

## Product Notes

**Corrosivity – Non-Chloride, Non-Corrosive:** MasterLife CI 30 admixture is a corrosion-inhibiting admixture and will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of this admixture.

**Compatibility:** MasterLife CI 30 admixture may be used in combination with any BASF admixture. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

## Storage and Handling

**Storage Temperature:** MasterLife CI 30 admixture can be stored at temperatures between 10 and 100 °F (-12 and 38 °C). If MasterLife CI 30 admixture freezes, it can be fully reconstituted by thawing and mechanical agitation. Do not use pressurized air for agitation.

**Shelf Life:** MasterLife CI 30 admixture has a minimum shelf life of 6 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterLife CI 30 admixture has been exceeded.

## Packaging

MasterLife CI 30 admixture is available in 55 gal (208 L) drums, 275 gal (1040 L) totes, and by bulk delivery.

## Chemical Composition

MasterLife CI 30 admixture contains a minimum of 30% calcium nitrite by mass as an active ingredient. MasterLife CI 30 admixture is identical in composition and mechanism to other commercially available 30% calcium nitrite corrosion-inhibiting admixtures; and at equal dosages, provides similar performance and corrosion protection.

The water content of MasterLife CI 30 admixture is approximately 7.3 lb/gal (0.88 kg/L). This water contributes to the consistency of the concrete mixture and the hydration of the cementitious materials. The water contributed by MasterLife CI 30 admixture should be used in the calculation of the water-to-cementitious materials ratio of the concrete.

## Related Documents

Safety Data Sheets: MasterLife CI 30 admixture

## Additional Information

For additional information on MasterLife CI 30 admixture or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

*The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.*

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\* Rheocrete CNI became MasterLife CI 30 under the Master Builders Solutions brand, effective January 1, 2014.



The Chemical Company

3

03 30 00

Cast-in-Place Concrete

03 40 00

Precast Concrete

# MasterGlenium® 7710

## High-Range Water-Reducing Admixture

Formerly GLENIUM 7710\*

### Description

MasterGlenium 7710 ready-to-use high-range water-reducing admixture is particularly effective in improving the day to day control of concrete production. This is accomplished by providing fast setting and high early compressive strength development. MasterGlenium 7710 admixture meets ASTM C 494 compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

### Applications

Recommended for use in:

- Concrete requiring high-early compressive strength development
- Applications requiring rapid setting of concrete
- Concrete where high flowability, increased stability and durability are needed
- Producing self-consolidating concrete (SCC)
- Concrete with varying water reduction requirements (10-40%)

### Features

MasterGlenium 7710 admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional raw materials to provide specific and exceptional value to all phases of the concrete construction process.

- Superior early strengths
- Superior ultimate strengths
- Rapid setting
- Consistent air entrainment
- Dosage flexibility

### Benefits

- Consistent placement operations
- Optimized mixture costs
- Reduction in patching costs
- Increased productivity
- Improved operational efficiencies
- Less QC support
- Fewer rejected loads
- Faster form turnover

**MASTER®**  
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SOLUTIONS

## Guidelines for Use

**Dosage:** MasterGlenium 7710 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most applications, dosages in the range of 3-10 fl oz/cwt (195-650 mL/100 kg) will provide excellent performance. For very high performance and self-consolidating concrete mixtures, up to 15 fl oz/cwt (975 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, job site conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

**Mixing:** MasterGlenium 7710 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

## Product Notes

**Corrosivity – Non-Chloride, Non-Corrosive:** MasterGlenium 7710 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7710 admixture.

**Compatibility:** MasterGlenium 7710 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, accelerators, retarders, extended set control admixtures, air-entrainers, corrosion inhibitors, and shrinkage reducers.

**Do not use MasterGlenium 7710 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.**

## Storage and Handling

**Storage Temperature:** MasterGlenium 7710 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7710 admixtures freezes, thaw and reconstitute by mechanical agitation. **Do not use pressurized air for agitation.**

**Shelf Life:** MasterGlenium 7710 admixture has a minimum shelf life of 6 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7710 admixture has been exceeded.

## Packaging

MasterGlenium 7710 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

## Related Documents

Safety Data Sheets: MasterGlenium 7710 admixture

## Additional Information

For additional information on MasterGlenium 7710 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

*The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.*

### Limited Warranty Notice

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\* GLENIUM 7710 became MasterGlenium 7710 under the Master Builders Solutions brand, effective January 1, 2014.

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**BASF Corporation**  
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The Chemical Company

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

# MasterAir® AE 90

## Air-Entraining Admixture

Formerly MB-AE 90\*

### Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

### Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

### Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

### Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

### Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

**Air Content Determination:** The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method" or ASTM C 173/C 173M, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method." The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, "Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete." If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

## Guidelines for Use

**Dosage:** There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

**Dispensing and Mixing:** Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

## Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

## Product Notes

**Corrosivity – Non-Chloride, Non-Corrosive:** MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

**Compatibility:** MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

## Storage and Handling

**Storage Temperature:** MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

**Shelf Life:** MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

**Safety:** Chemical goggles and gloves are recommended when transferring or handling this material.

## Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

## Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

## Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

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\* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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Client: **Concrete Systems, Inc.**  
Project: **Annual Testing**

CTL Project No: **395913**  
CTL Project Mgr.: **J. L. Jones**  
Analyst: **B. Szczerowski**  
Approved: **J. Pycz**  
Date Analyzed: **March 3, 2014**  
Date Reported: **March 5, 2014**

Contact: **Mr. Julio Cora**  
Submitter: **Ms. Shelly Kenney**  
Date Received: **February 27, 2014**

