

March 30, 2021

Andrew Zwack  
New York State Department of Environmental Conservation  
Division of Environmental Remediation, Region 9  
270 Michigan Avenue  
Buffalo, New York 14203

**RE: ADDENDUM TO REMEDIAL INVESTIGATION WORK PLAN, 624 RIVER ROAD,  
NORTH TONAWANDA, NEW YORK; NYSDEC SITE NO.: C932176**

Dear Mr. Zwack,

During the remedial investigation (RI) at 624 River Road, North Tonawanda, New York, two subsurface voids were encountered within two test trenches on February 17, 2021. Per our email and phone communications between March 9 and 25, 2021, the New York State Department of Environmental Conservation (NYSDEC) is requiring further assessment of the two voids. Based on visual observations in the field and review of the historic Certified Sanborn® maps, the subsurface voids may be associated with (1) a potential former surface water intake from the Niagara River and (2) a valve pit or similar water conveyance appurtenance. Please see enclosed **Figure 1** for subsurface void locations within Test Trenches TT-10 and TT-11 overlaid on Google Earth Pro® and the 1967 Certified Sanborn® map.


To address the NYSDEC's requirements, it is proposed that the two voids will be uncovered using an excavator. The test pits advanced to uncover the voids will be spaced, sized, and oriented as needed in the field to obtain the necessary information to assess the subsurface voids and satisfy NYSDEC's request. Once uncovered, the voids will be either (1) assessed to determine if the structures contain any water or other materials, and the characteristics of any contents, if safe to do so, or (2) obtain video information via camera within the two voids. The extent of the void spaces will be located with a global positioning system (GPS) device to provide accurate figures. Once the assessment is complete and the NYSDEC is satisfied with the assessment, the voids will be backfilled with a sand based flowable fill to mitigate any potential contaminant migration pathways in the subsurface that may exist. A specification sheet for the proposed flowable fill is enclosed in this addendum. The work outlined above will be completed under the procedures and support documents in the NYSDEC-approved remedial investigation work plan (RIWP) for 624 River Road.

It should be noted that during the test pitting, water and waste/contamination were not observed visually within the two voids. Based on analytical data received to date, soil and groundwater contamination was not observed in the vicinity of the two voids.

NYSDEC  
Mr. Andrew Zwack

Please let me know if you have any questions or comments and please considerer this final submittal the notification of commencement.

Sincerely,

A handwritten signature in black ink, appearing to read "Jason M. Brydges". The signature is written in a cursive style with a large initial "J" and "M".

Jason M. Brydges, PE  
President

Encl: Figure 1 and Flowable Fill Specification Sheet





MAP ADAPTED FROM GOOGLE EARTH PRO® AND THE 1967 CERTIFIED SANDBORN MAP

**LEGEND**

 TEST TRENCH TT-10 ADVANCED ON FEBRUARY 17, 2021 THAT CONTAINED SUBSURFACE VOID.

**TT-10**



960 Busti Avenue  
Suite B150  
Buffalo, NY 14213  
P: 716-362-6532

**Figure 1**  
**Subsurface Void Locations**

624 River Road  
Suite # C932176  
North Tonawanda, New York

Revisions


April 2021

SCALE: 1"=35'

SHEET 1 OF 1





## New Enterprise Stone & Lime Co. Inc.

500 Como Park Blvd. · Buffalo, NY 14227 · (716) 826-7310 · Dispatch (716) 566-9690

To All Parties Involved:

Acceptance and Review of this submittal provides the testing agency permission to provide test results as **REQUIRED** by ACI and ASTM standards. New Enterprise Stone & Lime Co., Inc. is permitted to be added on the distribution list(s) for any/all test reports distributed by the independent testing agency of record on your project(s) where NESL Concrete is being supplied.

- ACI318-11 Section 5.6.1 requires the testing agency performing acceptance testing of concrete to have minimum proficiency in compliance with ASTM C1077 *Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation*. All reports of acceptance tests are **required** to be provided to the licensed design professional, contractor, **concrete producer**, and when requested, to the owner and the building official.
- “ACI 301-10 1.6.5.1 - Evaluation is valid only if tests and procedures have been conducted in accordance with procedures specified.”

The information ensures that compressive strength data correlates to project specification requirements and if they are not, can be investigated at an early age for discrepancies. It does not benefit the owner, owner representation, contractor and producer to be notified of “low breaks” at 90 days or after the job is completed.

Per ACI Building Code and ASTM C-94, which are both part of project specifications NESL as your supplier, are entitled to timely distribution of all test reports. Please request your testing agency to place NESL on their distribution list. The information shared is essential in helping NESL provide all parties involved with a quality product, identify any possible issues, mitigate and address them at an early age. Failure to distribute the reports to the producer in a timely manner can be considered non-compliant and make the compressive reports invalid as ACI procedures were not followed if written into specifications. By acceptance and or review of the submittal you are accepting the terms to have an independent laboratory allow the release of all testing of the concrete to the producer.

The information can emailed or faxed to the following addresses. Thank you in advance for your cooperation.

