



Submittal Number	001.A
Project name	4 th Street Extension – Phase 2 From Tuscola St. To Brainard St
Project Number	PW-7045
Engineer/Architect	HNTB
Prime Contractor	MAJOR CONTRACTING GROUP 15347 DALE STREET DETROIT, MI 48223
Supplier	Hercules Concrete LLC
Specification Section Number	- City of Detroit Special Provision for Pavt Repr, Rem, Modified, Pavt Repr Nonreinf Conc, Modified, Concrete Pavement, Modified and Concrete Base Pavement, Modified - City of Detroit Specification for Sidewalks - City of Detroit Specification for Sidewalk Ramp, ADA and Detectable Warning Surface
Submittal Item	Concrete Mix Design
Date Submitted	08/05/2022

REVIEWED BY: Aaron Nguyen
Construction Engineer



Somat Engineering,
INCORPORATED

26445 Northline Road | Taylor, Michigan 48180



Approved



Approved as Noted



Rejected



Revise & Resubmit

Date: 08/11/2022



8/5/2022

Major Contracting Group
15347 Dale Street
Detroit, MI 48223
Attn: Dan Scappaticci

Project: PW-7037 City of Detroit 4th Street Extension Phase 2

We submit the following mixes for the project listed above.

MIX ID	Description
P1-SW	MDOT P1 3500 PSI AE W/WR – 3" MAX
P1-SM	MDOT P1 3500 PSI AE W/MR – 6" MAX

The mix designs listed above have been designed in accordance with MDOT 2012 Standard Specifications for Construction and the project specifications also in reference to ACI 318-08, chapter 5 (Quality Concrete), and ACI standard deviation / over design requirements. Please forward any and all concrete tests for record keeping purposes to gcbreakdata@herculesconcrete.com

Please do not hesitate to reach out to your salesman or any Hercules staff for further assistance should you need anything further.

Respectfully submitted,

Giuseppe Palumbo
Sales Manager
Hercules Concrete LLC.

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	JOB NUMBER	PROJECT LOCATION City of Detroit PW 7045 4th street Extension	PROJECT ENGINEER City of Detroit
CONCRETE SUPPLIER Hercules Materials Holdings, LLC		PLANT LOCATION 6497 E 10 Mile Road, Centerline / 2791 W Jefferson, Detroit MI	PLANT NUMBER HMH-04-CEN / 01-DET
GRADE OF CONCRETE 3500	PSI REQUIREMENT 3500	MIX DESIGN NUMBER P1-SW	INTENDED USE (S) Curb / Pavement
CONTRACTOR QC PLAN Y ☐ SUBMITTED? (MDOT use only) N ☐			
PRIME / SUBCONTRACTOR(S) Major Contracting Group / All Sub Contractors			
STANDARD SPEC DATE 01/01/20	QC/QA SPECIAL PROVISION DATE 04/03/20	JMF EFFECTIVE DATE 08/05/22	AGG. CORRECTION 0.2

MATERIAL DESIGN SOURCES AND PROPERTIES

COARSE AGGREGATE		INTERMEDIATE AGGREGATE		FINE AGGREGATE	
Aggregate Type	Limestone	Aggregate Type		Source Name	Stoneco-Burmeister
Source Name	Calcite	Source Name		MDOT Source No.	81-093
MDOT Source No.	71-3	MDOT Source No.		MDOT Series Class	2NS
MDOT Series Class	6AA	MDOT Series Class		Specific Gravity (Bulk Dry)*	2.61
Specific Gravity (Bulk Dry)*	2.53	Specific Gravity (Bulk Dry)*		Specific Gravity (Bulk SSD) optional	2.64
Specific Gravity (Bulk SSD) optional	2.57	Specific Gravity (Bulk SSD) optional		Absorption	1.1
Absorption	1.5	Absorption		Fineness Modulus (FM)	2.87
Unit Weight (Dry Rodded) DR or	94.2	Unit Weight (Dry Rodded) DR or			
Unit Weight (Dry Loose) DL	83.9	Unit Weight (Dry Loose) DL			
Percent Crushed	100%	Percent Crushed			
MDOT Freeze-Thaw (F-T) Dilation	0.028	MDOT Freeze-Thaw (F-T) Dilation			
Specific Gravity (Bulk Dry) of F-T	2.54	Specific Gravity (Bulk Dry) of F-T			
Sample*		Sample*			
Date of MDOT Freeze-Thaw Report	08/22/18	Date of MDOT Freeze-Thaw Report			

* If the bulk dry 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 the use on Department projects.

CEMENTITIOUS		ADMIXTURES	
Cement Source / Plant	Ash Grove (Mississauga)	Air Entrainment	0AE-PCA Premiere ConAir-X
Cement Type	Type 1L	Water Reducer	0WR50-PCA Premiere Optiflo-50
Cement Specific Gravity	3.12	Water Reducer	
Fly Ash Source (distributer & plant)		Water Reducer	
Fly Ash Class		Accelerator	
Fly Ash Specific Gravity		Other	
Slag Cement Source	Ash Grove (Detroit)	(Indicate Source & Product name with ticket code)	
Slag Cement Grade	100		
Slag Cement Specific Gravity	2.90	TYPE OF MIX WINTER/SUMMER	Winter & Summer
Other			

MIX PROPORTIONS

Volume of Coarse Aggregate (DR)	66%	Design Slump	3"
Coarse Aggregate Weight (Dry)	1655 (SSD 1680)	Specified Slump	0-3"
Intermediate Aggregate Weight (Dry)		Design Air %	6.5%
Fine Aggregate Weight (Dry)	1343 (SSD 1358)	Specified Air %	5.5 - 8.5%
Portland Cement Weight	342	PSI minimum required	3500
Fly Ash Weight		Total Cementitious	526
Fly Ash Percent of Cementitious		Yield cu/ft	27 +/- .02
Slag Cement Weight	184		
Slag Cement Percent of Cementitious	35%		
Total Water Weight	274		
Net Water Weight	234		
WC (as designed)	0.44		
Air Entrainment (dosage)	1 oz/cwt		
Water Reducer (dosage)	3 - 5 oz/cwt		
Other (dosage)			

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

Signature **Shane Ziegler** Digitally signed by Shane Ziegler
Date: 2022.04.25 08:07:30 -04'00'

MCA Level II Expiration Date: 04/15/25

Date: 08/05/22



Concrete Mix Evaluation Report

Mix Verification Method 1

Mix ID P1-SW

Mix Name MDOT P1 3500 PSI 35%
GGBFS W/WR

Design Strength (f'c) 3500 psi @ 28 Days

Required Strength (f'cr) 4700 psi @ 28 Days

ACI 318 Required Average Strength

Number Of Tests 9

Average Strength 6112 psi

St Dev 571 psi

St Dev (Modified) 571 psi

4 Yard Trail Batch - Mix batch to proportions & materials on attached jmf

Test Date	Mix	Lab	Temp (Concrete) (F)	Slump (in)	Air Content (%)	Unit Weight (lb/ft3)	Comp Strength (7-Day) (psi)	Acceptance Strength (28-Day) (psi)	Moving Average (psi)
02/28/2022	P1-SW		64	2.5	5.5	144.4	4260	6620	
02/28/2022	P1-SW		64	2.5	5.5	143.2	3560	5850	
02/28/2022	P1-SW		63	3	5.2	141.2	3340	5510	5993
02/28/2022	P1-SW		64	3	4.5	145.2	4870	6720	6027
02/28/2022	P1-SW		63	3	7.4	140.2	3800	5180	5803
02/28/2022	P1-SW		65	2.75	5.6	143	4600	6480	6127
02/28/2022	P1-SW		63	2.75	6.1		4900	6800	6153
02/28/2022	P1-SW		64	2.25	6	143.2	3720	5870	6383
02/28/2022	P1-SW		63	2.5	6.2	142.4	4100	5980	6217

