

Thursday, April 02, 2020

Merlo Const. Co. Inc.
4964 Technical Dr.
Milford, Mi. 48381

REVIEW Reviewed By: San Rofoo Construction Engineer  Somat Engineering INCORPORATED 26445 Northline Road Taylor, Michigan 48180	☐ Approved ☒ X Approved as Noted ☐ Rejected ☐ Revise & Resubmit Date: 04/02/2020
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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 # HE75E7CNA002-Grade PNC Concrete, 3 inch slump.
a. JMF and Verification Forms. | ACCEPTED | See comment on 2000 Forms |
| 2.) Mix ID # HE75E8CNA002-Grade PNC Concrete, 5 inch slump.
a. JMF and Verification Forms. | ACCEPTED | See comment on 2000 Forms |
| 3.) Mix ID # P155E7CNA002-Grade P1 Concrete, 3 inch slump.
a. JMF and Verification Forms. | ACCEPTED | See comment on 2000 Forms |
| 4.) Mix ID # P155ERCNA002-Grade P1 Concrete, 5 inch slump.
a. JMF and Verification Forms. | ACCEPTED | See comment on 2000 Forms |
| 5.) Mix ID # S1H5ERCNA002-Grade S1 Concrete, 5 inch slump.
a. JMF and Verification Forms. | ACCEPTED | See comment on 2000 Forms |
| 6.) Stockpile Management SOP | | |
| 7.) Certifications
a. NRMCA certification
b. Scale Calibration Certification
c. Admix Certification Letter
d. Admix Calibration Certification | | |
| 8.) ASR documentation
a. ASTM C-1293 | | |
| 9.) Materials:
a. Cement Mill Report
b. Slag Mill Report
c. Aggregates
d. Admixtures | | |
| 10.) Truck, Plant & Water Letter | | |

Please provide approval status when available.

Sincerely,

Nancy Donahue

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 RICHARD T DOHERTY
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 HE75E7CNA002	INTENDED USE (S) STRUCTURE ADJUSTMENTS >59 Deg
CONTRACTOR QC PLAN SUBMITTED? (MDOT use only)			Y ☐ N ☐
PRIME / SUBCONTRACTOR (S)			

MERLO CONSTRUCTION CO. INC.

STANDARD SPEC DATE 2012	QC/QA SPECIAL PROVISION 12SP-604A-09	DATE 6/11/2018	JMF EFFECTIVE DATE 4/2/2020	AGG. CORRECTION 0.2
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MATERIALS DESIGN SOURCES AND PROPERTIES

COARSE AGGREGATE		INTERMEDIATE AGGREGATE		FINE AGGREGATE	
Aggregate Type	limestone	Aggregate Type	NA	Source Name	Levy - Ray Road
Source Name	Presque Isle	Source Name	NA	MDOT Source Number	63-115
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)	2.62
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	1.1
Absorption	1.3	Absorption	0	Unit Weight (Dry Rodded) DR or	2.9
Unit Weight (Dry Rodded) DR or	98	Unit Weight (Dry Rodded) DR or	0	Fineness Modulus (FM)	
Unit Weight (Dry Loose) DL		Unit Weight (Dry Loose) DL			
Percent Crushed	100	Percent Crushed	100		
MDOT Freeze-Thaw (F-T) Dilation	0.016	MDOT Freeze-Thaw (F-T) Dilation	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		NA	NA	NA
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)	1156	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	294		
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)	NA NA
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: 2020.04.02 10:52:41 -04'00'

MCA Level II Expiration Date: **4/15/2021**

Date: **4/2/2020**

Remarks:

Portland Cement Concrete (PCC) Mixture Design Verification:**For PCC Grade:** PNC**Mix Verification:** For Mix Number: HE75E7CNA002**Mix Verification Method:** 2Mix Verification tests conducted by: Superior Materials, LLC LaboratoryProject Number: 82000Address: 10147 Grand RiverJob Number: 205935City / 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)	1156	
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	294	
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)	NA	NA
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	6/9/2018	11/6/2018	5/20/2019
Air Content	7.6	7	8
Slump	2.5	2.75	3
Temperature	75	67	66
Density (pcf)	144.2	142.6	144.2
Strength at	Days Old		
Cylinder 1			
Cylinder 2			
Average			
Strength at 7	Days Old		
Cylinder 1	0	3440	390
Cylinder 2			
Average	0	3440	390
Strength at 28	Days Old		
Cylinder 1	4370	4640	5940
Cylinder 2	6070	4910	5810
Average	5220	4775	5875

Statement of Verification

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

Signed: NANCY DONAHUEDate: 4/2/20Title: Technical Service / MCA-ACI Level II Certified Technician

JOB MIX FORMULA (JMF)
CONCRETE FIELD COMMUNICATION

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CONTROL SECTION 82000	JOB NUMBER 205935	PROJECT LOCATION VARIOUS LOCATIONS	PROJECT ENGINEER RICHARD T DOHERTY
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 HE75E8CNA002	INTENDED USE (S) STRUCTURE ADJUSTMENTS >59 Deg
PRIME / SUBCONTRACTOR (S)		CONTRACTOR QC PLAN SUBMITTED? (MDOT use only)	Y ☐ N ☐

MERLO CONSTRUCTION CO. INC.