Sincerely,

Jeremy J. Lockhart  
New Enterprise Stone & Lime Co. Inc  
Technical Services Manager  
(716) 566-9690  
(814)766-0298 (Fax)  
[jlockhart@nesl.com](mailto:jlockhart@nesl.com) (Email)  
<http://www.nesl.com/> (Website)



## New Enterprise Stone & Lime Co. Inc.

500 Como Park Blvd. · Buffalo, NY 14227 · (716) 826-7310 · Dispatch (716) 566-9690

March 30, 2021

Visone Site Development LLC  
9829 Main St.  
Clarence, NY 14031

Reference: 624 River Rd. North Tonawanda – CLSM Mix Submittal

**Area of Use: 40-150 PSI General Use CLSM**  
**Mix Number: RHEOFILLF**

Cement: ASTM C-150 Type I	60 lbs.
Flyash: ASTM C-618	60 lbs.
Concrete Sand: ASTM C-33	2450 lbs.
RHEOFILL ADMIXTURE (Plant added)	As required
Water	370 lbs. *
<b>Admixtures</b>	
Hydration Stabilizer Retarder: ASTM C-494 Type B & D (If Requested)	0 to 15 oz. /cwt.
Accelerator: Non-Chloride ASTM C-494 Type C & E (If Requested)	5 to 40 oz./cwt.
HRWR: ASTM C-494 Type A & F (If Requested-Site added)	4 to 16 oz. /cwt.
Slump: 6" to 10"	
HRWR Spread: 10" to 16"	

- **Rheofill** will provide strengths that range from 40 psi to 150 psi. Recommended testing per flowablefill.org is penetrometer in place testing and unit weights, if compression strength is used 4x8 cylinders at a minimum of 28, 56 & 90 days are advised.
- Water will be adjusted for desired slump - weights are based off an initial 370 lbs.

### Notes:

- All admixtures are certified by the manufacturer to contain less than 0.00015% chloride ions by weight of cement.
- Concrete shall be delivered in conformance with ASTM C-94.
- Testing must be performed in accordance with ASTM C-31 maintaining test cylinders at 60 to 80 degrees in a moist condition. ***Cylinders that are not fabricated and tested in strict conformance to the specification must not be used for evaluation of strength and acceptance.***
- Acceptance of this correspondence provides the testing lab permission to provide us cylinder test results as **REQUIRED** by ACI 318 5.6.1 and IBC: **ACI318-11 Section 5.6.1 requires the testing agency performing acceptance testing of concrete to have minimum proficiency in compliance with ASTM C1077 Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.** All reports of acceptance tests are **required** to be provided to the licensed design professional, contractor, **concrete producer**, and when requested, to the owner and the building official.
- Per ACI 301, ACI 318 & 322 ALL exterior concrete in a F3 classification shall be a MINIMUM of 4500 PSI

Sincerely,

*Jeremy J. Lockhart*

Jeremy J. Lockhart  
New Enterprise Stone & Lime Co., Inc.



# CERTIFICATE OF ANALYSIS: MISSISSAUGA PLANT ASTM: PORTLAND CEMENT GENERAL USE (TYPE I)

ANALYSIS OF:

MAY-2020

ASTM C150-16 & AASHTO M85-16 REQUIREMENTS		LIMITS	RESULTS	TEST METHOD
<b>PHYSICAL</b>	Fineness 45 µm Sieve (%) Retained		3	ASTM C430
	Autoclave % Expansion	≤ 0.80	0.07	ASTM C151 / AASHTO T107
	Sulphate Expansion (%) *	≤ 0.020	0.012	ASTM C1038
	Initial Time of Set - Vicat (min)	45 ≤ (min) ≤ 375	124	ASTM C191 / AASHTO T131
	Blaine (m <sup>2</sup> /kg)	≥ 260	392	ASTM C204, AASHTO T153
	Air Content (%)	≤ 12	8	ASTM C185 / AASHTO T137
	False Set (%)		70	ASTM C451
	Compressive Strengths at 1-day (MPa / PSI)		19.5 / 2824	ASTM C109 / C109M, AASHTO T106 / T106M
	Compressive Strengths at 3-day (MPa / PSI)	≥ 12.0 / 1740	30.1 / 4360	ASTM C109 / C109M, AASHTO T106 / T106M
	Compressive Strengths at 7-day (MPa / PSI)	≥ 19.0 / 2760	35.3 / 5123	ASTM C109 / C109M, AASHTO T106 / T106M
Compressive Strengths at 28-day (MPa / PSI) *		41.3 / 5984	ASTM C109 / C109M, AASHTO T106 / T106M	
<b>CHEMICAL</b>	Loss on Ignition (LOI) (%)	≤ 3.5	2.2	ASTM C114 / AASHTO T105
	Insoluble Residue (%) *	≤ 1.5	0.99	ASTM C114 / AASHTO T105
	Sulphur Trioxide (SO <sub>3</sub> ) (%)**	≤ 3.5	4.1	ASTM C114 / AASHTO T105
	Magnesium Oxide (MgO) (%)	≤ 6.0	2.2	ASTM C114 / AASHTO T105
	Silica Oxide (SiO <sub>2</sub> ) (%)		20.1	ASTM C114, AASHTO T105
	Alumina Oxide (Al <sub>2</sub> O <sub>3</sub> ) (%)		5.2	ASTM C114, AASHTO T105
	Iron Oxide (Fe <sub>2</sub> O <sub>3</sub> ) (%)		2.2	ASTM C114, AASHTO T105
	Calcium Oxide (CaO) (%)		62.7	ASTM C114, AASHTO T105
	Total Alkali (%)		0.96	ASTM C114, AASHTO T105
	Free Lime (%)		1.2	
	CO <sub>2</sub> in Cement (%)		1.5	ASTM C114, AASHTO T105
	Limestone Content (%)		3.8	ASTM C150 / C150M
	CaCO <sub>3</sub> in Limestone (%)		88	ASTM C114, AASHTO T105
	C <sub>3</sub> S (Adjusted) (%)		48	ASTM C150 / C150M
	C <sub>2</sub> S (Adjusted) (%)		20	ASTM C150 / C150M
	C <sub>3</sub> A (Adjusted) (%)		10	ASTM C150 / C150M
C <sub>4</sub> AF (Adjusted) (%)		7	ASTM C150 / C150M	