## REPORT of ANALYSIS

### ASTM C128, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate

Client Sample Identification:	Sand
CTLGroup Sample Identification:	3621302
Sample Source:	Decato-Loudon, NH
Relative Density (Specific Gravity at OD <sup>1</sup> )	2.58
Relative Density (Specific Gravity at SSD <sup>2</sup> )	2.60
Apparent Relative Density (Apparent Specific Gravity)	2.65
Density at OD, lb/ft <sup>3</sup>	160.5
Density at SSD, lb/ft <sup>3</sup>	162.0
Apparent Density at SSD, lb/ft <sup>3</sup>	165.0
Absorption, %	1.1

---

#### Notes:

1. OD = Oven Dry
2. SSD = Saturated Surface Dry
3. Densities are calculated by gravimetric procedure.
4. This report may not be reproduced except in its entirety.



Client: **Concrete Systems, Inc.**  
Project: **Annual Testing**

Contact: **Mr. Julio Cora**  
Submitter: **Ms. Shelly Kenney**  
Date Received: **February 27, 2014**

CTL Project No: **395913**  
CTL Project Mgr.: **J. L. Jones**  
Analyst: **B. Szczerowski**  
Approved: **J. Pycz**  
Date Analyzed: **March 3, 2014**  
Date Reported: **March 5, 2014**

## REPORT of ANALYSIS

### ASTM C127, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate

Client Sample Identification: 1/2" Stone  
CTLGroup Sample Identification: 3621301  
Sample Source: Brox-Dracut

Relative Density (Specific Gravity at OD<sup>1</sup>) 2.90  
Relative Density (Specific Gravity at SSD<sup>2</sup>) 2.91  
Apparent Relative Density  
(Apparent Specific Gravity) 2.94

Density at OD, lb/ft<sup>3</sup> 180.5  
Density at SSD, lb/ft<sup>3</sup> 181.5  
Apparent Density at SSD, lb/ft<sup>3</sup> 183.5

Absorption, % 0.5

---

#### Notes:

1. OD = Oven Dry
2. SSD = Saturated Surface Dry
3. This report may not be reproduced except in its entirety.

**Inisfree Investments LLC**  
**d/b/a DeCato Sand & Gravel**  
**SIEVE ANALYSIS WORK SHEET**

Date 3/25/2015

Project \_\_\_\_\_  
 Customer CSI  
 Material sample from delivery source  
 Pit Area \_\_\_\_\_

Use Concrete sand

GRADATION (Sample #1)				
Total Weight				
0				
Tare				
58.1				
Sample Wght				
-58.1				
Sieve Size	Accum. Weight Retained	Percent Retained	Percent Passing	Required Spec.
		0.00	0.00	
		0.00	0.00	
		0.00	0.00	
		0.00	0.00	
		0.00	0.00	
		0.00	0.00	
		0.00	0.00	
		0.00	0.00	
		0.00	0.00	
Fractured Faces				
SAND OR MINUS #4 FRACTION				
Sample Weight	Accum. Weight Retained	Cumulative Percent Retained	Percent Passing	Required Spec.
590.4				
Sieve Size	Retained	Retained	Passing	Spec.
3/8	0	0	100	100
#4	28.7	4.86	95.14	95-100
#8	89.3	15.13	84.87	
#16	177.5	30.06	69.94	45-80
#30	321.6	54.47	45.53	
#50	465.2	78.79	21.21	10 - 30
#100	516.7	87.52	12.48	2 - 10
F.M.		2.71		
#200	578.5	97.98	2.02	0-3

Remarks \_\_\_\_\_

Meets Requirements for Customer Specifications

Tested by Bruce Marshall, P.E.



