CANNONDESIGN

SUBMITTAL IDENTIFICATION SHEET

To be completed by Contractor/CM

WEBSTER UNIVERSITY ISB
PROJECT NAME

8274 BIG BEND BLVD
ADDRESS

NUMBER

WEBSTER UNIVERSITY
OWNER

CANNON DESIGN
ARCHITECT / ENGINEER

Joe Voypick
SUBMITTED BY

033000-22
CONTRACTOR / CM SUBMITTAL NO.

CANNON DESIGN SUBMITTAL NO.

DRAWING / DETAIL REFERENCE

033000
SPECIFICATION SECTION / PARAGRAPH

Vee Jay Concrete
MANUFACTURER / SUPPLIER

ITEM / PRODUCT ID

REQUIRED DATE

PRIORITY

◯ CRITICAL

ITEM BEING SUBMITTED (check only one)

- ◯ Shop Drawings
- ◯ Samples (_____ copies)
- ◯ LEED Submittal
- ◯ Certification / Qualifications
- ◯ Record Documents
- ◉ Product Data
- ◯ Coordination Drawing
- ◯ Calculations
- ◯ Schedules
- ◯ O&M Manuals
- ◯ Other _____

ITEM BEING SUBMITTED FOR (check only one)

◉ Action ◯ Information Only ◯ Record

REMARKS OR DEVIATIONS

CONTRACTOR / CM CERTIFICATION
(SUBMITTALS NOT CERTIFIED WILL BE RETURNED WITHOUT REVIEW)

PARIC

PARIC CORPORATION
SUBMITTAL STAMP

THIS SHOP DRAWING HAS BEEN REVIEWED BY PARIC CORPORATION

Subcontractor remains responsible for dimensions, quantities, coordination with other trades and compliance with contract documents.

By:
Devin D. Gates

Joe Voypick
REVIEWED BY

5/24/16
DATE

To be completed by Reviewer

03 3000-022
CANNON DESIGN SUBMITTAL NUMBER

5/24/16
RECEIVED DATE

- ◉ A. No Exceptions Taken
  No further review of submittal is required.
- ◯ B. Make Corrections Noted
  Incorporate corrections in work; resubmission is not required.
- ◯ C. Revise and Resubmit
  Revise as noted, and resubmit for review.
- ◯ D. Rejected
  Submittal is not in compliance with Contract Documents; provide new submittal.
- ◯ E. For Record / Information Only
  Submittal was reviewed for Record / Information purposes only.
- ◯ F. Not Required for Review
  Submittal is not required by Contract Documents and has not been reviewed.

Review is for conformance with the design concept of this project and for general compliance with contract documents. Contractor is responsible for quantities, dimensions and compliance with contract documents and for information that pertains to fabrication processes, construction techniques and coordination of this work with all trades which will be affected thereby. This review is null and void if submittal deviates from contract documents and does not indicate or note deviations.

A/E COMMENTS ◯ See attached sheet(s) for additional comments

SHOP DRAWING / SUBMITTAL REVIEW

- ☒ NO EXCEPTION TAKEN
- ☐ EXCEPTIONS NOTED, RESUBMITTAL NOT REQUIRED
- ☐ REJECTED
- ☐ REVIEWED FOR INFORMATION ONLY
- ☐ REVISE AND RESUBMIT AS NOTED

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for: Dimensions which shall be confirmed and correlated at the job site, fabrication processes and techniques of the construction, coordination of his work with that of all other trades and the satisfactory performance of his work.

DAVID MASON & ASSOCIATES, INC.

REVIEW BY: JYW DATE: 06/03/2016

REVIEWED BY

DATE

77 Westport Plaza
Suite 250
St. Louis, MO 63146

TRANSMITTAL

No. 15051-0047

Paric Corporation

PROJECT: Webster University Interdisciplinary Science Building

DATE: 05/24/2016

TO: Cannon Design
1100 Clark Ave
St Louis MO 63102

RE: Interior slab on grade mix design

ATTN: Kelvin Patel

JOB: 15051

WE ARE SENDING:	SUBMITTED FOR:	ACTION TAKEN:
☑ Shop Drawings	☑ Approval	☑ Approved as Submitted
☐ Letter	☐ Your Use	☐ Approved as Noted
☐ Prints	☐ As Requested	☐ Returned After Loan
☐ Change Order	☐ Review and Comment	☐ Resubmit
☐ Plans		☐ Submit
☐ Samples	**SENT VIA:**	☐ Returned
☐ Specifications	☐ Attached	☐ Returned for Corrections
☐ Other:	☐ Separate Cover Via:	☐ Due Date:

Item	*Package*	*Code*	*Rev.*	*Copies*	*Date*	*Description*	*Status*
Submittal		033000-22	1		05/24/2016	Interior slab on grade mix design	Submitted

NOTES:

CC: Paric Corporation, Kathy Bathe

Project Coordinator: Paric Corporation, Kathy Bathe

Signed: _____
Devin Gates

Vee-Jay Cement Contracting Co., Inc.
8053 Chivvis Drive • St. Louis, Missouri 63123-2333 • (314) 351-3366 • FAX (314) 351-5468

Submittal / Transmittal

Transmitted To:

Paric - Jason Szachnieski &
Devin Gates
JRSzachnieski@paric.com
ddgates@paric.com

Date	Qty	Vee-Jay Submittal No. 9676 02-00
5/23/16	1	
Submitted By:		
Jeremey Gregson		

Specification Section	Project
033000 - Cast-In-Place Concrete	Webster I.S.B

Product Category	Item No.	Product Description/Comments
Mix Design - Interior SOG/SOD	2.13 C & D	Kienstra #4000 SF NO AIR MR - 4000 PSI - 5.5 Sack
Mix Design - Interior SOG/SOD	2.13 C & D	Kienstra #4000 SF NO AIR FA MR - 4000 PSI - 6 Sack, 15% Fly Ash
Mix Design - Interior Topping/Pan Stair	2.13 E	Kienstra #4000 TF NO AIR - 4000 PSI - 6.5 Sack
Mix Design - Interior Topping/Pan Stair	2.13 E	Kienstra #4000 TF NO AIR FA - 4000 PSI - 6.5 Sack, 15% Fly Ash

The aforementioned proposed submittals are considered approved if Vee-Jay Cement Contracting Co., Inc. is directed to perform work prior to receiving reviewed submittals. Materials used and returned as non-conforming through review process after work has been placed will not be the responsibility of Vee-Jay Cement Contracting Co., Inc.

Remarks:

Vee-Jay Cement Contracting Co., Inc.

8053 Chivvis Drive • St. Louis, Missouri 63123-2333 • (314) 351-3366 • FAX (314) 351-5468

ASTM C-94 EXTENSION OF MIXING TIME AND ADDITION OF WATER ON SITE.

Vee-Jay Cement is requesting that an extension of mixing time and addition of hold back water be allowed as outlined in ASTM C-94 section 12.7

12.7 "If the desired slump or slump flow is less than specified, and unless otherwise stated, obtain the desired slump or slump flow within the tolerances stated in 7.1., 7.1.2, or 7.1.3 (see notes below) with a one-time addition of water . Do not exceed the maximum water content for the batch as established by the design mixture proportion. A onetime addition of water is not prohibited from being several distinct additions provided that no concrete has been discharged except for slump or slump flow testing. All water additions shall be completed within 15 minutes from the start of the first water addition. .....Discharge of the concrete shall be completed within 1 ½ hour or before the drum has revolved 300 revolutions, whichever comes first, after the introduction of the mixing water to the cement .....

These limitations are permitted to be waived by the purchaser if the concrete is of such slump or slump flow after the 1 ½ hour time or 300 revolution limit has been reached that is can be placed without the addition of water to the batch.

If you should have any further questions please contact us at (314) 351-3366

Note:

ASTM C-94 7.1.1 when slump is stated as a "maximum " or " not to exceed requirement " tolerances

7.1.2 when slump is stated as a target or nominal slump tolerances

7.1.3 when the purchaser states a slump flow requirement for self consolidating concrete tolerances

Rev. 10/7/13

755 South New Ballas Suite 150
St. Louis, MO. 63141

May 23, 2016

Jeremey Gregson
Vee Jay Cement Contr. Co., Inc.
8053 Chivis Dr.
St. Louis, MO 63123

Dear Jeremey,

The enclosed mixes are property of Kienstra ~ American Ready Mix and are designed for the sole use of Vee Jay Cement Contr. Co., Inc. for use on Webster University Interdisciplinary Science Bldg. The proprietary designs may not be duplicated or shared in any manner. **TO ENSURE ORDER ACCURACY IT IS THE CONTRACTOR'S RESPONSIBILITY TO ORDER THE CONCRETE FOR THIS PROJECT USING THE EXACT JOB NAME, MIX NAME(S), AND APPLICATION(S) LISTED IN THE BOX BELOW.**

Job Name: Webster University Interdisciplinary Science Bldg.

Mix Name/Application:	**4000 SF NO AIR MR**	**(INTERIOR SLAB ON GRADE / DECK – COLD WEATHER)**
	4000 SF NO AIR FA MR	**(INTERIOR SLAB ON GRADE / DECK – WARM WEATHER)**
	4000 TF NO AIR	**(INTERIOR TOPPING, PAN STAIRS – COLD WEATHER)**
	4000 TF NO AIR FA	**(INTERIOR TOPPING, PAN STAIRS – WARM WEATHER)**

Concrete Sampling and Testing:
The proposed mix designs will meet the project specifications when the concrete cylinders are sampled, stored, cured, and tested in strict accordance with current A.S.T.M. and A.C.I. standards and recommended practices. In the event additional testing is requested by the engineer, owner or customer, the required tests must be performed by a qualified, independent third party hired by the party requesting the additional testing. If the additional testing proves that concrete meets or exceeds the project's specifications, any associated costs with the extra testing required shall be paid for by the owner, engineer, or customer who requested the additional testing services.

We request the inclusion of Kienstra - Ready Mix Concrete on the distribution list for concrete cylinder tests from the testing laboratory.

Unless instructed otherwise, we will assume that the proposed mix designs are accepted and approved for the referenced project.

If we can be of further assistance, please feel free to call Joe Garza or myself.

Sincerely,

Jeff Schaefer

KIENSTRA READY MIX CONCRETE
755 SOUTH NEW BALLAS SUITE 150
ST. LOUIS, MO, 63141

seeMIX II Mix Report
4000 SF NO AIR MR
Strength Compressive: 4,000 psi
5/23/2016

Contractor ; VEE JAY CEMENT CONTRACTING CO.
Project : WEBSTER UNIVERSITY INTERDISCIPLINARY SCIENCE BLDG
Source of Concrete : AMERICAN READY MIX FENTON
Construction Type : INTERIOR SLAB ON GRADE / DECK - COLD WEATHER
Placement : CONVENTIONAL/PUMP

Weights per Cubic Yard (Saturated, Surface-Dry)	Quantity	Density	Yield, ft³
PORTLAND TYPE I/II CEMENT, lb	520	3.150	2.65
Water, lb	235	1.000	3.77
ST. LOUIS LIMESTONE, lb	1,780	2.620	10.89
FINISH SAND, lb	1,501	2.580	9.32
MID RANGE WATER REDUCER, oz (US)	31.2	1.000	0.03
Total Air, %	2.0 ± 1.0		0.54
		TOTAL	27.20

Water/Cement Ratio, lbs/lb	0.45
Slump, High, in	6.00
Low, in	4.00
Concrete Unit Weight, pcf	148.46
Yield, %	100.7

THE PROPESED MIX DESIGN IS BASED ON ACI STANDARDS AND HISTORICAL DATA. UNLESS INSTRUCTED OTHERWISE WE WILL ASSUME THE PROPOSED MIX DESIGN IS ACCEPTED AND APPROVED FOR THE REFERENCED PROJECT.