**COMMENTS:**

Parameters with no limit listed are included for information purposes only, and are not requirements of the standards.

\* Indicates result from previous month.

\*\* Compliant with ASTM C1038 Sulfate Expansion limit of 0.020% at 14-days.

This certifies compliance with CSA-A3001-13, ASTM C150-16, and AASHTO M85-16 standards for General Use Portland Cement with limestone.

The data is typical of product shipped by CRH Canada Group Inc. Individual shipments may vary.

REPORT PREPARED BY:

PRINT DATE:

Bruno Morgado, P. Eng. Performance Manager	July 2, 2020

# CERTIFICATE OF ANALYSIS: Belle River Fly Ash, China, MI

## ASTM: FLY ASH, Class C/F



ANALYSIS OF: **Oct-2020**

	LIMITS ASTM (AASHTO)	RESULTS	TEST METHOD
<b>ASTM C618 &amp; AASHTO M295 REQUIREMENTS</b>			
Fineness; Retained when wet-sieved 45 µm (No. 325) Sieve, max. %	34	11.54	ASTM C311
<b>Strength Activity Index</b>			
7 day; min. percent of control	75 <sup>†</sup>	98	ASTM C311
28 day; min. percent of control	75 <sup>†</sup>	98	ASTM C311
Water Requirement; max. percent of control	105 (100)	98	ASTM C311
Soundness, autoclave expansion, max. %	0.8	0.082	ASTM C311
Density, specific gravity (g/cm <sup>3</sup> )	--	2.58	ASTM C311
<b>Uniformity Requirements; variation from average of preceding tests</b>			
Density; max. variation from average, %	5	3.1	ASTM C311
Fineness, max. variation from average, %	5	2.8	ASTM C311
<b>CHEMICAL</b>			
Sum of SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , and Fe <sub>2</sub> O <sub>3</sub> , min. %	50.0	61.6	ASTM C311
Sulphur Trioxide (SO <sub>3</sub> ), max. %	5.0	3.3	ASTM C311
Moisture content, max. %	3.0	0.2	ASTM C311
Loss on ignition, max, %	6.0	2.1	ASTM C311
Silica Oxide (SiO <sub>2</sub> ) (%)	--	38.03	ASTM C311
Alumina Oxide (Al <sub>2</sub> O <sub>3</sub> ) (%)	--	18.44	ASTM C311
Iron Oxide (Fe <sub>2</sub> O <sub>3</sub> ) (%)	--	5.16	ASTM C311
Calcium Oxide (CaO) (%)	C >18.0/F 18.0 max	16.05	ASTM C311
Magnesium Oxide (MgO) (%)	--	3.73	ASTM C311
Sodium Oxide (Na <sub>2</sub> O) (%)	--	9.20	ASTM C311
Potassium Oxide (K <sub>2</sub> O) (%)	--	0.96	ASTM C311
Total alkalis (Na <sub>2</sub> O) eq. = Na <sub>2</sub> O + 0.658 K <sub>2</sub> O (%)	--	9.83	ASTM C311
Available alkalis, Na <sub>2</sub> O eq., (%)	‡	-	ASTM C311

### COMMENTS:

Parameters with no limit listed are included for information purposes only, and are not requirements of the standards.  
 † Meeting the 7 day or the 28 day strength activity index indicates compliance with the specification.  
 ‡ Not a requirement of ASTM C618 or AASHTO M295. Required only when requested by purchaser to limit alkali content in concrete containing reactive aggregate.

This certifies compliance with the most current editions of ASTM C 618 and AASTHO M 295 standards.  
 The data is typical of product shipped by CRH US. Individual shipments may vary.

**REPORT PREPARED BY:**

**PRINT DATE:**

Steve Lane - Chemical Laboratory Supervisor	2/26/2021
Tests performed by Ash Grove Cement - Technical Center	



New Enterprise Stone & Lime Co., Inc.

500 Como Pk. Blvd.

Cheektowaga, NY 14227

Buffalo Redi Mix

1951 Hamburg Turnpike

Lackawanna, NY 14218

Re: 2021 Aggregate Certification Franklinville

Dear Jeremy:

Please be advised that the concrete sand from our Franklinville plant will meet all of the material requirements for the New York State Department of Transportation Item # 703.07 and also for ASTM C-33 Limits for Deleterious Materials and Physical Requirements. The DOT source # is 5-3F and the latest test number is 19AF028.