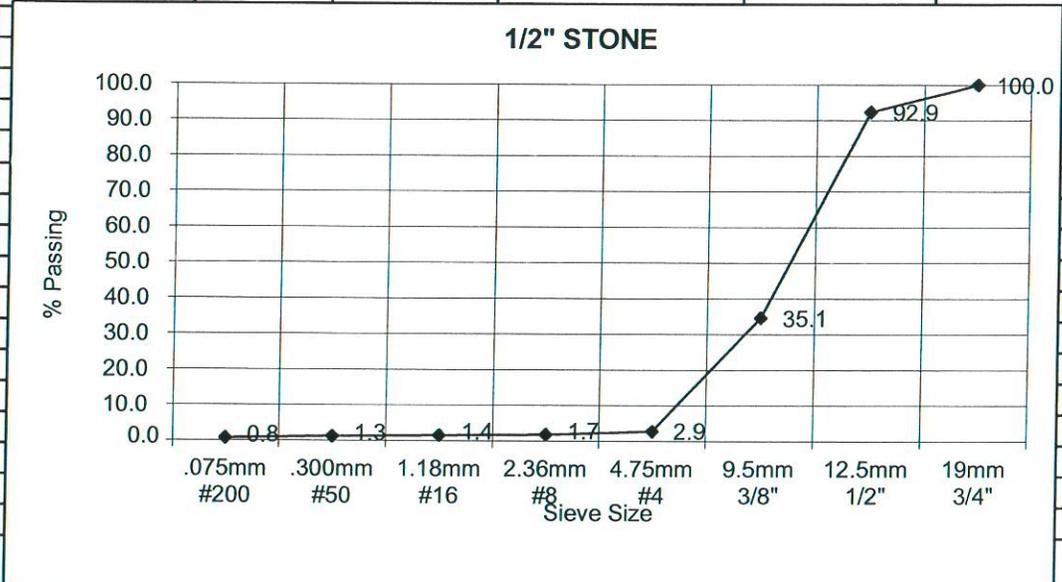
**BROX INDUSTRIES, INC.**

1471 Methuen Street - Dracut, MA 01826-5439

(978) 805-9788

Fax: (978) 805-9790

2015 GRADATION ANALYSIS					
<b>AS OF:</b>	3/3/15		<b>DESCRIPTION:</b>	1/2" STONE	
<b>LOCATION:</b>	Stockpile		<b>SPECIFICATION:</b>	ME- Class AA	
<b>JOB:</b>			<b>SOURCE:</b>	DRACUT, MA	
<b>SIEVE SIZE</b>		<b>PERCENT PASSING</b>		<b>SPECIFICATION</b>	
25mm 1"		100		100	
19mm 3/4"		100.0		90-100	
12.5mm 1/2"		92.9			
9.5mm 3/8"		35.1		20-55	
4.75mm #4		2.9		0-10	
2.36mm #8		1.7		0-5	
1.18mm #16		1.4			
.300mm #50		1.3			
.075mm #200		0.8		0-1.5	





Client: Concrete Systems, Inc.  
Project: Annual Testing

CTL Project No: 395913  
CTL Project Mgr.: J. L. Jones  
Analyst: B. Szczerowski  
Approved: J. Pycz  
Date Analyzed: March 3, 2014  
Date Reported: March 5, 2014

Contact: Mr. Julio Cora  
Submitter: Ms. Shelly Kenney  
Date Received: February 27, 2014

### REPORT of ANALYSIS

#### ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregate

Client Sample Identification: Sand  
CTLGroup Sample Identification: 3621302  
Sample Source: Decato-Loudon, NH  
Aggregate Type: Fine Aggregate  
Weight of Oven Dry Sample, g: 380.5

Sieve Size	Wt. Retained on Individual Sieve, g	% Retained on Individual Sieve	Cumulative % Retained Sieve	Cumulative % Passing Sieve
¾"	0.0	0	0.0	100
#4	5.5	1	1	99
#8	33.1	9	10	90
#16	60.5	16	26	74
#30	110.6	29	55	45
#50	101.4	27	82	18
#100	55.9	15	96	4
#200	11.0	3	99	0.7
Pan	2.8	1	100	0

Fineness Modulus = 2.71

Notes:

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Client: Concrete Systems, Inc.  
Project: Annual Testing

CTL Project No: 395913  
CTL Project Mgr.: J. L. Jones  
Analyst: B. Szczersowski

Contact: Mr. Julio Cora  
Submitter: Ms. Shelly Kenney  
Date Received: February 27, 2014

Approved: J. Pycz  
Date Analyzed: March 3, 2014  
Date Reported: March 5, 2014

### REPORT of ANALYSIS

#### ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregate

Client Sample Identification: 1/2" Stone  
CTLGroup Sample Identification: 3621301  
Sample Source: Brox-Dracut  
Aggregate Type: Coarse Aggregate  
Weight of Oven Dry Sample, g 3432.3

Sieve Size	Wt. Retained on Individual Sieve, g	% Retained on Individual Sieve	Cumulative % Retained Sieve	Cumulative % Passing Sieve
3/4"	0.0	0	0	100
1/2"	414.4	12	12	88
3/8"	2221.2	65	76.8	23
#4	773.2	23	99	1
#8	1.4	0.04	99.4	0.6
Pan	21.7	1	100	0

Notes:

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Client: **Concrete Systems, Inc.**  
 Project: **Annual Testing**

CTL Project No: **395913**  
 CTL Project Mgr.: **J. L. Jones**  
 Analyst: **B. Szczerowski**  
 Approved: **J. Pycz**  
 Date Analyzed: **03/11/14 to 3/17/14**  
 Date Reported: **March 18, 2014**

Contact: **Mr. Julio Cora**  
 Submitter: **Ms. Shelly Kenney**  
 Date Received: **February 27, 2014**

**REPORT of ANALYSIS**

**ASTM C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate**

Client Sample Identification: Sand  
 CTLGroup Sample Identification: 3621302  
 Sample Source: Decato-Loudon, NH  
 Aggregate Type: Fine Aggregate  
 Test Solution: Sodium Sulfate, Previously used solution

	Sieve sizes		Weights Before Test, g	% Passing After Test	Weighted % Loss After Test
	Passing	Retained			
#100		pan	...	...	...
#50		#100	...	...	...
#30		#50	100.0	5.4	1.4
#16		#30	100.0	3.3	1.0
#8		#16	100.0	1.5	0.2
#4		#8	100.0	1.1	0.1
3/8"		#4	...	...	...
<b>Totals</b>			...	...	<b>3</b>

Notes:

1. This report may not be reproduced except in its entirety.



Client: **Concrete Systems, Inc.**  
 Project: **Annual Testing**

Contact: **Mr. Julio Cora**  
 Submitter: **Ms. Shelly Kenney**  
 Date Received: **February 27, 2014**

CTL Project No: **395913**  
 CTL Project Mgr.: **J. L. Jones**  
 Analyst: **B. Szczerowski**  
 Approved: **J. Pycz**  
 Date Analyzed: **03/11/14 to 3/17/14**  
 Date Reported: **March 18, 2014**

**REPORT of ANALYSIS**

**ASTM C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate**

Client Sample Identification: 1/2" Stone  
 CTLGroup Sample Identification: 3621301  
 Sample Source: Brox-Dracut  
 Aggregate Type: Coarse Aggregate  
 Test Solution: Sodium Sulfate, Previously used solution