Each 28 Day Break is an average of 3 test cylinders

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CONTROL SECTION	JOB NUMBER	PROJECT LOCATION City of Detroit PW 7045 4th street Extension	PROJECT ENGINEER City of Detroit
CONCRETE SUPPLIER Hercules Materials Holdings, LLC		PLANT LOCATION 6497 E 10 Mile Road, Centerline / 2791 W Jefferson, Detroit MI	PLANT NUMBER HMH-04-CEN / 01-DET
GRADE OF CONCRETE 3500	PSI REQUIREMENT 3500	MIX DESIGN NUMBER P1-SM	INTENDED USE (S) Pavement / Walks
		CONTRACTOR QC PLAN	Y ☐
		SUBMITTED? (MDOT use only)	N ☐
PRIME / SUBCONTRACTOR(S) Major Contracting Group / All Sub Contractors			
STANDARD SPEC DATE 01/01/20	QC/QA SPECIAL PROVISION DATE 04/03/20	JMF EFFECTIVE DATE 08/05/22	AGG. CORRECTION 0.2

MATERIAL DESIGN SOURCES AND PROPERTIES

COARSE AGGREGATE		INTERMEDIATE AGGREGATE		FINE AGGREGATE	
Aggregate Type	Limestone	Aggregate Type		Source Name	Stoneco-Burmeister
Source Name	Calcite	Source Name		MDOT Source No.	81-093
MDOT Source No.	71-3	MDOT Source No.		MDOT Series Class	2NS
MDOT Series Class	6AA	MDOT Series Class		Specific Gravity (Bulk Dry)*	2.61
Specific Gravity (Bulk Dry)*	2.53	Specific Gravity (Bulk Dry)*		Specific Gravity (Bulk SSD) optional	2.64
Specific Gravity (Bulk SSD) optional	2.57	Specific Gravity (Bulk SSD) optional		Absorption	1.1
Absorption	1.5	Absorption		Fineness Modulus (FM)	2.75
Unit Weight (Dry Rodded) DR or	94.2	Unit Weight (Dry Rodded) DR or			
Unit Weight (Dry Loose) DL	83.9	Unit Weight (Dry Loose) DL			
Percent Crushed	100%	Percent Crushed			
MDOT Freeze-Thaw (F-T) Dilation	0.028	MDOT Freeze-Thaw (F-T) Dilation			
Specific Gravity (Bulk Dry) of F-T	2.54	Specific Gravity (Bulk Dry) of F-T			
Sample*		Sample*			
Date of MDOT Freeze-Thaw Report	08/22/18	Date of MDOT Freeze-Thaw Report			

* If the bulk dry 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 the use on Department projects.

CEMENTITIOUS		ADMIXTURES	
Cement Source / Plant	Ash Grove (Mississauga)	Air Entrainment	0AE-PCA Premiere ConAir-X
Cement Type	Type 1L	Water Reducer	0MR50-PCA Premiere OptiFlo-50
Cement Specific Gravity	3.12	Water Reducer	
Fly Ash Source (distributer & plant)		Water Reducer	
Fly Ash Class		Accelerator	
Fly Ash Specific Gravity		Other	
Slag Cement Source	Ash Grove (Detroit)	(Indicate Source & Product name with ticket code)	
Slag Cement Grade	100		
Slag Cement Specific Gravity	2.90	TYPE OF MIX WINTER/SUMMER	Winter & Summer
Other			

MIX PROPORTIONS

Volume of Coarse Aggregate (DR)	66%	Design Slump	5"
Coarse Aggregate Weight (Dry)	1655 (SSD 1680)	Specified Slump	4-6"
Intermediate Aggregate Weight (Dry)		Design Air %	6.5%
Fine Aggregate Weight (Dry)	1343 (SSD 1358)	Specified Air %	5.5 - 8.5%
Portland Cement Weight	342	PSI minimum required	3500
Fly Ash Weight		Total Cementitious	526
Fly Ash Percent of Cementitious		Yield cu/ft	27 +/- .02
Slag Cement Weight	184		
Slag Cement Percent of Cementitious	35%		
Total Water Weight	274		
Net Water Weight	234		
WC (as designed)	0.44		
Air Entrainment (dosage)	1 oz/cwt		
Water Reducer (dosage)	5 - 6 oz/cwt		
Other (dosage)			

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

Signature **Shane Ziegler** Digitally signed by Shane Ziegler
Date: 2022.04.25 08:08:13 -04'00'

MCA Level II Expiration Date: 04/15/25

Date: 08/05/22



Concrete Mix Evaluation Report

Mix Verification Method 1

ACI 318 Required Average Strength

Mix ID P1-SM

Number Of Tests 6

Mix Name MDOT P1 3500 PSI AE 35%
GGBFS W/MR

Average Strength 5140 psi

Design Strength (f'c) 3500 psi @ 28 Days

St Dev 540 psi

Required Strength (f'cr) 4700 psi @ 28 Days

St Dev (Modified) 540 psi

4 yard trail batch - Mix batch to proportions & materials on attached jmf

Test Date	Mix	Lab	Temp (Concrete) (F)	Slump (in)	Air Content (%)	Unit Weight (lb/ft3)	Comp Strength (7-Day) (psi)	Acceptance Strength (28-Day) (psi)	Moving Average (psi)
02/24/2022	P1-SM		64	5.75	7.6	142.8	2740	5110	
02/24/2022	P1-SM		63	4.25	6.8		3730	5860	
02/24/2022	P1-SM		64	5	7.7	142.8	2680	4400	5123
02/24/2022	P1-SM		63	5.25	7.4	144.4	2790	4690	4983
02/24/2022	P1-SM		64	5	6		3050	5570	4887
02/24/2022	P1-SM		66	4.75	7.4	141	2650	5210	5157

Each 28 Day Break is an average of 3 test cylinders



Re: All MDOT Projects

Admixture General Certification

<u>Spec.# and Material Name</u>	<u>Manufacturer</u>	<u>Product Name</u>	<u>Hercules Item #</u>
903.01 – Air Entraining Admix	Premiere	ConAir-X	AE
903.01 - Air Entraining Admix	Mapei	GRT SA14	AE
903.02 – Water Reducing Admix	Premiere	OptiFlo-50 Ultra	MR
903.02 - Water Reducing Admix	Premiere	Flo 2000	HR
903.02 - Water Reducing Retarder	Premiere	ProLong L	RET
903.04 – Concrete Accelerators	Premiere	NitroCast K	NCA
903.01 - Air Entraining Admix	Premiere	ConAir 260	AE

We certify the above referenced materials are provided into the referenced project.

Respectfully Submitted,

Giuseppe Palumbo
Hercules Materials Holdgins, LLC



12225 Stephens Rd.
Warren, MI 48089

April 4, 2022

This letter is to notify all MDOT Project Engineers of Hercuels Materials Holdings, LLC, new MDOT Plant Number and Locations.