STANDARD SPEC DATE 2012	QC/QA SPECIAL PROVISION 12SP-604A-09	DATE 6/11/2018	JMF EFFECTIVE DATE 4/2/2020	AGG. CORRECTION 0.2
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MATERIALS DESIGN SOURCES AND PROPERTIES

COARSE AGGREGATE		INTERMEDIATE AGGREGATE		FINE AGGREGATE	
Aggregate Type	limestone	Aggregate Type	NA	Aggregate Type	NA
Source Name	Presque Isle	Source Name	NA	Source Name	Levy - Ray Road
MDOT Source Number	71-47	MDOT Source Number	NA	MDOT Source Number	63-115
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)	2.62
Specific Gravity (Bulk SSD) optional		Specific Gravity (Bulk SSD) optional		Specific Gravity (Bulk SSD) optional	
Absorption	1.3	Absorption	0	Absorption	1.1
Unit Weight (Dry Rodded) DR or	98	Unit Weight (Dry Rodded) DR or	0	Unit Weight (Dry Rodded) DR or	
Unit Weight (Dry Loose) DL		Unit Weight (Dry Loose) DL		Unit Weight (Dry Loose) DL	
Percent Crushed	100	Percent Crushed	100	Percent Crushed	
MDOT Freeze-Thaw (F-T) Dilation	0.016	MDOT Freeze-Thaw (F-T) Dilation	NA	MDOT Freeze-Thaw (F-T) Dilation	
Specific Gravity (Bulk Dry) of F-T Sample *	2.56	Specific Gravity (Bulk Dry) of F-T Sample *	NA	Specific Gravity (Bulk Dry) of F-T Sample *	
Date of MDOT Freeze-Thaw Report	5/8/2014	Date of MDOT Freeze-Thaw Report	NA	Date of MDOT Freeze-Thaw Report	

* 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		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		NA	NA	NA	
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)		Slump Range	
	0.66	Design Slump* (in)	5.0 (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)	1156	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	294		
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)	NA NA
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: 2020.04.02 10:52:56 -04'00'

MCA Level II Expiration Date: **4/15/2021**

Date: **4/2/2020**

Remarks:

Portland Cement Concrete (PCC) Mixture Design Verification:**For PCC Grade:** PNC**Mix Verification:** For Mix Number: HE75E8CNA002**Mix Verification Method:** 2Mix Verification tests conducted by: Superior Materials, LLC LaboratoryProject Number: 82000Address: 10147 Grand RiverJob Number: 205935City / 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)	1156	
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	294	
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)	8.0	oz/cwt
High Range Water Reducer (dosage)	NA	NA
Accelerator (dosage)	NA	NA
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	8/22/2019	9/13/2019	10/23/2019
Air Content	7.2	6.5	6.8
Slump	6	5	5.75
Temperature	80	81	65
Density (pcf)	141.2	141.8	141.5
Strength at	Days Old		
Cylinder 1			
Cylinder 2			
Average			
Strength at 7	Days Old		
Cylinder 1	3730	3910	4810
Cylinder 2			
Average	3730	3910	4810
Strength at 28	Days Old		
Cylinder 1	6190	5490	6070
Cylinder 2	6210	5520	6130
Average	6200	5505	6100

Statement of Verification

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

Signed: NANCY DONAHUEDate: 4/2/20Title: Technical Service / MCA-ACI Level II Certified Technician

JOB MIX FORMULA (JMF) CONCRETE FIELD COMMUNICATION

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CONTROL SECTION 82000	JOB NUMBER 205935	PROJECT LOCATION VARIOUS LOCATIONS	PROJECT ENGINEER RICHARD T DOHERTY
CONCRETE SUPPLIER Superior Materials		PLANT LOCATION 20565 Hoover Road, Detroit, MI 48205	PLANT NUMBER Plant 2 (M-16)
GRADE OF CONCRETE P1	PSI REQUIREMENT 3500	MIX DESIGN NUMBER P155E7CNA002	INTENDED USE (S) STRUCTURE ADJUSTMENTS
PRIME / SUBCONTRACTOR (S)		CONTRACTOR QC PLAN SUBMITTED? (MDOT use only) Y ☐ N ☐	

MERLO CONSTRUCTION CO. INC.

STANDARD SPEC DATE 2012	QC/QA SPECIAL PROVISION 12SP-604A-09	DATE 6/11/2018	JMF EFFECTIVE DATE 4/2/2020	AGG. CORRECTION 0.2
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MATERIALS DESIGN SOURCES AND PROPERTIES

COARSE AGGREGATE		INTERMEDIATE AGGREGATE		FINE AGGREGATE	
Aggregate Type	limestone	Aggregate Type	NA	Aggregate Type	NA
Source Name	Presque Isle	Source Name	NA	Source Name	Levy - Ray Road
MDOT Source Number	71-47	MDOT Source Number	NA	MDOT Source Number	63-115
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)	2.62
Specific Gravity (Bulk SSD) optional		Specific Gravity (Bulk SSD) optional		Specific Gravity (Bulk SSD) optional	
Absorption	1.3	Absorption	0	Absorption	1.1
Unit Weight (Dry Rodded) DR or	98	Unit Weight (Dry Rodded) DR or	0	Unit Weight (Dry Rodded) DR or	
Unit Weight (Dry Loose) DL		Unit Weight (Dry Loose) DL		Unit Weight (Dry Loose) DL	
Percent Crushed	100	Percent Crushed	100	Fineness Modulus (FM)	2.9
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		NA	NA	NA	
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

		Slump Range	
Bulk Volume of Coarse Aggregate (DR)	0.65	Design Slump* (in)	3.0 (1.5-3)
Coarse Aggregate Weight (Dry)	1724	Specified Slump (in)	0 - 3
Intermediate Aggregate Weight (Dry)	0	Design Air %	6.5%
Fine Aggregate Weight (Dry)	1338	Specified Air %	5.5% - 8.5%
Portland Cement Weight	394	PSI minimum required	3500
Fly Ash Weight	0		
Fly Ash Percent of Cementitious	0	Total Cementitious	526
Slag Cement Weight	132		
Slag Cement Percent of Cementitious	25	Yield cu/ft	27
Total Water Weight	277		
Net Water Weight	239		
W/C (as designed)	0.45		
Air Entrainer* (dosage)	1.0 oz/cwt	HR (dosage)	NA NA
WR (dosage)	4.0 oz/cwt	Accelerator (dosage)	NA NA
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: 2020.04.02 10:53:06 -04'00'

MCA Level II Expiration Date: **4/15/2021**

Date: **4/2/2020**

Remarks:

Portland Cement Concrete (PCC) Mixture Design Verification:For PCC Grade: P1**Mix Verification:** For Mix Number: P155E7CNA002**Mix Verification Method:** 2Mix Verification tests conducted by: Superior Materials, LLC LaboratoryProject Number: 82000Address: 10147 Grand RiverJob Number: 205935City / State / Zip Brighton, MI 48116Telephone: 248-788-8000**Verification Mix Proportions***

Workability Factor, b/bo	<u>0.65</u>	
b/bo, Based on Unit Weight (DL) or (DR)	<u>DR</u>	
Coarse Aggregate Weight (Dry)	<u>1724</u>	
Intermediate Aggregate Weight (Dry)	<u>0</u>	
Fine Aggregate Weight (Dry)	<u>1338</u>	
Portland Cement Weight	<u>394</u>	
Fly Ash Weight	<u>0</u>	
Fly Ash Percent of Cementitious	<u>0</u>	
GGBFS Weight	<u>132</u>	
GGBFS Percent of Cementitious	<u>25</u>	
Total Water Weight	<u>277</u>	
Net Water Weight	<u>239</u>	
W/C (as designed)	<u>0.45</u>	
Air Entrainment (dosage)	<u>1.0</u>	oz/cwt
Water Reducer (dosage)	<u>4.0</u>	oz/cwt
Mid Range Water Reducer (dosage)	<u>NA</u>	NA
High Range Water Reducer (dosage)	<u>NA</u>	NA
Accelerator (dosage)	<u>NA</u>	NA
Other (dosage)	<u>NA</u>	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	8/8/2019	8/12/2019	8/18/2019
Air Content	6.8	6.4	7.1
Slump	2	3	3
Temperature	83	70	70
Density (pcf)	140.2	120.9	140
Strength at	Days Old		
Cylinder 1			
Cylinder 2			
Average			
Strength at 7	Days Old		
Cylinder 1	4000	4230	4270
Cylinder 2			
Average	4000	4230	4270
Strength at 28	Days Old		
Cylinder 1	4980	6230	5990
Cylinder 2	5020	5780	6150
Average	5000	6005	6070

Statement of Verification

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

Signed: NANCY DONAHUEDate: 4/2/20Title: 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 P1	PSI REQUIREMENT 3500	MIX DESIGN NUMBER P155ERCNA002	INTENDED USE (S) STRUCTURE ADJUSTMENTS
PRIME / SUBCONTRACTOR (S)		CONTRACTOR QC PLAN SUBMITTED? (MDOT use only)	Y ☐ N ☐

MERLO CONSTRUCTION CO. INC.

STANDARD SPEC DATE 2012	QC/QA SPECIAL PROVISION 12SP-604A-09	DATE 6/11/2018	JMF EFFECTIVE DATE 4/2/2020	AGG. CORRECTION 0.2
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MATERIALS DESIGN SOURCES AND PROPERTIES

COARSE AGGREGATE		INTERMEDIATE AGGREGATE		FINE AGGREGATE	
Aggregate Type	limestone	Aggregate Type	NA	Aggregate Type	NA
Source Name	Presque Isle	Source Name	NA	Source Name	Levy - Ray Road
MDOT Source Number	71-47	MDOT Source Number	NA	MDOT Source Number	63-115
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)	2.62
Specific Gravity (Bulk SSD) optional		Specific Gravity (Bulk SSD) optional		Specific Gravity (Bulk SSD) optional	
Absorption	1.3	Absorption	0	Absorption	1.1
Unit Weight (Dry Rodded) DR or	98	Unit Weight (Dry Rodded) DR or	0	Fineness Modulus (FM)	2.9
Unit Weight (Dry Loose) DL		Unit Weight (Dry Loose) DL			
Percent Crushed	100	Percent Crushed	100		
MDOT Freeze-Thaw (F-T) Dilation	0.016	MDOT Freeze-Thaw (F-T) Dilation	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 Entrainment* (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		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		NA	NA	NA	
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)	0.65	Design Slump* (in)	5.0 (3.5-6)
Coarse Aggregate Weight (Dry)	1724	Specified Slump (in)	0 - 6
Intermediate Aggregate Weight (Dry)	0	Design Air %	6.5%
Fine Aggregate Weight (Dry)	1338	Specified Air %	5.5% - 8.5%
Portland Cement Weight	394	PSI minimum required	3500
Fly Ash Weight	0		
Fly Ash Percent of Cementitious	0	Total Cementitious	526
Slag Cement Weight	132		
Slag Cement Percent of Cementitious	25	Yield cu/ft	27
Total Water Weight	277		
Net Water Weight	239		
W/C (as designed)	0.45		
Air Entrainment* (dosage)	1.0 oz/cwt	HR (dosage)	NA NA
WR (dosage)	4.0 oz/cwt	Accelerator (dosage)	NA NA
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: 2020.04.02 10:53:17 -04'00'

MCA Level II Expiration Date: **4/15/2021**

Date: **4/2/2020**

Remarks:

Portland Cement Concrete (PCC) Mixture Design Verification:**For PCC Grade:** P1**Mix Verification:** For Mix Number: P155ERCNA002**Mix Verification Method:** 2Mix Verification tests conducted by: Superior Materials, LLC LaboratoryProject Number: 82000Address: 10147 Grand RiverJob Number: 205935City / State / Zip Brighton, MI 48116Telephone: 248-788-8000**Verification Mix Proportions***

