Martin Marietta Materials

March 3, 2014
Concrete Curb & Paving
8118 Midway Drive
Littleton, Co 80125
Attn: Billy Hall

Re: Reata File 8, 9 – Horse Shoe Ridge
Various Locations
Parker, Co

Dear Billy:
For your approval, we are submitting the following mix design(s) for use on the above referenced project.

MIX I.D.	LOCATION	AGGREGATE	SLUMP	AIR	STRENGTH
CD4525	Sidewalk C & G - Hand	¾" NW Agg.	3 – 5"	5 - 8%	4,500 @ 28 Days
CD4535	Sidewalk C & G - Machine	¾" NW Agg.	1 – 2"	5 - 8%	4,500 @ 28 Days

NOTE: When ordering concrete specify if concrete is to be pumped or tailgated, AND if Fibermesh, Color or Accelerator, or other additives are needed.

Martin Concrete Dispatch Phone Number 303-421-0787

The required strengths will be met when the concrete is placed, tested and evaluated in accordance with applicable industry standards, project specifications. Martin Marietta Materials Inc. will not be responsible for concrete ordered and/or placed outside the design criteria as submitted. All materials used in the production of the submitted designs meet applicable ASTM standards.

As stated in ASTM C94-86b, Section 14.4, Martin Marietta Materials Inc. is entitled to copies of all test reports in order to monitor the concrete strength results for the project. It is recommended that all concrete "acceptance" test specimens be water cured on site in temperature controlled environment.

Sincerely,

Reggie Blacke
Sales Representative
303-507-4900

Martin Marietta Materials

Concrete Mix Design: CD4525
Description: 4,500 PSI - CDOT Class B, D, P
MMM Lab No.: 4030 on 1/20/14

CONCRETE MIX PROPORTIONS:

		ASTM	Varies	Cubic Yard	Units	
CEMENT	Cemex I/II	C-150		530	lbs	
FLY ASH	Nebraska C	C-618		130	lbs	
SAND	MMM Riverbend	C-33		1270	lbs	
#8 Agg	MMM Riverbend	C-33		150	lbs	
#57/67 Agg.	Spec Agg	C-33		1570	lbs	
AEA	Sika Air	C-260	0 to 8 oz/cy	1.98	oz	
MRWR	Sikament 686	C-494	0 to 9 oz/cwt	52.8	oz	
Water		C-94		280	lbs	33.6 Gal.

The above weights are based upon aggregates being in the saturated, surface dry condition. Batch plant corrections must be made for aggregates that vary from these moisture conditions. ** AEA adjustments at plant and on site may be required to achieve proper air entrainment. Air adjustments may be made with either liquid or Fritz air entrainment. Mix proportions may be adjusted in accordance with ACI 301 sections 3.8, 3.11 and 17.2.

PHYSICAL PROPERTIES OF MIX:	ACTUAL:	TARGET:
Slump	5.25"	3.00-5.00"
Air Content	5.2%	5.0-8.0%
Unit Weight	146.00	N/A
Water/Cement Ratio	0.42	.44 Max
Yield	26.92	27

COMPRESSIVE STRENGTH (psi):	7 DAY	28 DAY
(From Lab Trial 4030)	5640	2/17/2014
(7 Day Strength Exceeds 28 Day Minimum)	5700	
	5670	

FLEXURAL STRENGTH (psi):	7 DAY	28 DAY
(From Lab Trial 4030)	815	2/17/2014
(7 Day Strength Exceeds 28 Day Minimum)	825	
	820	

COMPRESSIVE STRENGTH (psi):	7 DAY	28 DAY
(From Field Data)	4600	5870

STRENGTH PERFORMANCE REPORT

Mix : CD4525 - CD4525 - 4500 PSI CLASS B/D/P
Period : 12/11/2013 to 01/21/2014

Number of Tests	31	**Specified Strength**	4500	**28 Day**	**Compressive Test**
Average Strength	5870	**Corrected CofV**	9.37	**ACI Running Average of 3 Criteria**	Yes
Required Strength	5280	**Standard Deviation**	550	**ACI Standard Deviation Criteria**	Yes

	Slump in	Air Content %	7 Str psi	28 Str psi
Count	31	31	31	31
Average	4.07	6.20	4600	5870
STDEV	0.88	1.01	540	550
COV%	21.66	16.26	10	10
Range Min	2.50	4.00	3760	5020
Range Max	6.00	8.10	5650	6950

Date	Sample	Ticket Date	Slump in	Air Content %	7 Str psi	28 Str psi
01/21/2014	20016723	27 Nov 2013	3.50	5.80	4210	5540
12/31/2013	43046469	31 Dec 2013	6.00	8.00	4740	6110
12/30/2013	46008498	30 Dec 2013	4.00	5.80	3770	5290
12/30/2013	45018993	30 Dec 2013	5.25	5.30	5190	6480
12/28/2013	21003539	28 Dec 2013	4.00	6.50	4360	5410
12/24/2013	37043589	24 Dec 2013	3.00	6.50	5200	6170
12/23/2013	23012240	23 Dec 2013	2.50	7.40	4470	6050
12/19/2013	45018686	19 Dec 2013	4.50	5.50	5100	6490
12/19/2013	45018677	19 Dec 2013	6.00	7.00	4230	5410
12/19/2013	20017399	19 Dec 2013	4.50	6.80	4650	5750
12/19/2013	23012185	19 Dec 2013	4.00	7.00	4220	5470
12/19/2013	37043341	19 Dec 2013	4.50	6.50	4770	5870
12/18/2013	36016376	18 Dec 2013	3.50	5.50	4070	5570
12/18/2013	35013457	18 Dec 2013	4.00	5.80	4720	5830
12/18/2013	23012151	18 Dec 2013	3.00	4.00	3960	5070
12/18/2013	20017312	18 Dec 2013	3.25	7.20	5550	6630
12/17/2013	23012094	17 Dec 2013	4.00	6.50	4340	5430
12/17/2013	20017285	17 Dec 2013	3.00	5.00	3990	5340
12/17/2013	20017265	17 Dec 2013	3.00	5.00	4750	5890
12/17/2013	20017271	17 Dec 2013	4.00	6.00	4530	5850
12/17/2013	43045482	17 Dec 2013	5.00	8.10	4380	5640
12/16/2013	23012069	16 Dec 2013	4.00	5.20	4750	6390
12/16/2013	45018495	16 Dec 2013	5.00	7.60	5650	6950
12/13/2013	20017115	13 Dec 2013	5.50	7.90	3920	5020
12/13/2013	37042843	13 Dec 2013	4.00	5.50	4560	5670
12/12/2013	36016118	12 Dec 2013	3.00	6.00	3760	5110
12/12/2013	37042645	12 Dec 2013	4.00	6.80	5330	6660
12/11/2013	45018364	11 Dec 2013	4.50	5.80	4980	6710
12/11/2013	45018375	11 Dec 2013	4.00	5.30	5610	6700
12/11/2013	36016043	11 Dec 2013	4.00	6.00	4080	5290
12/11/2013	36016031	11 Dec 2013	3.50	5.00	4680	6210