HMH-01-DET (Previously HER-01-DET)

Hercules Plant

2791 W Jefferson

Detroit, MI

HMH-02-TMP

Hercules Con E Co Portable Plant #2

2791 W Jefferson

Detroit, MI

HMH-03-TMP

Hercules Atlas Portable Plant #3

11811 Watson Road

Ypsilanti, MI

HMH-04-CEN (Previously HER-02-CEN)

Titan Plant

6497 E 10 Mile Road

Centerline, MI

Please note these changes, all new JMF's will be updated with these new MDOT Plant Number Designations. We have also put the new plant numbers on the NRMCA Certifications

Thank You,

Giuseppe Palumbo

Sales Manager

Hercules Materials Holdings, LLC

Hercules Materials Holdings, LLC
12225 Stephens Road,
Warren, MI 48089

3-23-2022

To Our Valued Customers,

This letter is to inform you of our change in cement this year. We are currently using Ash Grove Type I cement from Mississauga, Ontario. We will be using Ash Grove Type IL cement from Mississauga, Ontario. The new cement is currently being stocked at our RMC facilities.

The cement industry as a whole will be transferring production and sale of Type IL cement in our region. Type I cement will have limited availability this year. This is being implemented to address cement production from an environmental perspective. The cement industry recognizes that manufacturing cement is contributing negatively to environment, this change will reduce the carbon footprint of producing cement.

Type IL cement is an approved cement per ASTM C595 – *Standard Specification for Blended Hydraulic Cements*. This specification provides better utilization of materials and prediction of performance. It also provide more transparency for the users with respect to materials composition. With that said the Type IL no longer adheres to the requirements of ASTM C150 as the limestone content has been increased above the limit for type I.

Previous cements under ASTM C150 were permitted to contain up to 5.0% limestone fines and ASTM C595 permits up to 15.0% limestone fines.

MDOT recognizes and accepts the change from Type I to Type IL.

We have spent the past few months performing trials and researching the new cement. It is our opinion that the fresh and hardened properties of the new cement will perform similar to original type I it is replacing.

Previously submitted projects will be now using the new cement, please communicate any issues you have with your sales representative or me. I will continue to monitor the material from a technical standpoint but am confident in the new product.

Respectfully Submitted,
Hercules Materials Holdings, LLC



Jeremy Chesterfield
Director of Technical Services – 313-479-7404



GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

PAUL C. AJEGBA
DIRECTOR

March 22, 2022

Devon Gougeon
Ash Grove Cement
CRH Company
15225 Day Road
Dundee, MI 48131

Dear Devon Gougeon:

Subject: Approval Letter for the Ash Grove Cement Plant Location, Detroit Terminal

This letter is in response to your request to supply Type IL cement to the Michigan Department of Transportation (MDOT). After careful evaluation of your submittal, your request has been approved. Your company will remain on the MDOT Approved Manufacturers list for Portland Cement, Section 901. This letter can serve as verification of approval to supply to MDOT projects.

Please continue to submit Mill Test Reports biennially to:

MDOT-ConcreteTesting@Michigan.gov

If you should have any questions or concerns, please contact me at 517-812-8381 or ParsonsC2@Michigan.gov.

Sincerely,

Chris Parsons
Concrete Laboratory Supervisor

Devon Gougeon
Page 2
March 22, 2022

BFS:CFS:CP:ah

bcc: Kevin Kennedy
Tim Stallard
MDOT-MaterialsControl



CERTIFICATE OF ANALYSIS: MISSISSAUGA PLANT ASTM: PORTLAND-LIMESTONE CEMENT GENERAL USE (TYPE IL(10))

		ANALYSIS OF:		Sep-2021
ASTM C150-18 & AASHTO M85-18 REQUIREMENTS		LIMITS	RESULTS	TEST METHOD
PHYSICAL	Fineness 45 μm Sieve (%) Retained		7	ASTM C430
	Autoclave % Expansion	≤ 0.80	0.07	ASTM C151 / AASHTO T107
	Sulphate Expansion (%) *	≤ 0.020	0.008	ASTM C1038
	Initial Time of Set - Vicat (min)	45 ≤ (min) ≤ 420	128	ASTM C191 / AASHTO T131
	Blaine (m ² /kg)		435	ASTM C204, AASHTO T153
	Air Content (%)	≤ 12	8	ASTM C185 / AASHTO T137
	False Set (%)		71	ASTM C451
	Compressive Strengths at 1-day (MPa / PSI)		18.3 / 2648	ASTM C109 / C109M, AASHTO T106 / T106M
	Compressive Strengths at 3-day (MPa / PSI)	≥ 13.0 / 1890	29.5 / 4275	ASTM C109 / C109M, AASHTO T106 / T106M
	Compressive Strengths at 7-day (MPa / PSI)	≥ 20.0 / 2900	34.4 / 4990	ASTM C109 / C109M, AASHTO T106 / T106M
Compressive Strengths at 28-day (MPa / PSI) *	≥ 25.0 / 3620	41.1 / 5968	ASTM C109 / C109M, AASHTO T106 / T106M	
CHEMICAL	Loss on Ignition (LOI) (%)	≤ 10.0	4.6	ASTM C114 / AASHTO T105
	Insoluble Residue (%) *		- - -	ASTM C114 / AASHTO T105
	Sulphur Trioxide (SO ₃) (%)**	≤ 3.0	4.1	ASTM C114 / AASHTO T105
	Magnesium Oxide (MgO) (%)		2.3	ASTM C114 / AASHTO T105
	Silica Oxide (SiO ₂) (%)		19.2	ASTM C114, AASHTO T105
	Alumina Oxide (Al ₂ O ₃) (%)		5.1	ASTM C114, AASHTO T105
	Iron Oxide (Fe ₂ O ₃) (%)		2.2	ASTM C114, AASHTO T105
	Calcium Oxide (CaO) (%)		61.2	ASTM C114, AASHTO T105
	Total Alkali (%)		0.94	ASTM C114, AASHTO T105
	Free Lime (%)		0.7	
	CO ₂ in Cement (%)		3.6	ASTM C114, AASHTO T105
	Limestone Content (%)	5 ≤ (%) ≤ 15	9.7	ASTM C150 / C150M
	CaCO ₃ in Limestone (%)	≥70	83	ASTM C595, AASHTO M240
	C ₃ S (Adjusted) (%)		50	ASTM C150 / C150M
	C ₂ S (Adjusted) (%)		21	ASTM C150 / C150M
	C ₃ A (Adjusted) (%)		10	ASTM C150 / C150M
	C ₄ AF (Adjusted) (%)		7	ASTM C150 / C150M
COMMENTS:				
Parameters with no limit listed are included for information purposes only, and are not requirements of the standards.				
* Indicates result from previous month.				
** Compliant with ASTM C1038 Sulfate Expansion limit of 0.020% at 14-days.				
This certifies compliance with ASTM C595-20 and AASHTO M240-18 standards for General Use Portland-Limestone Cement.				
The data is typical of product shipped by Ash Grove, a Division of CRH Canada Group Inc. Individual shipments may vary.				
REPORT PREPARED BY:			PRINT DATE:	
Bruno Morgado				
Bruno Morgado, Optimization Manager			October 5, 2021	

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: Stoneco, Inc.
Attn.: Brian Wahl
7555 Whiteford Rd.
Ottawa Lake, MI 49267