Workability Factor, b/bo	<u>0.65</u>	
b/bo, Based on Unit Weight (DL) or (DR)	<u>DR</u>	
Coarse Aggregate Weight (Dry)	<u>1724</u>	
Intermediate Aggregate Weight (Dry)	<u>0</u>	
Fine Aggregate Weight (Dry)	<u>1338</u>	
Portland Cement Weight	<u>394</u>	
Fly Ash Weight	<u>0</u>	
Fly Ash Percent of Cementitious	<u>0</u>	
GGBFS Weight	<u>132</u>	
GGBFS Percent of Cementitious	<u>25</u>	
Total Water Weight	<u>277</u>	
Net Water Weight	<u>239</u>	
W/C (as designed)	<u>0.45</u>	
Air Entrainment (dosage)	<u>1.0</u>	oz/cwt
Water Reducer (dosage)	<u>4.0</u>	oz/cwt
Mid Range Water Reducer (dosage)	<u>8.0</u>	oz/cwt
High Range Water Reducer (dosage)	<u>NA</u>	NA
Accelerator (dosage)	<u>NA</u>	NA
Other (dosage)	<u>NA</u>	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	8/1/2018	7/17/2019	9/25/2019
Air Content	7.6	5.7	7
Slump	5.5	5.5	6
Temperature	69	71	81
Density (pcf)	14.2	141.8	141.2
Strength at	Days Old		
Cylinder 1			
Cylinder 2			
Average			
Strength at	Days Old		
Cylinder 1	3720	4000	3610
Cylinder 2			
Average	3720	4000	3610
Strength at	Days Old		
Cylinder 1	5080	5820	5460
Cylinder 2	5330	5940	5380
Average	5205	5880	5420

Statement of Verification

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

Signed: NANCY DONAHUEDate: 4/2/20Title: Technical Service / MCA-ACI Level II Certified Technician

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 RICHARD T DOHERTY
CONCRETE SUPPLIER Superior Materials		PLANT LOCATION 20565 Hoover Road, Detroit, MI 48205	PLANT NUMBER Plant 2 (M-16)
GRADE OF CONCRETE S1	PSI REQUIREMENT 4000	MIX DESIGN NUMBER S1H5ERCNA002	INTENDED USE (S) FOUNDATIONS
CONTRACTOR QC PLAN SUBMITTED? (MDOT use only)		Y ☐ N ☐	
PRIME / SUBCONTRACTOR (S)			

MERLO CONSTRUCTION CO. INC.

STANDARD SPEC DATE 2012	QC/QA SPECIAL PROVISION 12SP-604A-09	DATE 6/11/2018	JMF EFFECTIVE DATE 4/2/2020	AGG. CORRECTION 0.2
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MATERIALS DESIGN SOURCES AND PROPERTIES

COARSE AGGREGATE		INTERMEDIATE AGGREGATE		FINE AGGREGATE	
Aggregate Type	limestone	Aggregate Type	NA	Aggregate Type	NA
Source Name	Presque Isle	Source Name	NA	Source Name	Levy - Ray Road
MDOT Source Number	71-47	MDOT Source Number	NA	MDOT Source Number	63-115
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)	2.62
Specific Gravity (Bulk SSD) optional		Specific Gravity (Bulk SSD) optional		Specific Gravity (Bulk SSD) optional	
Absorption	1.3	Absorption	0	Absorption	1.1
Unit Weight (Dry Rodded) DR or	98	Unit Weight (Dry Rodded) DR or	0	Unit Weight (Dry Rodded) DR or	
Unit Weight (Dry Loose) DL		Unit Weight (Dry Loose) DL		Unit Weight (Dry Loose) DL	
Percent Crushed	100	Percent Crushed	100	Percent Crushed	
MDOT Freeze-Thaw (F-T) Dilation	0.016	MDOT Freeze-Thaw (F-T) Dilation	NA	MDOT Freeze-Thaw (F-T) Dilation	
Specific Gravity (Bulk Dry) of F-T Sample *	2.56	Specific Gravity (Bulk Dry) of F-T Sample *	NA	Specific Gravity (Bulk Dry) of F-T Sample *	
Date of MDOT Freeze-Thaw Report	5/8/2014	Date of MDOT Freeze-Thaw Report	NA	Date of MDOT Freeze-Thaw Report	

* 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		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		NA	NA	NA	
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)	0.65	Design Slump* (in)	5.0 (3.5-6)
Coarse Aggregate Weight (Dry)	1708	Specified Slump (in)	0 - 6
Intermediate Aggregate Weight (Dry)	0	Design Air %	6.5%
Fine Aggregate Weight (Dry)	1214	Specified Air %	5.5% - 8.5%
Portland Cement Weight	458	PSI minimum required	4000
Fly Ash Weight	0		
Fly Ash Percent of Cementitious	0	Total Cementitious	611
Slag Cement Weight	153		
Slag Cement Percent of Cementitious	25	Yield cu/ft	27
Total Water Weight	301		
Net Water Weight	265		
W/C (as designed)	0.43		
Air Entrainer* (dosage)	1.0 oz/cwt	HR (dosage)	NA NA
WR (dosage)	4.0 oz/cwt	Accelerator (dosage)	NA NA
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: 2020.04.02 10:53:29 -04'00'

MCA Level II Expiration Date: **4/15/2021**

Date: **4/2/2020**

Remarks:

Portland Cement Concrete (PCC) Mixture Design Verification:For PCC Grade: S1**Mix Verification:** For Mix Number: S1H5ERCNA002**Mix Verification Method:** 2Mix Verification tests conducted by: Superior Materials, LLC LaboratoryProject Number: 82000Address: 10147 Grand RiverJob Number: 205935City / State / Zip Brighton, MI 48116Telephone: 248-788-8000**Verification Mix Proportions***