Our Course Aggregate will meet for NYSDOT Item # 703-02 and also for ASTM C-33. The DOT source # is 5-3G and the latest test number is 19AG013C.

Respectfully Submitted,

New Enterprise Stone & Lime Co.



Paul M. Juda, QC



February 04, 2021

Buffalo Redi Mix

1951 Hamburg Turnpike

Lackawanna, NY 14218

Attn: Jeremy Lockhart

Dear Jeremy,

Enclosed are the 2020 yearly averages for our crushed #2's, crushed #1's and concrete sand.

#2's		#1's		Concrete sand	
Sieve	% Pass	Sieve	% Pass	Sieve	% Pass
1 1/2"	100	3/4"	100	#4	100
1"	98	1/2"	96	#8	88
3/4"	65	3/8"	61	#16	68
1/2"	6	1/4"	7	#30	46
3/8"	0.9	#4	1.1	#50	19
1/4"	0.3	1/8"	0.5	#100	5
				#200	1.7
				W/L	1.40
				FM	2.74

Respectfully Submitted,

New Enterprise Stone & Lime Co.

Paul M. Juda, Quality Control Manager

**Buffalo**

2727 Broadway, Suite 2  
Cheektowaga,  
Phone: 716-877-9577  
Fax: 716-877-9629

**Client:**

A Servidone Inc. B. Anthony Construction Corp JV  
1364 Route 9  
Castleton, NY 12033

**Project:**

17214  
Cashless Tolling - Williamsville Terminus  
Williamsville Terminus  
Williamsville, NY

Sample Details			
Set #:	15	Technician:	Mullen, Joshua
Specimen Size:	6" X 12"	Cast By:	Mullen, Joshua
Specimens In Set:	4	Date Cast:	11/17/20
Truck / Ticket #:	3202 / 11572167	Sampled From:	Chute
Contractor:	Oakgrove	Placement Method:	Chute
Batched:	13:30 EST	Sampled:	14:10 EST
		Cast:	14:25 EST
		Truck Empty:	14:30 EST
		Placement Time:	60 (min)

Location	
Placement Location:	Trenching
Location Details:	See attached map Toll booth removal trenches
Sample Location / Notes:	Labeled on attached map

Batch Log		Specifications	
Supplier:	NESL	Mix Design:	RHEOFILLF
On-Site Admixtures:	3.00 Gal Water (10 yd <sup>3</sup> )	Strength:	40 (psi)
		Slump:	7 - 12 (in)
		Spread:	

Field Measurements			
Weather:	Windy	Slump (in):	10 (ASTM C143)
Air Temperature (F):	35	Concrete Temp (F):	65 (ASTM C1064)
		Plastic Unit Weight:	
		Air Content:	24.0 (ASTM C231)
		Load Volume:	10 (yd <sup>3</sup> )

**Lab Test Results**

Testing Lab: Buffalo, 2727 Broadway Street, Suite 2, Cheektowaga, NY, 14227

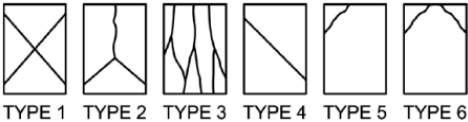
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (in)	Cylinder Area (in <sup>2</sup> )	Max Load (lbs)	Strength (psi)	Fracture Type	Break Remark	Capping Method
15-1	7	11/24/20	2 / 5	6.00	28.27	970	30	2		N
15-2	28	12/15/20	2 / 26	6.00	28.27	2,290	80	2		N
15-3	28	12/15/20	2 / 26	6.00	28.27	2,160	80	2		N
15-4	58 H	01/14/21	2 / 56	6.00	28.27	2,670	90	2		N

Test Age Average Strengths (psi): 7 Day - 30, 28 Day - 80, 58 Day - 90

Capping Methods	
Tested By: Austin Glasier (1,2,3), George Hirauk (4)	N: Unbonded Caps (ASTM C1231)
Checked In : 11/19/2020 (1,2,3,4)	

**General Remarks**

Water added at plant: 17.8 Gal/cy  
Water added on-site: 3 Gal  
Mark of Prudent Engineering was verbally notified today's test results.  
Spread: 8.5 inches



TYPE 1 TYPE 2 TYPE 3 TYPE 4 TYPE 5 TYPE 6



CWI, Special Inspector Lindsay Clark



**Buffalo**

2727 Broadway, Suite 2  
Cheektowaga,  
Phone: 716-877-9577  
Fax: 716-877-9629

**Client:**

A Servidone Inc. B. Anthony Construction Corp JV  
1364 Route 9  
Castleton, NY 12033

**Project:**

17215  
Cashless Tolling - Lackawanna Terminus  
Lackawanna Terminus  
Buffalo, NY

Sample Details			
Set #:	8	Technician:	Mullen, Joshua
Specimen Size:	6" X 12"	Cast By:	Mullen, Joshua
Specimens In Set:	4	Date Cast:	11/18/20
Truck / Ticket #:	3623 / 11572194	Sampled From:	Chute
Contractor:	Oakgrove	Placement Method:	Chute
Batched:	11:32 EST	Sampled:	12:10 EST
		Cast:	12:25 EST
		Truck Empty:	12:25 EST
		Placement Time:	53 (min)