Martin Marietta Materials

Concrete Mix Design: CD4535
Description: 4,500 PSI CDOT Class D, Air Entrained, 15% Class C Fly Ash
MMM Lab No.: 4044 on 1/22/14

CONCRETE MIX PROPORTIONS:

		ASTM	Varies	Cubic Yard	Units	
CEMENT	Cemex I/II	C-150		561	lbs	
FLY ASH	Plains Nebraska	C-618		99	lbs	
SAND	MMM Riverbend	C-33		1270	lbs	
#8 Agg.	MMM Riverbend	C-33		150	lbs	
#57/67 Agg.	MMM Spec Agg	C-33		1625	lbs	
AEA	Sika Air	C-260	0 to 18 oz/cy	8.58	oz	
MRWR	Sikament 686	C-494	0 to 9 oz/cwt	39.6	oz	
Water		C-94		235.0	lbs	28.21 Gal.

The above weights are based upon aggregates being in the saturated, surface dry condition. Batch plant corrections must be made for aggregates that vary from these moisture conditions. ** AEA adjustments at plant and on site may be required to achieve proper air entrainment. Air adjustments may be made with either liquid or Fritz air entrainment. Mix proportions may be adjusted in accordance with ACI 301 sections 3.8, 3.11 and 17.2.

PHYSICAL PROPERTIES OF MIX:	ACTUAL:	TARGET:
Slump	2.00"	1.00-3.00"
Air Content	5.5%	5.0-8.0%
Unit Weight	146.8	N/A
Water/Cement Ratio	0.36	.44 Max
Yield	26.84	27.00

COMPRESSIVE STRENGTH (psi): (From lab trial 4044)

7 DAY	28 DAY
5340	2/19/2014
5180	
5260	

FLEXURAL STRENGTH (psi): (From lab trial 4044)

7 DAY	28 DAY
985	2/19/2014
985	
985	

COMPRESSIVE STRENGTH (psi): (From Field Data)

7 DAY	28 DAY
5390	5870

STRENGTH PERFORMANCE REPORT

Mix : CD4535 - CD4535 - 4500 PSI CLASS B/D/P
Period : 09/04/2013 to 12/18/2013

Number of Tests	30	**Specified Strength**	4500	**28 Day**	**Compressive Test**
Average Strength	5870	**Corrected CofV**	8.52	**ACI Running Average of 3 Criteria**	Yes
Required Strength	5170	**Standard Deviation**	500	**ACI Standard Deviation Criteria**	Yes

	Slump in	Air Content %	7 Str psi	28 Str psi
Count	30	30	30	30
Average	1.83	6.41	5390	5870
STDEV	0.83	0.86	3750	500
COV%	45.35	13.36	70	10
Range Min	1.00	5.00	3750	5080
Range Max	4.00	8.00	25020	6940

Date	Sample	Ticket Date	Slump in	Air Content %	7 Str psi	28 Str psi
12/18/2013	46008362	18 Dec 2013	2.00	7.90	4620	5760
12/17/2013	35013382	17 Dec 2013	2.00	5.50	4510	5490
11/08/2013	45017146	08 Nov 2013	1.75	7.00	4490	6130
11/07/2013	22000656	07 Nov 2013	1.50	6.20	3850	5610
11/07/2013	20015761	07 Nov 2013	1.50	6.50	4740	5830
11/07/2013	23010989	07 Nov 2013	1.00	6.30	4070	5080
11/06/2013	45017062	06 Nov 2013	1.25	6.40	4610	5730
11/06/2013	45017043	06 Nov 2013	2.50	8.00	4330	5390
11/04/2013	45016985	04 Nov 2013	1.25	5.80	3750	5500
11/04/2013	45016978	04 Nov 2013	1.75	6.80	5350	6590
11/04/2013	36014946	04 Nov 2013	1.25	6.70	4330	5380
11/01/2013	20015579	01 Nov 2013	1.75	5.00	5340	6830
10/12/2013	36014084	12 Oct 2013	1.00	6.00	4430	5830
10/12/2013	36014063	12 Oct 2013	1.25	5.70	5070	6180
10/12/2013	36014063	12 Oct 2013	1.00	7.80	4190	5270
10/11/2013	36014043	11 Oct 2013	1.75	6.00	4860	6570
10/11/2013	36014011	11 Oct 2013	2.00	5.70	4860	6080
10/11/2013	36013965	11 Oct 2013	2.00	6.80	5480	6400
10/08/2013	37037507	08 Oct 2013	3.75	6.10	4430	5440
10/08/2013	37037507	08 Oct 2013	3.00	7.00	4750	5820
10/03/2013	35011635	03 Oct 2013	2.00	7.00	4820	6080
10/02/2013	37036984	02 Oct 2013	4.00	7.60	4580	5560
10/01/2013	36013553	01 Oct 2013	2.00	5.70	4430	5890
09/30/2013	37036701	30 Sep 2013	3.50	6.60	4270	5200
09/27/2013	36013442	27 Sep 2013	1.00	6.20	5340	6440
09/27/2013	46013481	27 Sep 2013	1.00	6.00	5940	6940
09/27/2013	36013454	27 Sep 2013	1.00	5.50	5680	6520
09/06/2013	46006768	06 Sep 2013	1.00	5.20	4140	5400
09/06/2013	45014937	06 Sep 2013	1.75	5.20	5310	5640
09/04/2013	46006682	04 Sep 2013	2.50	8.00	25020	5590

P.O. Box 529
Lyons, CO 80540
Plant (303) 823-2100
Sales (303) 758-1334

CEMENT MILL TEST REPORT

Cement Identified as:

Plant: CEMEX Lyons Cement **TYPE II & GU CEMENT** **Date: 11/11/2013**
Location: Lyons, CO
Production Dates:

Beginning: October 1, 2013
Ending: October 31, 2013

STANDARD CHEMICAL REQUIREMENTS (ASTM C114)	TEST RESULTS		ASTM C150 SPEC.	TYPE I	TYPE II	ASTM C1157 SPEC.	TYPE GU
Silicon Dioxide (SiO_2), %	20.5			----	----		----
Aluminum Oxide (Al_2O_3), %	4.6		Maximum	----	6.0		----
Ferric Oxide (Fe_2O_3), %	3.0		Maximum	----	6.0		----
Calcium Oxide (CaO), %	63.9			----	----		----
Magnesium Oxide (MgO), %	1.0		Maximum	6.0	6.0		----
Sulfur Trioxide (SO_3), % **	3.3		Maximum	3.0**	3.0**		----
Loss on Ignition (LOI), %	2.1		Maximum	3.0	3.0		----
Insoluble Residue, %	0.26		Maximum	0.75	0.75		----
Alkalies (Na_2O equivalent), %	0.82			----	----		----
Tricalcium Silicate (C_3S), % *	59			----	----		----
Dicalcium Silicate (C_2S), % *	12			----	----		----
Tricalcium Aluminate (C_3A), % *	7		Maximum	----	8		----
Tetracalcium Aluminoferrite (C_4AF), % *	9			----	----		----
($C_3S + 4.75C_3A$)	91			----	----		----
($C_4AF + 2C_3A$) or ($C_4AF + C_2F$), %	22			----	----		----
CO_2, %	1.3			----	----		----
Limestone, %	3.1		Maximum	5.0	5.0		----
$CaCO_3$ in Limestone, %	96		Minimum	70	70		----
Heat of Hydration @ 7 day (kcal/kg) #	74			----	----		----
PHYSICAL REQUIREMENTS							
(ASTM C 204) Blaine Fineness, cm^2/gm	3740		Minimum	2600	2600		----
(ASTM C 430) -325 Mesh, %	97.6			----	----		----
(ASTM C 191) Time of Setting (Vicat)							
Initial Set, minutes	109		Min. - Max.	45 - 375	45 - 375	Min. - Max.	45 - 420
Final Set, minutes	193			----	----		----
(ASTM C 451) False Set, %	77		Minimum	50	50	Minimum	50
(ASTM C 185) Air Content, %	7		Maximum	12	12		----
(ASTM C 151) Autoclave Expansion, %	-0.02		Maximum	0.80	0.80	Maximum	0.80
(ASTM C 187) Normal Consistency, %	25.3			----	----		----
(ASTM C 1038) Expansion in Water, %	0.004		Maximum	0.020	0.020	Maximum	0.020
(ASTM C 109) Compressive Strength, psi (MPa)	psi	MPa					
1 Day	2540	17.5		----	----		----
3 Day	4170	28.7	Minimum	1740 (12.0)	1450 (10.0)	Minimum	1890 (13)
7 Day	5080	35.0	Minimum	2760 (19.0)	2470 (17.0)	Minimum	2900 (20)

*** Note D in Table 1 of ASTM C150-11 allows for additional sulfate, provided expansion as measured by ASTM C1038 does not exceed 0.020%.*
** Adjusted for Limestone Addition per ASTM C 150-11, A1.6*
 # Heat of Hydration is provided for information only

CEMEX hereby certifies that this cement meets or exceeds the chemical and physical Specifications of:

ASTM C150 - 12 for Type I Portland Cement
ASTM C150 - 12 for Type II Portland Cement
ASTM C1157 - 11 for Type GU Hydraulic Cement

By: Timothy W. Rawlsky
Quality Control Manager
CEMEX - Lyons Cement Plant

P.O. Box 529
Lyons, CO 80540
Plant (303) 823-2100
Sales (303) 758-1334

CEMENT MILL TEST REPORT

Cement Identified as:

Plant: CEMEX Lyons Cement **TYPE II & GU CEMENT** **Date: 11/11/2013**
Location: Lyons, CO
Production Dates:
Beginning: October 1, 2013
Ending: October 31, 2013

Additional Data

Inorganic Processing Addition Data

Type	None Added

Base Cement Phase Composition

C_3S (%)	**61**
C_2S (%)	**13**
C_3A (%)	**7**
C_4AF (%)	**9**

CEMEX hereby certifies that the above described data represents the materials used in the cement manufactured during the production period indicated.

Timothy W Rawlsky

By:
Timothy W. Rawlsky
Quality Control Manager
CEMEX - Lyons Cement Plant

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Office of Biotechnology
Materials Analysis and Research Laboratory
23 Town Engineering
Ames, IA 50011-3232
Phone: 515 294-8752
FAX: 515 294-4563
http://www.marl.iastate.edu

FLY ASH ANALYSIS

Report To: Dale Kisling **Date:** 08/21/2013

Laboratory No.: GGSCOMP6-13 **Date Received:** 07/08/2013

Sample Identification: Gerald Gentleman Station, Unit #1

CHEMICAL COMPOSITION (mass %):			**ASTM C 618-12 Criteria** Class F	Class C
Silicon Oxide (SiO_2)	.....	38.5		
Aluminum Oxide (Al_2O_3)	.....	19.3		
Iron Oxide (Fe_2O_3(T))	.....	5.5		
SUM (SiO_2+Al_2O_3+Fe_2O_3(T))	.....	63.3	....70.0 min.	....50.0 min.
Sulfur Trioxide (SO_3)	.....	1.4	.....5.0 max.	.....5.0 max.
Calcium Oxide (CaO)	.....	24.1		
Magnesium Oxide (MgO)	.....	4.7		
Moisture Content	.....	0.1	.....3.0 max.	.....3.0 max.
Loss on Ignition	.....	0.3	.....6.0 max.	.....6.0 max.
Available Alkalis, equiv. %Na_2O	.....	1.2		
PHYSICAL TEST RESULTS:				
Fineness				
Retained on a 45-μm sieve, (%)	.....	16.4	.....34 max.	.....34 max.
Strength Activity Index				
With Portland Cement, (%)				
Ratio to Control @ 28 days	.....	97	.....75 min.	.....75 min.
Ratio to Control @ 7 days	.....	96	.....75 min.	.....75 min.
Water Requirement, (% of Control)	.....	95	....105 max.	....105 max.
Soundness				
Autoclave Expansion, (%)	.....	0.05	....0.8 max.	....0.8 max.
Density (g per cubic cm)	.....	2.62		

Materials Analysis & Research Laboratory - Participants in the Cement & Concrete Reference Laboratory pozzolan testing program.

Analysis Approved: Scott Schlorholtz

Dr. Scott Schlorholtz, Scientist - MARL

Martin Marietta Materials

Rocky Mountain Division
Metro Area Aggregate District
10170 Church Ranch Way, Suite 201
Westminster, CO 80021

Attention: Mr. Dan Green

Re: Aggregate Physical Property Test Results
Specification Aggregates Quarry
Golden, CO

March 1, 2013

Mr. Green:

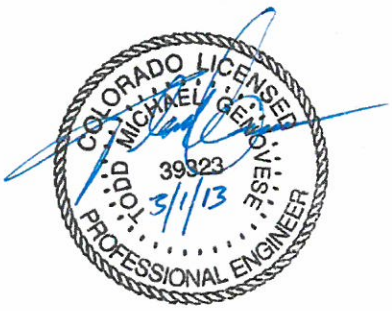
Enclosed are the results of the physical properties tests performed on the materials sampled from the Specification Aggregates Quarry in January 2013. Testing was performed in accordance with the procedures and specifications contained herein. Below is a summary of the results. Detailed test information is contained in the attachments.