Workability Factor, b/bo	<u>0.65</u>	
b/bo, Based on Unit Weight (DL) or (DR)	<u>DR</u>	
Coarse Aggregate Weight (Dry)	<u>1708</u>	
Intermediate Aggregate Weight (Dry)	<u>0</u>	
Fine Aggregate Weight (Dry)	<u>1214</u>	
Portland Cement Weight	<u>458</u>	
Fly Ash Weight	<u>0</u>	
Fly Ash Percent of Cementitious	<u>0</u>	
GGBFS Weight	<u>153</u>	
GGBFS Percent of Cementitious	<u>25</u>	
Total Water Weight	<u>301</u>	
Net Water Weight	<u>265</u>	
W/C (as designed)	<u>0.43</u>	
Air Entrainment (dosage)	<u>1.0</u>	oz/cwt
Water Reducer (dosage)	<u>4.0</u>	oz/cwt
Mid Range Water Reducer (dosage)	<u>8.0</u>	oz/cwt
High Range Water Reducer (dosage)	<u>NA</u>	NA
Accelerator (dosage)	<u>NA</u>	NA
Other (dosage)	<u>NA</u>	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	8/30/2018	8/30/2018	10/23/2018
Air Content	6.5	6.8	7.1
Slump	4.75	5.25	5.75
Temperature	78	78	67
Density (pcf)	142.3	142	141.8
Strength at	Days Old		
Cylinder 1			
Cylinder 2			
Average			
Strength at 7	Days Old		
Cylinder 1	0	0	0
Cylinder 2			
Average	0	0	0
Strength at 28	Days Old		
Cylinder 1	4780	4840	4700
Cylinder 2	6710	6070	7160
Average	6400	6070	7490

Statement of Verification

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

Signed: NANCY DONAHUEDate: 4/2/20Title: Technical Service / MCA-ACI Level II Certified Technician

SUPERIOR MATERIALS, INC

STANDARD OPERATING PROCEDURE

FUNCTION	OPERATIONS
----------	------------

TOPIC	AGGREGATE STOCK PILE MANAGEMENT & USE
-------	--

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
 2. INCLUDE MDOT PIT NUMBER
- 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.

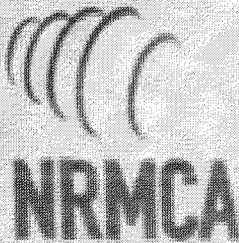
(3) **RESPONSIBILITIES**

- 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]
Signature of Licensed Professional Engineer

June 28, 2019

Inspection Date

July 05, 2021

Certification Expiration Date

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

[Signature]

Signature of Company Official

Operations Manager

Title of Company Official

NOTICE: The *Check List* indicates only that plant facilities are satisfactory for the production of concrete when properly operated. Conformance of the concrete itself with specification requirements must be verified by usual inspection methods in accordance with sales agreements.

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

Plant ID #: 902861

Certification ID #: 24708

© 1963, 1992, 2004, 2002, 2004, 2007, 2012

National Ready Mixed Concrete Association, 500 Spring 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-a200324104411

Test Date: 02/07/2020

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
02/07/2020	08/08/2020	Semi-Annually	72113-a	III
SCALE LOCATION		EQUIPMENT CONDITIONS		
CEMENT SCALE		Working	Clean	
SELECT NUMBER OF PM DAYS:		CAPACITY	10000 UOM	LB INCREMENT 5

AS FOUND TEST USING TEST WEIGHTS

Weight Applied	Reading	Error
0	LB 0	LB 0
6000	LB 6000	LB 0
0	LB 0	LB 0
	LB	LB
	LB	LB
	LB	LB
	LB	LB
	LB	LB
	LB	LB
	LB	LB
	LB	LB

AS LEFT TEST USING TEST WEIGHTS

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

AS LEFT BUILD TEST

Test Weight Applied	Material Weight Applied	Reading	Error
6000	LB 3600	LB 9600	LB 0
	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 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-a200324104411

Test Date: 02/07/2020

ISO Number: MS-FM-CEM-001

TEST INFORMATION

TEST WEIGHT CLASSIFICATION	EXPANDED UNCERTAINTY
F	3.68
ENVIRONMENTAL CONDITIONS	TEMPERATURE
Acceptable	30
WAS THE SCALE WITHIN CUSTOMERS REQUIRED ACCURACY?	
Yes	
TEST LOCATION	OVERALL RESULT
Onsite	Pass adjustment needed

Comments:

TRACEABILITY CERTIFICATE NUMBERS:

Kit	NIST	Date	Date Due
Description			
GL0601	MI-06-19-14292	6/13/2019	6/13/2021
TRUCK 6 - 1000 LB			
GL0602	MI-06-19-14292	6/13/2019	6/13/2021
TRUCK 6 - 1000 LB			
GL0603	MI-06-19-14292	6/13/2019	6/13/2021
TRUCK 6 - 1000 LB			
GL0604	MI-06-19-14292	6/13/2019	6/13/2021
TRUCK 6 - 1000 LB			
GL0605	MI-06-19-14292	6/13/2019	6/13/2021
TRUCK 6 - 1000 LB			
GL0606	MI-06-19-14292	6/13/2019	6/13/2021
TRUCK 6 - 1000 LB			

Technician(s): JOE BIELARZ;ray

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

Certificate of Calibration

Customer: SUPERIOR MATERIALS 2
SUP1048 20565 HOOVER

Certificate ID: 72113-b200324104725

Test Date: 02/07/2020

DETROIT, MI

ISO Number: MS-FM-CEM-001

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

CALIBRATION DATE	DUE DATE	TEST INTERVAL	SCALE ID	SCALE CLASS
02/07/2020	08/08/2020	Semi-Annually	72113-b	III L
SCALE LOCATION		EQUIPMENT CONDITIONS		
AGG SCALE		Working	Clean	
SELECT NUMBER OF PM DAYS:		CAPACITY	40000 UOM	LB INCREMENT 40

AS FOUND TEST USING TEST WEIGHTS

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

AS LEFT TEST USING TEST WEIGHTS

Weight Applied	Reading	Error
	LB	LB
	LB	LB
	LB	LB
	LB	LB
	LB	LB
	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 32000	LB 34000	LB 0
4000	LB 32000	LB 36000	LB 0
6000	LB 32000	LB 38000	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-b200324104725

Test Date: 02/07/2020

ISO Number: MS-FM-CEM-001

TEST INFORMATION

TEST WEIGHT CLASSIFICATION	EXPANDED UNCERTAINTY
F	27
ENVIRONMENTAL CONDITIONS	TEMPERATURE
Acceptable	30
WAS THE SCALE WITHIN CUSTOMERS REQUIRED ACCURACY?	
Yes	
TEST LOCATION	OVERALL RESULT
Onsite	Pass w/o adjustment