Report Date: 07/07/21
Job No.: 196195
Report No.: 120398A
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: Burmeister
Coarse Aggregate Source: #57 crLS MMA Phillipsburg, OH
Cement Source: Fairborn Cement Company
Date Received: 06/15/20
Date Cast: 07/07/20

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

Average Length Change, %		ASTM C 1293 Specification, %
56 Days:	0.011	---
90 Days:	0.014	---
180 Days:	0.017	---
270 Days:	0.021	---
365 Days:	0.023	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
120398A
1-File
1-brian.wahl@mipmc.com

Report To: Stoneco, Inc.
Sample ID: MDOT 2NS
Source: Burmeister

Job No.: 196195
Report No.: 120398A
Date Received: 06/15/20

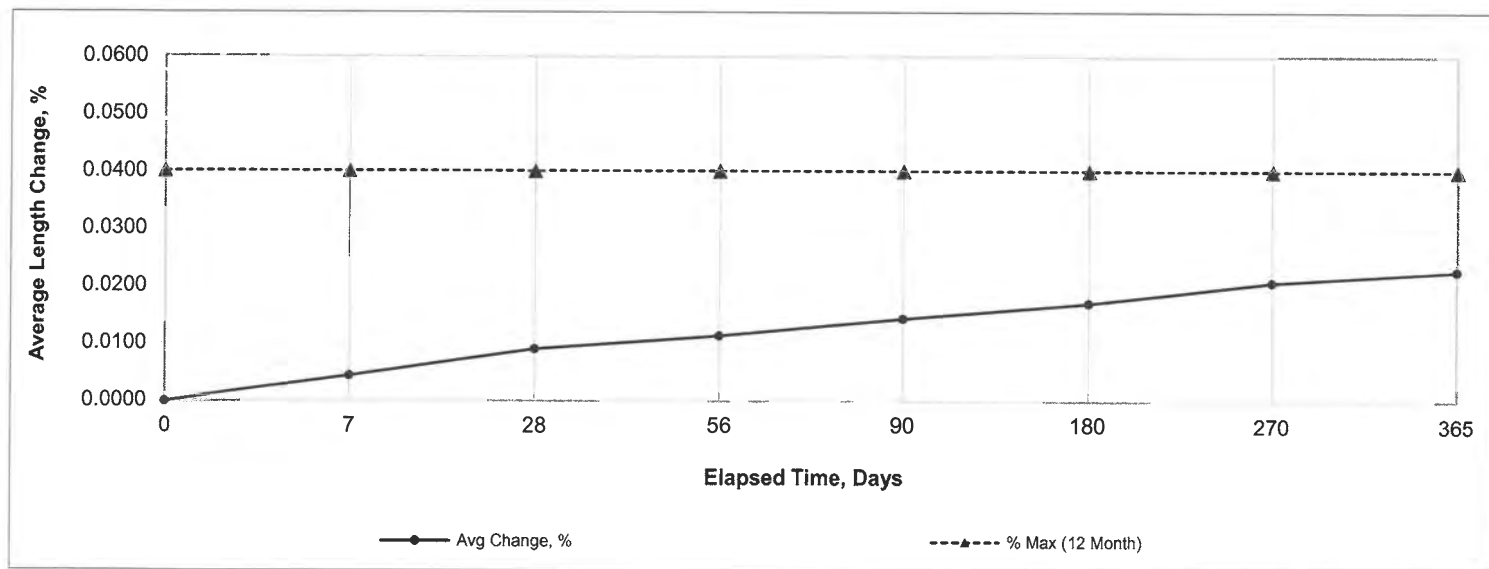
Concrete Mixture Summary				
Aggregates Used	Type	Source	Grading	
Coarse (Lab Standard)	#57 crLS	MMA Phillipsburg	Table 1, coarse	
Fine (Subject)	MDOT 2NS	Burmeister	Table 1, fine	
Cement Used	Source	Type	Na₂O Equiv., %	
Fairborn Cement Co.	Fairborn, OH	Portland Type I	0.8	
Pozzolan Used	Source	Type	Na₂O 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	Burmeister	2.653	1206	7.28493
Entrained Air, %:	n/a	n/a	2.6	0.70200
Total	n/a	n/a	4058	27.5
*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	2 3/4	2.6	
Fresh Unit Weight, cubic yard	Mass Yield, %			
149.6	100.5			
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: Stoneco, Inc.
Sample ID: MDOT 2NS
Source: Burmeister
Date Cast: 07/07/20

Job No.: 196195
Report No.: 120398A
Date Received: 06/15/20
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 07/08/20	A	0.0000	-0.0010	11.6308	n/a	0.0000
	B	0.0000	-0.0129	11.6189	n/a	
	C	0.0000	-0.0074	11.6244	n/a	
7 07/15/20	A	0.0000	-0.0008	11.6310	0.0020	0.0043
	B	0.0000	-0.0121	11.6197	0.0080	
	C	0.0000	-0.0071	11.6247	0.0030	
28 08/05/20	A	0.0000	-0.0004	11.6314	0.0060	0.0090
	B	0.0000	-0.0116	11.6202	0.0130	
	C	0.0000	-0.0066	11.6252	0.0080	
56 09/02/20	A	0.0000	-0.0004	11.6314	0.0060	0.0113
	B	0.0000	-0.0113	11.6205	0.0160	
	C	0.0000	-0.0062	11.6256	0.0120	
90 10/07/20	A	0.0000	0.0001	11.6319	0.0110	0.0143
	B	0.0000	-0.0112	11.6206	0.0170	
	C	0.0000	-0.0059	11.6259	0.0150	
180 01/06/21	A	0.0000	0.0004	11.6322	0.0140	0.0170
	B	0.0000	-0.0109	11.6209	0.0200	
	C	0.0000	-0.0057	11.6261	0.0170	
270 04/07/21	A	0.0000	0.0007	11.6325	0.0170	0.0207
	B	0.0000	-0.0103	11.6215	0.0260	
	C	0.0000	-0.0055	11.6263	0.0190	
365 07/07/21	A	0.0000	0.0009	11.6327	0.0190	0.0227
	B	0.0000	-0.0099	11.6219	0.0300	
	C	0.0000	-0.0055	11.6263	0.0190	





44265 Plymouth Oaks Blvd.
Plymouth, MI 48170
T 734-455-8600
F 734-455-8608
www.ttlassoc.com

June 1, 2022

MDOT Plant# HMH-01-DET

Mr. Tom Peters
Hercules Materials Holdings, LLC
12225 Stephens Road
Warren, Michigan 48089

RE: Concrete Plant Inspection for Hercules Concrete, Plant 1, Detroit, MI

Dear Mr. Peters:

TTL Associates, Inc. (TTL) on behalf of Hercules Materials Holdings (Hercules) performed a concrete plant inspection of the Hercules, Plant No. 1 located at 2791 West Jefferson Street in Detroit, Michigan on June 1, 2022.

This inspection was performed by Mr. Jeffrey Elliott, PE who is a National Ready Mixed Concrete Association (NRMCA) Inspecting Engineer, along with the NRMCA's Plant Certification Checklist, Revision 12. A copy of the completed checklist is attached to this letter. Based on this inspection, it has been determined that the Hercules Plant No. 1 is in conformance with the applicable NRMCA requirements.

If you have any questions or require further information, please feel free to contact us.

Respectfully submitted,

TTL Associates, Inc.