Procedure	Description	1-1/2" Rock	#57/67 Rock	1/2" Rock
ASTM C 136	Sieve Analysis of Fine and Coarse Aggregate	Att. #1-1	Att. #2-1	Att. #3-1
ASTM C 117	Materials Finer than 75µm (No. 200) Sieve by Washing	Att. #1-1	Att. #2-1	Att. #3-1
ASTM C 29	Bulk Density (Unit Weight) and Voids by Rodding	100 / 41	99 / 42	97 / 43
ASTM C 127	Specific Gravity and Absorption of Coarse Aggregate	2.73 / 0.5	2.74 / 0.8	2.73 / 0.8
ASTM C 131	Degradation of Coarse Aggregate in the LA Abrasion Machine	19	23	23
CDOT CP-L 4211	Degradation of Coarse Aggregate in the Micro Deval Apparatus	12.6	10.5	12.4
ASTM C 88	Soundness by Use of Magnesium Sulfate	2	4	5
ASTM C 142	Clay Lumps and Friable Particles	0.1	0.1	0.5
ASTM C 123	Lightweight Particles	0.0	0.0	0.0

The materials selected for testing do not constitute the constituents of any specific mix design or blend. The materials named above represent products sold from the aforementioned site. Please contact us if you have any questions regarding these results.

Respectfully submitted,
Martin Marietta Materials, Inc.
Central Laboratory

Randy Peterson
Aggregate Quality Supervisor



Todd Genovese, P.E.
Division QA/QC Manager

AASHTO R18

Martin Marietta Materials, Inc. **Attachment #1-1**

Specification Aggregates Quarry 1-1/2" Rock

Sieve Analysis of Fine and Coarse Aggregate **ASTM C 136 & C 117**

Sieve Size		Percent Passing (%)	Specification MMM (G Rock)
1-1/2"	37.5 mm	100	100
1"	25.0 mm	76	65 to 90
3/4"	19.0 mm	24	20 to 38
1/2"	12.5 mm	3	0 to 15
3/8"	9.5 mm	2	0 to 10
No. 4	4.75 mm	1	0 to 5
No. 8	2.36 mm	1	
No. 16	1.18 mm	1	
No. 30	600 µm	1	
No. 50	300 µm	1	
No. 100	150 µm	1	
No. 200	75 µm	0.8	1.5 max.*

* Denotes limit for dust of fracture that is essentially free of clay or shale.

Bulk Density (Unit Weight) and Voids by Rodding **ASTM C 29**

Sample Weight (lbs)	Measure Volume (ft^3)	Unit Weight (lbs/ft^3)	Unit Weight (tons/cy)	Voids by Rodding (%)
50.21	0.5000	100.4	1.36	40.8
49.55	0.5000	99.1	1.34	41.6
50.05	0.5000	100.1	1.35	41.0
	Average	100	1.35	41

Bulk Specific Gravity (DRY) = 2.718

Specific Gravity and Absorption of Coarse Aggregate **ASTM C 127**

Oven Dried Mass in Air (grams)	SSD Mass in Air (grams)	Mass in Water (grams)	$G_{sb\ (SSD)}$	Absorption (%)
5265.7	5292.1	3355.1	2.73	0.5

Degradation of Coarse Aggregate in the LA Abrasion Machine **ASTM C 131**

Grading	Sample Mass Before Test (grams)	Sample Mass After Test (grams)	Percent Loss (%)	Specification ASTM C 33
B	5000.3	4065.8	19	50% max.

Degradation of Coarse Aggregate in the Micro Deval Apparatus **CDOT CP-L 4211**

Grading	Sample Mass Before Test (grams)	Sample Mass After Test (grams)	Percent Loss (%)	Specification CDOT
A (7.2)	1500.0	1311.5	12.6	18% max.

Martin Marietta Materials, Inc.

Specification Aggregates Quarry

Attachment #1-2

1-1/2" Rock

Soundness by Use of Magnesium Sulfate

ASTM C 88

Sieve Size	Original Sample Individual % Retained		Mass of Individual Test Fraction (grams)	Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
				Before	After		
1-1/2" to 1"	24	76	1000.6	1500.7	1485.8	1.0	0.8
1" to 3/4"	52		500.1				
3/4" to 1/2"	21	22	670.0	1000.6	969.5	3.1	0.7
1/2" to 3/8"	1		330.6				
3/8" to No. 4	1	1	300.0	300.0	280.9	3.1	0.0
Minus No. 4	1	1	-	-	-	3.1	0.0
Total	**100**	**100%**	**coarse aggregate fraction**				**2**
Specification - ASTM C 33							18% max.

Sieve Size	Splitting		Crumbling		Cracking		Flaking		Total No. of Pieces Before Test
	No.	%	No.	%	No.	%	No.	%	
1-1/2" to 3/4"	0	0	0	0	0	0	0	0	28

Clay Lumps and Friable Particles

ASTM C 142

Sieve Size	Original Sample Individual % Retained		Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
			Before	After		
1-1/2" to 1"	24	76	2999.8	2994.2	0.2	0.1
1" to 3/4"	52					
3/4" to 1/2"	21	22	2000.6	1998.1	0.1	0.0
1/2" to 3/8"	1					
3/8" to No. 4	1	1	-	-	0.1	0.0
No. 4 to No. 16	1	1	-	-	0.1	0.0
Total	**100%**					**0.1**
Specification - ASTM C 33 (Class 5S)						2.0% max.

Lightweight Particles

ASTM C 123

Sieve Size	Specific Gravity of Heavy Liquid	Mass of Test Sample (grams)	Mass of Floating Particles (grams)	Percent of Lightweight Pieces (%)	Specification ASTM C 33
Plus No. 4	2.0	5120.3	0.0	**0.0**	0.5% max.

Martin Marietta Materials, Inc. **Attachment #2-1**

Specification Aggregates Quarry **#57/67 Rock**

Sieve Analysis of Fine and Coarse Aggregate — ASTM C 136 & C 117

Sieve Size		Percent Passing (%)	Specification ASTM (No. 57/67)
1"	25.0 mm	**100**	100
3/4"	19.0 mm	**94**	90 to 100
1/2"	12.5 mm	**45**	25 to 60
3/8"	9.5 mm	**26**	20 to 55
No. 4	4.75 mm	**4**	0 to 10
No. 8	2.36 mm	**2**	0 to 5
No. 16	1.18 mm	**2**	
No. 30	600 µm	**2**	
No. 50	300 µm	**2**	
No. 100	150 µm	**2**	
No. 200	75 µm	**1.4**	1.5 max.*

* Denotes limit for dust of fracture that is essentially free of clay or shale.

