

Friday, September 13, 2019

Major Cement Co. Div.I
26300 Sherwood Ave.
P.O. Box 19310
Detroit, Mi. 48219



Administrative Office
30701 West 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

RE: Concrete submittal for MDOT 82000-205935 Various Locations in Detroit.

**** For concrete to be delivered out of our Detroit North Plant****

Superior Materials, LLC submits the following concrete mixture(s) and documents for review.

Immediately below is a summary of this submittal.

SUPERIOR MATERIALS WARRANTS CONCRETE PLASTIC MEASURES WHEN TESTED AT THE DELIVERY UNIT DISCHARGE CHUTE UPON ARRIVAL ON SITE. WE WILL NOT BE RESPONSIBLE FOR PWL OR NON-PWL NEGATIVE ADJUSTMENTS AFTER OTHER TRANSPORT AND CONSOLIDATION METHODS ARE UTILIZED SUCH AS PUMPING, PAVING EQUIPMENT, VIBRATION, CONVEYORS, DROPPING, ... ETC., AS THESE HANDLING PROCEDURES ARE KNOWN TO ALTER PLASTIC MEASURES. IF A PLASTIC MEASURE(S), WHEN TESTED AT THE DELIVERY UNIT, IS FOUND TO BE OUTSIDE OF SPECIFICATION LIMITS (INCLUDING TOTAL AIR CONTENT BELOW 5.5% OR HIGHER THAN 8.5%), THE CONCRETE MUST EITHER BE REJECTED OR BROUGHT INTO SPECIFICATION LIMITS BEFORE PLACEMENT. ALL PLASTIC MEASURES RESULTS FOUND OUTSIDE OF QC PLAN ACTION LIMITS MUST BE CALLED INTO SUPERIOR MATERIALS QC DEPARTMENT AT ANY ONE OF THE NUMBERS: 810-240-9286 / 248-361-0958 / 248-875-3640 / 586-531-0004.

- 1.) Mix ID # DDHE75E70020-Grade PNC Concrete, 3 inch slump.
 - a. JMF and Verification Forms.
- 2.) Mix ID # DDHE75E80020-Grade PNC Concrete, 5 inch slump.
 - a. JMF and Verification Forms.
- 3.) Stockpile Management SOP
- 4.) Certifications
 - a. NRMCA certification
 - b. Scale Calibration Certification
 - c. Admix Certification Letter
 - d. Admix Calibration Certification
- 5.) ASR documentation
 - a. ASTM C-1293
- 6.) Materials:
 - a. Cement Mill Report
 - b. Slag Mill Report
 - c. Aggregates
 - d. Admixtures

Please provide approval status when available.

Sincerely,

Nancy Donahue
Technical Service
Superior Materials, LLC
(248) 640-2380 Cell
nxdonahue@superiormaterials.net

Serving All of Southeastern Michigan

Toll Free Order desk: (888) 988-4400 * Office: (248) 788-8000 * Fax: (248) 592-9074

JOB MIX FORMULA (JMF) CONCRETE FIELD COMMUNICATION

This form applies only to the project listed below and is not transferable to other projects
DISTRIBUTION: ORIGINAL - Project Engineer COPIES - Contractor, Lansing CFS, Region, Inspector

CONTROL SECTION 82000	JOB NUMBER 205935	PROJECT LOCATION VARIOUS LOCATIONS	PROJECT ENGINEER JOHN J QUALEY III
CONCRETE SUPPLIER Superior Materials		PLANT LOCATION 20565 Hoover Road, Detroit, MI 48205	PLANT NUMBER Plant 2 (M-16)
GRADE OF CONCRETE PNC	PSI REQUIREMENT 3500	MIX DESIGN NUMBER DDHE75E70020	INTENDED USE (S) STRUCTURE ADJUSTMENTS
PRIME / SUBCONTRACTOR (S)		CONTRACTOR OC PLAN SUBMITTED? (MDOT use only) Y ☐ N ☐	
MAJOR CEMENT CO. DIV. I			
STANDARD SPEC DATE 2012	QC/QA SPECIAL PROVISION 12SP-604A-09	DATE 6/11/2018	JMF EFFECTIVE DATE 9/13/2019
		AGG. CORRECTION 0.2	

MATERIALS DESIGN SOURCES AND PROPERTIES

COARSE AGGREGATE		INTERMEDIATE AGGREGATE		FINE AGGREGATE	
Aggregate Type	limestone	Aggregate Type	NA	Source Name	Levy - American Agg. Buno Road (Rupp)
Source Name	Presque Isle	Source Name	NA	MDOT Source Number	47-016
MDOT Source Number	71-47	MDOT Source Number	NA	MDOT Series Class	2NS
MDOT Series Class	6AA	MDOT Series Class	NA	Specific Gravity (Bulk Dry)	2.63
Specific Gravity (Bulk Dry)*	2.56	Specific Gravity (Bulk Dry)*	NA	Specific Gravity (Bulk SSD) optional	
Specific Gravity (Bulk SSD) optional		Specific Gravity (Bulk SSD) optional		Absorption	1
Absorption	1.3	Absorption	0	Fineness Modulus (FM)	2.75
Unit Weight (Dry Rodded) DR or	98	Unit Weight (Dry Rodded) DR or	0		
Unit Weight (Dry Loose) DL		Unit Weight (Dry Loose) DL			
Percent Crushed	100	Percent Crushed	100		
MDOT Freeze-Thaw (F-T) Dilatation	0.016	MDOT Freeze-Thaw (F-T) Dilatation	NA		
Specific Gravity (Bulk Dry) of F-T Sample *	2.56	Specific Gravity (Bulk Dry) of F-T Sample *	NA		
Date of MDOT Freeze-Thaw Report	5/8/2014	Date of MDOT Freeze-Thaw Report	NA		

* If the bulk specific gravity is more than 0.04 less than the bulk dry specific gravity of the most recently tested freeze-thaw sample, the aggregate will be considered to have changed characteristics and be required to have a new freeze-thaw test conducted prior to use on Department projects.

CEMENTITIOUS		ADMIXTURES		Manufacturer/Product Name	Type	Supplier Code
Cement Source / Plant	St. Marys Detroit	Air Entrainer* (Source/Prod/Type) w/ticket code		BASF MasterAir AE 200	AE	XUE12
Cement Type	I	WR** (Source/Prod/Type) w/ticket code		BASF MasterPozzolith 200	D	XUN12
Cement Specific Gravity	3.15	MR*** (Source/Prod/Type) w/ticket code		NA	NA	NA
Fly Ash Source (distributor & plant)	NA	HR**** (Source/Prod/Type) w/ticket code		NA	NA	NA
Fly Ash Class	NA	Accelerator (Source/Prod/Type) w/ticket code		BASF MasterSet AC 534	C	XUB11
Fly Ash Specific Gravity	NA	Other (Source/Prod/Type) w/ ticket code		NA	NA	NA
Slag Cement Source	St. Marys					
Slag Cement Grade	100					
Slag Cement Specific Gravity	2.9					
Other	NA					

TYPE OF MIX WINTER / SUMMER

* If AE dosage is less than 1.0 oz/cwt DO NOT REJECT refer to notes at end of QPL Admix Listings.