Prepared by :

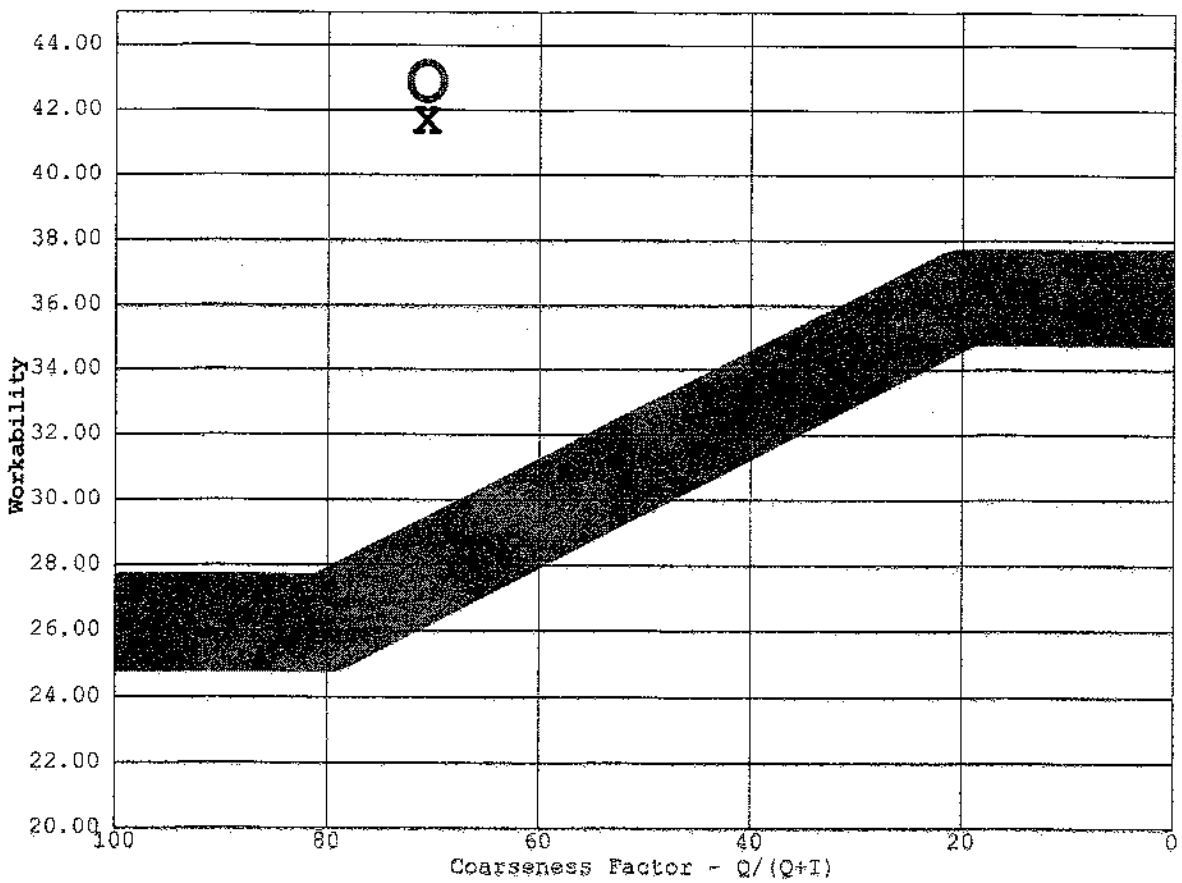
AMERICAN - READY MIX CONCRETE

Mix Analysis

Coarseness (40.4 / (40.4 + 16.8)) * 100	70.7
Workability	42.8
W - Adjust	41.7
Percent Mortar	57.5
Total Fineness Modulus	4.86

	Air	Water	Paste
%Paste	7.8	53.9	-
%Mortar	3.5	24.1	44.7
%Total	2.0	13.8	25.7

Coarseness Factor Chart



O Workability X W-Adjust

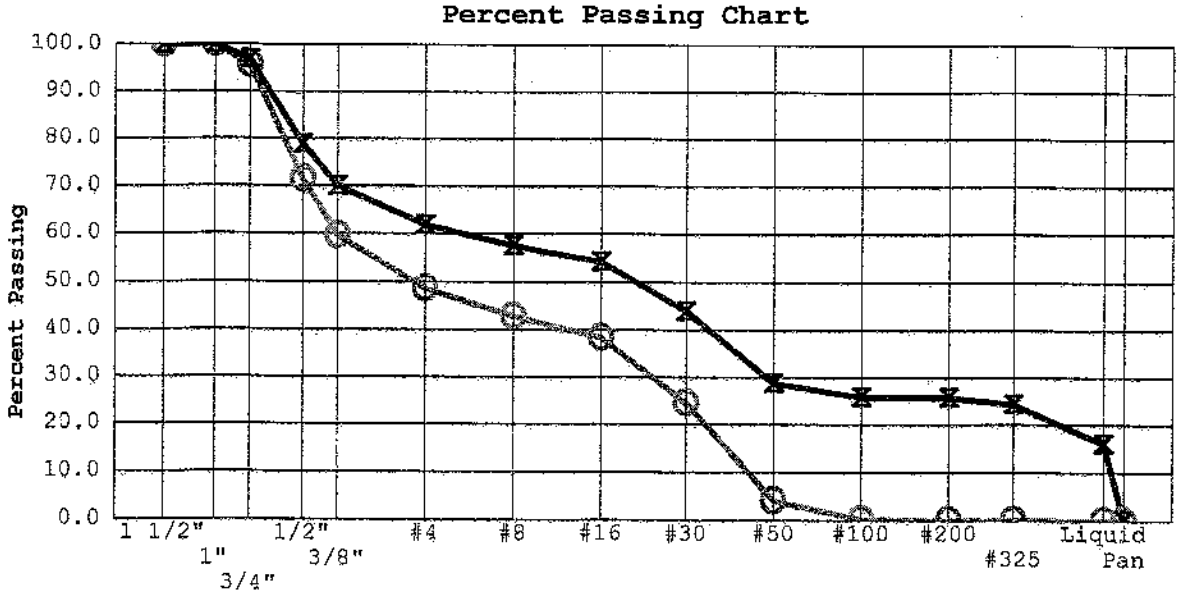
Full Gradation Analysis

Percent Passing

Sieve	Agg.1	Agg.2	Paste	Total	Aggr.
1 1/2"	-	-	-	-	-
1"	100.0	-	-	100.0	100.0
3/4"	92.0	-	-	96.8	95.7
1/2"	47.0	-	-	78.8	71.5
3/8"	25.0	100.0	-	70.0	59.6
#4	8.0	96.1	-	61.8	48.6
#8	2.0	90.5	-	57.5	42.8
#16	2.0	80.7	-	54.2	38.3
#30	0.0	53.3	-	44.0	24.6
#50	-	8.8	-	28.7	4.1
#100	-	0.3	-	25.8	0.1
#200	-	0.0	100.0	25.7	0.0
#325	-	-	94.3	24.2	-
Liquid	-	-	62.1	16.0	-
Pan	-	-	0.0	0.0	-
Fineness Modulus	6.71	2.70			
% of Aggregate	53.87	46.13			
% of Total	40.03	34.28			

Agg.1 : ST. LOUIS LIMESTONE
Agg.2 : FINISH SAND

Percent Passing Chart



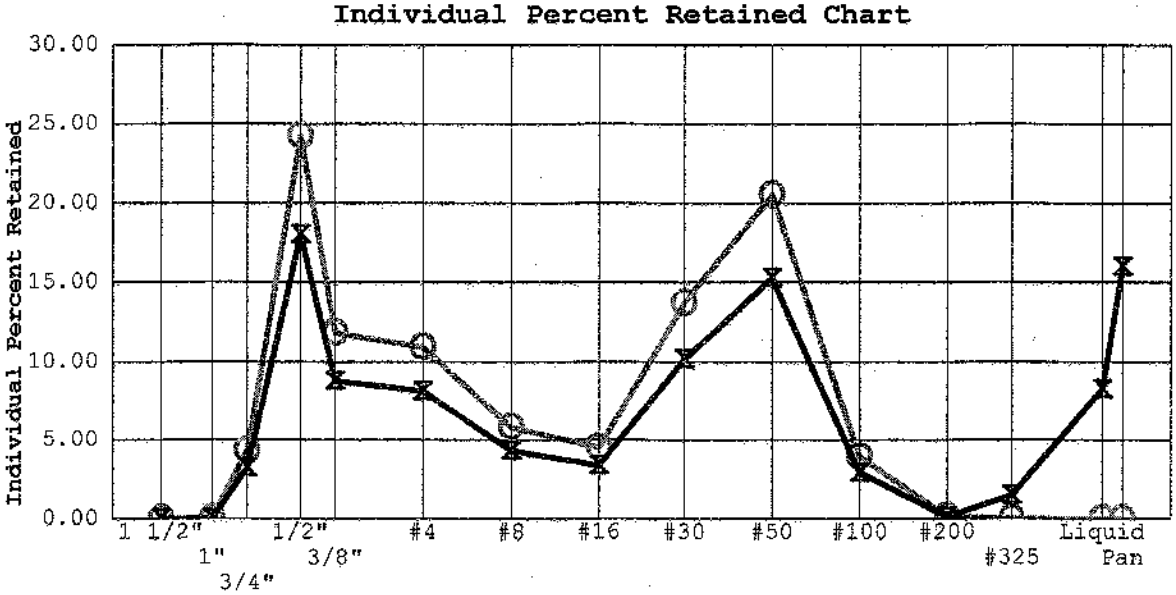
Full Gradation Analysis

Percent Retained

Sieve	Agg.1	Agg.2	Paste	Total	Aggr.
1 1/2"	0.0	0.0	0.0	0.0	0.0
1"	0.0	0.0	0.0	0.0	0.0
3/4"	8.0	0.0	0.0	3.2	4.3
1/2"	45.0	0.0	0.0	18.0	24.2
3/8"	22.0	0.0	0.0	8.8	11.9
#4	17.0	3.9	0.0	8.1	11.0
#8	6.0	5.6	0.0	4.3	5.8
#16	0.0	9.8	0.0	3.4	4.5
#30	2.0	27.4	0.0	10.2	13.7
#50	0.0	44.5	0.0	15.3	20.5
#100	0.0	8.5	0.0	2.9	3.9
#200	0.0	0.3	0.0	0.1	0.1
#325	0.0	0.0	5.7	1.5	0.0
Liquid	0.0	0.0	32.2	8.3	0.0
Pan	0.0	0.0	62.1	16.0	0.0
Fineness Modulus	6.71	2.70			
% of Aggregate	53.87	46.13			
% of Total	40.03	34.28			

Agg.1 : ST. LOUIS LIMESTONE
Agg.2 : FINISH SAND

Individual Percent Retained Chart



X Total O Combined Aggregates

KIENSTRA - READY MIX CONCRETE
755 SOUTH NEW BALLAS ROAD, SUITE 150
ST. LOUIS, MO 63141
(314) 994-1616

ACI 214 Summary of 4000 SFNA MR [4000 psi]

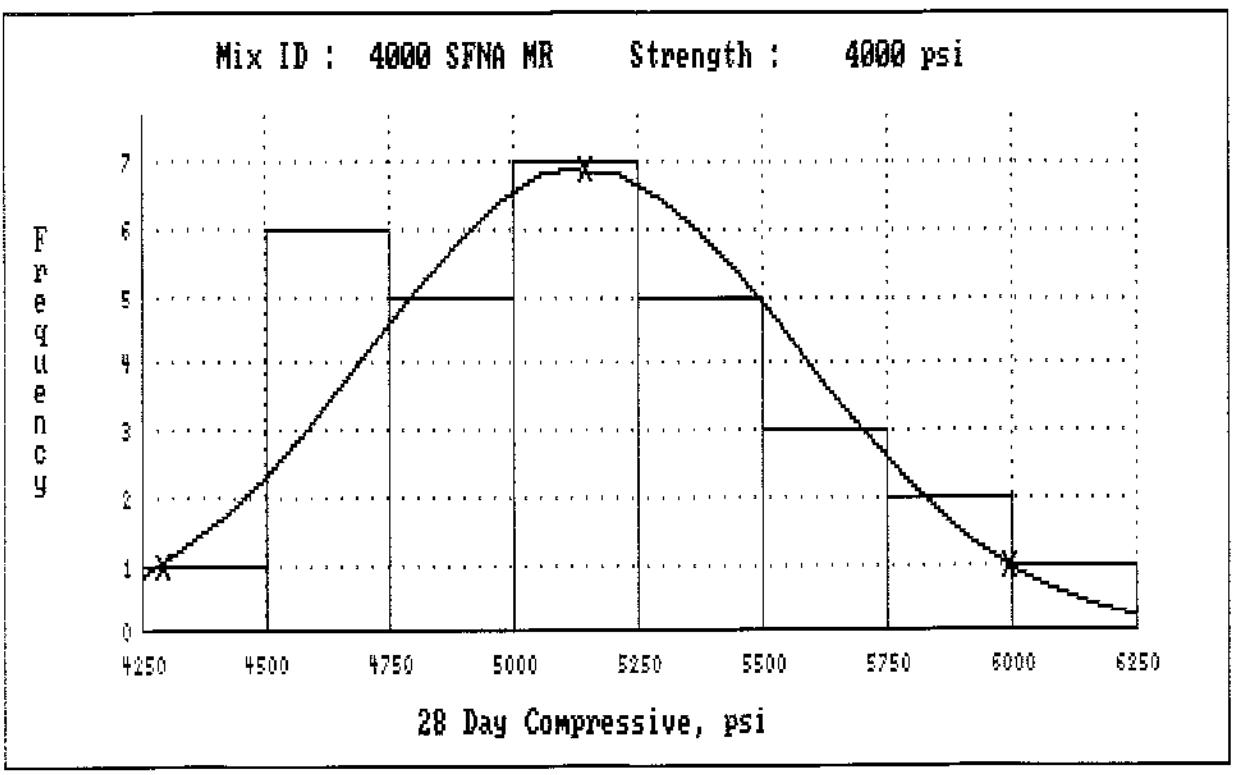
ACI 214 SUMMARY

Statistical Strength Summary

Average strength based on 30 tests	:	5142 psi
Overall Standard Deviation Control is Very Good	:	434 psi
Overall coefficient of variation	:	8.43 %
Overall within-test coefficient of variation Control is Very Good	:	3.01 %
Chance of strength falling below 4000 psi	:	- %
Chance of strength falling below 3500 psi	:	- %
Chance of "Average of 3" below 4000 psi	:	- %
ACI 214 Minimum Recommended Strength	:	4581 psi
Chance of strength less than specified - 500	<=	1 in 100
Chance of "Average of 3" less than specified	<=	1 in 100