Bulk Density (Unit Weight) and Voids by Rodding — ASTM C 29

Sample Weight (lbs)	Measure Volume (ft^3)	Unit Weight (lbs/ft^3)	Unit Weight (tons/cy)	Voids by Rodding (%)
49.04	0.5000	98.1	1.32	42.1
49.37	0.5000	98.7	1.33	41.7
49.94	0.5000	99.9	1.35	41.1
	Average	**99**	**1.34**	**42**

Bulk Specific Gravity (DRY) = 2.716

Specific Gravity and Absorption of Coarse Aggregate — ASTM C 127

Oven Dried Mass in Air (grams)	SSD Mass in Air (grams)	Mass in Water (grams)	$G_{sb\ (SSD)}$	Absorption (%)
3141.3	3165.5	2009.1	**2.74**	**0.8**

Degradation of Coarse Aggregate in the LA Abrasion Machine — ASTM C 131

Grading	Sample Mass Before Test (grams)	Sample Mass After Test (grams)	Percent Loss (%)	Specification ASTM C 33
B	4999.5	3832.7	**23**	50% max.

Degradation of Coarse Aggregate in the Micro Deval Apparatus — CDOT CP-L 4211

Grading	Sample Mass Before Test (grams)	Sample Mass After Test (grams)	Percent Loss (%)	Specification CDOT
A (7.2)	1500.3	1343.5	**10.5**	18% max.

Soundness by Use of Magnesium Sulfate

ASTM C 88

Sieve Size	Original Sample Individual % Retained		Mass of Individual Test Fraction (grams)	Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
				Before	After		
1-1/2" to 1"	-	6	1000.6	1500.1	1485.8	1.0	0.1
1" to 3/4"	6		500.1				
3/4" to 1/2"	49	68	670.0	1000.6	969.5	3.1	2.1
1/2" to 3/8"	19		330.6				
3/8" to No. 4	22	22	300.0	300.0	280.9	6.4	1.4
Minus No. 4	4	4	-	-	-	6.4	0.3
Total	100	100% coarse aggregate fraction					4
Specification - ASTM C 33							18% max.

Sieve Size	Splitting		Crumbling		Cracking		Flaking		Total No. of Pieces Before Test
	No.	%	No.	%	No.	%	No.	%	
1-1/2" to 3/4"	0	0	0	0	0	0	0	0	33

Clay Lumps and Friable Particles

ASTM C 142

Sieve Size	Original Sample Individual % Retained		Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
			Before	After		
1-1/2" to 1"		6	3002.4	3000.1	0.1	0.0
1" to 3/4"	6					
3/4" to 1/2"	49	68	2000.6	1998.1	0.1	0.1
1/2" to 3/8"	19					
3/8" to No. 4	22	22	1000.3	998.7	0.2	0.0
No. 4 to No. 16	3	3	-	-	0.2	0.0
Total	99%					0.1
Specification - ASTM C 33 (Class 5S)						2.0% max.

Lightweight Particles

ASTM C 123

Sieve Size	Specific Gravity of Heavy Liquid	Mass of Test Sample (grams)	Mass of Floating Particles (grams)	Percent of Lightweight Pieces (%)	Specification ASTM C 33
Plus No. 4	2.0	3001.3	0.0	0.0	0.5% max.

Martin Marietta Materials, Inc.

Specification Aggregates Quarry

Attachment #3-1

1/2" Rock

Sieve Analysis of Fine and Coarse Aggregate

ASTM C 136 & C 117

Sieve Size		Percent Passing (%)	Specification ASTM (No. 7)
3/4"	19.0 mm	**100**	100
1/2"	12.5 mm	**90**	90 to 100
3/8"	9.5 mm	**48**	40 to 70
No. 4	4.75 mm	**5**	0 to 15
No. 8	2.36 mm	**2**	0 to 5
No. 16	1.18 mm	**2**	
No. 30	600 µm	**2**	
No. 50	300 µm	**2**	
No. 100	150 µm	**2**	
No. 200	75 µm	**1.0**	1.5 max.*

* Denotes limit for dust of fracture that is essentially free of clay or shale.

Bulk Density (Unit Weight) and Voids by Rodding

ASTM C 29

Sample Weight (lbs)	Measure Volume (ft^3)	Unit Weight (lbs/ft^3)	Unit Weight (tons/cy)	Voids by Rodding (%)
23.25	0.2442	95.2	1.29	43.6
23.89	0.2442	97.8	1.32	42.0
23.56	0.2442	96.5	1.30	42.8
	Average	**97**	**1.30**	**43**

Bulk Specific Gravity (DRY) = 2.705

Specific Gravity and Absorption of Coarse Aggregate

ASTM C 127

Oven Dried Mass in Air (grams)	SSD Mass in Air (grams)	Mass in Water (grams)	$G_{sb\ (SSD)}$	Absorption (%)
2125.6	2141.7	1355.8	**2.73**	**0.8**

Degradation of Coarse Aggregate in the LA Abrasion Machine

ASTM C 131

Grading	Sample Mass Before Test (grams)	Sample Mass After Test (grams)	Percent Loss (%)	Specification ASTM C 33
C	5000.0	3870.7	**23**	50% max.

Degradation of Coarse Aggregate in the Micro Deval Apparatus

CDOT CP-L 4211

Grading	Sample Mass Before Test (grams)	Sample Mass After Test (grams)	Percent Loss (%)	Specification CDOT
B (7.3)	1500.1	1313.8	**12.4**	18% max.

Soundness by Use of Magnesium Sulfate

ASTM C 88

Sieve Size	Original Sample Individual % Retained		Mass of Individual Test Fraction (grams)	Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
				Before	After		
3/4" to 1/2"	10	52	670.0	1000.6	969.5	3.1	1.6
1/2" to 3/8"	42		330.6				
3/8" to No. 4	43	43	300.0	300.0	280.9	6.4	2.7
Minus No. 4	5	5	-	-	-	6.4	0.3
Total	**100**	**100% coarse aggregate fraction**					**5**
Specification - ASTM C 33							18% max.

Clay Lumps and Friable Particles

ASTM C 142

Sieve Size	Original Sample Individual % Retained		Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
			Before	After		
3/4" to 1/2"	10	52	2000.0	1984.5	0.8	0.4
1/2" to 3/8"	42					
3/8" to No. 4	43	43	1000.3	998.8	0.1	0.1
No. 4 to No. 16	3	3	-	-	0.1	0.0
Total	**98%**					**0.5**
Specification - ASTM C 33 (Class 5S)						2.0% max.