Water Reducer / *Mid-Range Water Reducer / ****High-Range Water Reducer

MIX PROPORTIONS

Bulk Volume of Coarse Aggregate (DR)	0.66	Design Slump* (in)	3.0 (1.5-3)
Coarse Aggregate Weight (Dry)	1744	Specified Slump (in)	0 - 3
Intermediate Aggregate Weight (Dry)	0	Design Air %	6.5%
Fine Aggregate Weight (Dry)	1157	Specified Air %	5.5% - 8.5%
Portland Cement Weight	493	PSI minimum required	3500
Fly Ash Weight	0		
Fly Ash Percent of Cementitious	0	Total Cementitious	658
Slag Cement Weight	165		
Slag Cement Percent of Cementitious	25	Yield cu/ft	27
Total Water Weight	293		
Net Water Weight	258		
W/C (as designed)	0.39		
Air Entrainer* (dosage)	1.0 oz/cwt	HR (dosage)	NA NA
WR (dosage)	4.0 oz/cwt	Accelerator (dosage)	12.0 oz/cwt
MR (dosage)	NA NA	Other (dosage)	NA NA

I certify that all applicable standard test methods have been followed verifying the mix design and JMF:

Signature **NXDonahue** Digitally signed by NXDonahue
Date: 2019.09.13 16:28:19 -04'00'

MCA Level II Expiration Date: 4/15/2021

Date: 9/13/2019

Remarks:

Portland Cement Concrete (PCC) Mixture Design Verification:For PCC Grade: PNC**Mix Verification:** For Mix Number: DDHE75E70020**Mix Verification Method:** 2Mix Verification tests conducted by: Superior Materials, LLC LaboratoryProject Number: 82000 Address: 10147 Grand RiverJob Number: 205935 City / State / Zip Brighton, MI 48116Telephone: 248-788-8000**Verification Mix Proportions***

Workability Factor, b/bo	0.66	
b/bo, Based on Unit Weight (DL) or (DR)	DR	
Coarse Aggregate Weight (Dry)	1744	
Intermediate Aggregate Weight (Dry)	0	
Fine Aggregate Weight (Dry)	1157	
Portland Cement Weight	493	
Fly Ash Weight	0	
Fly Ash Percent of Cementitious	0	
GGBFS Weight	165	
GGBFS Percent of Cementitious	25	
Total Water Weight	293	
Net Water Weight	258	
W/C (as designed)	0.39	
Air Entrainment (dosage)	1.0	oz/cwt
Water Reducer (dosage)	4.0	oz/cwt
Mid Range Water Reducer (dosage)	NA	NA
High Range Water Reducer (dosage)	NA	NA
Accelerator (dosage)	12.0	oz/cwt
Other (dosage)	NA	NA

*Refer to accompanying JMF Form for specifics on materials used in concrete mix design.

Verification Mix Properties

Batch			
	1	2	3
Date of Batch	10/25/2018	10/25/2018	10/25/2018
Air Content	5.5	6.6	5.5
Slump	2.5	3	2
Temperature	65	66	72
Density (pcf)	144.2	142.6	144.2
Strength at	Days Old		
Cylinder 1			
Cylinder 2			
Average			
Strength at	7 Days Old		
Cylinder 1	3790	4060	4960
Cylinder 2			
Average	3790	4060	4960
Strength at	28 Days Old		
Cylinder 1	5160	4960	5600
Cylinder 2	5270	4930	5520
Average	5215	4945	5560

Statement of Verification

All applicable ACI and ASTM methods have been followed in verifying this mix design.

Signed: NANCY DONAHUEDate: 9/13/19Title: Technical Service / MCA-ACI Level II Certified Technician

JOB MIX FORMULA (JMF) CONCRETE FIELD COMMUNICATION

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CONCRETE SUPPLIER Superior Materials		PLANT LOCATION 20565 Hoover Road, Detroit, MI 48205		PLANT NUMBER Plant 2 (M-16)	
GRADE OF CONCRETE PNC	PSI REQUIREMENT 3500	MIX DESIGN NUMBER DDHE75E80020	INTENDED USE (S) STRUCTURE ADJUSTMENTS	CONTRACTOR OC PLAN SUBMITTED? (MDOT use only)	Y ☐ N ☐
PRIME / SUBCONTRACTOR (S)					
MAJOR CEMENT CO. DIV. I					
STANDARD SPEC DATE 2012	QC/QA SPECIAL PROVISION 12SP-604A-09	DATE 6/11/2018	JMF EFFECTIVE DATE 9/13/2019	AGG. CORRECTION 0.2	

MATERIALS DESIGN SOURCES AND PROPERTIES					
COARSE AGGREGATE		INTERMEDIATE AGGREGATE		FINE AGGREGATE	
Aggregate Type	limestone	Aggregate Type	NA	Source Name	Levy - American Agg. Buno Road (Rupp)
Source Name	Presque Isle	Source Name	NA	Source Name	
MDOT Source Number	71-47	MDOT Source Number	NA	MDOT Source Number	47-016
MDOT Series Class	6AA	MDOT Series Class	NA	MDOT Series Class	2NS
Specific Gravity (Bulk Dry)*	2.56	Specific Gravity (Bulk Dry)*	NA	Specific Gravity (Bulk Dry)	2.63
Specific Gravity (Bulk SSD) optional		Specific Gravity (Bulk SSD) optional		Specific Gravity (Bulk SSD) optional	
Absorption	1.3	Absorption	0	Absorption	1
Unit Weight (Dry Rodded) DR or	98	Unit Weight (Dry Rodded) DR or	0	Fineness Modulus (FM)	2.75
Unit Weight (Dry Loose) DL		Unit Weight (Dry Loose) DL			
Percent Crushed	100	Percent Crushed	100		
MDOT Freeze-Thaw (F-T) Dilatation	0.016	MDOT Freeze-Thaw (F-T) Dilatation	NA		
Specific Gravity (Bulk Dry) of F-T Sample *	2.56	Specific Gravity (Bulk Dry) of F-T Sample *	NA		
Date of MDOT Freeze-Thaw Report	5/8/2014	Date of MDOT Freeze-Thaw Report	NA		

* If the bulk specific gravity is more than 0.04 less than the bulk dry specific gravity of the most recently tested freeze-thaw sample, the aggregate will be considered to have changed characteristics and be required to have a new freeze-thaw test conducted prior to use on Department projects.

CEMENTITIOUS		ADMIXTURES		Manufacturer/Product Name	Type	Supplier Code
Cement Source / Plant	St. Marys Detroit	Air Entrainer* (Source/Prod/Type) w/ticket code		BASF MasterAir AE 200	AE	XUE12
Cement Type	I	WR** (Source/Prod/Type) w/ticket code		NA	NA	NA
Cement Specific Gravity	3.15	MR*** (Source/Prod/Type) w/ticket code		BASF MasterPolyheed 997	MR	XUM11
Fly Ash Source (distributor & plant)	NA	HR**** (Source/Prod/Type) w/ticket code		NA	NA	NA
Fly Ash Class	NA	Accelerator (Source/Prod/Type) w/ticket code		BASF MasterSet AC 534	C	XUB11
Fly Ash Specific Gravity	NA	Other (Source/Prod/Type) w/ ticket code		NA	NA	NA
Slag Cement Source	St. Marys					
Slag Cement Grade	100					
Slag Cement Specific Gravity	2.9					
Other	NA					

TYPE OF MIX WINTER / SUMMER

* If AE dosage is less than 1.0 oz/cwt DO NOT REJECT refer to notes at end of QPL Admix Listings.

