



Central MS Area

FORM 1 - Mix Design Submittal

Project Description: STP-7337-00(001) Project Location: Rankin County
 Constructor: T.L. Wallace Concrete Supplier: MMC Materials, Inc.
 Mix Number: J4420247 Specified Compressive Strength: 3500 PSI
 Specified Slump: 3 Inches Specified Air Content: 3-6

Required Average strength, f_{cr} (check the appropriate box)

Based on Field Experience of Mixture 5010 PSI
 Based on Laboratory Trial Mixture _____

Material Properties and Source

Cementitious Material	Type	Supplier	Source	Specific Gravity
Portland Cement	Type I/II	Holcim	Theodore, AL	3.15
Fly Ash	Class C	Headwaters	White Bluff	2.51

Admixtures	Type	Supplier	Dosage Range	Dosage	Dosage
AE-90	AEA	BASF	0.25-4 fl oz/cwt	0.5 fl oz/cwt	3.0 fl oz/yd ³
Pozzolith 700N	Type A/D	BASF	1.5-7 fl oz/cwt	2.1 fl oz/cwt	12.0 fl oz/yd ³

Note: Dosage rate will require adjustments for field and environmental conditions.

Aggregate Size	Supplier	DOT Source #	Type	Sp. Gr. SSD	Sp. Gr. OD	Absorption	F.M.
#67	Hammett	3-26-2	Gravel	2.56	2.52	1.6%	6.67
Sand	Hammett	3-26-2	Natural	2.62	2.60	0.7%	2.75

Water: Local Water Association

Batch Quantities

Material	SSD Quantities lb/yd ³	Absolute Volume yd ³	Oven-Dry Quantities lb/yd ³	Absolute Volume yd ³
Portland Cement	451	2.29	451	2.29
Fly Ash	113	0.72	113	0.72
Mix Water	245	3.93	245	3.93
#67	1775	11.11	1746	11.11
Sand	1268	7.73	1259	7.76
Air Content, %	4.5%	1.22	4.5%	1.22
Total Mass, lb.	3852	27.00	3814	27.02

Mix Design Information:

Mix Description: 3500 PSI Class B #67
 Comments: _____
Temperature Control EXCLUDED

Designed by: Kyle Beckman
 Title: Regional QA Director

Mix Revision #: 0

W/CMT Ratio: 0.43
 Water - Gal/Yard: 29.4
 Unit Weight: 142.7 lbs/ft³

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION**

FORM FOR QC/QA CONCRETE DATA

Project Number: ACNH-9204-00(007)100486301
 County: Madison
 Project Description: I-55 Old Agency to N. of SR-463
 Constructor: Hill Brothers Construction
 Concrete Supplier: MMC
 Testing Period: 6/7/2012 TILL _____

Mix No.: J4420246
 Class: B
 Specified Strength: 4000 psi
 Maximum Slump: 4 inch
 Maximum Temperature: _____ °F
 Specified Air Content: _____ %

Date	Test No.	Reference Location	Volume		Air Content (%)	Concrete Temp. (°F)	Slump (in.)	7 Day Cylind	7 Day Average	28 Day Cylinder		Test Average (psi)	10 Tests			
			Quantity (yd³)	Accum. (yd³)				#1 (psi)		#1 (psi)	#2 (psi)		S. D. (psi)	Average (psi)	Req. Strength (psi)	s-fc (psi)
6/17/14	76	190-12-822	11.5		3.90	91	3.50	5120	5120	5920	5990	5960	#DIV/0!	5960	#DIV/0!	#DIV/0!
6/18/14	77	190-12-825	11.0		4.30	91	4.00	3730	3730	4630	4360	4500	1032	5230	5476	2632
6/19/14	78	190-12-830	12.0		4.70	91	3.25	4720	4720	6010	5730	5870	818	5443	5170	2418
6/20/14	79	190-12-834	11.0		4.70	90	3.75	4060	4060	4630	4590	4610	787	5235	5126	2387
6/23/14	80	190-12-838	16.0		5.30	85	3.00	4107	4107	5040	5090	5070	686	5202	4981	2286
6/30/14	81	190-12-846	11.0		5.60	91	3.75	4440	4440	5690	5810	5750	653	5293	4934	2253
7/1/14	82	190-12-850	9.0		4.00	89	3.00	4530	4530	5040	4940	4990	607	5250	4868	2207
7/2/14	83	190-12-852	9.0	3777	3.50	91	2.50	3210	3210	3620	3570	3600	810	5044	5158	2410
7/3/14	84	190-12-854	9.0		3.00	90	4.00			5120	5190	5160	759	5057	5085	2359
7/7/14	85	190-12-856	18.0	3804	3.40	86	3.25	3890	3890	4260	4970	4970	716	5048	5024	2316