Lightweight Particles

ASTM C 123

Sieve Size	Specific Gravity of Heavy Liquid	Mass of Test Sample (grams)	Mass of Floating Particles (grams)	Percent of Lightweight Pieces (%)	Specification ASTM C 33
Plus No. 4	2.0	2026.1	0.0	**0.0**	0.5% max.

Martin Marietta Materials

Rocky Mountain Division
Metro Area Aggregate District
10170 Church Ranch Way, Suite 201
Westminster, CO 80021

Attention: Mr. Dan Green

Re: Aggregate Physical Property Test Results
Riverbend Pit
Fort Lupton, CO

March 1, 2013

Mr. Green:

Enclosed are the results of the physical properties tests performed on the materials sampled from the Riverbend Pit in January 2013. Testing was performed in accordance with the procedures and specifications contained herein. Below is a summary of the results. Detailed test information is contained in the attachments.

Procedure	Description	#57/67 Rock	3/8" Pea Gravel	3/8" Squeegee	Washed Concrete Sand
ASTM C 136	Sieve Analysis of Fine and Coarse Aggregate	Att. #1-1	Att. #2-1	Att. #3-1	Att. #4-1
ASTM C 117	Materials Finer than 75µm (No. 200) Sieve by Washing	Att. #1-1	Att. #2-1	Att. #3-1	Att. #4-1
ASTM C 29	Bulk Density (Unit Weight) and Voids by Rodding	100 / 38	98 / 39	105 / 34	107 / 34
ASTM C 127	Specific Gravity (SSD) and Absorption of Coarse Aggregate	2.59 / 0.8	2.59 / 0.8	2.59 / 0.9	-
ASTM C 128	Specific Gravity (SSD) and Absorption of Fine Aggregate	-	-	-	2.61 / 0.9
ASTM C 131	Degradation of Coarse Aggregate in the LA Abrasion Machine	39	34	31	-
CDOT CP-L 4211	Degradation of Coarse Aggregate in the Micro Deval Apparatus	5.6	7.9	8.7	-
ASTM C 88	Soundness by Use of Magnesium Sulfate	3	6 / 6	6	8
ASTM C 142	Clay Lumps and Friable Particles	0.3	0.8	0.6	0.8
ASTM C 123	Lightweight Particles	0.0	0.1	0.0	0.4
ASTM D 2419	Sand Equivalent Value of Soils and Fine Aggregate	-	-	-	94
ASTM C 40	Organic Impurities in Fine Aggregate	-	-	-	Plate No. 1

The materials selected for testing do not constitute the constituents of any specific mix design or blend. The materials named above represent products sold from the aforementioned site. Please contact us if you have any questions regarding these results.

Respectfully submitted,
Martin Marietta Materials, Inc.
Central Laboratory

Randy Peterson
Aggregate Quality Supervisor

COLORADO LICENSED
MICHAEL TODD GENOVESE
39323
3/1/13
PROFESSIONAL ENGINEER

Todd Genovese, P.E.
Division QA/QC Manager

AAP AASHTO R18

Martin Marietta Materials, Inc.
Riverbend Pit

Attachment #1-1
#57/67 Rock

Sieve Analysis of Fine and Coarse Aggregate

ASTM C 136 & C 117

Sieve Size		Percent Passing (%)	Specification ASTM (No. 57/67)
1"	25.0 mm	100	100
3/4"	19.0 mm	96	90 to 100
1/2"	12.5 mm	54	25 to 60
3/8"	9.5 mm	24	20 to 55
No. 4	4.75 mm	5	0 to 10
No. 8	2.36 mm	2	0 to 5
No. 16	1.18 mm	2	
No. 30	600 µm	2	
No. 50	300 µm	2	
No. 100	150 µm	1	
No. 200	75 µm	0.3	1.0 max.

Bulk Density (Unit Weight) and Voids by Rodding

ASTM C 29

Sample Weight (lbs)	Measure Volume (ft^3)	Unit Weight (lbs/ft^3)	Unit Weight (tons/cy)	Voids by Rodding (%)
50.06	0.5000	100.1	1.35	37.5
49.71	0.5000	99.4	1.34	38.0
49.76	0.5000	99.5	1.34	37.9
	Average	100	1.35	38

Bulk Specific Gravity (DRY) = 2.568

Specific Gravity and Absorption of Coarse Aggregate

ASTM C 127

Oven Dried Mass in Air (grams)	SSD Mass in Air (grams)	Mass in Water (grams)	$G_{sb\ (SSD)}$	Absorption (%)
3205.7	3230.4	1982.0	2.59	0.8

Degradation of Coarse Aggregate in the LA Abrasion Machine

ASTM C 131

Grading	Sample Mass Before Test (grams)	Sample Mass After Test (grams)	Percent Loss (%)	Specification ASTM C 33
B	5001.1	3065.1	39	50% max.

Degradation of Coarse Aggregate in the Micro Deval Apparatus

CDOT CP-L 4211

Grading	Sample Mass Before Test (grams)	Sample Mass After Test (grams)	Percent Loss (%)	Specification CDOT
B (7.3)	1500.0	1416.2	5.6	18% max.

Martin Marietta Materials, Inc. **Attachment #2-1**

Riverbend Pit 3/8" Pea Gravel

Sieve Analysis of Fine and Coarse Aggregate

ASTM C 136 & C 117

Sieve Size		Percent Passing (%)	Specification ASTM (No. 8)
1/2"	12.5 mm	100	100
3/8"	9.5 mm	90	85 to 100
No. 4	4.75 mm	18	10 to 30
No. 8	2.36 mm	2	0 to 10
No. 16	1.18 mm	1	0 to 5
No. 30	600 µm	1	
No. 50	300 µm	1	
No. 100	150 µm	1	
No. 200	75 µm	0.1	1.0 max.

Bulk Density (Unit Weight) and Voids by Rodding

ASTM C 29

Sample Weight (lbs)	Measure Volume (ft^3)	Unit Weight (lbs/ft^3)	Unit Weight (tons/cy)	Voids by Rodding (%)
23.91	0.2442	97.9	1.32	38.9
23.92	0.2442	98.0	1.32	38.9
23.87	0.2442	97.7	1.32	39.0
	Average	98	1.32	39

Bulk Specific Gravity (DRY) = 2.567

Specific Gravity and Absorption of Coarse Aggregate

ASTM C 127

Oven Dried Mass in Air (grams)	SSD Mass in Air (grams)	Mass in Water (grams)	$G_{sb\ (SSD)}$	Absorption (%)
2096.8	2113.1	1296.3	2.59	0.8

Degradation of Coarse Aggregate in the LA Abrasion Machine

ASTM C 131

Grading	Sample Mass Before Test (grams)	Sample Mass After Test (grams)	Percent Loss (%)	Specification ASTM C 33
C	5000.1	3312.5	34	50% max.