Sieve sizes		Weights Before Test, g	% Passing After Test	Weighted
Passing	Retained			% Loss After Test
2½"	2"	...	...	...
2"	1½"	...	...	...
1½"	1"	...	...	...
1"	¾"	...	...	...
¾"	½"	666.3	0.3	0.0
½"	⅜"	330.2	0.3	0.2
⅜"	#4	300.6	0.3	0.1
#4	pan	...	...	...
<b>Totals</b>		...	...	<b>0</b>

**Qualitative Examination of Coarse Sizes**

	No. of Particles		Percent Particles	
	2½ to 1½ in.	1½ to ¾"	2½ to 1½ in.	1½ to ¾"
Splitting	0	0	0	0
Crumbling	0	0	0	0
Cracking	0	0	0	0
Flaking	0	0	0	0
Totals Before Test	0	0		

**Notes:**

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Client: **Concrete Systems, Inc.**  
Project: **Annual Testing**

Contact: **Mr. Julio Cora**  
Submitter: **Ms. Shelly Kenney**  
Date Received: **February 27, 2014**

CTL Project No: **395913**  
CTL Project Mgr.: **J. L. Jones**  
Analyst: **B. Szczerowski**  
Approved: **J. Pycz**  
Date Analyzed: **March 3, 2014**  
Date Reported: **March 5, 2014**

### REPORT of ANALYSIS

#### ASTM C131, Standard Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

Client Sample Identification:	1/2" Stone
CTLGroup Sample Identification:	3621301
Sample Source:	Brox-Dracut
Aggregate Type:	Crushed Rock
Nominal Maximum Size:	1/2
Grading	B
<b>Loss by abrasion and impact, %</b>	<b>10</b>

#### Notes:

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Client: **Concrete Systems, Inc.**  
Project: **Annual Testing**  
  
Contact: **Mr. Julio Cora**  
Submitter: **Ms. Shelly Kenney**  
Date Received: **February 27, 2014**

CTL Project No: **395913**  
CTL Project Mgr.: **J. L. Jones**  
Analyst: **B. Szczerowski**  
Approved: **J. Pycz**  
Date Analyzed: **March 3, 2014**  
Date Reported: **March 5, 2014**

**REPORT of ANALYSIS**

**ASTM C142, Standard Test Method for Clay Lumps and Friable Particles in Aggregates**

Client Sample Identification: Sand  
CTLGroup Sample Identification: 3621302  
Sample Source: Decato-Loudon, NH  
Aggregate Type: Fine Aggregate  
  
**% Clay Lumps and Friable Particles 0.00**

**Notes:**

1. This report may not be reproduced except in its entirety.



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Client:	<b>Concrete Systems, Inc.</b>	CTL Project No:	<b>395913</b>
Project:	<b>Annual Testing</b>	CTL Project Mgr.:	<b>J. L. Jones</b>
Contact:	<b>Mr. Julio Cora</b>	Analyst:	<b>B. Szczerowski</b>
Submitter:	<b>Ms. Shelly Kenney</b>	Approved:	<b>J. Pycz</b>
Date Received:	<b>February 27, 2014</b>	Date Analyzed:	<b>March 3, 2014</b>
		Date Reported:	<b>March 5, 2014</b>

---

**REPORT of ANALYSIS**

**ASTM C40, Organic Impurities in Fine Aggregates for Concrete**

Client Sample Identification	Sand
CTLGroup Sample Identification	3621302
Sample Source	Decato-Loudon, NH
Sample Reduction Method	Splitter
Procedure	Glass Color Standard
Results (Organic Plate No.)	2

**Interpretation:**

Per ASTM C40, the fine aggregate under test is not considered to possibly contain injurious organic impurities.

---

**Notes:**

1. Results refer specifically to the sample submitted.
2. This report may not be reproduced except in its entirety.



Client: **Concrete Systems, Inc.**  
Project: **Annual Testing**

Contact: **Mr. Julio Cora**  
Submitter: **Ms. Shelly Kenney**  
Date Received: **February 27, 2014**

CTL Project No: **395913**  
CTL Project Mgr.: **J. L. Jones**  
Analyst: **B. Szczerowski**  
Approved: **J. Pycz**  
Date Analyzed: **March 3, 2014**  
Date Reported: **March 5, 2014**

---

### REPORT of ANALYSIS

#### ASTM C142, Standard Test Method for Clay Lumps and Friable Particles in Aggregates

Client Sample Identification: 1/2" Stone  
CTLGroup Sample Identification: 3621301  
Sample Source: Brox-Dracut  
Aggregate Type: Coarse Aggregate

**% Clay Lumps and Friable Particles 0.03**

---

#### Notes:

1. This report may not be reproduced except in its entirety.



Client: Concrete Systems Inc.  
Project: 2014 Annual Testing

CTLGroup Project No.: 395913  
CTLGroup Work Request No.: 36213  
CTLGroup Proj. Mgr.: J. L. Jones  
Aggregate Processing By: B. Szczerwoski  
Test Specimens Cast By: P. Soni  
Test Specimens Measured By: W. Demharter  
Approved: X. Feng  
Report Date: March 21, 2014