Average 5010



AGGREGATE GRADATION - SPECIFIC GRAVITY

SOURCE and SAMPLING INFORMATION			
Aggregate Source:	Hammett	Aggregate Type:	Fine
MDOT Agg Source #:		Date Sampled:	7/22/2014
Sampling Location:	Plant Stock Pile	Date Tested:	7/23/2014
Sampled by:	Ben Hardy	Tested by:	Ben Hardy

GRADATION INFORMATION										
Initial Weight (grams)		476.8		Minimum Initial Dry Weight Required (grams)			300		Acceptable	
Sieve	Weight Retained		Percent Retained		Total % Passing	MDOT % Passing		Gradation Status		
	Cumulative	Individual	Cumulative	Individual		MIN	MAX			
	(grams)		(%)			(%)	(%)			
2 inch	63.0 mm									
1-1/2 inch	50.0 mm									
1-1/4 inch	37.5 mm									
1 inch	25.0 mm									
3/4 inch	19.0 mm									
1/2 inch	12.5 mm									
3/8 inch	9.5 mm	1.1	1.1	0.2	0.2	99.8	97	100	Acceptable	
No. 4	4.75 mm	37.6	36.5	7.9	7.7	92.1	92	100	Acceptable	
No. 8	2.36 mm	90.7	53.1	19.0	11.1	81.0	75	100	Acceptable	
No. 16	1.18 mm	125.2	34.5	26.3	7.3	73.7	45	90	Acceptable	
No. 30	0.6 mm	183.1	57.9	38.4	12.1	61.6	25	70	Acceptable	
No. 40	0.425 mm	296.3	113.2	62.1	23.7	37.9				
No. 50	0.3 mm	396.1	99.8	83.1	21.0	16.9	3	35	Acceptable	
No. 100	0.15 mm	474.9	78.8	99.6	16.5	0.4	0	10	Acceptable	
No. 200	0.15 mm					100.0				
Pan		476.8	1.9	100.0						
Total		476.8								
Required Final Dry Weight Range (grams)							475.4	478.2	Acceptable	

GRADATION SUMMARY	
Did the Initial Weight meet or exceed the Minimum required weight?	Yes.
Did the gradation meet all the requirements for gradation?	Yes.
Is the Total Weight within 0.3% of Initial Dry Weight?	Yes.
Sieve size:	8 inch dia.
Was any sieve overloaded?	No.
Fineness Modulus:	2.75
GRADATION STATUS: Acceptable	

SPECIFIC GRAVITY INFORMATION			
FINE AGGREGATE			
<i>Pycnometer Method</i>			
Mass of oven-dry specimen in air:	497.2	Bulk SG (OD Basis):	2.61
Mass of pycnometer filled with water:	689.4	Bulk SG (SSD Basis):	2.63
Mass of pycnometer with specimen and water :	999.0	Apparent SG:	2.65
Mass of saturated, surface-dry specimen:	500.0	Absorption (%):	0.56
COARSE AGGREGATE			
Mass of oven-dry specimen in air:		Bulk SG (OD Basis):	
Mass of saturated, surface-dry specimen in air:		Bulk SG (SSD Basis):	
Mass of saturated sample in water:		Absorption (%):	

FINE AGGREGATE EQUIVALENCY INFORMATION		
ASTM D2419		
Sand Reading		Sand Equivalent Value
Clay Reading		