Degradation of Coarse Aggregate in the Micro Deval Apparatus

CDOT CP-L 4211

Grading	Sample Mass Before Test (grams)	Sample Mass After Test (grams)	Percent Loss (%)	Specification CDOT
C (7.4)	1500.1	1381.6	7.9	18% max.

Soundness by Use of Magnesium Sulfate

ASTM C 88

Sieve Size	Original Sample Individual % Retained		Mass of Individual Test Fraction (grams)	Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
				Before	After		
1-1/2" to 1"	-	4	-	-	-	1.7	0.1
1" to 3/4"	4		-				
3/4" to 1/2"	42	72	670.4	1000.2	983.1	1.7	1.2
1/2" to 3/8"	30		329.8				
3/8" to No. 4	19	19	300.3	300.3	280.3	6.7	1.3
Minus No. 4	5	5	-	-	-	6.7	0.3
Total	**100**	**100%**	**coarse aggregate fraction**				**3**
Specification - ASTM C 33							18% max.

Sieve Size	Splitting		Crumbling		Cracking		Flaking		Total No. of Pieces Before Test
	No.	%	No.	%	No.	%	No.	%	
1-1/2" to 3/4"	0	0	1	4	0	0	1	4	26

Clay Lumps and Friable Particles

ASTM C 142

Sieve Size	Original Sample Individual % Retained		Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
			Before	After		
1-1/2" to 1"	-	4	-	-	0.1	0.0
1" to 3/4"	4					
3/4" to 1/2"	42	72	2003.1	2000.1	0.1	0.1
1/2" to 3/8"	30					
3/8" to No. 4	19	19	1000.5	990.5	1.0	0.2
Total	**95%**					**0.3**
Specification - ASTM C 33 (Class 5S)						2.0% max.

Lightweight Particles

ASTM C 123

Sieve Size	Specific Gravity of Heavy Liquid	Mass of Test Sample (grams)	Mass of Floating Particles (grams)	Percent of Lightweight Pieces (%)	Specification ASTM C 33
Plus No. 4	2.0	3205.7	0.8	**0.0**	0.5% max.

Soundness by Use of Magnesium Sulfate

ASTM C 88

Sieve Size	Original Sample Individual % Retained		Mass of Individual Test Fraction (grams)	Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
				Before	After		
3/4" to 1/2"	-	10	-	330.2	317.8	3.8	0.4
1/2" to 3/8"	10		330.2				
3/8" to No. 4	72	72	300.3	300.3	280.3	6.7	4.8
Minus No. 4	18	0	-	-	-	0.0	0.0
Total	**100**	**82%**	**coarse aggregate fraction**				**6**
Specification - ASTM C 33							18% max.
No. 4 to No. 8	16	16	100	100	93.7	6.3	1.0
No. 8 to No. 16	1	1	-	-	-	6.7	0.1
No. 16 to No. 30	-	-	-	-	-	-	-
No. 30 to No. 50	-	-	-	-	-	-	-
Minus No. 50	1	1	-	-	-	0.0	0.0
Total	**18**	**18%**	**fine aggregate fraction**				**6**
Specification - ASTM C 33							15% max.

Clay Lumps and Friable Particles

ASTM C 142

Sieve Size	Original Sample Individual % Retained		Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
			Before	After		
3/4" to 1/2"	-	10	2003.1	2000.1	0.1	0.0
1/2" to 3/8"	10					
3/8" to No. 4	72	72	1000.5	990.5	1.0	0.7
No. 4 to No. 16	17	17	25.2	25.1	0.4	0.1
Total	**99%**					**0.8**
Specification - ASTM C 33 (Class 5S)						2.0% max.

Lightweight Particles

ASTM C 123

Sieve Size	Specific Gravity of Heavy Liquid	Mass of Test Sample (grams)	Mass of Floating Particles (grams)	Percent of Lightweight Pieces (%)	Specification ASTM C 33
Plus No. 4	2.0	2096.8	1.2	**0.1**	0.5% max.

Martin Marietta Materials, Inc. **Attachment #3-1**

Riverbend Pit **3/8" Squeegee**

Sieve Analysis of Fine and Coarse Aggregate

ASTM C 136 & C 117

Sieve Size		Percent Passing (%)	Specification ASTM (No. 9)
3/8"	9.5 mm	**100**	100
No. 4	4.75 mm	**77**	85 to 100
No. 8	2.36 mm	**33**	10 to 40
No. 16	1.18 mm	**13**	0 to 10
No. 30	600 µm	**6**	0 to 5
No. 50	300 µm	**2**	
No. 100	150 µm	**1**	
No. 200	75 µm	**0.2**	1.0 max.

Bulk Density (Unit Weight) and Voids by Rodding

ASTM C 29

Sample Weight (lbs)	Measure Volume (ft^3)	Unit Weight (lbs/ft^3)	Unit Weight (tons/cy)	Voids by Rodding (%)
25.59	0.2442	104.8	1.41	34.6
25.75	0.2442	105.4	1.42	34.2
25.61	0.2442	104.9	1.42	34.6
	Average	**105**	**1.42**	**34**

Bulk Specific Gravity (DRY) = 2.568

Specific Gravity and Absorption of Coarse Aggregate

ASTM C 127

Oven Dried Mass in Air (grams)	SSD Mass in Air (grams)	Mass in Water (grams)	$G_{sb\ (SSD)}$	Absorption (%)
2119.4	2137.7	1312.4	**2.59**	**0.9**

Degradation of Coarse Aggregate in the LA Abrasion Machine

ASTM C 131

Grading	Sample Mass Before Test (grams)	Sample Mass After Test (grams)	Percent Loss (%)	Specification ASTM C 33
D	5000.0	3467.2	**31**	50% max.

Degradation of Coarse Aggregate in the Micro Deval Apparatus

CDOT CP-L 4211

Grading	Sample Mass Before Test (grams)	Sample Mass After Test (grams)	Percent Loss (%)	Specification CDOT
D (8.2)	1500.1	1369.6	**8.7**	18% max.

Martin Marietta Materials, Inc.
Riverbend Pit

Attachment #3-2
3/8" Squeegee

Soundness by Use of Magnesium Sulfate

ASTM C 88

Sieve Size	Original Sample Individual % Retained		Mass of Individual Test Fraction (grams)	Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
				Before	After		
3/8" to No. 4	23	23	300.1	300.1	287.4	4.2	1.0
No. 4 to No. 8	44	44	100	100	93.3	6.7	2.9
No. 8 to No. 16	20	20	100	100	91.4	8.6	1.7
No. 16 to No. 30	7	7	100	100	96.6	3.4	0.2
No. 30 to No. 50	4	4	-	-	-	3.4	0.1
Minus No. 50	2	2	-	-	-	0.0	0.0
Total	**100**	**100%**	**fine aggregate fraction**				**6**
Specification - ASTM C 33							15% max.