Comments:

TRACEABILITY CERTIFICATE NUMBERS:

Kit	NIST	Date	Date Due
Description			
GL0601	MI-06-19-14292	6/13/2019	6/13/2021
TRUCK 6 - 1000 LB			
GL0602	MI-06-19-14292	6/13/2019	6/13/2021
TRUCK 6 - 1000 LB			
GL0603	MI-06-19-14292	6/13/2019	6/13/2021
TRUCK 6 - 1000 LB			
GL0604	MI-06-19-14292	6/13/2019	6/13/2021
TRUCK 6 - 1000 LB			
GL0605	MI-06-19-14292	6/13/2019	6/13/2021
TRUCK 6 - 1000 LB			
GL0606	MI-06-19-14292	6/13/2019	6/13/2021
TRUCK 6 - 1000 LB			

Technician(s): JOE BIELARZ;ray

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 02

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: 02/13/2020



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

ADMIXTURE GENERAL CERTIFICATION

Date: Thursday, April 02, 2020

Contractor: MERLO CONSTRUCTION CO. INC.

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: Levy Co.
Attn.: Mitchell Holt
8800 Dix Rd.
Detroit, MI 48209

Report Date: 01/15/20
Job No.: 187540
Report No.: 019278A
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: Ray Rd. (Pit #63-115)
Coarse Aggregate Source: #57 crLS MMA Phillipsburg, OH
Cement Source: Fairborn Cement Company
Date Received: 11/26/18
Date Cast: 01/15/19

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

Average Length Change, %		ASTM C 1293 Specification, %
56 Days:	0.011	---
90 Days:	0.015	---
180 Days:	0.026	---
270 Days:	0.028	---
365 Days:	0.030	0.040 Max.

Bowser-Morner certifies that this test was performed in accordance with ASTM C1293 procedures.
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
019278A
1-File
1-mholt@edwlevy.com

Report To: Levy Co.
Sample ID: MDOT 2NS
Source: Ray Rd. (Pit #63-115)

Job No.: 187540
Report No.: 019278A
Date Received: 11/26/18

Concrete Mixture Summary

Aggregates Used	Type	Source	Grading
Coarse (Lab Standard)	#57 crLS	MMA Phillipsburg	Table 1, coarse
Fine (Subject)	MDOT 2NS	Ray Rd. (Pit #63-115)	Table 1, fine
Cement Used	Source	Type	Na ₂ O Equiv., %
Fairborn Cement Co.	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	Fairborn Cement Co.*	3.15	708	3.60195
Water	BMI Standard	1.00	297	4.75962
#57 crLS	MMA Phillipsburg*	2.648	1847	11.17801
MDOT 2NS	Ray Rd. (Pit #63-115)	2.655	1207	7.28548
Entrained Air, %:	n/a	n/a	2.3	0.62100
Total	n/a	n/a	4059	27.4

*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	0.419	3 3/4	2.3
Fresh Unit Weight, cubic yard	Mass Yield, %		
149.7	100.4		

Storage Containers

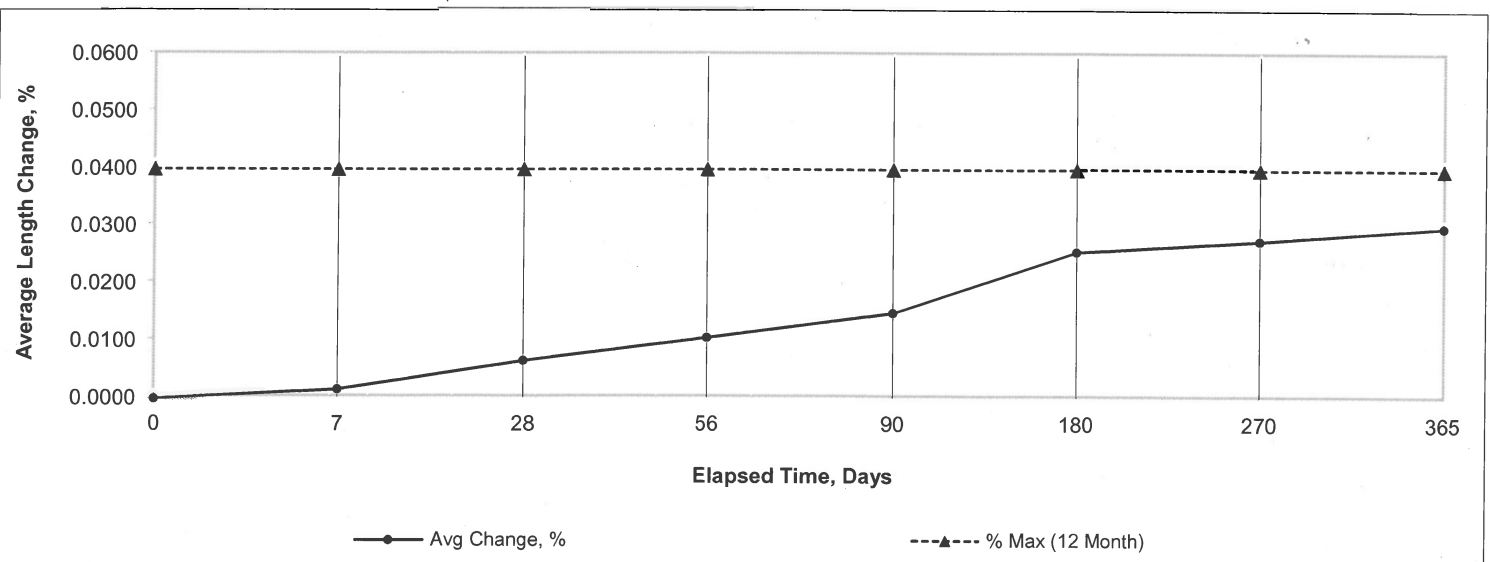
6-gallon (23-liter) plastic pail with gamma seal lid conforming to ASTM C1293, sections 5.2.1 and 5.3.1