Comments: _____



AGGREGATE GRADATION - SPECIFIC GRAVITY

SOURCE and SAMPLING INFORMATION			
Aggregate Source:	Hammett	Aggregate Type:	#67
MDOT Agg Source #:	3-26-2	Date Sampled:	7/22/2014
Sampling Location:	Plant Stock Pile	Date Tested:	7/23/2014
Sampled by:	Ben Hardy	Tested by:	Ben Hardy

GRADATION INFORMATION									
Initial Weight (grams)		11042.9		Minimum Initial Dry Weight Required (grams)			5000		Acceptable
Sieve	Weight Retained		Percent Retained		Total % Passing	MDOT % Passing		Gradation Status	
	Cumulative	Individual	Cumulative	Individual		MIN	MAX		
	(grams)		(%)			(%)	(%)		
2 inch	63.0 mm								
1-1/2 inch	50.0 mm								
1-1/4 inch	37.5 mm								
1 inch	25.0 mm				100.0	100	100	Acceptable	
3/4 inch	19.0 mm	448.5	448.5	4.1	4.1	95.9	80	100	Acceptable
1/2 inch	12.5 mm	4910.4	4461.9	44.5	40.4	55.5			
3/8 inch	9.5 mm	8217.6	3307.2	74.4	29.9	25.6	20	55	Acceptable
No. 4	4.75 mm	10777.8	2560.2	97.6	23.2	2.4	0	10	Acceptable
No. 8	2.36 mm	10972.5	194.7	99.4	1.8	0.6	0	5	Acceptable
No. 16	1.18 mm								
No. 30	0.6 mm								
No. 40	0.425 mm								
No. 50	0.3 mm								
No. 100	0.15 mm								
No. 200	0.15 mm								
Pan		11040.0	67.5	100.0					
Total		11040.0							
Required Final Dry Weight Range (grams)						11009.8	11076.0	Acceptable	

GRADATION SUMMARY	
Did the Initial Weight meet or exceed the Minimum required weight?	Yes.
Did the gradation meet all the requirements for gradation?	Yes.
Is the Total Weight within 0.3% of Initial Dry Weight?	Yes.
Sieve size:	16 x 24 inch
Was any sieve overloaded?	No.
Fineness Modulus:	2.76
GRADATION STATUS: Acceptable	

SPECIFIC GRAVITY INFORMATION			
FINE AGGREGATE			
<i>Pycnometer Method</i>			
Mass of oven-dry specimen in air:	<input type="text"/>	Bulk SG (OD Basis):	<input type="text"/>
Mass of pycnometer filled with water:	<input type="text"/>	Bulk SG (SSD Basis):	<input type="text"/>
Mass of pycnometer with specimen and water :	<input type="text"/>	Apparent SG:	<input type="text"/>
Mass of saturated, surface-dry specimen:	<input type="text"/>	Absorption (%):	<input type="text"/>
COARSE AGGREGATE			
Mass of oven-dry specimen in air:	4711.6	Bulk SG (OD Basis):	2.50
Mass of saturated, surface-dry specimen in air:	4799.2	Bulk SG (SSD Basis):	2.55
Mass of saturated sample in water:	2916.6	Absorption (%):	1.86

FINE AGGREGATE EQUIVALENCY INFORMATION		
ASTM D2419		
Sand Reading	<input type="text"/>	Sand Equivalent Value
Clay Reading	<input type="text"/>	

Comments: _____

Headwaters Resources certifies that pursuant to ASTM C-618-12 protocol for testing, the test data listed herein was generated by applicable ASTM methods and meets requirements of ASTM C-618 and AASHTO M-295 for Class C fly ash.