KIENSTRA - READY MIX CONCRETE
755 SOUTH NEW BALLAS ROAD, SUITE 150
ST. LOUIS, MO 63141
(314) 994-1616

Frequency Distribution of 4000 SFNA MR [4000 psi]



SUMMARY STATISTICS

Number of tests	=	30
Minimum	=	4373
Maximum	=	6050
Average	=	5142
Standard deviation	=	434
Median	=	5107
Interval	=	250

FREQUENCY DISTRIBUTION

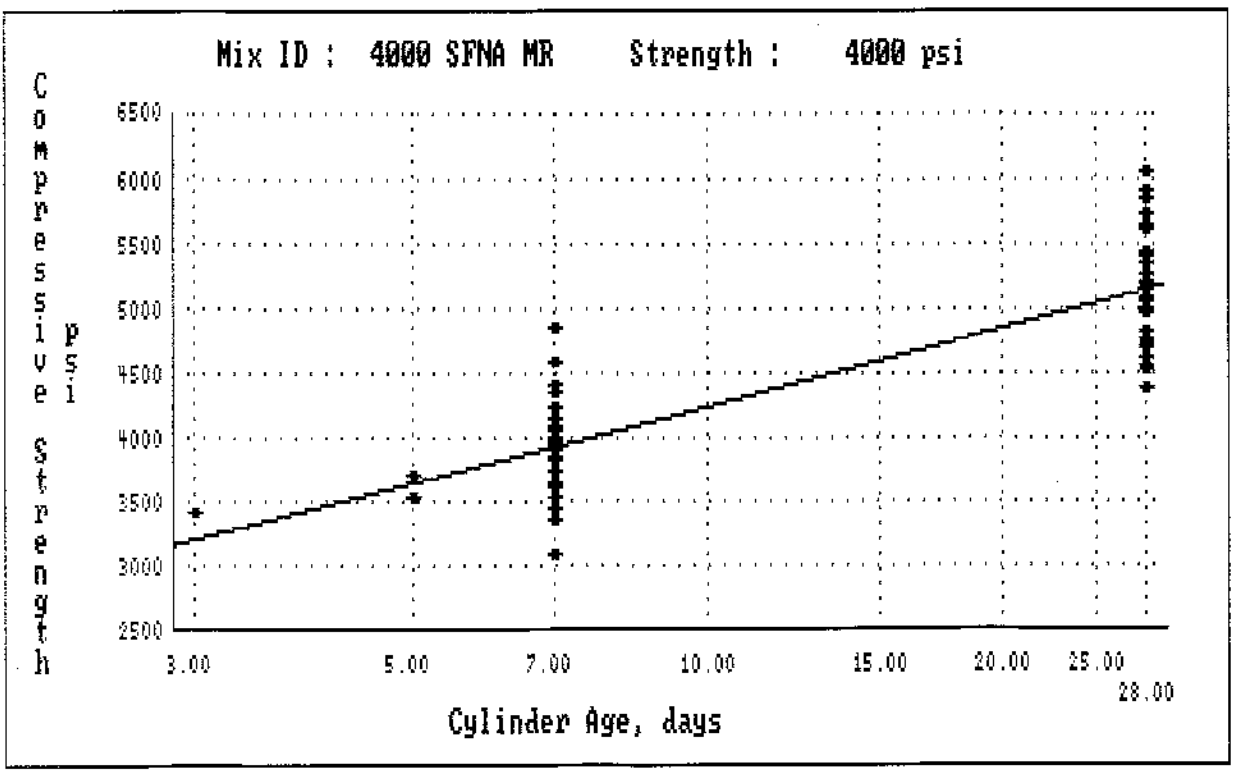
Range				Cumul
Lower	Upper	Count	Percent	Percent
4250	4500	1	3.33	3.33
4500	4750	6	20.00	23.33
4750	5000	5	16.67	40.00
5000	5250	7	23.33	63.33
5250	5500	5	16.67	80.00

Range Lower	Range Upper	Count	Percent	Cumul Percent
5500	5750	3	10.00	90.00
5750	6000	2	6.67	96.67
6000	6250	1	3.33	100.00

Seq Num	Sample ID	Sample Date	28 day Comp psi	
1	49256	6/26/13	4705	
2	49257	6/26/13	5360	
3	49438	7/10/13	4980	
4	49440	7/10/13	4525	
5	50380	9/30/13	5615	
6	13-C1	2/28/14	5403	
7	13-C2	2/28/14	5203	
8	13-C3	2/28/14	5437	
9	29-C1	3/28/14	5083	
10	52-C1	8/ 1/14	4740	
11	52-C3	8/ 1/14	4553	
12	52-C4	8/ 1/14	4373	
13	52-C6	8/ 1/14	4693	
14	52-C8	8/ 1/14	4627	
15	59-C1	9/ 8/14	5193	
16	59-C4	9/ 8/14	4997	
17	55-C1	10/ 8/14	4750	
18	55-C2	10/ 8/14	5170	
19	9599	11/28/14	6050	>
20	9600	11/28/14	5080	
21	9605	12/ 3/14	5130	
22	101-C1	12/18/14	5263	
23	101-C2	12/18/14	4833	
24	101-C3	12/18/14	5397	
25	114-C1	1/14/15	4960	
26	122-C1	1/28/15	5830	
27	122-C2	1/28/15	5717	
28	122-C3	1/28/15	5907	
29	122-C4	1/28/15	5637	
30	58089	9/22/15	5045	

KIENSTRA - READY MIX CONCRETE
755 SOUTH NEW BALLAS ROAD, SUITE 150
ST. LOUIS, MO 63141
(314) 994-1616

Strength Gain of 4000 SFNA MR [4000 psi]



STRENGTH GAIN ANALYSIS
==========
Number of tests = 63
y = Compressive Strength x = Cylinder Age

REGRESSION RESULTS [y = A + (B * log x)]

A = 2230
B = 2010
Standard error of estimate = 396.0
Coefficient of correlation = 0.8510
Coefficient of determination = 0.7240

KIENSTRA READY MIX CONCRETE
755 SOUTH NEW BALLAS SUITE 150
ST. LOUIS, MO, 63141

seeMIX II Mix Report
4000 SF NO AIR FA MR
Strength Compressive: 4,000 psi
5/23/2016

Contractor : VEE JAY CEMENT CONTRACTING CO.
Project : WEBSTER UNIVERSITY INTERDISCIPLINARY SCIENCE BLDG
Source of Concrete : AMERICAN READY MIX FENTON
Construction Type : INTERIOR SLAB ON GRADE/DECK - WARM WEATHER
Placement : CONVENTIONAL/PUMP

Weights per Cubic Yard (Saturated, Surface-Dry)	Quantity	Density	Yield, ft^3
PORTLAND TYPE I/II CEMENT, lb	479	3.150	2.44
CLASS C FLY ASH, lb	85	2.670	0.51
Water, lb	252	1.000	4.04
ST LOUIS LIMESTONE, lb	1,780	2.620	10.89
FINISH SAND, lb	1,408	2.580	8.75
MID RANGE WATER REDUCER, oz (US)	33.8	1.000	0.04
Total Air, %	2.0 ± 1.0		0.54
		TOTAL	27.20

Water/Cement Ratio, lbs/lb	0.45
Slump, High, in	6.00
Low, in	4.00
Concrete Unit Weight, pcf	147.30
Yield, %	100.7

THE PROPOSED MIX DESIGN IS BASED ON ACI STANDARDS AND HISTORICAL DATA. UNLESS INSTRUCTED OTHERWISE, WE WILL ASSUME THE PROPOSED MIX DESIGN IS ACCEPTED AND APPROVED FOR THE REFERENCED PROJECT.

Prepared by :

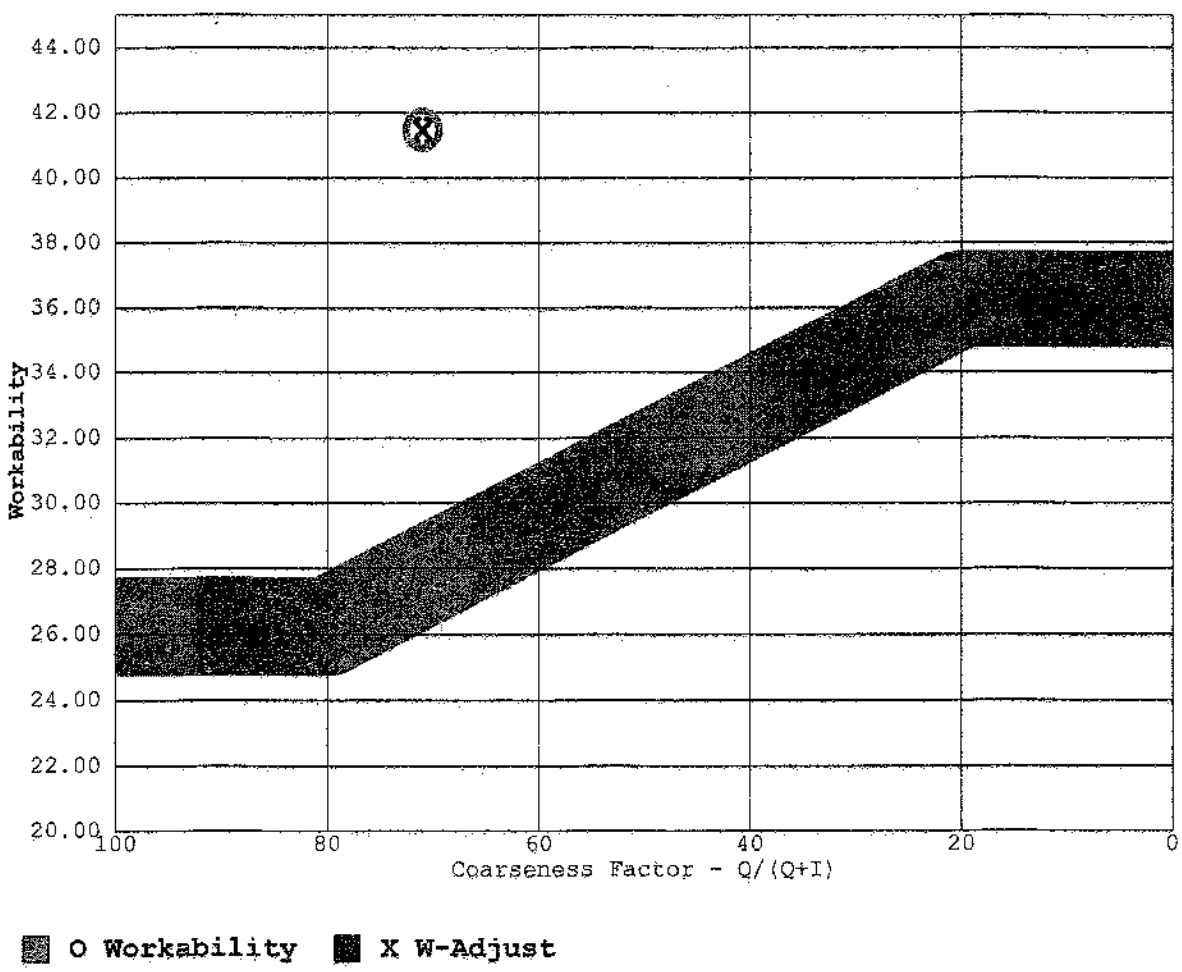
AMERICAN - READY MIX CONCRETE

Mix Analysis

Coarseness	(41.6 / (41.6 + 17.0)) * 100	71.0
Workability		41.4
W - Adjust		41.4
Percent Mortar		57.7
Total Fineness Modulus		4.92