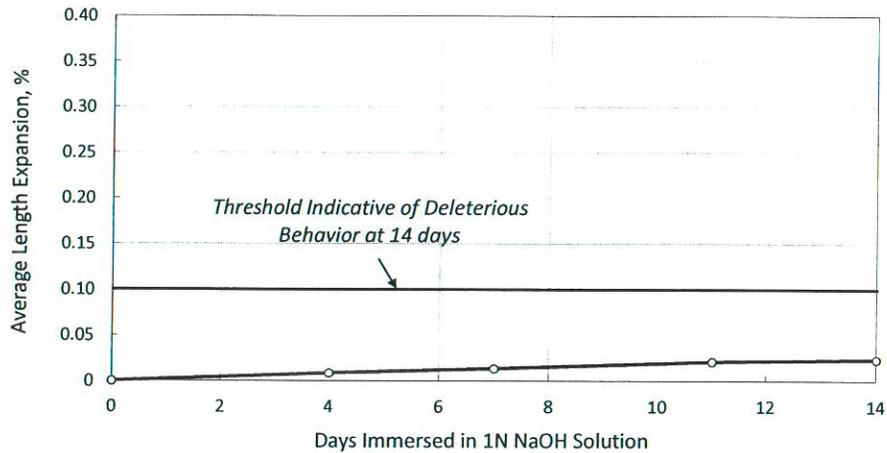
Contact: Mr. Julio Cora  
Submitter: Mr. Julio Cora  
Date Received: February 27, 2014

## AASHTO T303 (Modified) Standard Method of Test for Accelerated Detection of Potentially Deleterious Expansion of Mortar Bars Due to Alkali-Silica Reaction

Material: Coarse Aggregate  
Client ID: 1/2" Stone  
CTLGroup ID: 3621301  
Source: Brox; Loudon, NH  
Proportion: 100%

Cement  
Dragon Type III  
3621303  
Dragon Products  
70%

Fly Ash  
Type F Fly Ash  
3621304  
Headwaters; Somerset, MA  
30%



Date	Age, days	Test Condition	Specimen Expansion, %			Average
			A	B	C	
03/07/14	0	1N NaOH	0.000	0.000	0.000	0.00
03/11/14	4	1N NaOH	0.008	0.009	0.009	0.01
03/14/14	7	1N NaOH	0.012	0.015	0.014	0.01
03/18/14	11	1N NaOH	0.020	0.022	0.022	0.02
03/21/14	14	1N NaOH	0.022	0.026	0.023	0.02

Notes:

1. Test specimens are 1x1x11.25-in. mortar bars.
2. A water-cement ratio of 0.50 by mass was used to fabricate test specimens.
3. Submitted job cement was used to fabricate test specimens.
4. This report may not be reproduced except in its entirety.



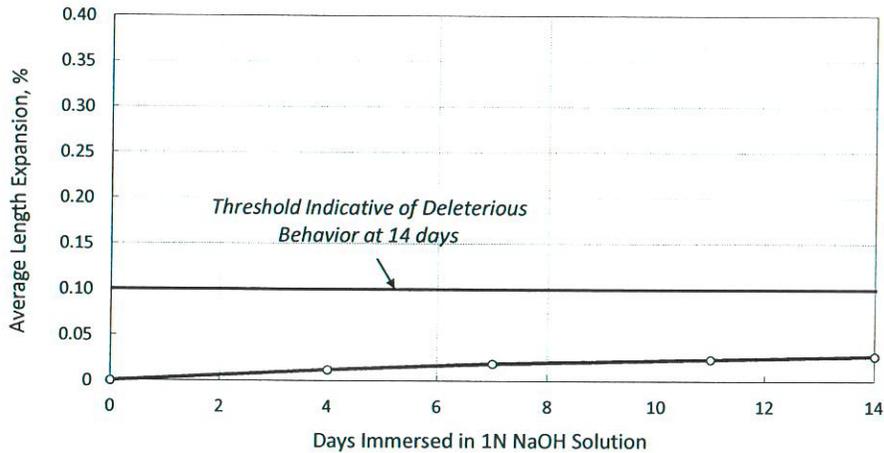
Client: Concrete Systems Inc.  
Project: 2014 Annual Testing

CTLGroup Project No.: 395913  
CTLGroup Work Request No.: 36213  
CTLGroup Proj. Mgr.: J. L. Jones  
Aggregate Processing By: B. Szczerowski  
Test Specimens Cast By: P. Soni  
Test Specimens Measured By: W. Demharter  
Approved: X. Feng  
Report Date: March 21, 2014

Contact: Mr. Julio Cora  
Submitter: Mr. Julio Cora  
Date Received: February 27, 2014

### AASHTO T303 (Modified) Standard Method of Test for Accelerated Detection of Potentially Deleterious Expansion of Mortar Bars Due to Alkali-Silica Reaction

Material: Fine Aggregate	Cement	Fly Ash
Client ID: DeCato Sand	Dragon Type III	Type F Fly Ash
CTLGroup ID: 3621302	3621303	3621304
Source: Loudon, NH	Dragon Products	Headwaters; Somerset, MA
Proportion: 100%	70%	30%



Date	Age, days	Test Condition	Specimen Expansion, %			Average
			A	B	C	
03/07/14	0	1N NaOH	0.000	0.000	0.000	0.00
03/11/14	4	1N NaOH	0.012	0.012	0.012	0.01
03/14/14	7	1N NaOH	0.017	0.019	0.021	0.02
03/18/14	11	1N NaOH	0.024	0.023	0.025	0.02
03/21/14	14	1N NaOH	0.027	0.028	0.028	0.03

Notes:

1. Test specimens are 1x1x11.25-in. mortar bars.
2. A water-cement ratio of 0.50 by mass was used to fabricate test specimens.
3. Submitted job cement was used to fabricate test specimens.
4. This report may not be reproduced except in its entirety.