Jeffrey S. Elliott, P.E.
Vice President
(NRMCA Inspecting Engineer #803871)

Attachment



PJLA
Calibration
Accreditation # 59303

METRO SCALE COMPANY, INC.
17670 ALLEN ROAD, MELVINDALE, MI 48122
PHONE: (313) 382-6190 FAX: (313) 382-6194

SCALE CALIBRATION REPORT

81882

TECHNICIAN: <i>Mike Luth</i>	DATE: <i>3-4-22</i> Next Due:
SCALE MFG: Cardinal	CUSTOMER: HERCULES CONCRETE INC(DETROIT)
MODEL NO: 201	ADDRESS: 2791 W. JEFFERSON
SERIAL NO: E36419-0104	
LOCATION: Agg Scale	DETROIT, MI 48216

CAPACITY/RESOLUTION: 45,000 X 10 LB

CONDITION PRIOR TO CALIBRATION: ☒ ACCEPTABLE ☐ NEEDS REPAIR - UNABLE TO CAL.

UNITS OF MEASURE: ☒ POUNDS ☐ KG ☐ GRAMS ☐ OTHER:

CALIBRATED TO HANDBOOK 44 TOLERANCE: ☐ YES ☐ NO ☐ LEGAL FOR TRADE

APPLIED WEIGHT	TEST READING		SERIAL NUMBERS OF WEIGHTS USED:
	BEFORE	AFTER	
0 LB	0	0	0N76, 0N77, 115 @ 1000 LB
2000LB	2000	2000	
4000LB	4010	4010	Shift Test: Before L/C Cable/Indicator After Position 1: <i>NA</i> 1 2 Position 2: 3 4 Position 3: 3 4 Position 4:
6000LB	6010	6010	
12000LB	12,040	12,040	
24000LB	24,040	24,040	
36000LB	33,140	33,140	

COMMENTS:

SCALE OK FOR USE ☒ YES ☐ NO

NOTES:

- SCALE TOLERANCE AS APPLIED TO NIST HANDBOOK 44 REQUIREMENTS.
- DEVICES LISTED ON THIS SHEET WERE CHECKED AND CALIBRATED WITH WEIGHTS TRACEABLE TO SI THROUGH N.I.S.T. CERTIFICATIONS FOR TEST WEIGHTS ARE AVAILIABLE UPON REQUEST.
- CALIBRATION COMPLIES WITH MSC INSTRUCTION QW 4.11.02, ISO IEC 17025:2017 AND WITH REFERENCE TO NIST HANDBOOK 44 WHERE APPLICABLE.
- RESULTS OF THIS CALIBRATION RELATE ONLY TO THE ITEMS SPECIFIED ABOVE.
- THIS REPORT IS NOT TO BE REPRODUCED EXCEPT IN FULL, WITHOUT WRITTEN PERMISSION OF MSC.
- ALL CALIBRATIONS PERFORMED UNDER NORMAL WORKING ENVIORNMENTAL CONDITIONS UNLESS NOTED UNDER COMMENTS.
- THE UNCERTAINTY CALCULATIONS ARE AVAILABLE UPON WRITTEN REQUEST FROM THE CUSTOMER.
- END OF REPORT.

BMIH



METRO SCALE COMPANY, INC.
 17670 ALLEN ROAD, MELVINDALE, MI 48122
 PHONE: (313) 382-6190 FAX: (313) 382-6194

No. 9650

SCALE CALIBRATION REPORT

TECHNICIAN: <i>Alan Lulka / Mike Lulka</i>	DATE: <i>3-4-22</i> Next Due:
SCALE MFG: <i>Cardinal</i>	CUSTOMER: <i>Hercules Concrete</i>
MODEL NO: <i>201</i>	ADDRESS: <i>2791 W. Jefferson Inc.</i>
SERIAL NO: <i>E36119-0156</i>	
LOCATION: <i>Cement Scale</i>	<i>Detroit MI 48216</i>
CAPACITY/RESOLUTION: <i>10,000 x 2 lb</i>	
CONDITION PRIOR TO CALIBRATION: ☒ ACCEPTABLE ☐ NEEDS REPAIR – UNABLE TO CAL.	
UNITS OF MEASURE: ☒ POUNDS ☐ KG ☐ GRAMS ☐ OTHER:	
CALIBRATED TO HANDBOOK 44 TOLERANCE: ☐ YES ☐ NO ☐ LEGAL FOR TRADE	

APPLIED WEIGHT	TEST READING		SERIAL NUMBERS OF WEIGHTS USED:			
	BEFORE	AFTER				
0 lb	0	0	<i>0N76, 0N77, 115 @ 1000 lb</i>			
1000 lb	1000	1000				
2002 lb	2002	2002				
3004 lb	3004	3004				
4054 lb	4054	4054				
5000 lb	5000	5000				
6006 lb	6004	6004				

COMMENTS:

SCALE OK FOR USE ☒ YES ☐ NO

- NOTES:
- SCALE TOLERANCE AS APPLIED TO NIST HANDBOOK 44 REQUIREMENTS.
 - DEVICES LISTED ON THIS SHEET WERE CHECKED AND CALIBRATED WITH WEIGHTS TRACEABLE TO SI THROUGH N.I.S.T. CERTIFICATIONS FOR TEST WEIGHTS ARE AVAILABLE UPON REQUEST.
 - CALIBRATION COMPLIES WITH MSC INSTRUCTION QW 4.11.02, ISO IEC 17025:2017 AND WITH REFERENCE TO NIST HANDBOOK 44 WHERE APPLICABLE.
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 - THE UNCERTAINTY CALCULATIONS ARE AVAILABLE UPON WRITTEN REQUEST FROM THE CUSTOMER.
 - END OF REPORT.



ADMIXTURE DISPENSERS CALIBRATION FORM Page 1

CUSTOMER: Hercules Detroit DATE: 6/29/2022
ADDRESS: 115 Rosa Parks Blvd.
Detroit, Mi 48216

DATE OF ORIGINAL CERTIFICATION: _____

ADMIX #1

NAME: ConAir X
DOSAGE RATE: 0.5 - 4 /CWT.
TARGET METERED MEASURED
25 oz. 25 oz. 25 oz.
50 oz. 50 oz. 50 oz.

ADMIX #2

NAME: ProLong L
DOSAGE RATE: 2.5 - 6.5 /CWT.
TARGET METERED MEASURED
50 oz. 50 oz. 50 oz.
100 oz. 100 oz. 100 oz.

ADMIX #3

NAME: OptiFlo MR
DOSAGE RATE: 3 - 16 /CWT.
TARGET METERED MEASURED
300 oz. 300 oz. 300 oz.

ADMIX #4

NAME: OptiFlo 50
DOSAGE RATE: 3 - 6 /CWT.
TARGET METERED MEASURED
100 oz. 100 oz. 100 oz.

ADMIX #5

NAME: NitroCast K
DOSAGE RATE: 10 oz. /CWT.
TARGET METERED MEASURED
130 oz. 130 oz. 130 oz.
260 oz. 260 oz. 260 oz.