	Air	Water	Paste
%Paste	7.2	53.4	-
%Mortar	3.5	25.7	48.2
%Total	2.0	14.8	27.8

Coarseness Factor Chart



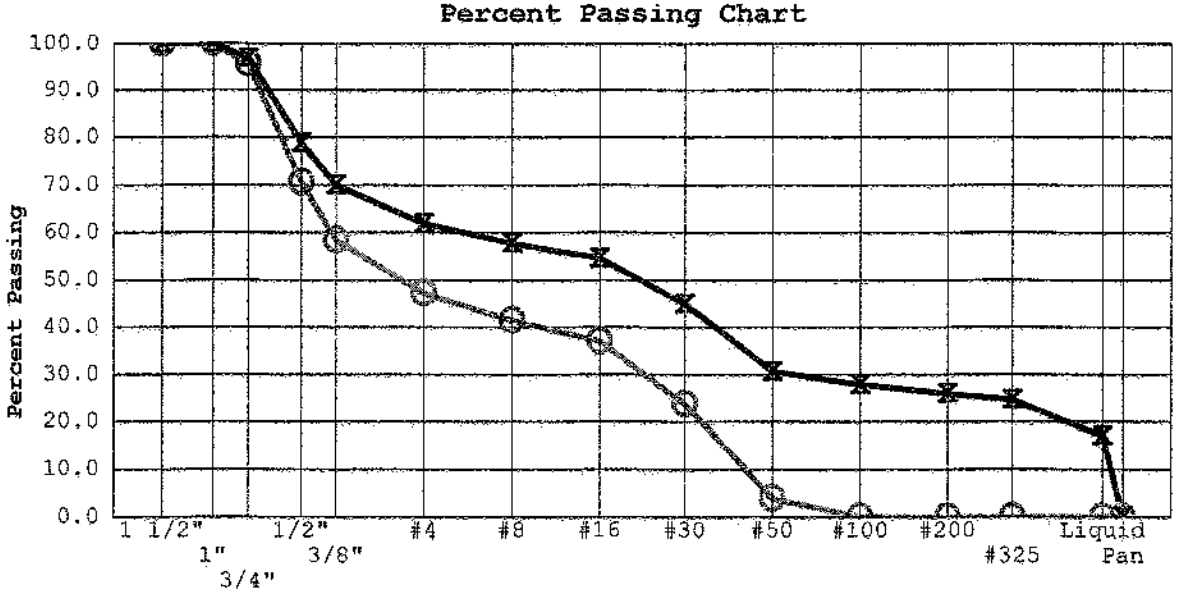
Full Gradation Analysis

Percent Passing

Sieve	Agg.1	Agg.2	Paste	Total	Aggr.
1 1/2"	-	-	100.0	-	-
1"	100.0	-	100.0	100.0	100.0
3/4"	92.0	-	100.0	96.8	95.6
1/2"	47.0	-	100.0	78.8	70.6
3/8"	25.0	100.0	100.0	70.0	58.4
#4	8.0	96.1	100.0	61.9	47.2
#8	2.0	90.5	100.0	57.7	41.4
#16	2.0	80.7	100.0	54.6	37.1
#30	0.0	53.3	100.0	45.0	23.7
#50	-	8.8	100.0	30.6	3.9
#100	-	0.3	100.0	27.9	0.1
#200	-	0.0	93.3	25.9	0.0
#325	-	-	88.5	24.6	-
Liquid	-	-	61.0	17.0	-
Pan	-	-	0.0	0.0	-
Fineness Modulus	6.71	2.70			
% of Aggregate	55.45	44.55			
% of Total	40.03	32.16			

Agg.1 : ST LOUIS LIMESTONE
Agg.2 : FINISH SAND

Percent Passing Chart



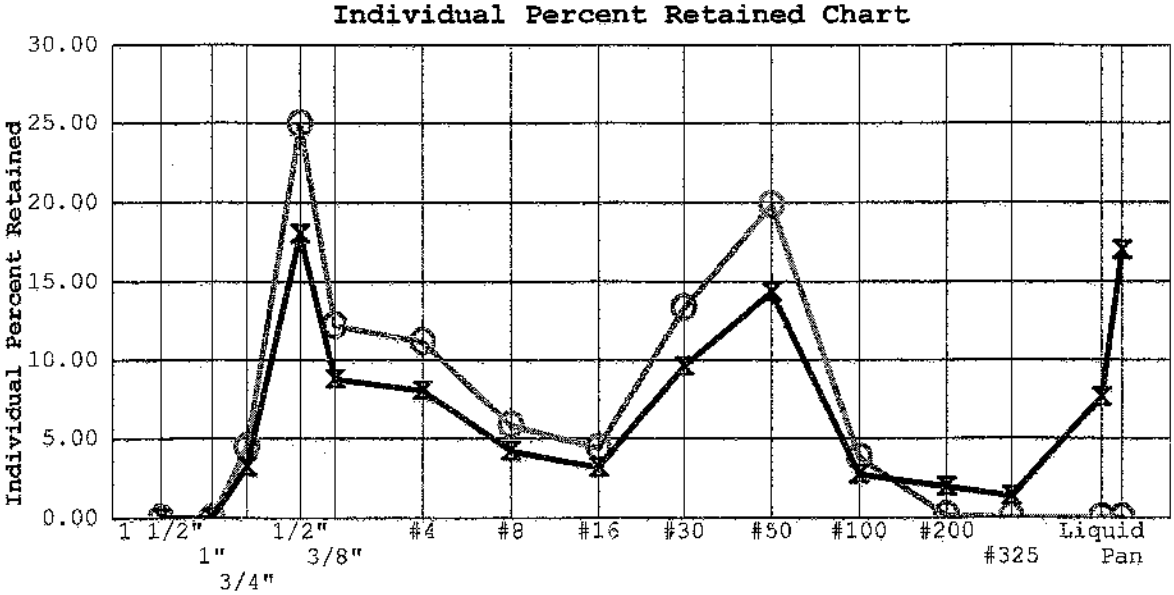
Full Gradation Analysis

Percent Retained

Sieve	Agg.1	Agg.2	Paste	Total	Aggr.
1 1/2"	0.0	0.0	0.0	0.0	0.0
1"	0.0	0.0	0.0	0.0	0.0
3/4"	8.0	0.0	0.0	3.2	4.4
1/2"	45.0	0.0	0.0	18.0	25.0
3/8"	22.0	0.0	0.0	8.8	12.2
#4	17.0	3.9	0.0	8.1	11.2
#8	6.0	5.6	0.0	4.2	5.8
#16	0.0	9.8	0.0	3.2	4.4
#30	2.0	27.4	0.0	9.6	13.3
#50	0.0	44.5	0.0	14.3	19.8
#100	0.0	8.5	0.0	2.7	3.8
#200	0.0	0.3	6.7	2.0	0.1
#325	0.0	0.0	4.8	1.3	0.0
Liquid	0.0	0.0	27.4	7.6	0.0
Pan	0.0	0.0	61.0	17.0	0.0
Fineness Modulus	6.71	2.70			
% of Aggregate	55.45	44.55			
% of Total	40.03	32.16			

Agg.1 : ST LOUIS LIMESTONE
Agg.2 : FINISH SAND

Individual Percent Retained Chart



KIENSTRA - READY MIX CONCRETE
755 SOUTH NEW BALLAS ROAD, SUITE 150
ST. LOUIS, MO 63141
(314) 994-1616

ACI 214 Summary of 4000 SFNA FA MR [4000 psi]

ACI 214 SUMMARY

Statistical Strength Summary

Average strength based on 30 tests : 5547 psi

Overall Standard Deviation : 402 psi
Control is Very Good

Overall coefficient of variation : 7.25 %

Overall within-test coefficient of variation : 3.49 %
Control is Very Good

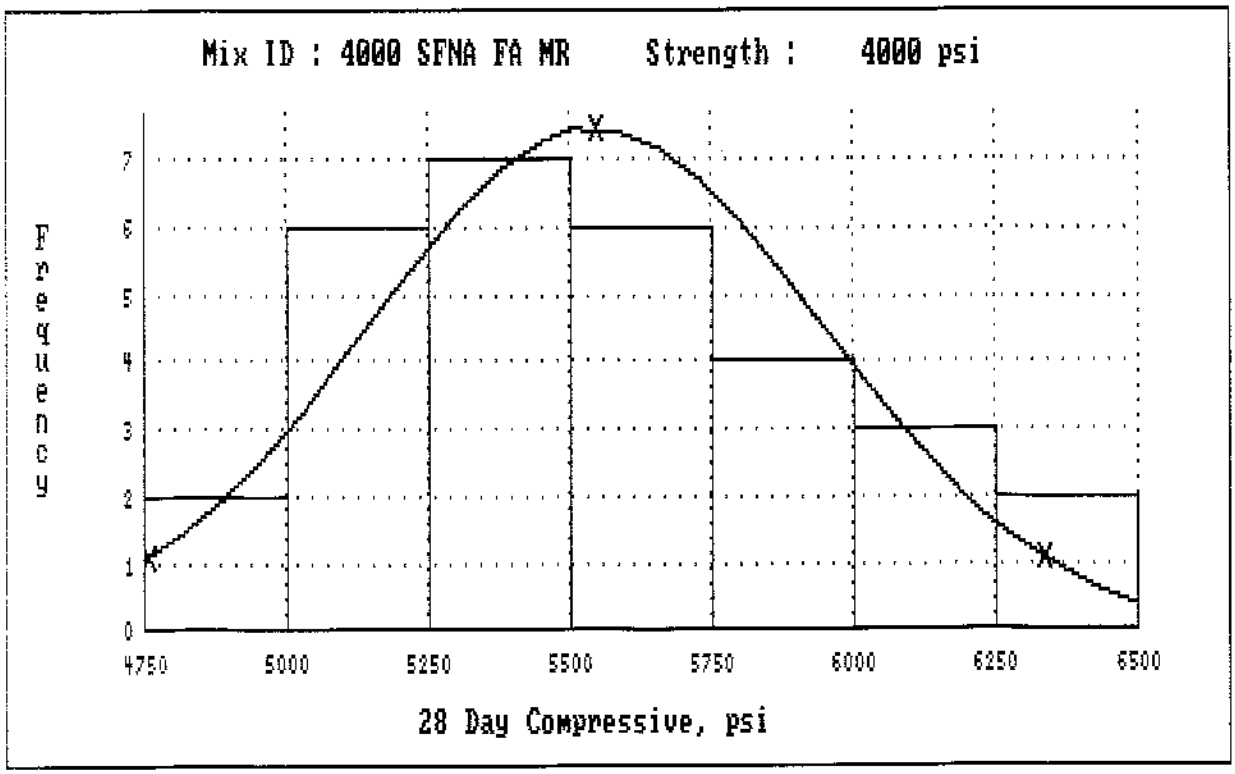
Chance of strength falling below 4000 psi : - %
Chance of strength falling below 3500 psi : - %
Chance of "Average of 3" below 4000 psi : - %

ACI 214 Minimum Recommended Strength : 4539 psi

Chance of strength less than specified - 500 <= 1 in 100
Chance of "Average of 3" less than specified <= 1 in 100

KIENSTRA - READY MIX CONCRETE
755 SOUTH NEW BALLAS ROAD, SUITE 150
ST. LOUIS, MO 63141
(314) 994-1616

Frequency Distribution of 4000 SFNA FA MR [4000 psi]



SUMMARY STATISTICS

Number of tests	=	30
Minimum	=	4840
Maximum	=	6413
Average	=	5547
Standard deviation	=	402
Median	=	5493
Interval	=	250

FREQUENCY DISTRIBUTION

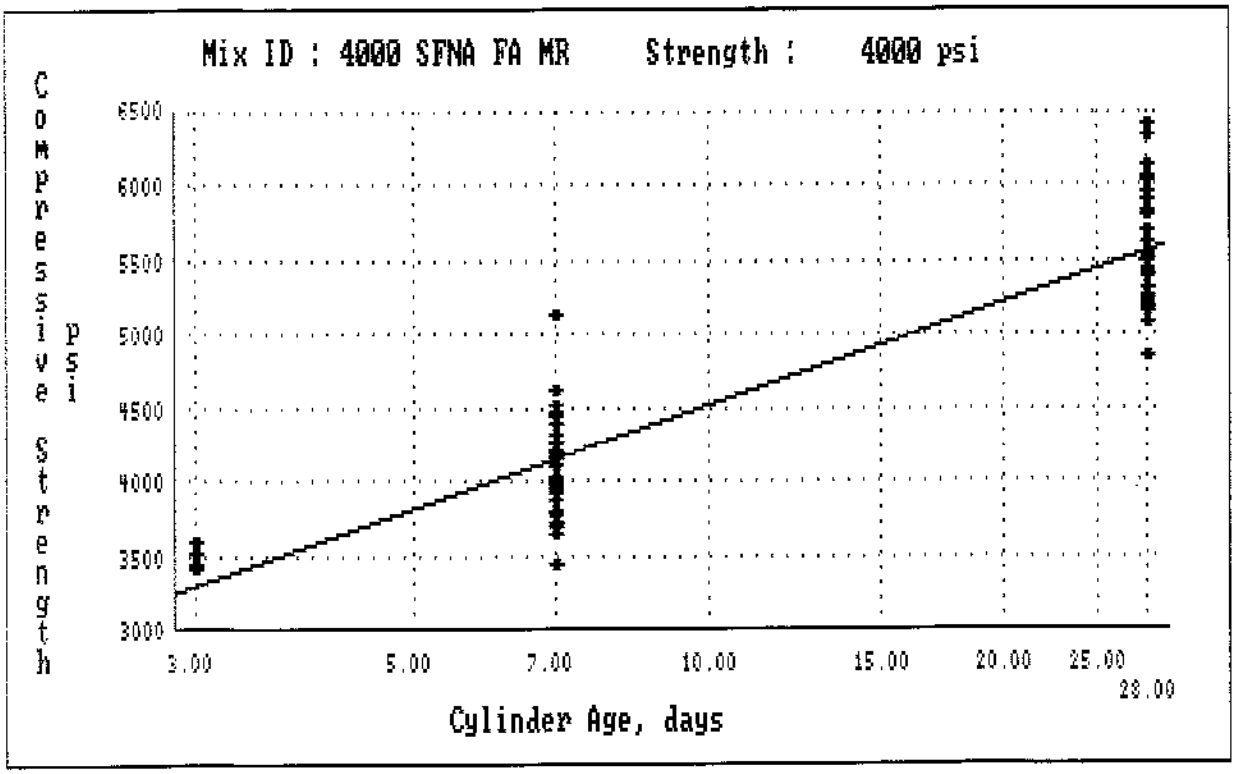
Range Lower	Range Upper	Count	Percent	Cumul Percent
4750	5000	2	6.67	6.67
5000	5250	6	20.00	26.67
5250	5500	7	23.33	50.00
5500	5750	6	20.00	70.00
5750	6000	4	13.33	83.33