Location	
Placement Location:	Trenching
Location Details:	Toll booth trench fill in
Sample Location / Notes:	Between toll lane 4 and 5 WB, toll trench

Batch Log		Specifications	
Supplier:	NESL	Mix Design:	RHEOFILLF
On-Site Admixtures:	None	Strength:	40 (psi)
		Air:	15.0 - 35.0 (%)
		Slump:	7 - 12 (in)

Field Measurements			
Weather:	Clear, Breezy	Slump (in):	9-1/4 (ASTM C143)
Air Temperature (F):	34	Concrete Temp (F):	72 (ASTM C1064)
		Plastic Unit Weight:	
		Air Content:	24.0 (ASTM C231)
		Load Volume:	10 (yd <sup>3</sup> )

**Lab Test Results**

Testing Lab: Buffalo, 2727 Broadway Street, Suite 2, Cheektowaga, NY, 14227

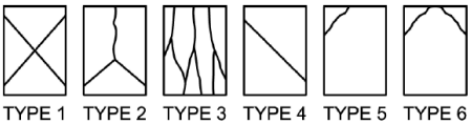
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (in)	Cylinder Area (in <sup>2</sup> )	Max Load (lbs)	Strength (psi)	Fracture Type	Break Remark	Capping Method
8-1	7	11/25/20	5 / 2	6.00	28.27	740	30	2		N
8-2	28	12/16/20	5 / 23	6.00	28.27	2,160	80	2		N
8-3	28	12/16/20	5 / 23	6.00	28.27	1,880	70	2		N
8-4	57 H	01/14/21	5 / 52	6.00	28.27	2,230	80	2		N

Test Age Average Strengths (psi): 7 Day - 30, 28 Day - 70, 57 Day - 80

Capping Methods	
Tested By: Austin Glasier (1,2,3), George Hirauk (4)	N: Unbonded Caps (ASTM C1231)
Checked In : 11/23/2020 (1,2,3,4)	

**General Remarks**

Water added at plant: 18.2 Gal/cy  
Water added on site: 0 Gal  
Gary from Prudent was made aware of today's results.  
Spread measured 8 inches



*Elizabeth Roll*

Staff Engineer, EIT Elizabeth Roll

**Buffalo**

2727 Broadway, Suite 2  
Cheektowaga,  
Phone: 716-877-9577  
Fax: 716-877-9629

**Client:**

A Servidone Inc. B. Anthony Construction Corp JV  
1364 Route 9  
Castleton, NY 12033

**Project:**

17215  
Cashless Tolling - Lackawanna Terminus  
Lackawanna Terminus  
Buffalo, NY

Sample Details			
Set #:	9	Technician:	Mullen, Joshua
Specimen Size:	6" X 12"	Cast By:	Mullen, Joshua
Specimens In Set:	4	Date Cast:	11/19/20
Truck / Ticket #:	3201 / 11721364	Sampled From:	Chute
Contractor:	Oakgrove	Placement Method:	Chute
Batched:	10:45 EST	Sampled:	11:20 EST
Cast:	11:35 EST	Truck Empty:	11:40 EST
Placement Time:	55 (min)		

Location	
Placement Location:	Trenching
Location Details:	Toll booth removal trench fill
Sample Location / Notes:	Toll booth cutouts in lanes 4,5 WB RH side 5 LH side toll booth cutout

Batch Log		Specifications	
Supplier:	NESL	Mix Design:	RHEOFILLF
On-Site Admixtures:	40.00 Gal Water (10 yd³)	Strength:	40 (psi)
		Air:	15.0 - 35.0 (%)
		Slump:	7 - 12 (in)

Field Measurements			
Weather:	Clear	Slump (in):	9-1/4 (ASTM C143)
Air Temperature (F):	50	Concrete Temp (F):	76 (ASTM C1064)
		Plastic Unit Weight:	
		Air Content:	22.0 (ASTM C231)
		Load Volume:	10 (yd³)

**Lab Test Results**

Testing Lab: Buffalo, 2727 Broadway Street, Suite 2, Cheektowaga, NY, 14227

Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (in)	Cylinder Area (in²)	Max Load (lbs)	Strength (psi)	Fracture Type	Break Remark	Capping Method
9-1	8	11/27/20	4 / 4	6.00	28.27	900	30	5		N
9-2	28	12/17/20	4 / 24	6.00	28.27	1,740	60	2		N
9-3	28	12/17/20	4 / 24	6.00	28.27	1,760	60	2		N
9-4	56 H	01/14/21	4 / 52	6.00	28.27	2,200	80	2		N

Test Age Average Strengths (psi): 8 Day - 30, 28 Day - 60, 56 Day - 80

Capping Methods	
Tested By: Austin Glasier (1,2,3), George Hirauk (4)	N: Unbonded Caps (ASTM C1231)
Checked In : 11/23/2020 (1,2,3,4)	

**General Remarks**

Water added at plant: 14.6 Gal/cy  
Water added on site: 40 Gal  
Gary of Prudent was made aware of today's results.  
Spread measured 8.5 inches



TYPE 1 TYPE 2 TYPE 3 TYPE 4 TYPE 5 TYPE 6

*Elizabeth Roll*

Staff Engineer, EIT Elizabeth Roll



# MasterCell<sup>®</sup> 25

## Admixture for Controlled Low Strength Materials (CLSM)

Formerly Rheocell Rheofill\*

### Description

MasterCell 25 admixture is a ready-to-use, self-contained product for use in various flowable fill applications where reduced densities (unit weights) and air contents of up to 35% are desired.