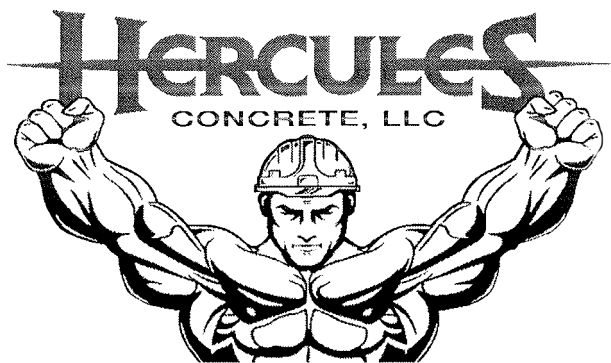
ADMIX #6

NAME: UltraFlo 2000
DOSAGE RATE: 2 - 12 /CWT.
TARGET METERED MEASURED
100 oz. 100 oz. 100 oz.

ADMIX #7

NAME: Impede CNI
DOSAGE RATE: _____ /CWT.
TARGET METERED MEASURED
130 oz. 130 oz. 130 oz.
260 oz. 260 oz. 260 oz.

CERTIFIED BY: Mike McKown



Water Meter Accuracy Verification
55 Gallon Drum Calibration Sheet

90 day requirement for volumetric water batching devices per MDOT

Date of Calibration 6/29/2022

Next Calibration Date 9/29/2022

Plant Information

Plant Name	Hercules Concrete
Plant Number	1
Water Temp	48
Ambient Temp	51
Meter Type	Flow
Meter Brand	BMH
Pulse Count	1.0 gal
Source	City of Detroit Water

TEST # 1

Metered Quantity	<u>50</u>	Meter Setting	0.0385
Measured Quantity	<u>50</u>	Adjusted Setting	NA

Test # 2

Metered Quantity	<u>50</u>	Meter Setting	0.0385
Measured Quantity	<u>50</u>	Adjusted Setting	NA

Test # 3

Metered Quantity	<u>50</u>	Meter Setting	0.0385
Measured Quantity	<u>50</u>	Adjusted Setting	NA

I certify that the above information and test results are true and accurate.

Giuseppe Palumbo

Giuseppe Palumbo

National Ready Mixed Concrete Association



Certificate of Conformance For Concrete Production Facilities

THIS IS TO CERTIFY THAT

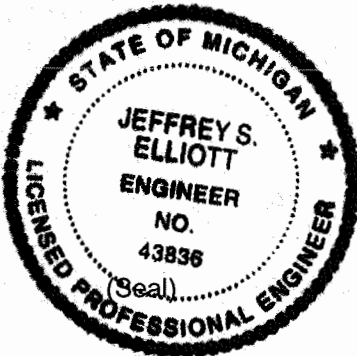
Titan Plant, Center Line, MI

Titan Concrete

MDOT Plant # HMH-04-CEN

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

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



Signature of Licensed Professional Engineer

June 02, 2021

Inspection Date

June 02, 2023

Certification Expiration Date

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

Signature of Company Official

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 on verification that the production facility conforms to the requirements of the NRMCA Certification of Ready Mixed Concrete Production Facilities, QC3. Unauthorized reproduction or misuse of this certificate may result in legal action.

Plant ID #: 856973

Certification ID #: 28310

© 1965, 1992, 2001, 2002, 2006, 2007, 2012

National Ready Mixed Concrete Association 66 Canal Center Plaza, Suite 250 • Alexandria • Virginia 22314

Metro**S**cale**C**ompany Inc.

A Michigan Corporation

17670 Allen Road Melvindale, MI 48122

Sales • Service • Calibrations • ISO/IEC 17025:2017

PH: 313-382-6190 Fax: 313-382-6194

Industrial Weighing Equipment

www.metroscaleco.com

Work Order No. 015371

DATE:

5-2-2022

P.O. #		TECH ALEX LULKO	
CUSTOMER HERCULES CONCRETE INC.		MIKE LULKO	
ADDRESS 6497 E. TEN MILE RD.			
CITY CENTERLINE	STATE MI	ZIP 48105	PHONE
EQUIPMENT		SERIAL NUMBER	
REMOVED FOR REPAIR ☐		RETURNED FROM REPAIR ☐	
WORK PERFORMED SCALE INSPECTION.			
CHECKED THE BATCH PLANT SCALES FOR PROPER OPERATION AND CALIBRATION.			
MADE ADJUSTMENTS WHERE NEEDED.			
CEMENT #1: CLEANED AROUND LOAD CELLS, CLEANED MATERIAL STUCK BETWEEN SHIPPING BRACKETS.			
THE BATCH PLANT SCALES ARE OK FOR USE.			
PARTS		COST	
		PRICE BREAKDOWN	COST
		PARTS TOTAL	
		SHOP LABOR	
		LABOR: HR. REG. @ \$	
		LABOR: HR. O/T @ \$	
		ISO 17025 DOC.	
		TRUCK EXP.	
		TOTAL	
CUSTOMER SIGNATURE: 			



PJLA
Calibration
Accreditation # 59303

METRO SCALE COMPANY, INC.
17670 ALLEN ROAD, MELVINDALE, MI 48122
PHONE: (313) 382-6190 FAX: (313) 382-6194

No. 9721

SCALE CALIBRATION REPORT

TECHNICIAN: <i>Alex Lulko / Mike Lulko</i>	DATE: <i>5-2-22</i>
SCALE MFG: <i>Cardinal</i>	CUSTOMER: <i>Hercules Concrete Inc.</i>
MODEL NO: <i>205</i>	ADDRESS: <i>6497 E Ten Mile Rd</i>
SERIAL NO: <i>E33720-0013</i>	
LOCATION: <i>Erie Strayer Cement Scale 1</i>	<i>Centerline MI 48015</i>
CAPACITY/RESOLUTION: <i>10,000 x 5 Lb</i>	
CONDITION PRIOR TO CALIBRATION: ☒ ACCEPTABLE ☐ NEEDS REPAIR - UNABLE TO CAL.	
UNITS OF MEASURE: ☒ POUNDS ☐ KG ☐ GRAMS ☐ OTHER:	
CALIBRATED TO HANDBOOK 44 TOLERANCE: ☐ YES ☐ NO ☐ LEGAL FOR TRADE	

APPLIED WEIGHT	TEST READING		SERIAL NUMBERS OF WEIGHTS USED:
	BEFORE	AFTER	
<i>0 Lb</i>	<i>0</i>	<i>0</i>	<i>114, 108, 22222, 0N76, 0N78, 103 @ 1000 Lb</i>
<i>2000 Lb</i>	<i>2000</i>	<i>2000</i>	
<i>4000 Lb</i>	<i>4000</i>	<i>4000</i>	
<i>6000 Lb</i>	<i>6000</i>	<i>6000</i>	

Shift Test:		Before		L/C Cable/Indicator		After	
Position 1:	<i>NA</i>	1	2	3	4	<i>NA</i>	
Position 2:							
Position 3:							
Position 4:							

COMMENTS:

SCALE OK FOR USE ☒ YES ☐ NO

NOTES:

- SCALE TOLERANCE AS APPLIED TO NIST HANDBOOK 44 REQUIREMENTS.
- DEVICES LISTED ON THIS SHEET WERE CHECKED AND CALIBRATED WITH WEIGHTS TRACEABLE TO SI THROUGH N.I.S.T. CERTIFICATIONS FOR TEST WEIGHTS ARE AVAILABLE UPON REQUEST.
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- THE UNCERTAINTY CALCULATIONS ARE AVAILABLE UPON WRITTEN REQUEST FROM THE CUSTOMER.
- END OF REPORT.