Range Lower	Range Upper	Count	Percent	Cumul Percent
6000	6250	3	10.00	93.33
6250	6500	2	6.67	100.00

Seq Num	Sample ID	Sample Date	28 day Comp psi	
1	132678D	7/27/12	5623	
2	132701A	8/ 3/12	6413	>
3	132982A	8/23/12	5393	
4	132982B	8/23/12	5437	
5	133052A	9/ 4/12	5533	
6	133245A	10/ 3/12	6037	
7	133464A	10/16/12	6137	
8	134598B	3/11/13	5940	
9	134903A	5/ 1/13	5703	
10	134882A	5/10/13	5315	
11	134882B	5/10/13	5260	
12	135766A	7/22/13	4855	
13	135766B	7/22/13	5185	
14	135308A	8/ 2/13	5210	
15	135693A	8/ 2/13	6050	
16	135693B	8/ 2/13	5520	
17	135693C	8/ 2/13	5795	
18	135693D	8/ 2/13	5405	
19	135693E	8/ 2/13	5625	
20	133589A	8/ 3/13	5383	
21	136009A	8/16/13	5827	
22	136009B	8/16/13	5480	
23	136017A	8/16/13	4840	
24	136019A	8/19/13	5230	
25	135979A	8/27/13	6343	>
26	135810A	9/23/13	5890	
27	136526A	9/25/13	5240	
28	136488A	9/27/13	5505	
29	134806A	10/ 2/13	5170	
30	16-C1	3/ 6/14	5070	

KIENSTRA - READY MIX CONCRETE
755 SOUTH NEW BALLAS ROAD, SUITE 150
ST. LOUIS, MO 63141
(314) 994-1616

Strength Gain of 4000 SFNA FA MR [4000 psi]



STRENGTH GAIN ANALYSIS

Number of tests = 64

y = Compressive Strength x = Cylinder Age

REGRESSION RESULTS [y = A + (B * log x)]

A = 2210
B = 2290

Standard error of estimate =	368.0
Coefficient of correlation =	0.9040
Coefficient of determination =	0.8170

KIENSTRA READY MIX CONCRETE
755 SOUTH NEW BALLAS SUITE 150
ST. LOUIS, MO, 63141

seeMIX II Mix Report
4000 TF NO AIR
Strength Compressive: 4,000 psi
5/23/2016

Contractor : VEE JAY CEMENT CONTRACTING CO.
Project : WEBSTER UNIVERSITY INTERDISCIPLINARY SCIENCE BLDG
Source of Concrete : AMERICAN READY MIX FENTON
Construction Type : INTERIOR TOPPING/PAN STAIRS - COLD WEATHER
Placement : CONVENTIONAL/PUMP

Weights per Cubic Yard (Saturated, Surface-Dry)	Quantity	Density	Yield, ft^3
PORTLAND TYPE I/II CEMENT, lb	611	3.150	3.11
Water, lb	272	1.000	4.36
MERAMEC TORPEDO GRAVEL, lb	1,550	2.510	9.90
FINISH SAND, lb	1,490	2.580	9.25
MID RANGE WATER REDUCER, oz (US)	36.7	1.000	0.04
Total Air, %	2.0 ± 1.0		0.54
		TOTAL	27.20

Water/Cement Ratio, lbs/lb	0.45
Slump, High, in	6.00
Low, in	4.00
Concrete Unit Weight, pcf	144.31
Yield, %	100.7

THE PROPOSED MIX DESIGN IS BASED ON ACI STANDARDS AND HISTORICAL DATA. UNLESS INSTRUCTED OTHERWISE, WE WILL ASSUME THE PROPOSED MIX DESIGN IA ACCEPTED AND APPROVED FOR THE REFERENCED PROJECT.

Prepared by :

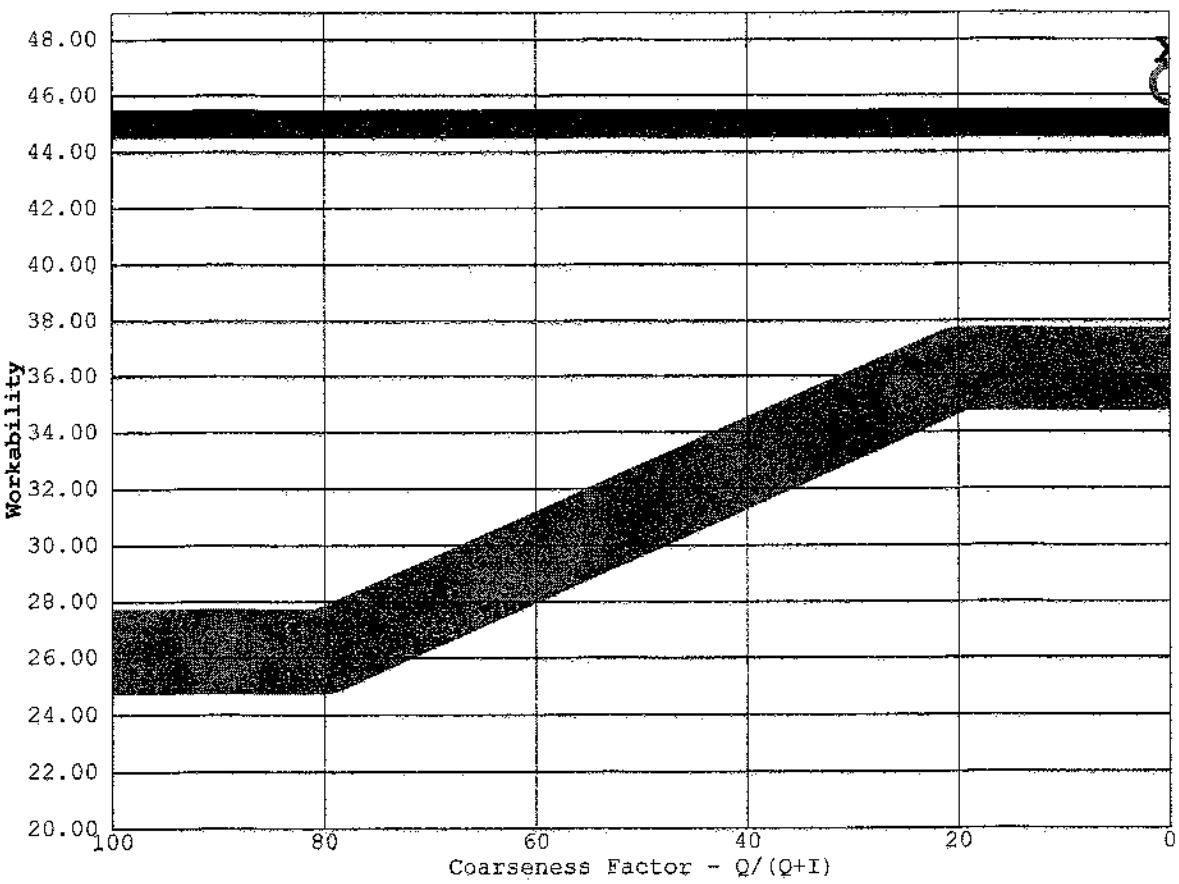
AMERICAN - READY MIX CONCRETE

Mix Analysis

Coarseness (0.0 / (0.0 + 53.7)) * 100	0.0
Workability	46.3
W - Adjust	47.6
Percent Mortar	62.2
Total Fineness Modulus	4.06

	Air	Water	Paste
%Paste	6.8	54.2	-
%Mortar	3.2	25.8	47.6
%Total	2.0	16.0	29.6

Coarseness Factor Chart



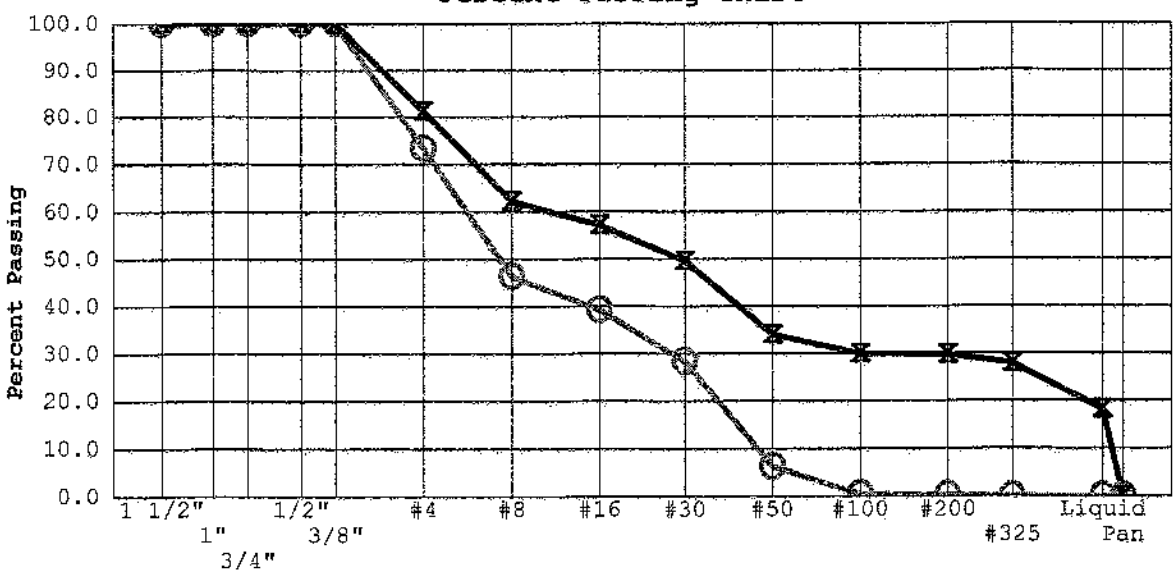
Full Gradation Analysis

Percent Passing

Sieve	Agg.1	Agg.2	Paste	Total	Aggr.
1 1/2"	-	-	100.0	100.0	-
1"	-	-	100.0	100.0	-
3/4"	-	-	100.0	100.0	-
1/2"	-	-	100.0	100.0	-
3/8"	100.0	100.0	100.0	100.0	100.0
#4	50.5	97.7	100.0	81.2	73.3
#8	4.9	90.6	100.0	62.2	46.3
#16	0.5	80.5	100.0	57.2	39.2
#30	0.0	58.6	100.0	49.5	28.3
#50	-	13.0	100.0	34.0	6.3
#100	-	1.0	100.0	29.9	0.5
#200	-	0.6	100.0	29.8	0.3
#325	-	0.0	94.2	27.9	0.0
Liquid	-	-	61.4	18.2	-
Pan	-	-	0.0	0.0	-
Fineness Modulus	5.44	2.59			
% of Aggregate	51.68	48.32			
% of Total	36.38	34.02			