### Applications

Recommended for use in:

- Backfill (flowable fill) – sewer trenches, utility trenches, bridge abutments, retaining walls, conduit trenches, etc.
- Structural Fill – foundation sub bases, floor slab bases, pipe bedding

### Features

MasterCell 25 admixture produced CLSM can be used in any application in lieu of compacted soil. MasterCell 25 admixture is used in flowable fill mixes to lower the density (unit weight), eliminate settlement, and to control strength development. It produces stable air contents of 15-35% and reduces water content by as much as 50%.

### Benefits

- Increased yield
- Optimum workability – can be produced in either fluid or plastic consistency
- Increased pumpability
- Little or no bleeding
- No segregation
- Reduced shrinkage
- Reduced settlement
- Control of strength development
- Cost-effective compared to in-place cost of compacted soil

## Performance Characteristics

### Technical Data\*

	Mix 1 1 yd <sup>3</sup> (0.8 m <sup>3</sup> ) Load	Mix 2 4 yd <sup>3</sup> (3 m <sup>3</sup> ) Load
Cement, lb/yd <sup>3</sup> (kg/m <sup>3</sup> )	95 (56)	100 (60)
Sand, lb/yd <sup>3</sup> (kg/m <sup>3</sup> )	2,260 (1,340)	2,220 (1,320)
Water, lb/yd <sup>3</sup> (kg/m <sup>3</sup> )	171 (100)	177 (105)
MasterSet AC 534 admixture, fl oz/cwt (mL/100 kg)	16 (1,040)	–
MasterCell 25 admixture	1 Small Bag	1 Large Bag
Air Content	33%	35%
Compressive Strength, psi (MPa)		
@ 28 Days	110 (0.8)	40 (0.3)
@ 58 Days	160 (1.1)	60 (0.4)

\*Based on field trials using specific set of materials. Results will vary depending on local materials and ambient conditions. Trial mixtures are strongly recommended to determine performance characteristics with local materials.

Note: Setting times may be extended when high air content producing materials are used. If an earlier load bearing (set) time is desired, an accelerating admixture may be used in the flowable fill mixture.

### Guidelines for Use

MasterCell 25 admixture is a powdered material packaged in a ready-to-use disintegrative bag. MasterCell 25 admixture is formulated for use in producing flowable fill mixtures. It is not recommended for use in conventional concrete.

MasterCell 25 admixture performs best when added to mixes with an initial slump of 1-3 in. (25-75 mm). If necessary, the water content of the mix should be adjusted to obtain a maximum 3 in. (75 mm) initial slump. The MasterCell 25 admixture bag is simply tossed into the truck hopper and mixed with the previously batched materials for a minimum of 5 minutes at slow mixing speed. It is not necessary to wash down the hopper after adding MasterCell 25 admixture.

MasterCell 25 admixture may be added at the jobsite or at the ready-mixed concrete plant.

### Storage and Handling

**Storage Temperature:** MasterCell 25 admixture should be stored in a dry area at temperatures below 130 °F (54 °C).

**Handling:** The use of gloves and goggles are recommended when handling MasterCell 25 admixture.

**Shelf Life:** MasterCell 25 admixture has a minimum shelf life of 12 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 MasterCell 25 admixture has been exceeded.

### Packaging

MasterCell 25 admixture is available in two sizes. The small bag will treat 1 yd<sup>3</sup> (0.8 m<sup>3</sup>) and the large bag will treat 4 yd<sup>3</sup> (3 m<sup>3</sup>). MasterCell 25 admixture is supplied by the case:

- 1 yd<sup>3</sup> (0.8 m<sup>3</sup>) bag – 40 bags per case
- 4 yd<sup>3</sup> (3 m<sup>3</sup>) bag – 20 bags per case

### Related Documents

Safety Data Sheets: MasterCell 25 admixture

### Additional Information

For additional information on MasterCell 25 admixture, contact your local sales representative.

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\* Rheocell Rheofill became MasterCell 25 under the Master Builders Solutions brand, effective January 1, 2014.

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# MasterSet<sup>®</sup> DELVO

## Hydration Controlling Admixture

### Description

MasterSet DELVO ready-to-use, liquid admixture is used for making more uniform and predictable high-performance concrete. MasterSet DELVO admixture retards setting time by controlling the hydration of portland cement and other cementitious materials while facilitating placing and finishing operations. MasterSet DELVO admixture meets ASTM C 494/C 494M requirements for Type B, retarding, and Type D, water-reducing and retarding, admixtures.