Water Reducer / *Mid-Range Water Reducer / ****High-Range Water Reducer

MIX PROPORTIONS					
Bulk Volume of Coarse Aggregate (DR)	0.66	Design Slump* (in)	5.0	Slump Range	(3.5-6)
Coarse Aggregate Weight (Dry)	1744	Specified Slump (in)	0 - 6		
Intermediate Aggregate Weight (Dry)	0	Design Air %	6.5%		
Fine Aggregate Weight (Dry)	1157	Specified Air %	5.5% - 8.5%		
Portland Cement Weight	493	PSI minimum required	3500		
Fly Ash Weight	0				
Fly Ash Percent of Cementitious	0	Total Cementitious	658		
Slag Cement Weight	165				
Slag Cement Percent of Cementitious	25	Yield cu/ft	27		
Total Water Weight	293				
Net Water Weight	258				
W/C (as designed)	0.39				
Air Entrainer* (dosage)	1.0 oz/cwt	HR (dosage)	NA	NA	
WR (dosage)	NA	Accelerator (dosage)	12.0	oz/cwt	
MR (dosage)	8.0 oz/cwt	Other (dosage)	NA	NA	

I certify that all applicable standard test methods have been followed verifying the mix design and JMF:

Signature **NXDonahue** Digitally signed by NXDonahue
Date: 2019.09.13 16:28:32
0400

MCA Level II Expiration Date: 4/15/2021

Date: 9/13/2019

Remarks:

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Workability Factor, b/bo	0.66	
b/bo, Based on Unit Weight (DL) or (DR)	DR	
Coarse Aggregate Weight (Dry)	1744	
Intermediate Aggregate Weight (Dry)	0	
Fine Aggregate Weight (Dry)	1157	
Portland Cement Weight	493	
Fly Ash Weight	0	
Fly Ash Percent of Cementitious	0	
GGBFS Weight	165	
GGBFS Percent of Cementitious	25	
Total Water Weight	293	
Net Water Weight	258	
W/C (as designed)	0.39	
Air Entrainment (dosage)	1.0	oz/cwt
Water Reducer (dosage)	NA	NA
Mid Range Water Reducer (dosage)	8.0	oz/cwt
High Range Water Reducer (dosage)	NA	NA
Accelerator (dosage)	12.0	oz/cwt
Other (dosage)	NA	NA

*Refer to accompanying JMF Form for specifics on materials used in concrete mix design.

Verification Mix Properties

Batch			
	1	2	3
Date of Batch	12/1/2018	12/5/2018	12/5/2018
Air Content	7.4	6.4	7
Slump	6	4	4
Temperature	67	68	64
Density (pcf)	140	141.4	140.6
Strength at	Days Old		
Cylinder 1			
Cylinder 2			
Average			
Strength at	7 Days Old		
Cylinder 1	5450	4590	4830
Cylinder 2			
Average	5450	4590	4830
Strength at	28 Days Old		
Cylinder 1	6330	5700	6160
Cylinder 2	6230	5950	6180
Average	6280	5825	6170

Statement of Verification

All applicable ACI and ASTM methods have been followed in verifying this mix design.

Signed: NANCY DONAHUEDate: 9/13/19Title: Technical Service / MCA-ACI Level II Certified Technician

SOP Ops82

Effective Date 1-5-03

SUPERIOR MATERIALS, INC STANDARD OPERATING PROCEDURE

FUNCTION	OPERATIONS	TOPIC	AGGREGATE STOCK PILE MANAGEMENT & USE
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OBJECTIVE (S): Standardized procedure for aggregates inventory and use during concrete production.

RESPONSIBILITY: Plant operators, yardmen, area managers.

(1) STATEMENT OF POLICY

- a. Proper aggregate inventory/use procedures are mandatory to eliminate material cross contamination and segregation issues as well as inventory balancing/control.
- b. The required procedures apply for all concrete production facilities – including both wet and dry batched plants, and the block plant.

(2) REQUIRED PROCEDURES

- a. Before any aggregate(s) are received in the yards:
 - Appropriately sized storage bins (as determined by the applicable area manager) must be constructed.
 - i. The area selected must be pitched to prevent rain-water or rain-bird collection/ponding.
 - ii. The area selected must be not impede gravel train or front loader traffic.
 1. Do not allow mixer traffic and aggregate traffic to cross.
 - iii. Use interlocking concrete blocks erected to an elevation of 8'.
 1. The block storage bin must have three sides and an open face.
 - iv. Label each yard storage bin with lettering at least 12" in height. Use the following designations for labeling:

1. 6AA, 6A, 2NS, 467, 29A, 26A, HAYDITE C, HAYDITE B, 17A, PEASTONE, 31A, 6AASLAG

- b. When receiving raw materials into the yard:
 - All delivery tickets must be signed by the plant operator, before dumping.
 - The plant operator will retain a copy of the delivery.
 - The plant operator will maintain inventory in Oracle PPM and the Spectrum/Eagle batch computer.
 - The plant operator will inter-office mail these tickets to Farmington Hills office at the end of each day.
- c. Maintaining aggregate stock piles:
 - The yardman will keep the stock pile levels so that the do not extend beyond, or outside of the concrete block yard storage bins.
 - For aggregate sizes of 1.5" or larger, the stone must be remixed with the loader during stock pile maintenance.
 - The yardman will operate the rain-birds (aggregate stock pile water sprinklers) from 5/1 to 9/1.
- d. Using aggregates:
 - When loading the plant(s) with aggregates from stockpiles, work across the entire face of the stock pile to prevent segregation.
 - To prevent segregation, keep the plant aggregate bins full at all times.

(3) RESPONSIBILITIES

- a. Plant operators and area managers are responsible for training of gravel train drivers and yardmen on procedure execution.
- b. Plant operators and yardmen are responsible for procedure execution.

Approved By: _____

Date: _____

National Ready Mixed Concrete Association



Certificate of Conformance For Concrete Production Facilities

THIS IS TO CERTIFY THAT

Detroit Plant 2, Detroit, MI

Superior Materials, LLC

has been inspected by the undersigned licensed professional engineer for conformance with the requirements of the *Check List for Ready Mixed Concrete Production Facilities*. As of the inspection date, the facilities met the requirements for production by

***Truck Mixing with Automatic Batching and Recordings of
Cementitious Materials, Aggregate, Water, and Chemical Admixtures***



Signature of Licensed Professional Engineer

June 28, 2019

Inspection Date

July 05, 2021

Certification Expiration Date

This certifies that these facilities are in compliance with the Check List requirements and will maintain promptly any deficiencies which develop.

Rich D. Buel

Signature of Company Official

Operations Manager

Title of Company Official

NOTICE: This Check List certifies that these facilities are in compliance with the requirements of the Check List when properly applied. Conformance of the facilities with specific requirements must be verified by visual inspection methods in accordance with sales agreements.

This certificate is issued by the National Ready Mixed Concrete Association as evidence that the production facility conforms to the requirements of the NRMCA Certification of Ready Mixed Concrete Production Facilities. Any intentional falsification or misuse of this certificate may result in legal action.