Agg.1 : MERAMEC TORPEDO GRAVEL
Agg.2 : FINISH SAND

Percent Passing Chart



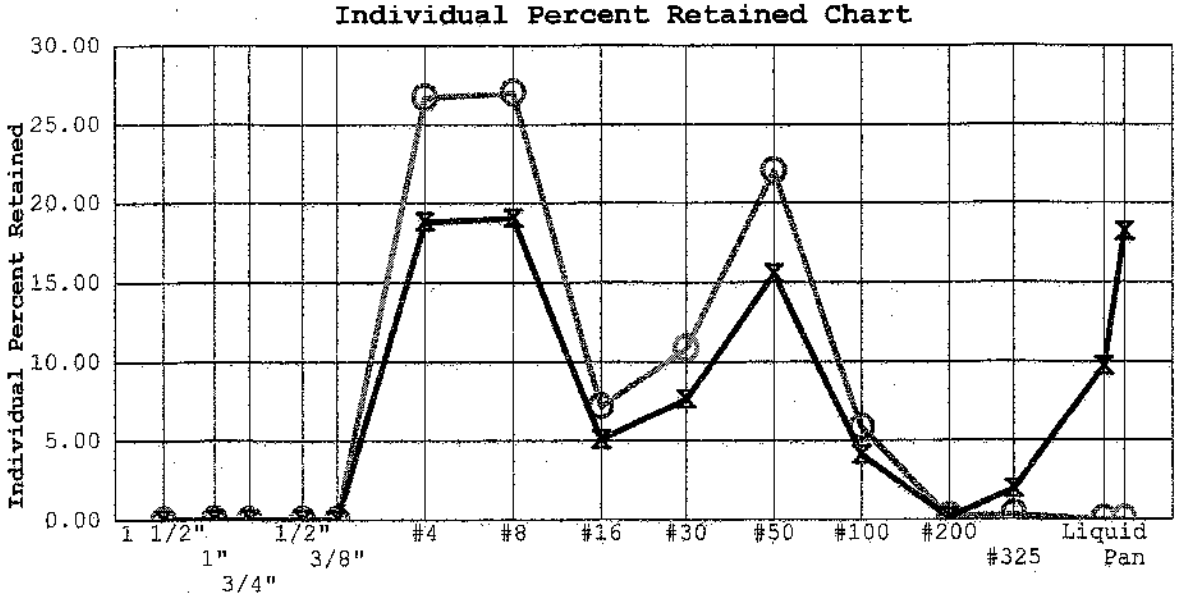
Full Gradation Analysis

Percent Retained

Sieve	Agg.1	Agg.2	Paste	Total	Aggr.
1 1/2"	0.0	0.0	0.0	0.0	0.0
1"	0.0	0.0	0.0	0.0	0.0
3/4"	0.0	0.0	0.0	0.0	0.0
1/2"	0.0	0.0	0.0	0.0	0.0
3/8"	0.0	0.0	0.0	0.0	0.0
#4	49.5	2.3	0.0	18.8	26.7
#8	45.6	7.1	0.0	19.0	27.0
#16	4.4	10.1	0.0	5.0	7.2
#30	0.5	21.9	0.0	7.6	10.8
#50	0.0	45.6	0.0	15.5	22.0
#100	0.0	12.0	0.0	4.1	5.8
#200	0.0	0.4	0.0	0.1	0.2
#325	0.0	0.6	5.8	1.9	0.3
Liquid	0.0	0.0	32.8	9.7	0.0
Pan	0.0	0.0	61.4	18.2	0.0
Fineness Modulus	5.44	2.59			
% of Aggregate	51.68	48.32			
% of Total	36.38	34.02			

Agg.1 : MERAMEC TORPEDO GRAVEL
Agg.2 : FINISH SAND

Individual Percent Retained Chart



X Total O Combined Aggregates

KIENSTRA - READY MIX CONCRETE
755 SOUTH NEW BALLAS ROAD, SUITE 150
ST. LOUIS, MO 63141
(314) 994-1616

ACI 214 Summary of 4000 TF NO AIR [4000 psi]

ACI 214 SUMMARY

Statistical Strength Summary

Average strength based on 20 tests : 5110 psi

Overall Standard Deviation : 489 psi
Control is Very Good

Overall coefficient of variation : 9.57 %

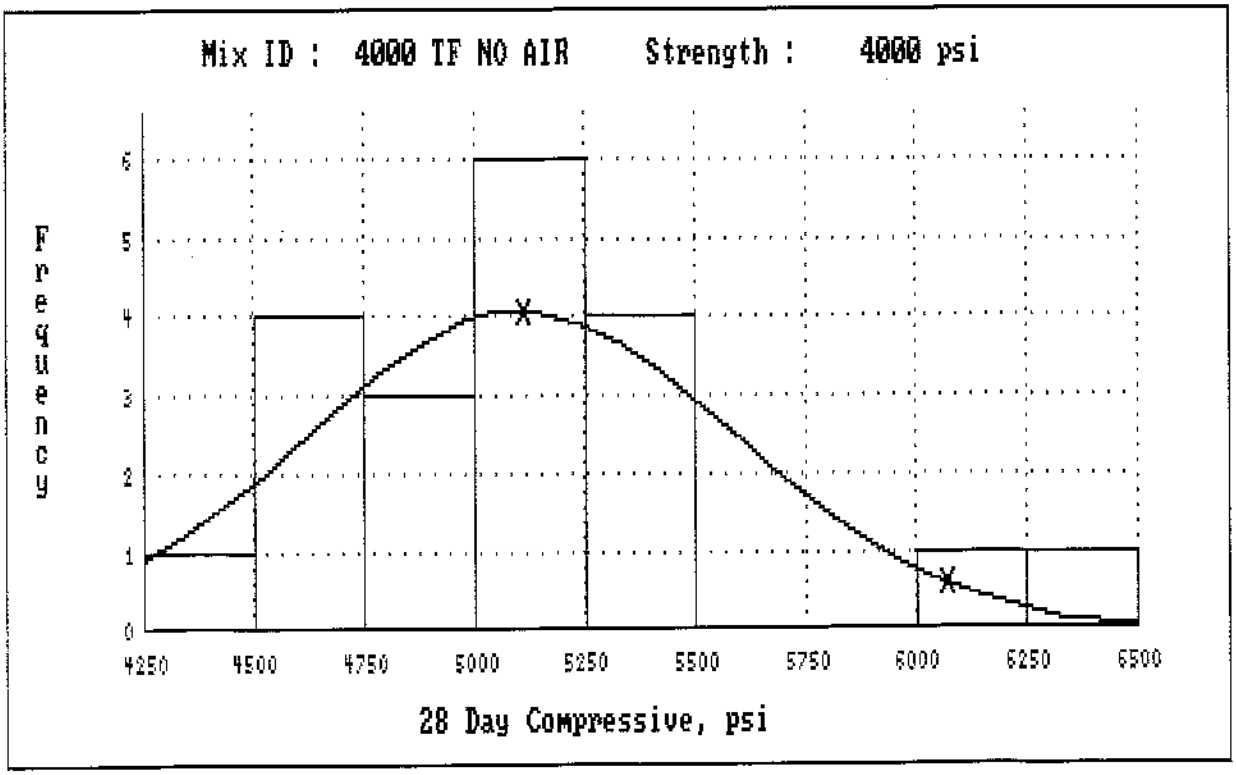
Overall within-test coefficient of variation : 3.40 %
Control is Very Good

Chance of strength falling below	4000 psi	:	1.2 %
Chance of strength falling below	3500 psi	:	- %
Chance of "Average of 3" below	4000 psi	:	- %

ACI 214 Minimum Recommended Strength	:	4731 psi
Standard deviation adjusted for 20 tests	:	528 psi
Chance of strength less than specified - 500	<=	1 in 100
Chance of "Average of 3" less than specified	<=	1 in 100

KIENSTRA - READY MIX CONCRETE
755 SOUTH NEW BALLAS ROAD, SUITE 150
ST. LOUIS, MO 63141
(314) 994-1616

Frequency Distribution of 4000 TF NO AIR [4000 psi]



SUMMARY STATISTICS

Number of tests	=	20
Minimum	=	4460
Maximum	=	6370
Average	=	5110
Standard deviation	=	489
Median	=	5063
Interval	=	250

FREQUENCY DISTRIBUTION

Range Lower	Range Upper	Count	Percent	Cumul Percent
4250	4500	1	5.00	5.00
4500	4750	4	20.00	25.00
4750	5000	3	15.00	40.00
5000	5250	6	30.00	70.00
5250	5500	4	20.00	90.00

Range Lower	Range Upper	Count	Percent	Cumul Percent
5500	5750	0	0.00	90.00
5750	6000	0	0.00	90.00
6000	6250	1	5.00	95.00
6250	6500	1	5.00	100.00

Seq Num	Sample ID	Sample Date	28 day Comp psi	
1	102661	4/17/ 3	4460	
2	104691	4/ 9/ 4	4965	
3	104714	4/13/ 4	5125	
4	51	9/ 5/ 7	4840	
5	71	10/29/ 7	4675	
6	123205	5/11/10	5075	
7	42486	12/ 9/10	4505	
8	42487	12/ 9/10	4600	
9	42488	12/ 9/10	5275	
10	130253A	11/ 9/11	4730	
11	130268A	11/10/11	5030	
12	130258A	11/23/11	5485	
13	130514B	12/ 5/11	6370	>
14	132129A	7/26/12	5133	
15	2035	7/31/12	6190	>
16	132630A	8/ 6/12	5390	
17	132669A	8/ 8/12	5280	
18	132716A	8/10/12	5075	
19	135098A	7/16/13	4940	
20	135098B	7/16/13	5050	

KIENSTRA - READY MIX CONCRETE
755 SOUTH NEW BALLAS ROAD, SUITE 150
ST. LOUIS, MO 63141
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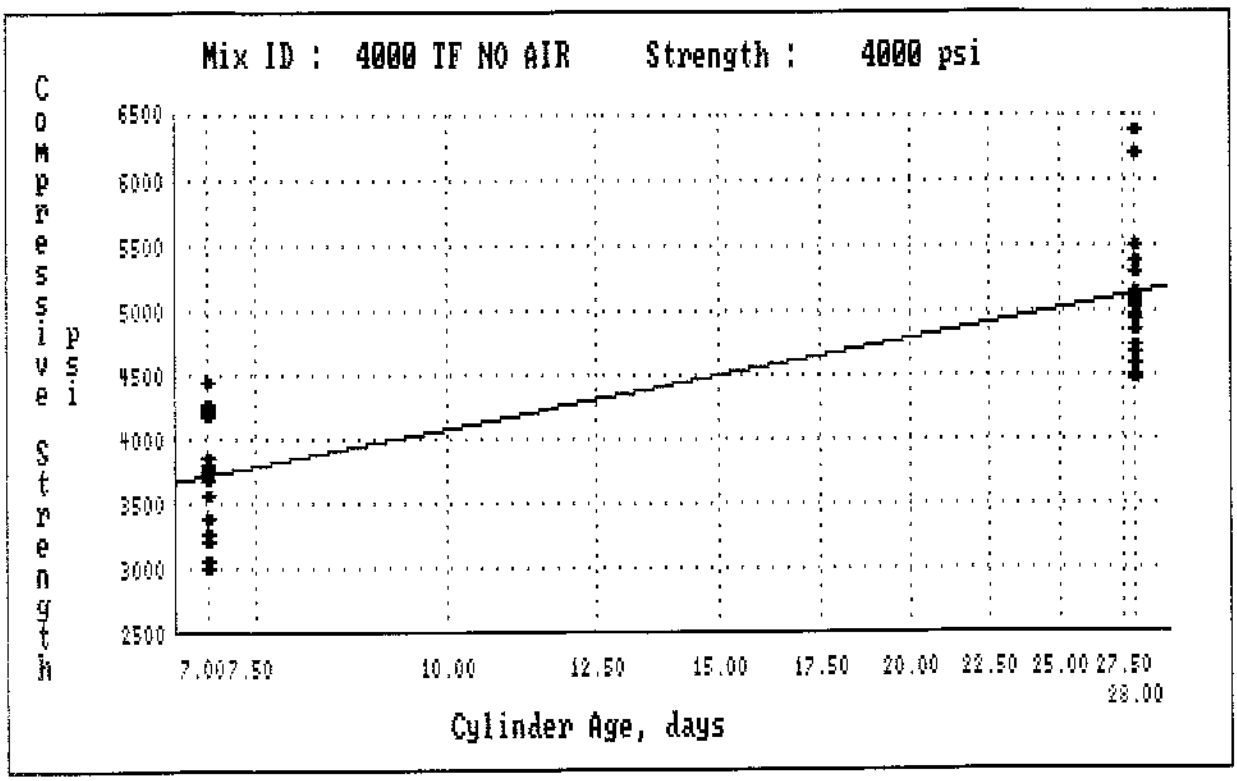
Strength Gain of 4000 TF NO AIR [4000 psi]



STRENGTH GAIN ANALYSIS
==========
Number of tests = 40

y = Compressive Strength x = Cylinder Age

REGRESSION RESULTS [y = A + (B * log x)]

A = 1760
B = 2310

Standard error of estimate = 466.0
Coefficient of correlation = 0.8380
Coefficient of determination = 0.7020

KIENSTRA READY MIX CONCRETE
755 SOUTH NEW BALLAS SUITE 150
ST. LOUIS, MO, 63141

seeMIX II Mix Report
4000 TF NO AIR FA
Strength Compressive: 4,000 psi
5/23/2016

Contractor : VEE JAY CEMENT CONTRACTING CO.
Project : WEBSTER UNIVERSITY INTERDISCIPLINARY SCIENCE BLDG
Source of Concrete : AMERICAN READY MIX FENTON
Construction Type : INTERIOR TOPPING / PAN STAIRS - WARM WEATHER
Placement : CONVENTIONAL/PUMP

Weights per Cubic Yard (Saturated, Surface-Dry)	Quantity	Density	Yield, ft^3
PORTLAND TYPE I/II CEMENT, lb	519	3.150	2.64
CLASS C FLY ASH, lb	92	2.670	0.55
WELL WATER, lb	272	1.000	4.36
WINTER BROS MERAMEC TORPEDO GRAVEL, lb	1,550	2.510	9.90
FINISH SAND, lb	1,479	2.580	9.19
TYPE A WATER REDUCER, oz (US)	18.3	1.000	0.02
Total Air, %	2.0 ± 1.0		0.54
		TOTAL	27.20

Water/Cement Ratio, lbs/lb	0.45
Slump, High, in	5.00
Low, in	3.00
Concrete Unit Weight, pcf	143.88
Yield, %	100.7

THE PROPOSED MIX DESIGN IS BASED ON ACI STANDARDS AND HISTORICAL DATA. UNLESS INSTRUCTED OTHERWISE, WE WILL ASSUME THE PROPOSED DESIGN IS ACCEPTED AND APPROVED FOR THE REFERENCED PROJECT.