### Applications

Recommended for use in:

- Stabilization of concrete washwater
- Stabilization of returned plastic concrete
- Stabilization of freshly batched concrete for long hauls
- 4x4<sup>™</sup> Concrete
- Pumped concrete, shotcrete (wet mix) and conventionally-placed concrete
- Plain, reinforced, precast, prestressed, lightweight and normal weight concrete
- Pervious concrete

### Features

- Reduced water content required for a given workability
- Retarded setting time characteristics
- Improved workability

### Benefits

- Provides flexibility in the scheduling of placing and finishing operations
- Offsets the effects of slump loss during extended delays between mixing and placing
- Reduces waste associated with concrete washwater and returned concrete
- Increased strength – compressive and flexural

### Performance Characteristics

**Rate of Hardening:** The temperature of a concrete mixture and the ambient temperature (forms, earth, air, etc.) affect the hardening rate of concrete. At higher temperatures, concrete hardens more rapidly which may cause problems with placing and finishing.

One of the functions of MasterSet DELVO admixture is to retard the set of concrete. Within the normal dosage range, it will generally extend the working and setting times of concrete containing normal portland cement, fly ash, slag cement and silica fume approximately 1 hour to 5 hours compared to a plain concrete mixture. This depends on job materials and temperatures. Trial mixtures should be made under approximate job conditions to determine the dosage required.

**Compressive Strength:** Concrete produced with MasterSet DELVO admixture will develop higher early (within 24 hours) and higher ultimate strengths than plain concrete when used within the recommended dosage range and under normal, comparable curing conditions. When MasterSet DELVO admixture is used in heat-cured concrete, the length of the preheating period should be increased until the initial set of the concrete is achieved. The actual heat-curing period is then reduced accordingly to maintain existing production cycles without sacrificing early or ultimate strengths.

## Guidelines for Use

**Dosage:** MasterSet DELVO admixture is recommended for use at a dosage of  $4 \pm 1$  fl oz/cwt ( $260 \pm 65$  mL/100 kg) of cementitious materials for most concrete mixtures using average concrete ingredients. For long time-to-discharge applications, such as long hauls, dosages higher than the recommended range may be required. Specifically, for shotcrete applications, MasterSet DELVO admixture is recommended for use at a dosage of 1.5 fl oz/cwt to 25 fl oz/cwt (100 mL/100 kg to 1,500 mL/100 kg) of cementitious materials. Because of variations in job conditions and concrete materials, dosages other than the recommended amounts may be required. In such cases, contact your local sales representative. For concrete washwater and returned concrete stabilization, utilize MasterSet DELVO charts to determine the appropriate dosage rates.

## Product Notes

**Corrosivity – Non-Chloride, Non-Corrosive:** MasterSet DELVO admixture will neither initiate nor promote corrosion of reinforcing steel in concrete. This admixture does not contain intentionally-added calcium chloride or other chloride-based ingredients.

**Compatibility:** MasterSet DELVO admixture may be used in combination with any BASF admixture. When used in conjunction with another admixture, each admixture must be dispensed separately into the mixture.

**CAUTION:** While MasterSet DELVO and MasterLife CI 30 admixtures are compatible in the same concrete mixture when added separately, these two admixtures are NOT compatible in the same STORAGE TANK OR CONTAINER, in any ratio, as potentially harmful gas may result from blending the two. Contact a BASF representative if there are any questions regarding admixture storage or admixture compatibility.

## Storage and Handling

**Storage Temperature:** MasterSet DELVO admixture should be stored above freezing temperatures. If MasterSet DELVO 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:** MasterSet DELVO admixture has a minimum shelf life of 12 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 MasterSet DELVO admixture has been exceeded.

## Packaging

MasterSet DELVO admixture is supplied in specially designed 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

## Related Documents

Safety Data Sheets: MasterSet DELVO admixture



## Additional Information

For more information on MasterSet DELVO admixture, contact your local sales representative.

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# MasterSet<sup>®</sup> FP 20

## Accelerating Admixture

### Description

MasterSet FP 20 admixture is a multi-component, non-chloride, water-reducing and accelerating admixture formulated to accelerate concrete setting time and increase early and ultimate strengths across a wide range of ambient temperatures (hot, mild, cold and subfreezing). MasterSet FP 20 admixture meets ASTM C 494/C 494M requirements for Type C, accelerating, and Type E, water-reducing and accelerating, admixtures.

### Applications

Recommended for use in:

- Concrete being placed in subfreezing ambient conditions
- Reinforced, precast, pumped, flowable, lightweight or normal weight concrete and shotcrete (wet mix)
- Concrete placed on galvanized steel floor and roof systems
- Prestressed concrete
- Fast-track concrete construction
- Concrete subject to chloride ion limitations
- Self-consolidating concrete
- Pervious concrete
- 4x4<sup>™</sup> Concrete

### Features

- Accelerated setting time
- Especially effective for concrete placement at ambient temperatures as low as 20 °F (-7 °C)
- Superior workability
- Increased early and ultimate strengths
- Superior finishing characteristics for flatwork and cast surfaces

### Benefits

- Earlier finishing of slabs – reduced labor costs
- Reduced in-place concrete costs
- Reduced or eliminated heating and protection time in cold weather
- Earlier stripping and reuse of forms

### Performance Characteristics

#### Mixture Data

Type II cement, lb/yd <sup>3</sup> (kg/m <sup>3</sup> )	600 (356)
Slump, in. (mm)	4 ± 1 (100 ± 25)
Air Content, %	Non-air-entrained concrete
Concrete Temperature	55 °F (12 °C)