Form RMA-4 (4/2006)

Certification ID #: 24708

© 1941, 1992, 2001, 2002, 2004, 2007, 2010

National Ready Mixed Concrete Association, 800 Hurling Street • Silver Spring • Maryland 20910



GREAT LAKES SCALE COMPANY
35380 UNION LAKE RD.
HARRISON TOWNSHIP, MI 48045
Phone: (586) 776-0517

Certificate of Calibration

Customer: SUPERIOR MATERIALS 2
SUP1048 20565 HOOVER

Certificate ID: 72113-a190010115820

Test Date: 08/16/2019

DETROIT, MI

ISO Number: MS-FM-CEM-001

(*) Make: ALKON Model: COMMAND SN#: 72113-a Capacity: 10000 LB Graduation: 5 LB

CALIBRATION DATE	DUE DATE	TEST INTERVAL	SCALE ID	SCALE CLASS
08/16/2019	02/15/2020	Semi-Annually	72113-a	III
SCALE LOCATION		EQUIPMENT CONDITIONS		
		Working	Clean	
SELECT NUMBER OF PM DAYS:		CAPACITY	10000 UOM	LB INCREMENT 5

AS FOUND TEST USING TEST WEIGHTS

AS LEFT TEST USING TEST WEIGHTS

Weight Applied	Reading	Error	Weight Applied	Reading	Error
0	LB 0	LB 0	0	LB 0	LB 0
6000	LB 5985	LB -15	1000	LB 1000	LB 0
0	LB 0	LB 0	2000	LB 2000	LB 0
	LB	LB	3000	LB 3000	LB 0
	LB	LB	4000	LB 4000	LB 0
	LB	LB	5000	LB 5000	LB 0
	LB	LB	6000	LB 6000	LB 0
	LB	LB		LB	LB
	LB	LB		LB	LB
	LB	LB		LB	LB

AS LEFT BUILD TEST

Test Weight Applied	Material Weight Applied	Reading	Error
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB
LB	LB	LB	LB

OVERALL TEST RESULTS N/A



GREAT LAKES SCALE COMPANY
35380 UNION LAKE RD.
HARRISON TOWNSHIP, MI 48045
Phone: (586) 776-0517

Certificate of Calibration

Customer: SUPERIOR MATERIALS 2
SUP1048 20565 HOOVER

Certificate ID: 72113-b190010120413

Test Date: 08/16/2019

DETROIT, MI

ISO Number: MS-FM-CEM-001

(*) Make: ALKON Model: COMMAND SNR: 72113-b Capacity: 40000 LB Graduation: 40 LB

CALIBRATION DATE	DUE DATE	TEST INTERVAL	SCALE ID	SCALE CLASS
08/16/2019	02/15/2020	Semi-Annually	72113-b	III L
SCALE LOCATION		EQUIPMENT CONDITIONS		
		Working	Clean	
SELECT NUMBER OF PM DAYS:		CAPACITY	40000 UOM LB	INCREMENT 40

AS FOUND TEST USING TEST WEIGHTS

AS LEFT TEST USING TEST WEIGHTS

Weight Applied	Reading	Error	Weight Applied	Reading	Error
0	LB 0	LB 0		LB	LB
1000	LB 1000	LB 0		LB	LB
2000	LB 2000	LB 0		LB	LB
3000	LB 3000	LB 0		LB	LB
4000	LB 4000	LB 0		LB	LB
5000	LB 5000	LB 0		LB	LB
6000	LB 6000	LB 0		LB	LB
0	LB 0	LB 0		LB	LB
	LB	LB		LB	LB
	LB	LB		LB	LB

AS LEFT BUILD TEST

Test Weight Applied	Material Weight Applied	Reading	Error
2000	LB 6000	LB 8000	LB 0
4000	LB 6000	LB 10000	LB 0
6000	LB 6000	LB 12000	LB 0
2000	LB 12000	LB 14000	LB 0
4000	LB 12000	LB 16000	LB 0
6000	LB 12000	LB 18000	LB 0
2000	LB 18000	LB 20000	LB 0
4000	LB 18000	LB 22000	LB 0
6000	LB 18000	LB 24000	LB 0
2000	LB 24000	LB 26000	LB 0
4000	LB 24000	LB 28000	LB 0
6000	LB 24000	LB 30000	LB 0
2000	LB 30000	LB 32000	LB 0
4000	LB 30000	LB 34000	LB 0
6000	LB 30000	LB 36000	LB 0
	LB	LB	LB
	LB	LB	LB
	LB	LB	LB
	LB	LB	LB

OVERALL TEST RESULTS PASS



GREAT LAKES SCALE COMPANY
35380 UNION LAKE RD.
HARRISON TOWNSHIP, MI 48045
Phone: (586) 776-0517

Customer: SUPERIOR MATERIALS 2
SUP1048 20565 HOOVER

DETROIT, MI

Certificate ID: 72113-8190818120413

Test Date: 08/16/2019

ISO Number: MS-FM-CEM-001

TEST INFORMATION

TEST WEIGHT CLASSIFICATION	EXPANDED UNCERTAINTY
F	37
ENVIRONMENTAL CONDITIONS	TEMPERATURE
Acceptable	80
WAS THE SCALE WITHIN CUSTOMERS REQUIRED ACCURACY?	
Yes	
TEST LOCATION	OVERALL RESULT
Onsite	Pass w/o adjustment

Comments:

Scale on zero load tested, load tested and sealed.

TRACEABILITY CERTIFICATE NUMBERS:

Kit	NIST	Date	Date Due
Description			
GL1502	MI-03-19-14172	3/19/2019	3/19/2021
TRUCK 15 - 1000 LB			
GL1503	MI-03-19-14172	3/19/2019	3/19/2021
TRUCK 15 - 1000 LB			
GL1504	MI-03-19-14172	3/19/2019	3/19/2021
TRUCK 15 - 1000 LB			
GL1505	MI-03-19-14172	3/19/2019	3/19/2021
TRUCK 15 - 1000 LB			
GL1506	MI-03-19-14172	3/19/2019	3/19/2021
TRUCK 15 - 1000 LB			
GL1517	MI-06-19-14306	6/26/2019	6/26/2021
TRUCK 15 - 1000 LB			

Technician(s): ED GORHAM/CAL

Signature:

Devices were calibrated with the certified test weights. Adjustments made to restore and/or maintain the accuracy of the device conform to the tolerances established by NIST or Manufacturers Specifications. Best measurement of uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.



GREAT LAKES SCALE COMPANY
35380 UNION LAKE RD.
HARRISON TOWNSHIP, MI 48045
Phone: (586) 776-0517

Customer: SUPERIOR MATERIALS 2
SUP1048 20565 HOOVER

DETROIT, MI

Certificate ID: 72113-4190818115828

Test Date: 08/16/2019

ISO Number: MS-FM-CEM-001

TEST INFORMATION

TEST WEIGHT CLASSIFICATION	EXPANDED UNCERTAINTY
F	1.0%
ENVIRONMENTAL CONDITIONS	TEMPERATURE
Acceptable	80
WAS THE SCALE WITHIN CUSTOMERS REQUIRED ACCURACY?	
Yes	
TEST LOCATION	OVERALL RESULT
Onsite	Pass adjustment needed

Comments:

Scale on zero load tested, calibrated, retested and sealed.