ISA  
 GROSSMAN RD N  
 AYREVILLE, NJ 08872-1472  
 ISA

CUSTOMER SHIP TO  
 HARMAC REBAR & STEEL CORP  
 301 JERNEE MILL RD  
 SA YREVILLE, NJ 08872-1769  
 USA

CUSTOMER BILL TO  
 HARMAC REBAR & STEEL CORP  
 433 S MAIN ST STE 202  
 WEST HARTFORD, CT 06110-2812  
 USA

GRADE  
 60 (420)

SHAPE / SIZE  
 REBAR ROUND / #5 (16MM)

LENGTH  
 40'00"

WEIGHT  
 50,060 LB

HEAT / BATCH  
 61100175/02

SALES ORDER  
 2002502/000010

SPECIFICATION / DATE or REVISION  
 ASTM A615/A615M-14

CUSTOMER PURCHASE ORDER NUMBER  
 365142

BILL OF LADING  
 2822-0000003107

DATE  
 03/16/2015

CHEMICAL COMPOSITION

C	Mn	P	S	SI	Cu	Ni	Cr	Mo	Sn	V	CEqVA706
%	%	%	%	%	%	%	%	%	%	%	%
0.48	0.74	0.019	0.044	0.21	0.24	0.14	0.09	0.037	0.014	0.016	0.62

MECHANICAL PROPERTIES

YS	MPa	UTS	UTS	G/L	G/L
PSI	MPa	PSI	MPa	Inch	mm
67710	467	102710	708	8.000	2000.0
66807	461	101968	703	8.000	2000.0

MECHANICAL PROPERTIES

Elong.	BendTest
%	
14.00	OK
13.50	OK

GEOMETRIC CHARACTERISTICS

%Light	Def Light	Def Gap	Def Space
%	Inch	Inch	Inch
4.40	0.034	0.098	0.408
4.60	0.034	0.099	0.408

COMMENTS / NOTES

The above figures are certified chemical and physical test records as contained in the permanent records of company. We certify that these data are correct and in compliance with specified requirements. This material, including the billets, was melted and manufactured in the USA. CMTR complies with EN 10204 3.1.

*Maskary*  
 BHASKAR YALAMANCHILI  
 QUALITY DIRECTOR

SPC - Daily Report - 03/12/2015

Work Center	Start Date	Shift	Quality Control Inspector	Manufacturer	Batch Number
54000002	03/11/2015 05:00:00 pm	Empty Shift	K. MINAYA	EPOXY POWDER VALSPAR 720A009 1800LB	5196018183
54000002	03/12/2015 06:30:00 am	Shift A	K. MINAYA	EPOXY POWDER VALSPAR 720A009 1800LB	5296018749
54000002	03/12/2015 05:00:00 pm	Empty Shift	K. MINAYA		

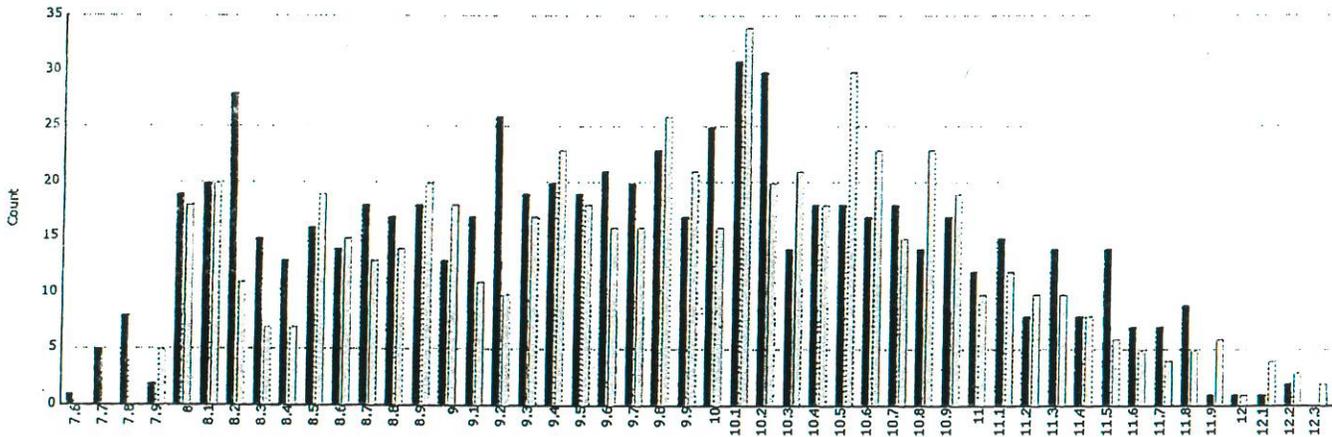
Produced Batches	Mill Batches	Batch Number	Inspection Lot	Visual Inspection				
6110160906	6110182103	6109885303	6110017502	6110017602	6110111602	6110160906	040001807514	OK
		6110160903	6110168202	6110168302	6110168402	6110182103	040001807520	OK
		6110168502	6110182102	6110184202	6110184303			

Actual Calibration (high)	Actual Calibration (low)	Bend Test	Cure Time	Gel Time	Hand Held Holidays	Inline Holidays	Temperature
9.93	9.93	PASS	48	11	0.13	0.25	415
9.93	9.93	PASS	50	11	0.2	0.35	428

This letter is to certify that the epoxy-coated material listed above has been coated per the powder manufacturer's recommendations and conforms to ASTM D3963, ASTM A775, AASHTO M-284, and the Gerdau Amersteel coating division's quality assurance program. The supporting data for coating thickness, continuity, flexibility and material composition are attached.