#### Mild Weather

Setting Time: Ambient Temperature: 70 °F (21 °C)

Mixture	Time of Set	
	Initial Set (h:min)	Difference (h:min)
Plain	4:30	REF
MasterSet FP 20 admixture @ > 10 fl oz/cwt (650 mL/100 kg)	3:18	- 1:12





## Packaging

MasterSet FP 20 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

## Related Documents

Safety Data Sheets: MasterSet FP 20 admixture

## Additional Information

For additional information on MasterSet FP 20 admixture or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

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# MasterRheobuild® 1000

## High-Range Water-Reducing Admixture

### Description

MasterRheobuild 1000 high-range, water-reducing admixture is formulated to produce rheoplastic concrete. Rheoplastic concrete flows easily, maintaining high plasticity for time periods longer than conventional superplasticized concrete. Rheoplastic concrete has the low water-cementitious materials ratio of no-slump concrete, providing excellent engineering (hardened) properties. The slump-retention characteristics of rheoplastic concrete permit the addition of MasterRheobuild 1000 admixture at the batch plant.

MasterRheobuild 1000 admixture meets ASTM C 494/C 494M requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

### Applications

Recommended for use in:

- Concrete where high plasticity, normal-setting characteristics and accelerated strengths are desired
- Prestressed, precast and ready-mixed concrete applications
- Civil and mining applications

### Features

#### Plastic State:

- Increased slump, up to 11 in. (280 mm)
- Extended slump retention
- Controlled set times
- Cohesive and non-segregating
- Minimal bleed water

#### Hardened State:

- Higher earlier strengths than can be achieved with conventional high-range water reducers
- Increased ultimate compressive strength
- Higher modulus of elasticity
- Improved bond strength to steel
- Low permeability
- High durability
- Reduced shrinkage and creep
- Highly reliable in-place structural integrity

### Benefits

- Less dependence on consolidation energy
- Job time and cost reduced through higher productivity rates and/or reduced labor
- Early strength allows for accelerated construction methods, resulting in completion dates ahead of schedule
- Engineering specification changes can allow for greater limits on the free-fall of concrete, lift heights, concrete temperatures and potential economic mixture adjustments

## Performance Characteristics

**Rate of Hardening:** MasterRheobuild 1000 admixture is formulated to produce normal-setting characteristics throughout its recommended dosage range. Setting time of concrete is influenced by the chemical and physical composition of the basic ingredients of the concrete, temperature of the concrete and climatic conditions. Trial mixes should be made with job materials to determine the dosage required for a specified setting time and a given strength requirement.

**Workability:** Concrete containing MasterRheobuild 1000 admixture has the ability to maintain a rheoplastic state of 8-11 in. (200-280 mm) of slump if such workability is required. The precise duration of workability depends not only on temperature, but also on the type of cement, supplementary cementitious materials, mixture proportions, the nature of the aggregates, the method of transport and the dosage.

## Guidelines for Use

**Dosage:** MasterRheobuild 1000 admixture can be used at a dosage rate up to 25 fl oz/cwt (1,625 mL/100 kg) of cementitious materials, depending upon the application and the desired increase in slump and strength. This dosage range applies for most concrete mixtures using typical concrete ingredients. However, variations in job conditions and concrete materials, such as silica fume, may require dosages outside the recommended dosage range desirable. In such cases, contact your local sales representative.

**Mixing:** Because slump retention is increased using MasterRheobuild 1000 admixture, it may be batched at the ready-mixed concrete plant. MasterRheobuild 1000 admixture can also be added at the jobsite to increase slump if desired. For directions on the proper evaluation and use of MasterRheobuild 1000 admixture in specific applications, contact your local sales representative.

## Product Notes

**Corrosivity – Non-Chloride, Non-Corrosive:** MasterRheobuild 1000 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 MasterRheobuild 1000 admixture.

**Compatibility:** MasterRheobuild 1000 admixture may be used in combination with most BASF admixtures. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mix. **MasterRheobuild 1000 admixture should not be used with MasterMatrix® UW 450, MasterMatrix VMA 358, MasterMatrix VMA 450, MasterPolyheed® 100, MasterPolyheed 1020, MasterPolyheed 1025, MasterPolyheed 1720, MasterPolyheed 1725 and MasterGlenium®-based high-range, water-reducing admixtures as erratic behaviors in slump, slump flow or pumpability may be experienced.**

## Storage and Handling

**Storage Temperature:** MasterRheobuild 1000 admixture should be stored above freezing temperatures. If MasterRheobuild 1000 admixture freezes, thaw at 45 °F (7 °C) or above and completely reconstitute by mild mechanical agitation. **Do not use pressurized air for agitation.**

**Shelf Life:** MasterRheobuild 1000 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 MasterRheobuild 1000 admixture has been exceeded.

## Packaging

MasterRheobuild 1000 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

## Related Documents

Safety Data Sheets: MasterRheobuild 1000 admixture



## Additional Information

For additional information on MasterRheobuild 1000 admixture or its use in developing a concrete mixture with special characteristics, contact your local sales representative.

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