Prepared by :

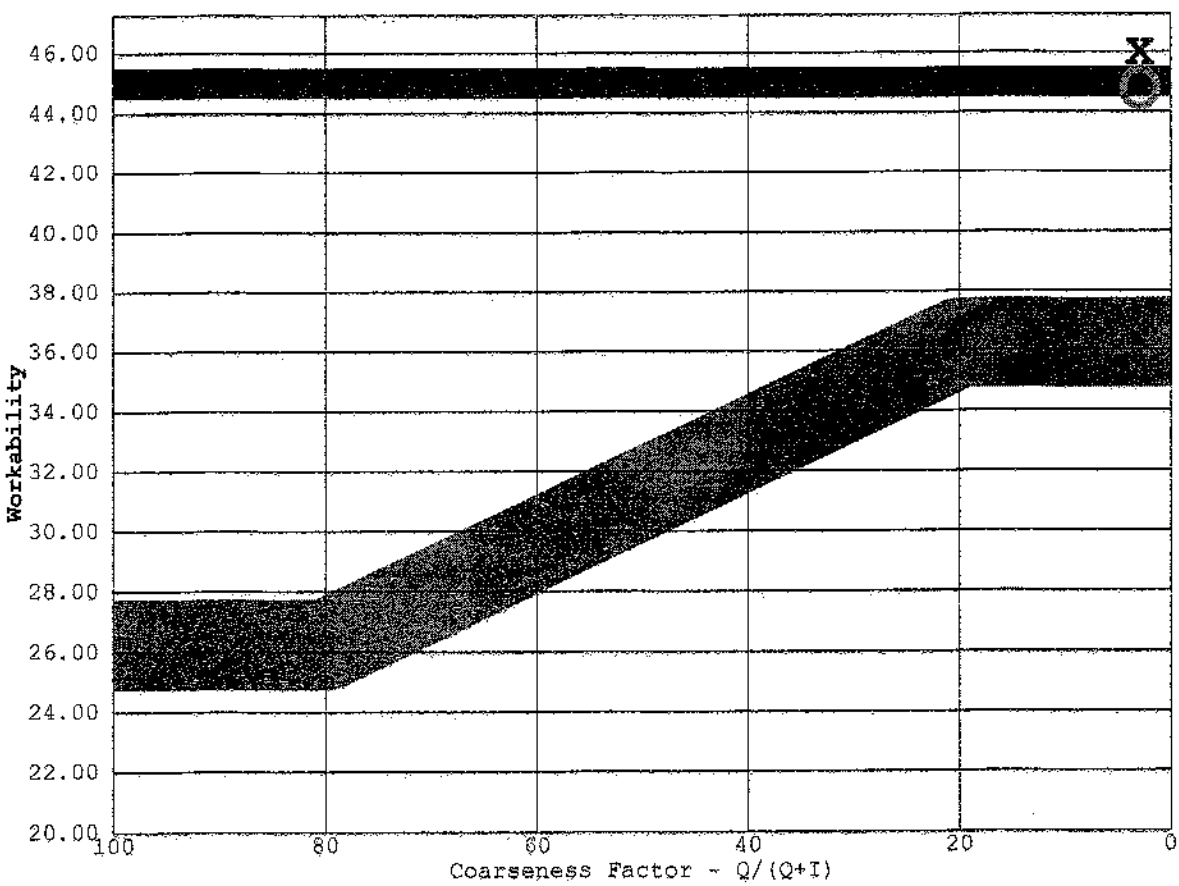
AMERICAN - READY MIX CONCRETE

Mix Analysis

Coarseness (1.6 / (1.6 + 53.7)) * 100	2.9
Workability	44.7
W - Adjust	46.0
Percent Mortar	61.2
Total Fineness Modulus	4.27

	Air	Water	Paste
%Paste	6.7	53.7	-
%Mortar	3.3	26.2	48.7
%Total	2.0	16.0	29.8

Coarseness Factor Chart



O Workability X W-Adjust

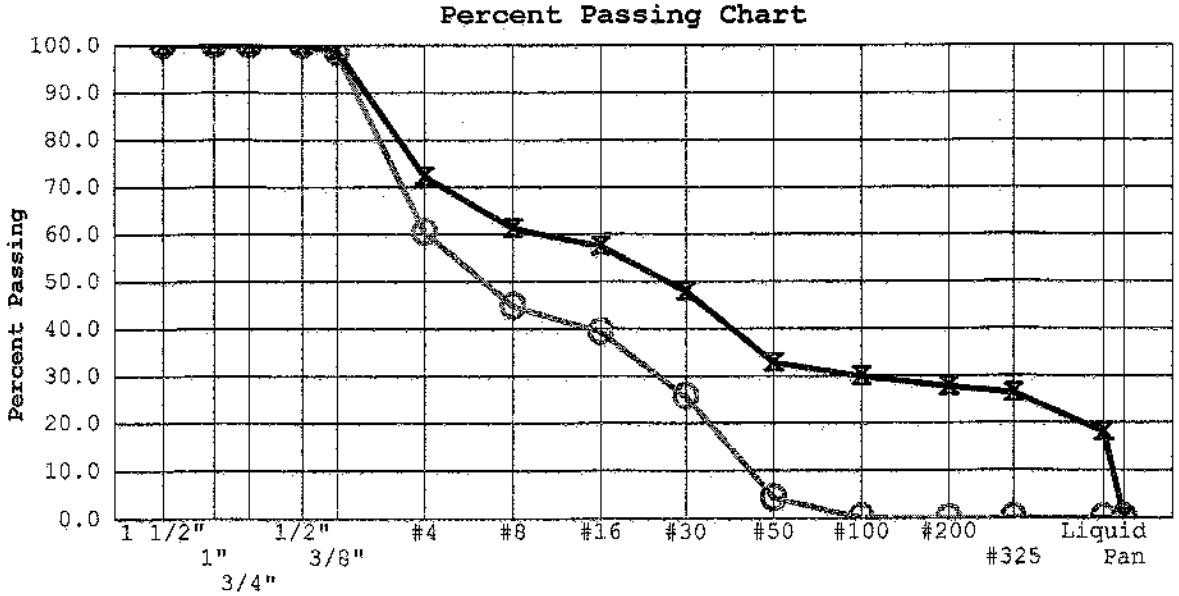
Full Gradation Analysis

Percent Passing

Sieve	Agg.1	Agg.2	Paste	Total	Aggr.
1 1/2"	-	-	-	-	-
1"	-	-	-	-	-
3/4"	-	-	-	-	-
1/2"	100.0	-	-	100.0	100.0
3/8"	96.9	100.0	-	98.9	98.4
#4	27.3	96.1	-	72.2	60.4
#8	2.2	90.5	-	61.2	44.7
#16	0.8	80.7	-	57.4	39.3
#30	0.0	53.3	-	47.8	25.7
#50	-	8.8	-	32.8	4.2
#100	-	0.3	100.0	29.9	0.1
#200	-	0.0	93.2	27.8	0.0
#325	-	-	88.3	26.4	-
Liquid	-	-	60.7	18.1	-
Pan	-	-	0.0	0.0	-
Fineness Modulus	5.73	2.70			
% of Aggregate	51.85	48.15			
% of Total	36.38	33.78			

Agg.1 : WINTER BROS MERAMEC TORPEDO GRAVEL
Agg.2 : FINISH SAND

Percent Passing Chart



X Total O Combined Aggregates

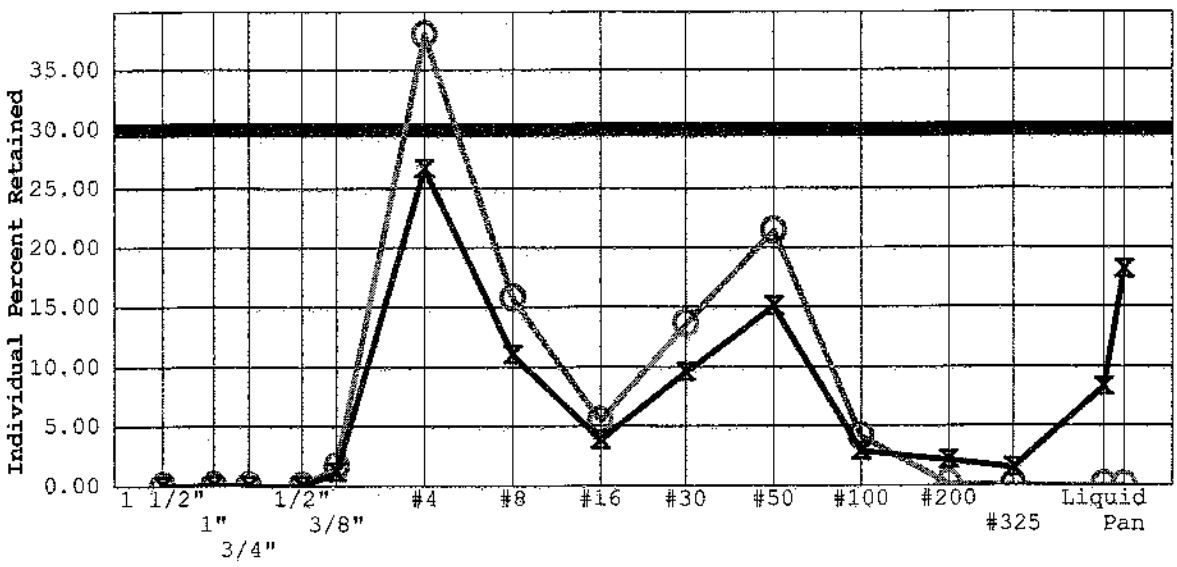
Full Gradation Analysis

Percent Retained

Sieve	Agg.1	Agg.2	Paste	Total	Aggr.
1 1/2"	0.0	0.0	0.0	0.0	0.0
1"	0.0	0.0	0.0	0.0	0.0
3/4"	0.0	0.0	0.0	0.0	0.0
1/2"	0.0	0.0	0.0	0.0	0.0
3/8"	3.1	0.0	0.0	1.1	1.6
#4	69.6	3.9	0.0	26.6	38.0
#8	25.1	5.6	0.0	11.0	15.7
#16	1.4	9.8	0.0	3.8	5.4
#30	0.8	27.4	0.0	9.5	13.6
#50	0.0	44.5	0.0	15.0	21.4
#100	0.0	8.5	0.0	2.9	4.1
#200	0.0	0.3	6.8	2.1	0.1
#325	0.0	0.0	4.9	1.5	0.0
Liquid	0.0	0.0	27.7	8.3	0.0
Pan	0.0	0.0	60.7	18.1	0.0
Fineness Modulus	5.73	2.70			
% of Aggregate	51.85	48.15			
% of Total	36.38	33.78			

Agg.1 : WINTER BROS MERAMEC TORPEDO GRAVEL
Agg.2 : FINISH SAND

Individual Percent Retained Chart



KIENSTRA - READY MIX CONCRETE
755 SOUTH NEW BALLAS ROAD, SUITE 150
ST. LOUIS, MO 63141
(314) 994-1616

ACI 214 Summary of 4000 TFNA FA [4000 psi]

ACI 214 SUMMARY

Statistical Strength Summary

Average strength based on 26 tests : 5766 psi

Overall Standard Deviation : 462 psi
Control is Very Good

Overall coefficient of variation : 8.01 %

Overall within-test coefficient of variation : 3.26 %
Control is Very Good

Chance of strength falling below 4000 psi : - %
Chance of strength falling below 3500 psi : - %
Chance of "Average of 3" below 4000 psi : - %