PJLA
Calibration
Accreditation # 59303

METRO SCALE COMPANY, INC.
17670 ALLEN ROAD, MELVINDALE, MI 48122
PHONE: (313) 382-6190 FAX: (313) 382-6194

SCALE CALIBRATION REPORT

84887

TECHNICIAN: <i>Alex Lulka / Mike Lulka</i>		DATE: <i>5-2-22</i> Next Due:				
SCALE MFG: Cardinal		CUSTOMER: HERCULES CONCRETE INC(WARR				
MODEL NO: 205		ADDRESS: 6497 E TEN MILE RD				
SERIAL NO: E02821-0006						
LOCATION: Erie Strayer Cement Scale <i>2</i>		CENTERLINE, MI 48015				
CAPACITY/RESOLUTION: <i>10,000 X 5 LB</i>						
CONDITION PRIOR TO CALIBRATION: ☒ ACCEPTABLE ☐ NEEDS REPAIR – UNABLE TO CAL.						
UNITS OF MEASURE: ☒ POUNDS ☐ KG ☐ GRAMS ☐ OTHER:						
CALIBRATED TO HANDBOOK 44 TOLERANCE: ☐ YES ☐ NO ☐ LEGAL FOR TRADE						
APPLIED WEIGHT	TEST READING		SERIAL NUMBERS OF WEIGHTS USED:			
	BEFORE	AFTER				
0 LB	<i>0</i>	<i>0</i>	<i>114, 108, 22222, 0N76, 0N78, 103, @ 1000 lb</i>			
2000LB	<i>2000</i>	<i>2000</i>				
4000LB	<i>4000</i>	<i>4000</i>				
6000LB	<i>6000</i>	<i>6000</i>				
			Shift Test: Before	L/C Cable/Indicator		After
			Position 1:	<i>NA</i>	<i>1</i>	<i>2</i>
			Position 2:			
			Position 3:			
			Position 4:			
				<i>3</i>	<i>4</i>	

COMMENTS:

SCALE OK FOR USE ☒ YES ☐ NO

NOTES:

1. SCALE TOLERANCE AS APPLIED TO NIST HANDBOOK 44 REQUIREMENTS.
2. DEVICES LISTED ON THIS SHEET WERE CHECKED AND CALIBRATED WITH WEIGHTS TRACEABLE TO SI THROUGH N.I.S.T. CERTIFICATIONS FOR TEST WEIGHTS ARE AVAILABLE UPON REQUEST.
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7. THE UNCERTAINTY CALCULATIONS ARE AVAILABLE UPON WRITTEN REQUEST FROM THE CUSTOMER.
8. END OF REPORT.



PJLA
Calibration
Accreditation # 59303

METRO SCALE COMPANY, INC.
17670 ALLEN ROAD, MELVINDALE, MI 48122
PHONE: (313) 382-6190 FAX: (313) 382-6194

84888

SCALE CALIBRATION REPORT

TECHNICIAN: <i>Alvin Luthi / Mike Luthi</i>		DATE: 5-2-22 Next Due:	
SCALE MFG: Cardinal		CUSTOMER: HERCULES CONCRETE INC(WARR)	
MODEL NO: 205		ADDRESS: 6497 E TEN MILE RD	
SERIAL NO: E33720-0010			
LOCATION: Erie Strayer Agg Scale		CENTERLINE, MI 48015	
CAPACITY/RESOLUTION: 50,000 X 20 LB			
CONDITION PRIOR TO CALIBRATION: ☒ ACCEPTABLE ☐ NEEDS REPAIR – UNABLE TO CAL.			
UNITS OF MEASURE: ☒ POUNDS ☐ KG ☐ GRAMS ☐ OTHER:			
CALIBRATED TO HANDBOOK 44 TOLERANCE: ☐ YES ☐ NO ☐ LEGAL FOR TRADE			
APPLIED WEIGHT	TEST READING		SERIAL NUMBERS OF WEIGHTS USED:
	BEFORE	AFTER	
0 LB	0	0	114, 21222, 103 @ 1000lb
2000LB	2000	2000	
4000LB	4000	4000	
6000LB	6000	6000	
8000LB	8080	9080	
10000LB	15,020	15,020	
12000LB	21,000	21,000	
14000LB	27,020	27,020	
16000LB	30,000	30,000	
18000LB	36,080	36,080	

COMMENTS:

SCALE OK FOR USE ☒ YES ☐ NO

NOTES:

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- DEVICES LISTED ON THIS SHEET WERE CHECKED AND CALIBRATED WITH WEIGHTS TRACEABLE TO SI THROUGH N.I.S.T. CERTIFICATIONS FOR TEST WEIGHTS ARE AVAILABLE UPON REQUEST.
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- END OF REPORT.



ADMIXTURE DISPENSERS CALIBRATION FORM

CUSTOMER: Titan Concrete DATE: 7/5/2022
ADDRESS: 6497 E 10 Mile Rd
Warren, Mi 48091

DATE OF ORIGINAL CERTIFICATION: _____

ADMIX #1

NAME: ConAir X
DOSAGE RATE: 0.5 - 4 /CWT.
TARGET METERED MEASURED
25 oz. 25 oz. 25 oz.
9 oz. 9 oz. 9 oz.

ADMIX #2

NAME: ProLong L
DOSAGE RATE: 2.5 - 6.5 /CWT.
TARGET METERED MEASURED
50 oz. 50 oz. 50 oz.
197 oz. 197 oz. 197 oz.

ADMIX #3

NAME: OptiFlo MR
DOSAGE RATE: 3 - 16 /CWT.
TARGET METERED MEASURED
300 oz. 300 oz. 300 oz.
135 oz. 135 oz. 135 oz.

ADMIX #4

NAME: OptiFlo 50
DOSAGE RATE: 3 - 6 /CWT.
TARGET METERED MEASURED
100 oz. 100 oz. 100 oz.
210 oz. 210 oz. 210 oz.

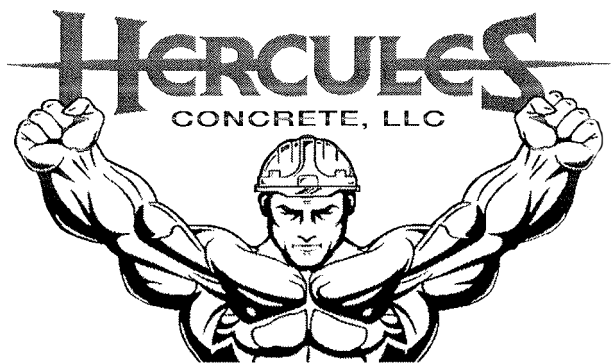
ADMIX #5

NAME: NitroCast K
DOSAGE RATE: 10 oz. /CWT.
TARGET METERED MEASURED
130 oz. 130 oz. 130 oz.
260 oz. 260 oz. 260 oz.

ADMIX #6

NAME: UltraFlo 2000
DOSAGE RATE: 2 - 12 /CWT.
TARGET METERED MEASURED
130 oz. 130 oz. 130 oz.
256 oz. 256 oz. 256 oz.