TRACEABILITY CERTIFICATE NUMBERS:

Kit	NIST	Date	Date Due
Description			
GL1502	MI-03-19-14172	3/19/2019	3/19/2021
TRUCK 15 - 1000 LB			
GL1503	MI-03-19-14172	3/19/2019	3/19/2021
TRUCK 15 - 1000 LB			
GL1504	MI-03-19-14172	3/19/2019	3/19/2021
TRUCK 15 - 1000 LB			
GL1505	MI-03-19-14172	3/19/2019	3/19/2021
TRUCK 15 - 1000 LB			
GL1506	MI-03-19-14172	3/19/2019	3/19/2021
TRUCK 15 - 1000 LB			
GL1517	MI-08-19-14306	6/26/2019	6/26/2021
TRUCK 15 - 1000 LB			

Technician(s): ED GORHAM; CAL

Signature:

Devices were calibrated with the certified test weights. Adjustments made to restore and/or maintain the accuracy of the device conform to the tolerances established by NIST or Manufacturers Specifications. Best measurement of uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

CUSTOMER LOCATION

Superior Materials

Hoover plant

ADMIXTURE	REQUIRED	MEASURED	OVER/UNDER
MasterAir AE 200	32 oz.	32 oz.	-----
Masterpozzolith 200	42 oz.	42 oz.	-----
MasterPolyheed 997	48 oz.	48 oz.	-----
MasterPolyheed 100	48 oz.	48 oz.	-----
MasterRheobuild1000	60 oz.	60 oz.	-----
MasterSet AC 534	60 oz.	60 oz.	-----
Masterglenium7925	40 oz.	40 oz.	-----
MasterSet Delvo	-----	-----	-----
MasterLife CI 30	-----	-----	-----
Water	150 gal	150 gal	

TESTED AND APPROVED BY: *Jacob Honey*

DATE: 08/15/2019



30701 West 10 Mile Rd.
Suite 500
Farmington Hills, Mi. 48336

ADMIXTURE GENERAL CERTIFICATION

Date: Friday, September 13, 2019
Contractor: MAJOR CEMENT CO. DIV. I
Control Section: 82000 **Job No.:** 205935
QC/QA Spec. Prov.: 12SP-604A-09 **Date Effective:** 6/11/2018
Project/Location: VARIOUS LOCATIONS

We certify that the following described QPL materials have been tested and meets the specification requirements of the MICHIGAN DEPARTMENT OF TRANSPORTATION and ASTM, or MDOT Specs, and were provided and incorporated into the identified project.

The following admixtures are listed on the MDOT QUALIFIED PRODUCTS LIST (QPL) and may be used in the above listed project.

Table 903-1 (from 2012 Standard Specifications for Construction, Sec 903) ASTM C 494 Terms for Chemical Admixtures		
Type	Term	Manufacturer: BASF Construction Chemical Co.
A	Water-reducing admixtures	MasterPozzolith 200
C	Accelerating admixtures	MasterSet AC 534
D	Water-reducing and retarding admixtures	MasterPozzolith 200
E	Water-reducing and accelerating admixtures	NA
F	Water-reducing, high range admixtures	MasterRheobuild 1000
G	Water-reducing, high range, and retarding admixtures	NA

903.01 - Master Air AE 200

The Department refers to water-reducing, mid range admixtures, not included in ASTM C 494, as MR.

Admixtures from BASF that fall under this "Type" are as follows:

MasterPolyheed 997

MasterPolyheed 100

All admixtures as used, meet the minimum dosage rates as set forth in MDOT's QPL.

Nancy Donahue
Technical Service
Superior Materials, LLC
(248) 640-2380 Cell
nxdonahue@superiormaterials.net

Serving All of Southeastern Michigan

Toll Free Order desk: (888) 988-4400 * Office: (248) 788-8000 * Fax: (248) 592-9074

BOWSER-MORNER, INC.

Delivery Address: 4518 Taylorsville Rd • Dayton, Ohio 45424 Mailing Address: P.O. Box 51 • Dayton, Ohio 45401

AASHTO/ISO 17025 Accredited • USACE Validated



LABORATORY REPORT

Report To: E. C. Levy Co.
Attn: John Perry
8800 Dix Ave.
Detroit, MI 48209

Report Date: 01/11/18
Job No.: 177392
Report No.: 018643B
No. of Pages: 3

Report On: Laboratory Determination of Alkali-Silica Reactivity (ASR)

Procedure: Length Change of Concrete Due to Alkali-Silica Reaction (ASTM C 1293)

Material and Source Information

Sample Identification: MDOT 2NS
Fine Aggregate Source: AA Buno Rd. (#47-16)
Coarse Aggregate Source: MMA - Phillipsburg, OH
Cement Source: Cemex - Fairborn, OH
Date Received: 11/09/16
Date Cast: 01/09/17

Results are summarized below and detailed on the attached data sheets.

Average Length Change, %		ASTM C 1293 Specification, %
56 Days:	0.016	---
90 Days:	0.019	---
180 Days:	0.020	---
270 Days:	0.026	---
365 Days:	0.029	0.040 Max.

Should you have any questions, or if we may be of further service, please contact me at (937) 236-8805, ext. 329.

Respectfully submitted,

BOWSER-MORNER, INC.

Scott D. Ruhkamp, Supervisor
Special Projects Section
Construction Materials Laboratory

SDR/sdr
018643B
1-File
1-jperry@edwdlevy.net
1-kachroeder@edwdlevy.net

All Reports Remain The Confidential Property Of BOWSER-MORNER And No Publication Or Distribution Of Reports May Be Made Without Our Express Written Consent, Except As Authorized By Contract. Results Contained In This Report Are Reflective Only Of The Items Calibrated Or Tested. Unless Otherwise Agreed, Samples Or Specimens Will Be Discarded Or Returned At BOWSER-MORNER'S DISCRETION. AASHTO/ISO 17025 Accreditation applies only to the parameters included in BOWSER-MORNER'S current scope of accreditation. Go to www.bowser-morner.com/accreditation for review.