Measurement Distribution

Note: The measurement distribution and statistics are for the entire production on 03/12/2015



Readings	Standard Deviation						
	Count	Average	Min	Max	SD	-2 SD	+2 SD
19MM	690.00	9.71	7.60	12.20	1.07	7.56	11.85
16MM	630.00	9.84	7.90	12.30	1.04	7.77	11.91
	1320	9.77	7.6	12.3	1.06	7.65	11.89

# Valspar Corporation

## CERTIFICATION of COMPLIANCE

Date: 2/4/15

Specification: ASTM A775, AASHTO M284, AASHTO M254

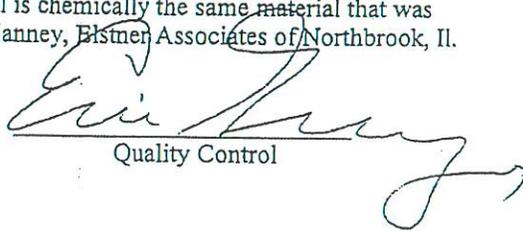
Valspar Product Code: 720A009

Batch Number: 5196018183

Production Date: 1/27/15

Batch Size: 37,994 lbs

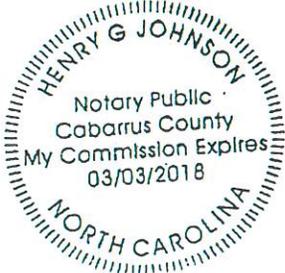
I hereby certify that the above lot of material was manufactured to formulation, meeting all the requirements of the above specifications and that this material is chemically the same material that was tested by Valley Forge Laboratories of Devon, PA. or Wiss, Janney, Elstner Associates of Northbrook, IL.

  
Quality Control

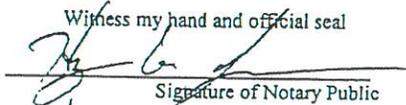
10300 Claude Freeman Drive  
Charlotte, NC 28262  
Phone: (704) 548-2828  
Fax: (704) 547-0634

State/Commonwealth NC County of Cabarrus  
On this the 6 of February, 2015, before me Henry G. Johnson  
Day Month Year Name of Notary Public

The undersigned Notary Public, personally appeared Eric Gregory  personally known to me  
Name(s) of Signer(s)



To be the person(s) whose name(s) is/are subscribed to the within instrument, and acknowledged to me that he/she/they executed the same for the purposes therein stated.

Witness my hand and official seal  
  
Signature of Notary Public

Henry G. Johnson  
Other Required Information (Printed Name of Notary, Residence, etc.)

The articles identified above were produced in the United States and qualify as "U.S.-made end products", "domestic construction materials" and "domestic manufactured goods"

The data on this sheet represent measured values. Since application variables are a major factor in product performance, this information should serve only as a general guide. Valspar assumes no obligation or liability for use of this information. UNLESS VALSPAR AGREES OTHERWISE IN WRITING, VALSPAR MAKES NO WARRANTIES, EXPRESS OR IMPLIED, AND DISCLAIMS ALL IMPLIED WARRANTIES INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR FREEDOM FROM PATENT INFRINGEMENT. VALSPAR WILL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES. Your only remedy for any defect in this product is the replacement of the defective product, or a refund of its purchase price, at our option.



MADE IN UNITED STATES

USA  
 1 CROSSMAN RD N  
 SAYREVILLE, NJ 08872-1472  
 USA

CUSTOMER SHIP TO  
 HARMAC REBAR & STEEL CORP  
 301 JERNEE MILL RD  
 SAYREVILLE, NJ 08872-1769  
 USA

CUSTOMER BILL TO  
 HARMAC REBAR & STEEL CORP  
 433 S MAIN ST STE 202  
 WEST HARTFORD, CT 06110-2812  
 USA

SALES ORDER  
 1895915/000010

GRADE  
 60 (420)

SHAPE / SIZE  
 REBAR ROUND / #6 (19MM)

LENGTH  
 40'00"

WEIGHT  
 50,290 LB

HEAT / BATCH  
 61101843/03

CUSTOMER PURCHASE ORDER NUMBER  
 863775

BILL OF LADING  
 2822-0000003033

DATE  
 02/26/2015

SPECIFICATION / DATE OF REVISION  
 ASTM A615/A615M-14

CHEMICAL COMPOSITION		C	Mn	P	S	Si	Cu	NI	Cr	Mo	Sn	V	CEq <sup>A706</sup>
		%	%	%	%	%	%	%	%	%	%	%	%
0.43		0.68	0.032	0.071	0.24	0.39	0.16	0.09	0.053	0.020	0.010	0.57	

MECHANICAL PROPERTIES		YS	UTS	G/L	G/L
		PSI	PSI	Inch	mm
63682	439	95909	661	8.000	200.0
64205	443	97364	671	8.000	200.0

MECHANICAL PROPERTIES		Elong.	BendTest
		%	
15.50	OK		
15.00	OK		

GEOMETRIC CHARACTERISTICS			
%Light	Def Hgt	Def Gap	DesSpace
%	Inch	Inch	Inch
5.40	0.044	0.135	0.501
5.70	0.044	0.121	0.501

COMMENTS / NOTES

The above figures are certified chemical and physical test records as contained in the permanent records of company. We certify that these data are correct and in compliance with specified requirements. This material, including the billets, was melted and manufactured in the USA. CMTR complies with EN 10204 3.1.