Report of Class "C" Fly Ash White Bluff Plant, Redfield, Arkansas Unit #1

DATE: September 8, 2014 LABORATORY NUMBER: UNIT #1 JULY

<u>CHEMICAL ANALYSIS</u>		COMPOSITE DATE			
		JULY 2014			
		ASTM C-618-12 SPECIFICATIONS		AASHTO M-295-11 SPECIFICATIONS	
		CLASS C	CLASS F	CLASS C	CLASS F
Silicon Dioxide (SiO ₂)	37.27 %				
Aluminum Oxide (Al ₂ O ₃)	21.39 %				
Iron Oxide (Fe ₂ O ₃)	5.78 %				
Sum of SiO ₂ , Al ₂ O ₃ , & Fe ₂ O ₃	64.44 %	50 Min.	70 Min.	50 Min.	70 Min.
Magnesium Oxide (MgO)	4.62 %				
Sulfur Trioxide (SO ₃)	1.13 %	5.0 Max.	5.0 Max.	5.0 Max.	5.0 Max.
Moisture Content	0.07 %	3.0 Max.	3.0 Max.	3.0 Max.	3.0 Max.
Loss On Ignition	0.29 %	6.0 Max.	6.0 Max.	5.0 Max.	5.0 Max.
Available Alkalis as Na ₂ O	1.52 %			^A 1.5Max.	^A 1.5Max.
Calcium Oxide (CaO)	23.92 %				
<u>PHYSICAL ANALYSIS</u>					
Fineness: Amount retained on 325 sieve %	6.26 %	34% Max.	34% Max.	34%Max.	34%Max.
Water Requirement, % Control	94 %	105%Max	105%Max	105%Max	105%Max
Specific Gravity	2.56				
Autoclave Expansion, %	- 0.04 %	0.8% Max	0.8% Max	0.8% Max	0.8% Max
Strength Activity Index With Portland Cement, 7 Day	102 %	75% Min.	75% Min.	75% Min.	75% Min.

^A Applicable only when required by purchaser.

AUTHORIZED SIGNATURE:



Material Certification Report

Material: Portland Cement Test Period: 01-Sep-2014
 Type: I-II To: 30-Sep-2014

Certification

This Holcim cement meets the specifications of ASTM C150 for Type I-II cement, and complies with AASHTO M85 specifications for Type I-II cement.

General Information

Supplier:	Holcim (US) Inc.	Source Location:	Theodore Plant
Address:	P.O. Box 649 Theodore, AL 36582		P.O. Box 649 Theodore, AL 36582
Telephone:	(251) 443-1290	Contact:	Alissa Collins
Date Issued:	16-Oct-2014		

The following information is based on average test data during the test period. The data is typical of cement shipped by Holcim; individual shipments may vary.

Tests Data on ASTM Standard Requirements

Chemical			Physical		
Item	Limit ^A	Result	Item	Limit ^A	Result
SiO ₂ (%)	-	19.1	Air Content (%)	12 max	7
Al ₂ O ₃ (%)	6.0 max	4.6	Blaine Fineness (m ² /kg)	260 min	397
Fe ₂ O ₃ (%)	6.0 max	3.3			
CaO (%)	-	64.3	Autoclave Expansion (%) (C151)	0.80 max	0.00
MgO (%)	6.0 max	1.1	Compressive Strength MPa (psi):		
SO ₃ (%)	3.0 max ^B	3.5	3 days	12.0 (1740) min	27.6 (4000)
Loss on Ignition (%)	3.0 max	2.6	7 days	19.0 (2760) min	34.0 (4930)
Insoluble Residue (%)	0.75 max	0.27	Initial Vicat (minutes)	45-375	109
CO ₂ (%)	-	1.8	Mortar Bar Expansion (%) (C1038)	-	0.004
Limestone (%)	5.0 max	4.1			
CaCO ₃ in Limestone (%)	70 min	101			
Inorganic Processing Addition (%)	5.0 max	0.0			
Potential Phase Compositions ^C :					
C ₂ S (%)	-	65			
C ₃ S (%)	-	5			
C ₄ A (%)	8 max	7			
C ₄ AF (%)	-	10			
C ₂ S + 4.75C ₄ A (%)	-	98.3			

Tests Data on ASTM Optional Requirements

Chemical			Physical		
Item	Limit ^A	Result	Item	Limit ^A	Result
Equivalent Alkalies (%)	0.60 max	0.44	Heat of Hydration: kJ/kg (cal/g) ^D 7 Days (for informational purposes)	-	324 (77)

Notes

^A Dashes in the limit / result columns mean Not Applicable.