Report To: E. C. Levy Co.
 Sample ID: MDOT 2NS
 Source: AA Buno Rd. (#47-16)

Job No.: 177392
 Report No.: 018643B
 Date Received: 11/09/16

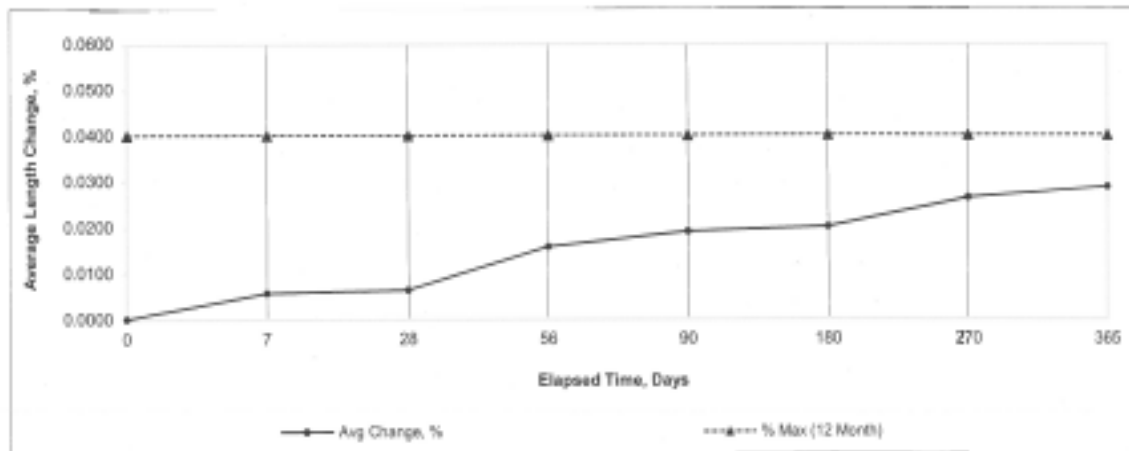
Concrete Mixture Summary				
Aggregates Used		Type	Source	Grading
Coarse (Lab Standard)		#57 crLS	MMA-Phillipsburg, OH	Table 1, coarse
Fine (Subject)		MDOT 2NS	AA Buno Rd. (#47-16)	Table 1, fine
Cement Used		Source	Type	Na ₂ O Equiv., %
Cemex		Fairborn, OH	Portland Type I	0.8
Pozzolan Used		Source	Type	Na ₂ O Equiv., %
n/a		n/a	n/a	n/a
Admixtures Used		Source	Type	Dosage Rate
n/a		n/a	n/a	n/a
Concrete Proportions, SSD, lbs/cubic yard				
Component	Source	Specific Gravity	Mass, lbs	Volume, cubic yard
Portland Cement	Cemex Fairborn*	3.15	708	3.60195
Water	BMI Standard	1.00	308	4.93590
#57 crLS	MMA-Phillipsburg, OH	2.664	1824	10.97251
MDOT 2NS	AA Buno Rd. (#47-16)	2.655	1241	7.49070
Entrained Air, %:	n/a	n/a	2.5	0.67500
Total	n/a	n/a	4081	27.7
*The cement and coarse aggregate used in this test are BMI's laboratory standards and meet sections 7.1 and 7.2				
Sodium Hydroxide Added, %		W/Cm	Slump, inches	Air, %
0.4		0.435	3 3/4	2.5
Fresh Unit Weight, cubic yard		Mass Yield, %		
150.8		100.2		
Storage Containers				
6-gallon (23-liter) plastic pail with gamma seal lid conforming to ASTM C1293, sections 5.2.1 and 5.3.1				

Report To: E. C. Levy Co.
Sample ID: MDOT 2NS
Source: AA Buno Rd. (#47-16)
Date Cast: 01/09/17

Job No.: 177392
Report No.: 018643B
Date Received: 11/09/16
Ref. Rod Length: 11.622118

Procedure: Length Change of Concrete Due to Alkali-Silica Reaction (ASTM C 1293)

Age, Days	ID	Reference Rod, inch	Specimen Readings, inch	Expansion, inch	Length Change, %	Avg, %
Initial 01/10/17	A	0.0000	0.0048	11.6269	n/a	0.0000
	B	0.0000	0.0085	11.6306	n/a	
	C	0.0000	0.0115	11.6336	n/a	
7 01/17/17	A	0.0000	0.0053	11.6274	0.0050	0.0057
	B	0.0000	0.0094	11.6315	0.0090	
	C	0.0000	0.0118	11.6339	0.0030	
28 02/07/17	A	0.0000	0.0054	11.6275	0.0080	0.0063
	B	0.0000	0.0094	11.6315	0.0090	
	C	0.0000	0.0119	11.6340	0.0040	
56 03/07/17	A	0.0000	0.0065	11.6286	0.0170	0.0157
	B	0.0000	0.0099	11.6320	0.0140	
	C	0.0000	0.0131	11.6352	0.0160	
90 04/11/17	A	0.0000	0.0066	11.6287	0.0180	0.0190
	B	0.0000	0.0106	11.6327	0.0210	
	C	0.0000	0.0133	11.6354	0.0180	
180 07/11/17	A	0.0000	0.0066	11.6287	0.0180	0.0200
	B	0.0000	0.0107	11.6328	0.0220	
	C	0.0000	0.0135	11.6356	0.0200	
270 10/10/17	A	0.0000	0.0076	11.6297	0.0280	0.0263
	B	0.0000	0.0112	11.6333	0.0270	
	C	0.0000	0.0139	11.6360	0.0240	
365 01/09/18	A	0.0000	0.0078	11.6299	0.0300	0.0267
	B	0.0000	0.0114	11.6335	0.0290	
	C	0.0000	0.0142	11.6363	0.0270	



Portland Cement Type I/II

Production Period: 7/01/2019 to 7/31/2019

STANDARD REQUIREMENTS

Chemical Data			Physical Data		
Item	Spec. Limit	Results	Item	Spec. Limit	Results
SiO ₂ (%)		19.1	Air Content of mortar (volume %)	12.0 max	8
Al ₂ O ₃ (%)	6.0 max	5.0	Blaine fineness (m ² /kg)	260.0 min	403
Fe ₂ O ₃ (%)		3.14	Autoclave expansion (%)	0.8 max	0.07
CaO (%)		61.8			
MgO (%)	6.0 max	2.6	Compressive strength (MPa/psi):		
SO ₃ (%)*	3.0 max	3.75	1 day		17.5 [2537]
Loss of ignition (%)	3.5 max	2.3	3 days	12.0[1740] min	27.7 [4017]
Na ₂ O (%)		0.24	7 days	19.0[2760] min	32.2 [4677]
K ₂ O (%)		1.08	28 days (previous month)	28.0[4060] min	39.5 [5734]
Insoluble residue (%)	1.5 max	0.20	Time of setting (minutes)		
CO ₂ (%)		1.2	(Vicat) Initial	45 - 375	91
Limestone (%)	5.0 max	2.7	(Vicat) Final		207
CaCO ₃ in limestone (%)	70.0 min	97.0			
Inorganic process addition(%)	5.0 max	0.0			
			Mortar Bar Expansion (ASTM C1038) (%)*	0.02 max	0.008
Potential phase composition			Base Cement Phase Composition		
C ₃ S (%)		57	C ₃ S (%)		57
C ₂ S (%)		12	C ₂ S (%)		12
C ₃ A (%)	8 max	8	C ₃ A (%)		8
C ₄ AF (%)		10	C ₄ AF (%)		10

OPTIONAL REQUIREMENTS

Item	Spec. Limit	Results	Item	Spec. Limit	Results
Equiv. Alkalies	A	0.95	False Set (%)	50 min	
			Retained 325 (%)		5.59

Additional Data

Type	Limestone	Inorganic Processing Addition
Amount	2.7	0.0
SiO ₂ (%)	2.1	
Al ₂ O ₃ (%)	0.6	
Fe ₂ O ₃ (%)	0.2	
CaO (%)	49.2	
SO ₃ (%)	0.4	

This cement meets ASTM C150, A3000 compendium, A3003, A3004, A3006 and CSA A3001 for Type I and Type II Portland Cement

*It is permissible to exceed the max value for SO₃ content, provided it is demonstrated by C-1038 that the cement will not develop expansion exceeding 0.02% in 14 Days

A Test result provided for information only.