Report To: Levy Co.
Sample ID: MDOT 2NS
Source: Ray Rd. (Pit #63-115)
Date Cast: 01/15/19

Job No.: 187540
Report No.: 019278A
Date Received: 11/26/18
Ref. Rod Length: 11.631805

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 01/16/19	A	0.0000	-0.0041	11.6277	n/a	0.0000
	B	0.0000	-0.0120	11.6198	n/a	
	C	0.0000	-0.0093	11.6225	n/a	
7 01/23/19	A	0.0000	-0.0039	11.6279	0.0020	0.0017
	B	0.0000	-0.0119	11.6199	0.0010	
	C	0.0000	-0.0091	11.6227	0.0020	
28 02/13/19	A	0.0000	-0.0035	11.6283	0.0060	0.0067
	B	0.0000	-0.0115	11.6203	0.0050	
	C	0.0000	-0.0084	11.6234	0.0090	
56 03/13/19	A	0.0000	-0.0032	11.6286	0.0090	0.0107
	B	0.0000	-0.0110	11.6208	0.0100	
	C	0.0000	-0.0080	11.6238	0.0130	
90 04/17/19	A	0.0000	-0.0027	11.6291	0.0140	0.0150
	B	0.0000	-0.0106	11.6212	0.0140	
	C	0.0000	-0.0076	11.6242	0.0170	
180 07/17/19	A	0.0000	-0.0017	11.6301	0.0240	0.0257
	B	0.0000	-0.0095	11.6223	0.0250	
	C	0.0000	-0.0065	11.6253	0.0280	
270 10/16/19	A	0.0000	-0.0014	11.6304	0.0270	0.0277
	B	0.0000	-0.0094	11.6224	0.0260	
	C	0.0000	-0.0063	11.6255	0.0300	
365 01/15/20	A	0.0000	-0.0013	11.6305	0.0280	0.0300
	B	0.0000	-0.0090	11.6228	0.0300	
	C	0.0000	-0.0061	11.6257	0.0320	



Portland Cement Type I/II

Production Period: 2/01/2020 to 2/29/2020

STANDARD REQUIREMENTS

Chemical Data			Physical Data		
Item	Spec. Limit	Results	Item	Spec. Limit	Results
SiO ₂ (%)		19.5	Air Content of mortar (volume %)	12.0 max	8
Al ₂ O ₃ (%)	6.0 max	5.1	Blaine fineness (m ² /kg)	260.0 min	399
Fe ₂ O ₃ (%)		3.06	Autoclave expansion (%)	0.8 max	0.05
CaO (%)		62.1			
MgO (%)	6.0 max	3.1	Compressive strength (MPa/psi):		
SO ₃ (%)*	3.0 max	3.76	1 day		18.6 [2698]
Loss of ignition (%)	3.5 max	1.4	3 days	12.0[1740] min	27.0 [3911]
Na ₂ O (%)		0.23	7 days	19.0[2760] min	31.5 [4564]
K ₂ O (%)		0.94	28 days (previous month)	28.0[4060] min	38.0 [5508]
Insoluble residue (%)	1.5 max	0.27	Time of setting (minutes)		
CO ₂ (%)		0.6	(Vicat) Initial	45 - 375	88
Limestone (%)	5.0 max	1.4	(Vicat) Final		190
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	0.009
Potential phase composition			Base Cement Phase Composition		
C ₃ S (%)		55	C ₃ S (%)		55
C ₂ S (%)		15	C ₂ S (%)		15
C ₃ A (%)	8 max	8	C ₃ A (%)		8
C ₄ AF (%)		9	C ₄ AF (%)		9

OPTIONAL REQUIREMENTS

Item	Spec. Limit	Results	Item	Spec. Limit	Results
Equiv. Alkalies	A	0.85	False Set (%)	50 min	
			Retained 325 (%)		4.23

Additional Data

Type	Limestone	Inorganic Processing Addition
Amount	1.4	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, A3005 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 C1038 that the cement will not develop expansion exceeding 0.02% in 14 Days

A Test result provided for information only.

March 26, 2020

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: 2/01/2020 to 2/29/2020

STANDARD REQUIREMENTS - SLAG

Chemical Data			Physical Data		
Item	Spec. Limit	Results	Item	Spec. Limit	Results
Sulfide Sulfur (S) (%)	2.5 max	0.7	Air Content of mortar (volume %)	12 max	5
Sulfate Sulfur (as SO ₃) (%)		1.7	Blaine fineness (m ² /kg)	260 min	536
Added Sulfate Sulfur (as SO ₃) (%)			Retained 325 (%)		2.42
Inorganic process addition (%)	5.0 max		Compressive strength (MPa/psi):		
			7 days		23.5 [3407]
			28 days (previous month)		43.3 [6285]
			Slag Activity Index (%) (SAI)		
			7 Day		82.8
			28 Day	95 min	120.1

STANDARD REQUIREMENTS - REFERENCE CEMENT

Chemical Data			Physical Data		
Item	Spec. Limit	Results	Item	Spec. Limit	Results
Equiv. Alkalies	A	0.89	Blaine fineness (m ² /kg)	260 min	390
Potential phase composition					
C ₃ S (%)		58	Compressive strength (MPa/psi):		
C ₂ S (%)		15	7 days		28.4 [4116]
C ₃ A (%)		8	28 days		36.1 [5232]
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 (%)	0.04
SiO ₂ (%)			
Al ₂ O ₃ (%)			
Fe ₂ O ₃ (%)			
CaO (%)			
SO ₃ (%)			

This cement meets ASTM C989 and AASHTO M302 Specifications for Grade 100 Slag Cement and CSA A3001 for Type S Slag Cement

A Test result provided for information only.