^B It is permissible to exceed the specification limit provided that ASTM C1038 Mortar Bar Expansion does not exceed 0.020 % at 14 days.

^C Adjusted per Annex A1.8 of ASTM C150 and AASHTO M85.

^D Test result represents most recent value and is provided for information only. Analysis of Heat of Hydration has been carried out by CTL Group, Skokie, IL. This data may have been reported on previous mill certificates.

Additional Data

Inorganic Processing Addition Data			Base Cement Phase Composition		
Item	Result ^A		Item	Result	
Type	-		C ₂ S (%)	65	
Amount (%)	-		C ₃ S (%)	5	
SiO ₂ (%)	-		C ₄ A (%)	7	
Al ₂ O ₃ (%)	-		C ₄ AF (%)	11	
Fe ₂ O ₃ (%)	-				
CaO (%)	-				
SO ₃ (%)	-				

By *Alissa Collins*, Quality Manager



The Chemical Company

January 23, 2014

MMC Materials Inc.
P.O. Box 307
Jackson, Mississippi 39205

Attention: Kyle Beckman
Project: All Projects
Project location: All Locations

Certificate of Conformance
MasterAir® AE 90 Admixture
BASF Corporation* Air-Entraining Admixture for Concrete

*(successor in interest to BASF Construction Chemicals, LLC , which is successor by merger to BASF Admixtures, Inc., formerly known as Degussa Admixtures, Inc., formerly known as Master Builders, Inc.)

I, Richard Hubbard, Sr. Technical Marketing Specialist for BASF Corporation, Cleveland, Ohio, certify:

That MasterAir AE 90 admixture is a BASF Corporation Air-Entraining Admixture for concrete; and

That MasterAir AE 90 and MB AE 90 admixture are the same product having identical composition, differing only in designation; and

That no calcium chloride or chloride based ingredient is used in the manufacture of MasterAir AE 90 admixture; and

That MasterAir AE 90 admixture, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.000068 percent (0.68 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That MasterAir AE 90 admixture meets the requirements of ASTM C260, the Standard Specification for Air-Entraining Admixtures for Concrete, as well as the requirements for air-entraining admixtures as specified in Corps of Engineers' CRD-C 13 and AASHTO M154.

Richard Hubbard
Sr. Technical Marketing Specialist, BASF Corporation

BASF Corporation
23700 Chagrin Boulevard
Cleveland, OH 44122
216 838-7500 ph
www.masterbuilders.com

**Master
Builders**
Admixture Solutions



The Chemical Company

January 23, 2014

MMC Materials Inc.
P.O. Box 307
Jackson, Mississippi 39205

Attention: Kyle Beckman
Project: All Projects
Project location: All Locations

Certificate of Conformance
MasterPozzolith® 700 Admixture
BASF Corporation* Water-Reducing Admixture for Concrete

*(successor in interest to BASF Construction Chemicals, LLC , which is successor by merger to BASF Admixtures, Inc., formerly known as Degussa Admixtures, Inc., formerly known as Master Builders, Inc.)

I, Richard Hubbard, Sr. Technical Marketing Specialist for BASF Corporation, Cleveland, Ohio, certify:

That MasterPozzolith 700 admixture is a BASF Corporation Water-Reducing Admixture for concrete; and

That MasterPozzolith 700 admixture and Pozzolith 700N admixture are the same product having identical composition, differing only in designation; and

That no calcium chloride or chloride based ingredient is used in the manufacture of MasterPozzolith 700 admixture; and

That MasterPozzolith 700 admixture, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.00080 percent (8.0 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That MasterPozzolith 700 admixture meets the requirements for a Type A, Water-Reducing, Type B, Retarding, and Type D, Water-Reducing and Retarding Admixture specified in ASTM C494/C494M and AASHTO M194, the Standard Specifications for Chemical Admixtures for Concrete, as well as the requirements for Type A, Type B and Type D admixtures as specified in Corps of Engineers' CRD-C 87.

Richard Hubbard
Sr. Technical Marketing Specialist, BASF Corporation

BASF Corporation
23700 Chagrin Boulevard
Cleveland, OH 44122
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**Master
Builders**
Admixture Solutions