August 17, 2019

St. Marys Cement
Detroit Plant

9333 Dearborn Avenue

Detroit, MI 48209

Tel: (313) 842-4600 - Fax: (313) 849-4512

Linda Harris

Linda M. Harris
Quality Control Manager

Slag Cement Grade 100 - Cemplus

Production Period: 7/01/2019 to 7/31/2019

STANDARD REQUIREMENTS - SLAG

Chemical Data			Physical Data		
Item	Spec. Limit	Results	Item	Spec. Limit	Results
Sulfide Sulfur (S) (%)	2.5 max	1.0	Air Content of mortar (volume %)	12 max	6
Sulfate Sulfur (as SO ₃) (%)		2.5	Blaine fineness (m ² /kg)	260 min	536
Added Sulfate Sulfur (as SO ₃) (%)			Retained 325 (%)		2.74
Inorganic process addition (%)	5.0 max		Compressive strength (MPa/psi):		
			7 days		23.2 [3366]
			28 days (previous month)		42.2 [6117]
			Slag Activity Index (%) (SAI)		
			7 Day		78.0
			28 Day	95 min	104.1

STANDARD REQUIREMENTS - REFERENCE CEMENT

Chemical Data			Physical Data		
Item	Spec. Limit	Results	Item	Spec. Limit	Results
Equiv. Alkalies	A	0.78	Blaine fineness (m ² /kg)	260 min	390
Potential phase composition			Compressive strength (MPa/psi):		
C ₃ S (%)		58	7 days		29.5 [4278]
C ₂ S (%)		15	28 days		40.5 [5879]
C ₃ A (%)		8			
C ₄ AF (%)		8			

ADDITIONAL DATA

Item		Item	Results
Type	Inorganic Processing Addition	Specific Gravity (g/cm ³)	2.91
Amount	0.0	Autoclave expansion (%)	0.06
SiO ₂ (%)			
Al ₂ O ₃ (%)			
Fe ₂ O ₃ (%)			
CaO (%)			
SO ₃ (%)			

This cement meets ASTM C959 and AASHTO M302 Specifications for Grade 100 Slag Cement and CSA A3001 for Type S Slag Cement

A Test result provided for information only.

August 17, 2019

St. Marys Cement

Detroit Plant

9333 Dearborn Avenue

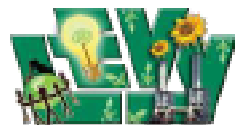
Detroit, MI 48209

Tel: (313) 842-4600 - Fax: (313) 849-4512

Linda Harris

Linda M. Harris

Quality Control Manager



**SOLUTIONS FOR
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3300 Dix Ave., Detroit, MI 48209

Weekly Product Conformance Report

For Week of August 05 2019 to August 10 2019

Product: 2NS Natural Sand

Location: American Aggregate, Buno Road Plant

State Pit Number: 47-16

U.S.Sieve	3/8"	#4	#8	#16	#30	#50	#100	LBW	FM
Metric Sieve	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm		
MDOT Specification	100	95-100	85-95	35-75	20-55	10-30	0-10	0-3.0	2.55 - 2.95
Percent Passing									
2018 Shipping Average	100	96	86	72	53	20	3	0.4	2.71
July 2019 Average	100	96	85	71	51	16	2	0.3	2.78
Week of 08/05/2019	100	97	87	74	54	18	2	0.3	2.68

Average Physical Property Data

ASTM C 29, Loose Unit Weight (2018 Average) - 108 lb/ft³

ASTM C 29, Rodded Unit Weight (2018 Average) - 114 lb/ft³

ASTM C 128, Bulk Specific Gravity Dry (Average of Last 5 Tests) - 2.66

ASTM C 128, Bulk Specific Gravity SSD (Average of Last 5 Tests) - 2.690

ASTM C 128, Absorption (Average of Last 5 Tests) - 1.0%

ASTM C 142, Clay Lumps and Friable Particles In Aggregate - 0.7% – TTL

ASTM C 123, Lightweight Particles In Aggregate (Coal & Lignite @ 2.00 Gs) - 0.2% – TTL

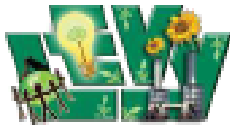
ASTM C 88, Soundness of Aggregate by Use of Sodium Sulfate - 3% loss – TTL

ASTM C 40, Organic Impurities In Fine Aggregate for Concrete < 1

ASTM C 1252, Uncompacted Void Content, Method A - 41.2%

MTM 118, Fine Aggregate Angularity - 1.5

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**SOLUTIONS FOR
YOUR ENVIRONMENT™**

8800 Dix Ave., Detroit, MI 48209

Weekly Product Conformance Report

For Week of August 05 2019 to August 10 2019

Product: 6AA Limestone

Source: Lafarge North America, Presque Isle Quarry

Location: SCA, Detroit Dock

State Pit Number: 71-47

U.S.Sieve	1 1/2"	1"	3/4"	1/2"	3/8"	#4	LBW
Metric Sieve	37.5mm	25.0mm	19.0mm	12.5mm	9.5mm	4.75mm	
MDOT Specification	100	95-100	-	30-60	-	0-8	0-2.0
Percent Passing							
2018 Shipping Average	100	100	86	46	23	3	1.2
July 2019 Average	100	98	80	39	21	4	1.0
Week of 08/05/2019	100	96	69	35	20	5	1.7

Average Physical Property Data

MTM 110, Soft Particles (2017) - 0.0% (Specification 2.0% maximum) – Lafarge Data

MTM 110, Clay-Ironstone Particles (2017) - 0.0% (Specification 1.0% maximum) – Lafarge Data

MTM 110, Chert Particles (2017) - 0.0% – Lafarge Data

MTM 110, Sum of Soft Particles and Chert (2017) - 0.0% (Specification 4.0% maximum) – Lafarge Data

MTM 115, Freeze-Thaw Dilation - 0.016% (Tested 2014) – MDOT

ASTM C 29, Loose Unit Weight (2018 Average) - 89 lb/ft³

ASTM C 29, Rodded Unit Weight (2018 Average) - 98 lb/ft³

ASTM C 127, Bulk Specific Gravity Dry (2018) - 2.56

ASTM C 127, Bulk Specific Gravity SSD (2018) - 2.59

ASTM C 127, Absorption (2018) - 1.5%

ASTM C 142, Clay Lumps and Friable Particles In Aggregate - 0.2%

ASTM C 131, Abrasion and Impact In the Los Angeles Machine - 33%

ASTM C 88, Soundness of Aggregate by Use of Sodium Sulfate - 3% loss – Lafarge Data

ASTM C 123, Light Weight Particles (Chert [Less Than 2.40 sp.gr SSD]) In Aggregate - 0.0% – TTL

ASTM C 123, Light Weight Particles (Coal and Lignite) In Aggregate - 0.0% – TTL

This information is not to be taken as warranty or representation for which we assume legal responsibility nor as permission or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation and verification.

Weekly Summary 20190805 - 6AA Limestone SCA Detroit Dock



The Chemical Company

3

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

MasterAir® AE 200

Air-Entraining Admixture

Formerly Micro Air*

Description

MasterAir AE 200 air-entraining admixture provides concrete with extra protection by creating air bubbles that are ultrastable, small and closely spaced – a characteristic especially useful in the types of concrete known for their difficulty to entrain and maintain the air content desired.