March 30, 2020

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



8800 Dix Ave., Detroit, MI 48209

Weekly Product Conformance Report

For Week of March 02 2020 to March 07 2020

Product: 2NS Natural Sand

Location: American Aggregate, Ray Road Plant

State Pit Number: 63-115

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	65-95	35-75	20-55	10-30	0-10	0-3.0	2.70 - 3.10
Percent Passing									
2018 Shipping Average	100	96	78	61	46	25	5	0.8	2.89
February Average	100	96	78	62	47	25	6	0.9	2.86
Week of 03/02/2020	No Shipping								

Average Physical Property Data

ASTM C 29, Loose Unit Weight (2019 Average) - 111 lb/ft³

ASTM C 29, Rodded Unit Weight (2019 Average) - 117 lb/ft³

ASTM C 128, Bulk Specific Gravity Dry (2019 Average) - 2.669

ASTM C 128, Bulk Specific Gravity SSD (2019 Average) - 2.692

ASTM C 128, Absorption (2019 Average) - 0.8%

ASTM C 142, Clay Lumps and Friable Particles in Aggregate - 0.3% -- TTL

ASTM C 123, Lightweight Particles in Aggregate (Coal & Lignite @ 2.00 Gs) - 0.3% -- 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 - 39.7%

MTM 118, Fine Aggregate Angularity - 1.5

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.



8800 Dix Ave., Detroit, MI
48209

Weekly Product Conformance Report

For Week of March 02 2020 to March 07 2020

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							
2019 Shipping Average	100	98	80	43	25	5	1.3
February Average	100	99	97	52	29	5	1.3
Week of 03/02/2020	100	99	89	55	32	7	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 (2019 Average) - 91 lb/ft³

ASTM C 29, Rodded Unit Weight (2019 Average) - 99 lb/ft³

ASTM C 127, Bulk Specific Gravity Dry (2019) - 2.66

ASTM C 127, Bulk Specific Gravity SSD (2019) - 2.70

ASTM C 127, Absorption (2019) - 1.4%

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

ASTM C 131, Abrasion and Impact in the Los Angeles Machine - 31%

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

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.

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

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

* Micro Air became MasterAir AE 200 under the Master Builders Solutions brand, effective January 1, 2014.

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BASF Corporation
Admixture Systems

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1800 Clark Boulevard
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ■ Fax: 905 792-0651



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.

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.

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

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* 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/yd³ (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

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

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Detroit Concrete Laboratory, 9333 Dearborn Street, Detroit MI 48209

ASTM - C 1567

Standard Test Method for Determining the Potential Alkali Reactivity of Combinations of Cementitious Materials and Aggregates

Customer: Superior Materials
Address: 30701 W. 10 Mile Road, Suite 500
Farmington Hills, MI 48336
Phone: 248-788-8000

Date Materials Received: 4/24/2018

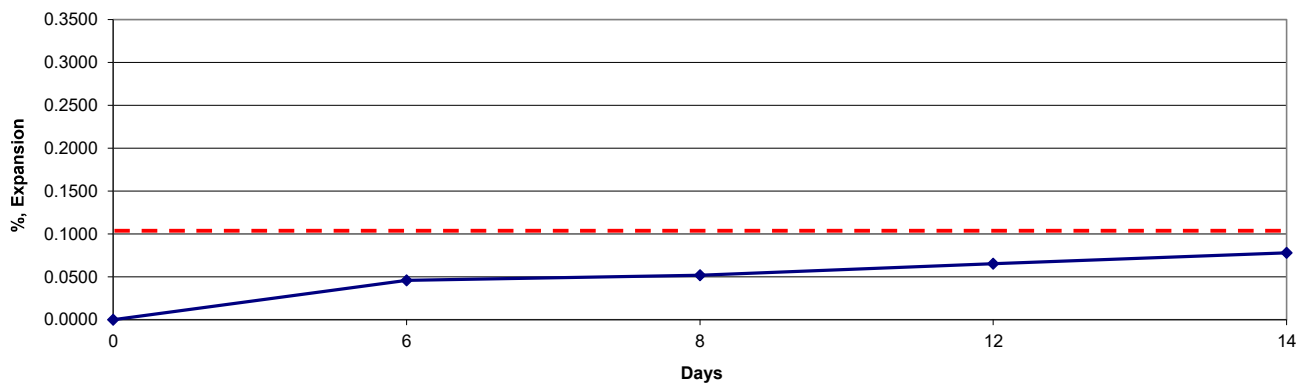
Material Type: Concrete Sand, Ray Road, MDOT #63-115
Material Type: Crushed Limestone, Presque Isle, MDOT #71-47
Cement Used: SMC Detroit T-I Portland Cement
SCM Used: SMC Detroit, Grade 100, Slag Cement

Bar Length = 11.25 Inch
Stud Length = 0.625 Inch
Gauge Length = 10 Inch

56% Coarse Aggregate / 44% Fine Aggregate / 0% Slag Cement

Date & Time Cast		Gauge reading			Length Change			% Expansion			Avg. Expansion
		A	B	C	A	B	C	A	B	C	
D&T Initial Reading	5/15/18 2:30 PM	-0.0478	-0.0780	-0.0603	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
D&T 0 Day Reading	5/17/18 2:30 PM	-0.0448	-0.0750	-0.0557	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
D&T 6 Day Reading	5/23/18 2:30 PM	-0.0395	-0.0698	-0.0524	0.0053	0.0052	0.0033	0.0530	0.0520	0.0330	0.0460
D&T 8 Day Reading	5/25/18 2:30 PM	-0.0389	-0.0692	-0.0518	0.0059	0.0058	0.0039	0.0590	0.0580	0.0390	0.0520
D&T 12 Day Reading	5/29/18 2:30 PM	-0.0373	-0.0677	-0.0509	0.0075	0.0073	0.0048	0.0750	0.0730	0.0480	0.0653
D&T 14 Day Reading	5/31/18 2:30 PM	-0.0360	-0.0664	-0.0497	0.0088	0.0086	0.0060	0.0880	0.0860	0.0600	0.0780

56% Coarse Aggregate / 44% Fine Aggregate / 0% Slag Cement



56% Coarse Aggregate / 44% Fine Aggregate / 0% Slag Cement