Clay Lumps and Friable Particles

ASTM C 142

Sieve Size	Original Sample Individual % Retained		Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
			Before	After		
3/8" to No. 4	23	23	1000.5	990.5	1.0	0.2
No. 4 to No. 16	64	64	25.2	25.1	0.4	0.3
Total	**87%**					**0.6**
Specification - ASTM C 33 (Class 5S)						2.0% max.

Lightweight Particles

ASTM C 123

Sieve Size	Specific Gravity of Heavy Liquid	Mass of Test Sample (grams)	Mass of Floating Particles (grams)	Percent of Lightweight Pieces (%)	Specification ASTM C 33
Plus No. 4	2.0	2119.4	1.0	**0.0**	0.5% max.

Martin Marietta Materials, Inc. **Attachment #4-1**

Riverbend Pit **Washed Concrete Sand**

Sieve Analysis of Fine and Coarse Aggregate

ASTM C 136 & C 117

Sieve Size		Percent Passing (%)	Specification ASTM (Fine Agg.)
3/8"	9.5 mm	**100**	100
No. 4	4.75 mm	**100**	95 to 100
No. 8	2.36 mm	**92**	80 to 100
No. 16	1.18 mm	**64**	50 to 85
No. 30	600 µm	**40**	25 to 60
No. 50	300 µm	**15**	5 to 30
No. 100	150 µm	**3**	0 to 10
No. 200	75 µm	**0.8**	0 to 3.0

Bulk Density (Unit Weight) and Voids by Rodding

ASTM C 29

Sample Weight (lbs)	Measure Volume (ft^3)	Unit Weight (lbs/ft^3)	Unit Weight (tons/cy)	Voids by Rodding (%)
25.96	0.2442	106.3	1.44	34.2
26.05	0.2442	106.7	1.44	34.0
26.02	0.2442	106.6	1.44	34.0
	Average	**107**	**1.44**	**34**

Bulk Specific Gravity (DRY) = 2.588

Specific Gravity and Absorption of Fine Aggregate

ASTM C 128

Oven Dried Mass in Air (grams)	Mass of Pycnometer Filled with Water (grams)	SSD Mass in Air (grams)	Mass of Pycnometer w/ Sample and Water (grams)	$G_{sb\ (SSD)}$	Absorption (%)
495.4	1256.1	500.0	1564.7	**2.612**	**0.9**

Soundness by Use of Magnesium Sulfate

ASTM C 88

Sieve Size	Original Sample Individual % Retained		Mass of Individual Test Fraction (grams)	Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
				Before	After		
No. 4 to No. 8	8	8	100.0	100.0	93.3	6.7	0.5
No. 8 to No. 16	28	28	100.0	100.0	85.0	15.0	4.2
No. 16 to No. 30	24	24	100.0	100.0	94.2	5.8	1.4
No. 30 to No. 50	25	25	100.0	100.0	94.0	6.0	1.5
Minus No. 50	15	15	-	-	-	0.0	0.0
Total	**100**	**100%**	**fine aggregate fraction**				**8**
Specification - ASTM C 33							15% max.

Clay Lumps and Friable Particles

ASTM C 142

Sieve Size	Original Sample Individual % Retained		Mass of Combined Test Fraction (grams)		Percent Passing Designated Sieve After Test (grams)	Weighted Percent Loss (%)
			Before	After		
No. 4 to No. 16	-	-	25.5	25.3	0.8	0.8
Total						**0.8**
Specification - ASTM C 33 (Class 5S)						2.0% max.

Lightweight Particles

ASTM C 123

Sieve Size	Specific Gravity of Heavy Liquid	Mass of Test Sample (grams)	Mass of Floating Particles (grams)	Percent of Lightweight Pieces (%)	Specification ASTM C 33
Plus No. 50	2	200.9	0.9	**0.4**	0.5% max.

Sand Equivalent Value of Soils and Fine Aggregate

ASTM D 2419

	Specimen 1	Specimen 2	Specimen 3
Sand Reading	3.5	3.5	3.3
Clay Reading	3.7	3.7	3.7
Sand Equivalent	95	95	90

Average SE Value	94

Organic Impurities in Fine Aggregate

ASTM C 40

Organic Plate Number
Plate Number 1

Sika Corporation
Construction

January 14, 2013

Certificate of Compliance

Mr. Matt Riebe, Quality Control Manager
E-mail: mattr@suburbanreadymix.com

Martin Marietta Materials, Inc.
10170 Church Ranch Way # 200
Westminister, CO 80021
Ph: 303-657-4000

Re: **Sika Air** air entraining admixture

This is to certify that **Sika Air** air entraining admixture conforms to the current ASTM C 260 and AASHTO M 154 specifications.

Sika Air is manufactured under quality control conditions by Sika Corporation. **Sika Air** exhibits the typical physical properties as stated in the current data sheet for this product found at Sika's website www.sikaconstruction.com when used as directed within the product's shelf life for one year after date of installation. **Always read the current applicable product data sheet, material safety data sheet and label prior to use.**

Results may differ based upon statistical variations depending upon mix design, mixing methods and equipment, temperature, application methods, test methods, actual site conditions and curing conditions.

NO OTHER WARRANTIES, EXPRESS OR IMPLIED, SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND. SIKA SHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS HELD BY OTHERS.

Sincerely,
Sika Corporation

David White
Technical Services Director

cc: Steven Calhoun/Sika Corporation
Ray Williamson/Sika Corporation

Sika Corporation
Construction

January 14, 2013

Certificate of Compliance

Mr. Matt Riebe, Quality Control Manager
E-mail: mattr@suburbanreadymix.com

Martin Marietta Materials, Inc.
10170 Church Ranch Way # 200
Westminister, CO 80021
Ph: 303-657-4000

Re: **Sikament 686** high range and mid range water reducing admixture

This is to certify that **Sikament 686** high range and mid range water reducing admixture conforms to the current ASTM C 494, Types A and F, and AASHTO M 194, Types A and F specifications.

Sikament 686 is manufactured under quality control conditions by Sika Corporation. **Sikament 686** exhibits the typical physical properties as stated in the current data sheet for this product found at Sika's website www.sikaconstruction.com when used as directed within the product's shelf life for one year after date of installation. **Always read the current applicable product data sheet, material safety data sheet and label prior to use.**

Results may differ based upon statistical variations depending upon mix design, mixing methods and equipment, temperature, application methods, test methods, actual site conditions and curing conditions.

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Sincerely,
Sika Corporation

David White (RW)

David White
Technical Services Director

cc: Steven Calhoun/Sika Corporation
Ray Williamson/Sika Corporation