Even when used at a lower dosage than standard air-entraining admixtures, MasterAir AE 200 admixture 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
- Greatly improved stability of air-entrainment
- Ultra stable air bubbles

Benefits

- Increased resistance to damage from cyclic freezing and thawing
- Increased resistance to scaling from deicing salts
- Improved plasticity and workability
- Improved air-void system in hardened concrete
- Improved ability to entrain and retain air in low-slump concrete, concrete containing high-carbon content fly ash, concrete using large amounts of fine materials, concrete using high-alkali cements, high-temperature concrete, and concrete with extended mixing times
- 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 200 admixture can be used to obtain adequate freezing and thawing durability in a properly proportioned concrete mixture, if standard industry practices are followed.

MASTER®
» BUILDERS
SOLUTIONS

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 200 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 200 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.125 to 1.5 fl oz/cwt (8-98 mL/100 kg) of cement. In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 200 admixture needed is somewhat less than the amount required in plain concrete. Due to possible changes in the factors that can affect the dosage of MasterAir AE 200 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 200 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 200 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 or with the initial batch water. If the concrete mixture contains 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 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 200 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized steel floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 200 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 mixture.

Storage and Handling

Storage Temperature: MasterAir AE 200 admixture should be stored and dispensed at 35 °F (2 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If it freezes, thaw and reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 200 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 200 admixture has been exceeded.

Safety: MasterAir AE 200 admixture is a caustic solution. Chemical goggles and gloves are recommended when transferring or handling this material. (See SDS and/or product label for complete information.)

Packaging

MasterAir AE 200 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 200 admixture

Additional Information

For suggested specification information or for additional product data on MasterAir AE 200 admixture, 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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* Micro Air became MasterAir AE 200 under the Master Builders Solutions brand, effective January 1, 2014.

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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

MasterPozzolith® 200

Water-Reducing Admixture

Formerly Pozzolith 200 N *

Description

MasterPozzolith 200 ready-to-use, liquid admixture is used for making more uniform and predictable quality concrete. It meets ASTM C 494/C 494M requirements for Type A, water-reducing, Type B, retarding, and Type D, water-reducing and retarding, admixtures.

Applications

Recommended for use in:

- Prestressed concrete
- Precast concrete
- Reinforced concrete
- Shotcrete
- Lightweight concrete
- Pumped concrete
- 4x4™ Concrete
- Pervious concrete
- Self-consolidating concrete (SCC)

Features

- Reduced water content required for a given workability
- Controlled setting characteristics – normal or retarded

Benefits

- Improved workability
- Reduced segregation
- Improved finishing characteristics for flatwork and cast surfaces
- Increased compressive and flexural strengths

Guidelines for Use

Dosage: MasterPozzolith 200 admixture is recommended for use at a dosage of 3-4 fl oz/cwt (195-260 mL/100 kg) of cementitious materials for Type A applications and up to 6 fl oz/cwt (390 mL/100 kg) for Type B and D requirements. 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.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterPozzolith 200 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: MasterPozzolith 200 admixture may be used in combination with any BASF admixtures. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mixture.

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Storage and Handling

Storage Temperature: MasterPozzolith 200 admixture should be stored above freezing temperatures. If MasterPozzolith 200 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: MasterPozzolith 200 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 MasterPozzolith 200 admixture has been exceeded.

Packaging

MasterPozzolith 200 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterPozzolith 200 admixture

Additional Information

For additional information on MasterPozzolith 200 admixture or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

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* Pozzolith 200 N became MasterPozzolith 200 under the Master Builders Solutions brand, effective January 1, 2014.

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MasterPolyheed® 997

Mid-Range Water-Reducing Admixture

Formerly PolyHeed 997*

Description

MasterPolyheed 997 admixture is a patented multi-component, mid-range water-reducing admixture. MasterPolyheed 997 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:

- All concrete applications where superior workability, pumpability and finishability qualities are desired, in particular, flatwork, pumped concrete and pervious concrete
- Concrete containing manufactured sand and harsh concrete mixtures

Features

- True mid-range water reduction (5-15%) and excellent performance across a wide slump range, especially the difficult slump range of 5-8 in. (125-200 mm)
- Superior workability, pumpability and finishability qualities even in concrete mixtures containing low amounts of cementitious materials
- Superior finishing characteristics for residential/commercial flatwork and formed surfaces

Benefits

- Significantly reduced placement and finishing time resulting in lower in-place concrete costs
- Higher strength at all ages
- Enhanced concrete durability
- Increased service life of concrete structures

Performance Characteristics

Mixture Data: 500 lb/ycd³ (295 kg/m³) of Type I cement; slump 6-7 in. (150-180 mm); 5-6% air; concrete temperature 70 °F (21 °C); ambient temperature, 70 °F (21 °C).

Setting Time Performance¹

Mixture	Initial Set (h:min)	Difference (h:min)
Reference	6:01	—
MasterPolyheed 997 admixture @		
5 fl oz/cwt (325 mL/100 kg)	6:22	+0:21
10 fl oz/cwt (650 mL/100 kg)	6:57	+0:56
15 fl oz/cwt (980 mL/100 kg)	7:31	+1:30

Compressive Strength, psi (MPa)

Mixture	7-Day	28-Day
Plain	2360 (16.3)	3320 (22.9)
MasterPolyheed 997 admixture @		
5 fl oz/cwt (325 mL/100 kg)	3060 (21.1)	3930 (27.1)
10 fl oz/cwt (650 mL/100 kg)	3740 (25.8)	4610 (31.8)
15 fl oz/cwt (980 mL/100 kg)	4620 (31.9)	5460 (37.7)

¹Note: The data shown are based on controlled laboratory tests. Reasonable variations from the results shown here may be experienced as a result of differences in concrete making materials and jobsite conditions.

Guidelines for Use

Dosage: MasterPolyheed 997 admixture has a recommended dosage range of 3-15 fl oz /cwt (195-980 mL/100 kg) of cementitious material for most concrete mixes.

As the dosage of MasterPolyheed 997 admixture increases to 15 fl oz/cwt (980 mL/100 kg) of cementitious materials, normal concrete setting characteristics are maintained and early and ultimate compressive strengths increase.

BASF does not recommend the use of dosages outside the recommended range without trial testing. Consult your local sales representative for assistance in determining the dosage for optimum performance.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterPolyheed 997 admixture will neither initiate nor promote corrosion of reinforcing or prestressing steel embedded in concrete, or of galvanized steel floor and roof systems. MasterPolyheed 997 admixture does not contain intentionally added calcium chloride or other chloride-based ingredients.

Compatibility: MasterPolyheed 997 admixture may be used in combination with any BASF admixtures. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: If MasterPolyheed 997 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: MasterPolyheed 997 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 MasterPolyheed 997 admixture has been exceeded.

Packaging

MasterPolyheed 997 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterPolyheed 997 admixture

Additional Information

For additional information on MasterPolyheed 997 admixture or its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

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* Polyheed 997 became MasterPolyheed 997 under the Master Builders Solutions brand, effective January 1, 2014.

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