*Maskey*  
 BHASKAR VALAMANCHILI  
 QUALITY DIRECTOR

SPC - Daily Report - 02/04/2015

Work Center	Start Date	Shift	Quality Control Inspector	Manufacturer	Batch Number
54000002	02/03/2015 05:00:00 pm	Empty Shift	K. MINAYA	EPOXY POWDER VALSPAR 720A009 1800LB	5196018185
54000002	02/04/2015 06:30:00 am	Shift A	K. MINAYA		
54000002	02/04/2015 05:00:00 pm	Empty Shift	K. MINAYA		

Produced Batches	Mill Batches	Batch Number	Inspection Lot	Visual Inspection				
6110141405	6110184305	6109884604	6109885303	6109994703	6109994802	6110141405	040001711937	OK
6110206304		6109994903	6110013202	6110140803	6110141402	6110206304	040001712048	OK
		6110141502	6110184202	6110184303	6110205102	6110184305	040001712191	OK
		6110206202	6110206302	6110206402				

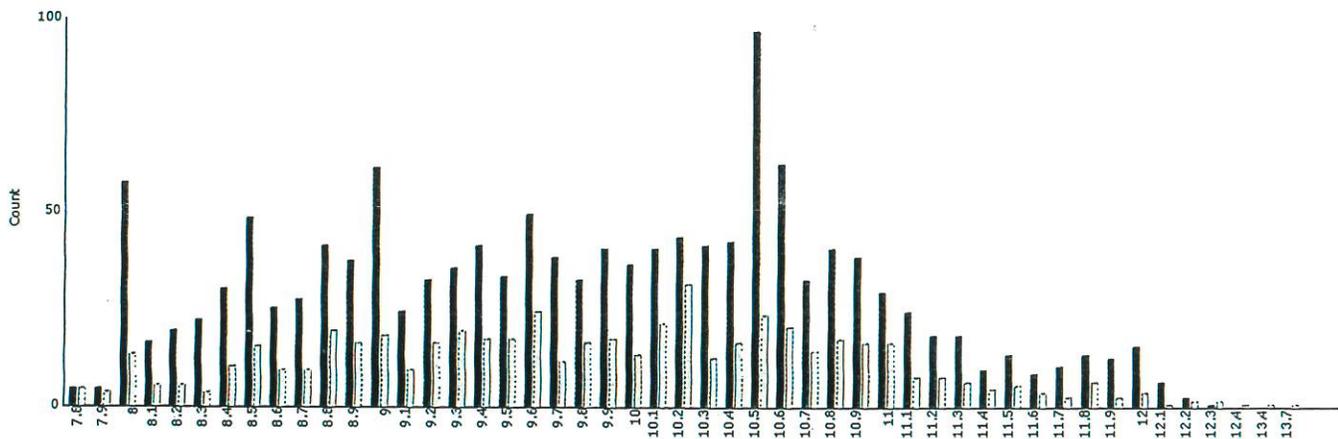
  

Actual Calibration (hgh)	Actual Calibration (low)	Bend Test	Cure Time	Gel Time	Hand Held Holidays	Inline Holidays	Temperature
9.93	9.93	PASS	50	11	0.06	0.11	427
9.93	9.93	PASS	52	12	0.08	0.04	426.33
9.93	9.93	PASS	47	11	0.16	0.08	443

This letter is to certify that the epoxy-coated material listed above has been coated per the powder manufacturer's recommendations and conforms to ASTM D3963, ASTM A775, AASHTO M-284, and the Gerdau Ameristeel coating division's quality assurance program. The supporting data for coating thickness, continuity, flexibility and material composition are attached.

Measurement Distribution

Note: The measurement distribution and statistics are for the entire production on 02/04/2015



Readings		Standard Deviation						
Size	Count	Average	Min	Max	SD	-2 SD	+2 SD	
19MM	1,408.00	9.82	7.80	12.30	1.05	7.72	11.91	
16MM	570.00	9.86	7.80	13.70	1.03	7.80	11.92	
	1978	9.83	7.8	13.7	1.04	7.75	11.92	

# Valspar Corporation

## CERTIFICATION of COMPLIANCE

Date: 1/30/15

Specification: ASTM A775, AASHTO M284, AASHTO M254

Valspar Product Code: 720A009

Batch Number: 5196018185

Production Date: 1/27/15

Batch Size: 37,800 lbs

I hereby certify that the above lot of material was manufactured to formulation, meeting all the requirements of the above specifications and that this material is chemically the same material that was tested by Valley Forge Laboratories of Devon, PA. or Wiss, Janney, Elstner Associates of Northbrook, IL.

  
Quality Control

10300 Claude Freeman Drive  
Charlotte, NC 28262  
Phone: (704) 548-2828  
Fax: (704) 547-0634

State/Commonwealth NC County of Cabarrus

On this the 30 of January, 2015 before me Henry G. Johnson  
Day Month Year Name of Notary Public

The undersigned Notary Public, personally appeared Stephanee Yates  personally known to me  
Name(s) of Signer(s)



To be the person(s) whose name(s) is/are subscribed to the within instrument, and acknowledged to me that he/she/they executed the same for the purposes therein stated.

Witness my hand and official seal

  
Signature of Notary Public

Henry G. Johnson  
Other Required Information: (Printed Name of Notary, Residence, etc.)

The articles identified above were produced in the United States and qualify as "U.S.-made end products", "domestic construction materials" and "domestic manufactured goods"

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