CERTIFIED BY: Mike McKown



Water Meter Accuracy Verification
55 Gallon Drum Calibration Sheet

90 day requirement for volumetric water batching devices per MDOT

Date of Calibration 7/5/2022

Next Calibration Date 10/5/2022

Plant Information

Plant Name	Titan Concrete
Plant Number	2
Water Temp	52
Ambient Temp	55
Meter Type	Flow
Meter Brand	Badger
Pulse Count	1.0 gal
Source	City of Detroit Water

TEST # 1

Metered Quantity	<u>50</u>	Meter Setting	0.0385
Measured Quantity	<u>50</u>	Adjusted Setting	NA

Test # 2

Metered Quantity	<u>50</u>	Meter Setting	0.0385
Measured Quantity	<u>50</u>	Adjusted Setting	NA

Test # 3

Metered Quantity	<u>50</u>	Meter Setting	0.0385
Measured Quantity	<u>50</u>	Adjusted Setting	NA

I certify that the above information and test results are true and accurate.

Giuseppe Palumbo

Giuseppe Palumbo



12225 Stephens Rd.
Warren, MI 48089

CONTRACTOR / PRODUCTION PLANT AGGREGATE STOCKPILE MANAGEMENT PLAN

Submitted By: Giuseppe Palumbo

Hercules Materials Holdings, LLC

12225 Stephens Road,
Warren, MI 48089

MDOT – Stockpile Management Plan

The plan covers the procedures that Hercules Materials Holdings, LLC intends to implement to ensure compliance with current industry standards and to MDOT 2020 Standard Specifications for Construction, except as provided by contract proposal as stated on title page of this plan. This plan covers the procedures for determining optimized aggregate gradations for Portland Cement Concrete (PCC), Grade 3500HP, 4500HP or other blended optimized grade.

All Hercules Material Holding plants are MDOT qualified and NRMCA certified per ASTM C-94 Standards. All plants supplying concrete in Metro Detroit are also inspected bi-annually by Wayne County.

Aggregates utilized for MDOT projects are from approved manufacturers for

Coarse, Intermediate and 2NS aggregates. All aggregates will be delivered to the plants via gravel bulk haulers. Once our distribution hub has been qualified we will distribute boat stone from the dock to our own producing plants.

Materials,

Aggregate Sources; Aggregates delivered to our production facilities are from MDOT's Approved Manufacturers. Boat stone is delivered to our dock from pre-approved distributors. Aggregates purchased from this list are produced with strict compliance with MDOT standards and testing according to the suppliers Quality Control Plan as submitted by them to MDOT for review and approval.

Supplier production and load out sample gradation analysis are provided weekly by supplier, and often times at greater frequency as they monitor daily production to ensure compliance with their quality control plan.

Project specifications will be followed to ensure the correct aggregate is being utilized per the project requirements. Specifically absorption limits and Freeze thaw requirements will be strictly followed.

Stock Pile Management

Shipping / Delivery; Aggregates are delivered to Hercules Material Holdings, LLC locations by qualified, insured bulk delivery professionals. They will be used for daily hauling of all aggregates used in production of concrete. The bulker drivers are familiar with our supplier's facilities and also understand our plant process and material locations to ensure no cross contamination between aggregates sources. In fact our material codes will be shared with our suppliers to ensure the bulk drivers are requesting the correct material. Delivery professionals will not unload at our production plants until authorized to do so by the plant manager / stock pile manager. Load in tickets will be delivered to the plant operator, stamped, entered into our stock managing system and delivered to the main office for payment.

Storage; Aggregates are stockpiled by loader or loaded directly into plant bins dependent on plant configuration.

Stockpiles will be maintained to eliminate contamination from yard traffic. No Calcium Chloride will be permitted for use as dust control in the aggregate stockpile area.

Stockpiles shall be maintained in separate piles and/or bins. Bins will be properly marked and identified to inform delivery professionals unload in the correct location.

In addition to performing aggregate gradations required for production gradations Hercules will monitor Aggregate Supplier load outs for deviation in gradations and also run gradations internally. All technicians utilized in sampling and grading analysis are certified to perform test by Michigan Certified Aggregate Technicians. Individual Certification will be submitted with this QC Plan.

Preconditioning; All attempts will be employed to maintain aggregate moisture contents to SSD, provided it does not compromise mix uniformity due to excess moisture contents. Aggregate moisture checks will be performed as needed to ensure compliance.

Handling and moving aggregates will be kept to a minimum to decrease the amount of material degradation occurring that contributes to the aggregates Loss by Wash (LBW).

Verification of Physical Requirements; included with the concrete mix submittal package a copy of written verification from the aggregate suppliers that the materials meet the specified physical requirements including supporting documentation and most current MDOT Freeze thaw test.

Aggregate Sampling Procedure / Process Control

Michigan Certified Aggregate Technicians will be utilized to sample, perform mechanical analysis and report all gradation analysis.

Job Mix formula has been developed by utilizing quality control pit gradations as well as mini stockpile gradations.

All sampling and gradation reporting has been completed by Michigan Certified Aggregate Technician (MCAT). If a failed result occurs a re-sample should be performed immediately on a new mini stockpile method. If the material fails a second time the supplier shall be notified and requested to sample a load in from the source. If that sample fails then the material shall be replaced at the suppliers cost.

Determination of Optimum Aggregate Proportions; Hercules Materials Holdings, LLC utilizes a Quality Control computer program produced by Stonemont. The program is used for our internal quality management of aggregates, concrete samples and mix design submittals. Our gradations are entered into Stonemont program and then the resultant gradations are used to determine the optimized aggregate proportions for both the theoretical design and also the weekly production gradations as required for MDOT compliance. The intent is to sample Thursday am, allowing a submittal to occur Friday for the following week. We will submit the gradations on MDOT's official gradation worksheet for acceptance.

Individual samples will be obtained for coarse, intermediate and fine aggregate, as discussed in MDOT 2020 Standard Specifications for Construction.

The Theoretical Combined Aggregate gradations; the theoretical gradations meeting sections 4.4.1.1.1, 4.4.1.1.2, 4.4.1.1.3 and 4.4.1.1.4 are included in the Concrete Mix design submittal package for this project and will be attached to the Job Mix Formula (MDOT Form 1976).

Coarseness Factor; the coarseness factor (CF) has been calculated based on the formula in 2020 specifications and is calculated to the nearest tenth. The CF is included in the concrete mix submittal package.

Workability Factor; the workability factor (WF) has been calculated based on the formula in 2020 specifications and is calculated to the nearest tenth. The WF is included in the concrete mix submittal package.

The CF vs WF Chart is included with the concrete submittal package.

Process Control During Concrete Production;

Action & Suspension Limits:

<u>Quality Characteristic</u>	<u>Action Limits</u>	<u>Suspension Limits</u>
Coarseness Factor	< 50 or > 73	< 45 or > 75
Workability Factor	< 30 or > 38	< 28 or > 44

Corrective Action Limits

Action Limits will be monitored throughout the production process.

Action limits are set at the operation boundary limits as established on Table 902-1 Grading Requirements chart as provided by MDOT.

The Contractor/Engineer will be notified whenever the process approaches an action limits.

Suspension of Work Limits

When and if the production gradations resulted a value that is outside the operational limits as set by the chart provided by MDOT, production will cease and the following will be implemented to correct the gradation back within the action limits / operational boundaries lines.

Material causing values to exceed limits will be removed from production operations and stockpiled separately as to not be incorporated into production.

Stockpile to be investigated for segregation possibilities

Suppliers Load out reports to be reviewed for discrepancies

Supplier to be contacted and revise producing operations if gradations need to be altered and brought back within MDOT requirements.