ACI 214 Minimum Recommended Strength : 4633 psi
Standard deviation adjusted for 26 tests : 473 psi
Chance of strength less than specified - 500 <= 1 in 100
Chance of "Average of 3" less than specified <= 1 in 100

KIENSTRA - READY MIX CONCRETE
755 SOUTH NEW BALLAS ROAD, SUITE 150
ST. LOUIS, MO 63141
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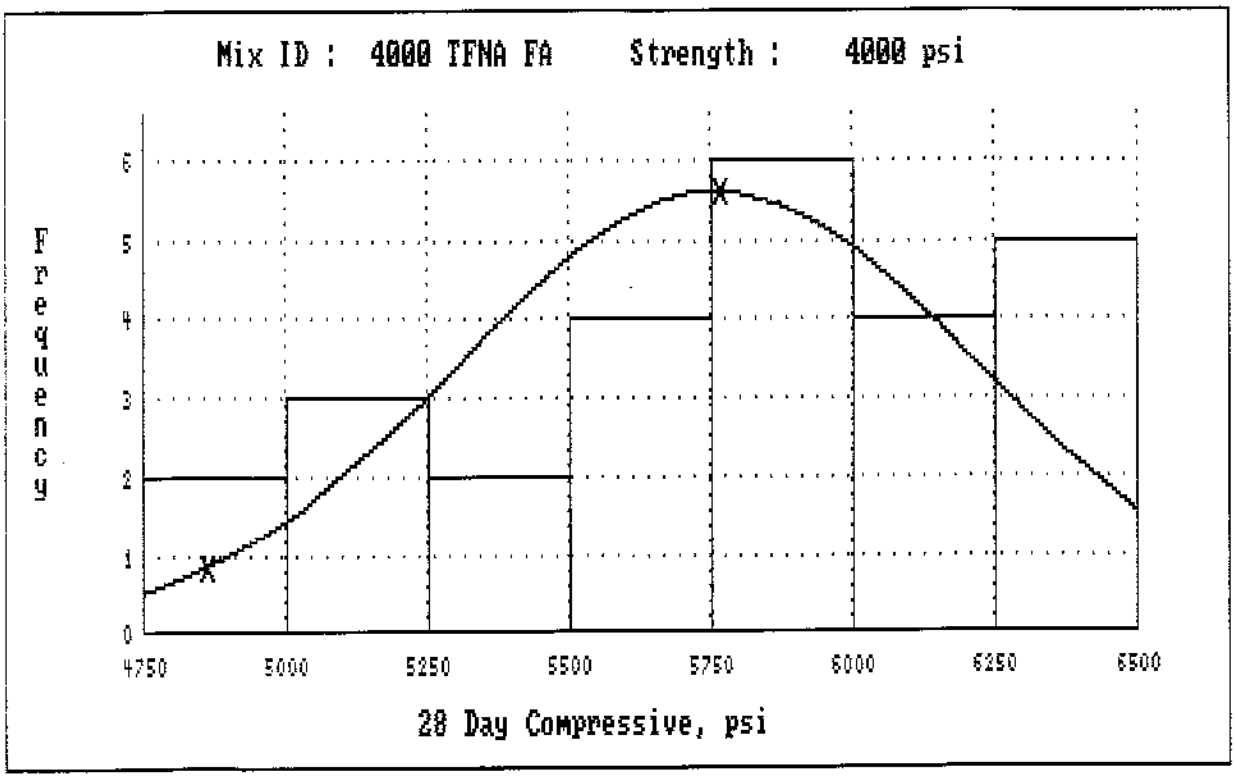
Frequency Distribution of 4000 TFNA FA [4000 psi]



SUMMARY STATISTICS

Number of tests	=	26
Minimum	=	4825
Maximum	=	6440
Average	=	5766
Standard deviation	=	462
Median	=	5850
Interval	=	250

FREQUENCY DISTRIBUTION

Range				
Lower	Upper	Count	Percent	Cumul Percent
4750	5000	2	7.69	7.69
5000	5250	3	11.54	19.23
5250	5500	2	7.69	26.92
5500	5750	4	15.38	42.31
5750	6000	6	23.08	65.38

Range Lower	Range Upper	Count	Percent	Cumul Percent
6000	6250	4	15.38	80.77
6250	6500	5	19.23	100.00

Seq Num	Sample ID	Sample Date	28 day Comp psi	
1	131950A	5/18/12	5215	
2	131928A	5/21/12	6440	
3	132000A	5/25/12	5930	
4	132010A	5/30/12	5800	
5	131651A	6/ 1/12	5935	
6	131942A	6/ 1/12	6135	
7	132074A	6/ 5/12	5055	
8	132077A	6/ 6/12	5440	
9	132066A	6/ 8/12	4825	<
10	132166A	6/15/12	6125	
11	132213A	6/22/12	6160	
12	132157A	6/29/12	6355	
13	131675A	7/ 6/12	5520	
14	132328A	7/10/12	5603	
15	132593A	7/12/12	6257	
16	132593B	7/12/12	6330	
17	132127A	7/18/12	6297	
18	132639A	7/20/12	5900	
19	130570A	7/25/12	5457	
20	132668A	7/27/12	5780	
21	132722A	8/ 3/12	5720	
22	132748A	8/15/12	6005	
23	2018A	8/17/12	5535	
24	132913A	8/24/12	5203	
25	50744	10/21/13	5990	
26	51100	11/20/13	4913	

KIENSTRA - READY MIX CONCRETE
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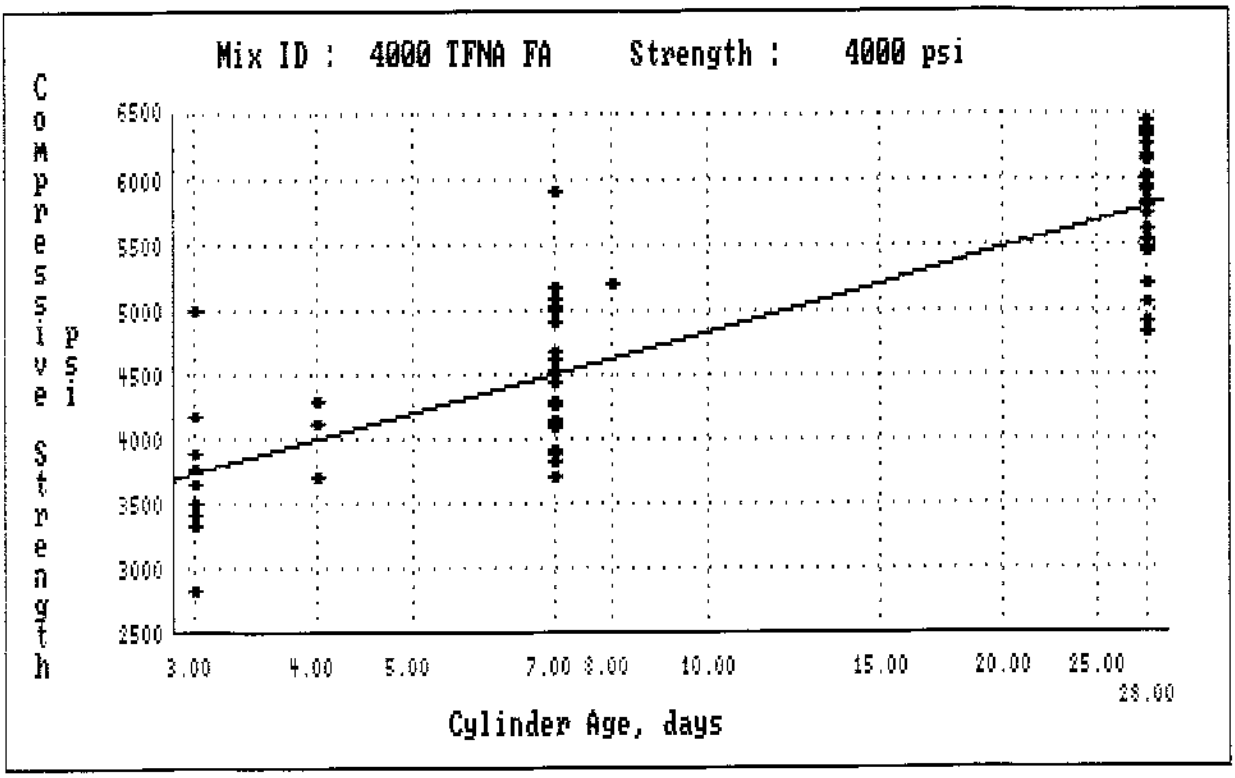
ST. LOUIS, MO 63141
(314) 994-1616

Strength Gain of 4000 TFNA FA [4000 psi]



STRENGTH GAIN ANALYSIS
==========
Number of tests = 65

y = Compressive Strength x = Cylinder Age

REGRESSION RESULTS [y = A + (B * log x)]

A = 2710
B = 2120

Standard error of estimate = 497.0
Coefficient of correlation = 0.8500
Coefficient of determination = 0.7220

Continental Cement Company
10107 Highway 79
Hannibal, MO 63401

Mill Test Report

HANNIBAL PLANT
TYPE I / II CEMENT
MARCH, 2016

STANDARD REQUIREMENTS

CHEMICAL

	Result	Specification
SiO2	19.6	
Al2O3	4.69	6.0 Max.
Fe2O3	3.19	6.0 Max.
CaO	62.3	
MgO	3.22	6.0 Max.
SO3	3.16	3.0 Max.
Loss On Ignition	2.51	3.0 Max.
Insoluble Residue	0.40	0.75 Max.
CO2 (%)	1.26	
Limestone (%)	2.9	5.0 Max.
CaCO3 in Limestone (%)	97.9	70 Min.
Potential Phase Composition (4):		
C3S	54	
C3A	7	8 Max.
C3S + 4.75(C3A)	87	100 Max.

Note (4): Adjusted as per A1.6

PHYSICAL

	Result	Specification
Blaine Fineness	3815	2600 - 4300 (1)
Autoclave Exp., %	0.08	0.80 Max.
Time of Setting, Minutes		
Initial Vicat	93	45 Min.
Final Vicat	193	375 Max.
Air Content, %	9	12 Max.
Compressive Strength, psi		
1 Day	2017	
3 Day	3378	1740 Min.
7 Day	4236	2760 Min.
28 Day	5707	
C 1038 Mortar Bar Expansion, %	0.007	0.020 (3)

Note (1): Maximum Blaine limit does not apply if C3S + 4.75(C3A) ≤ 90.
Note (3): Required only if %SO3 > 3.0%. The data provided represents the most recent result.

OPTIONAL REQUIREMENTS

CHEMICAL

Equivalent Alkalies	0.50	0.60 Max.

PHYSICAL

False Set	89	50 Min.
Heat of Hydration, kJ/kg		
7-Day	330 (2)	
Finesness, %Passing 325 Mesh	98.3	

Note (2): Test result represents the most recent value and is reported for information only.

This cement complies with ASTM C 150 and AASHTO M 85 specifications.
This cement meets the standard requirements of the ASTM C150/C150M - 12 Type II(MH) specification.
This cement meets the standard requirements of the AASHTO M 85 - 11 Type II(MH) specification.

Date: 05/10/16

By: Chris Leonard
Chris Leonard
Quality Control Manager

Analytical Testing Service Laboratories, Inc.

P.O. Box 1118, Joplin, Missouri 64802
(417) 782-6573

Mineral Resource Tech. Inc., A CEMEX Co.
929 Gessner, Suite 1900 Houston
Houston, Texas 77024
1-813-671-2266 ext.114

February 12, 2016

Attn: Oscar Jaramillo

Re: 07039 - Labadie Fly Ash Sample - 3200 Ton Composite - Silo D - 12/ 08-17 /2015

	AASHTO-M295 Class "C" Requirements	ASTM C-618 Class "C" Requirements	Actual
Fineness (+325 Mesh)	34% Max	34% Max	11.90%
Fineness Variation	5.0% Max	5.0% Max	0.30%
Moisture Content	3% Max	3% Max	0.10%
Density g/cm^3 C188	****	****	2.72
Density Variation	5.0% Max	5.0% Max	0.55%
Loss on Ignition	5% Max	6% Max	0.23%
Soundness	0.8% Max	0.8% Max	0.03%
S.A.I., 7 Days	75% Min	75% Min	105.10%
S.A.I., 28 Days	75% Min	75% Min	109.10%
Water Req. % Control	105% Max	105% Max	94.20%
Silica SiO_2	****	****	34.41%
Aluminum Oxide Al_2O_3	****	****	22.58%
Ferric Oxide Fe_2O_3	****	****	5.72%
Total	50% Min	50% Min	62.71%
Sulfur Trioxide SO_3	5% Max	5.0% Max	1.62%
Calcium Oxide CaO	****	****	26.03%
Magnesium Oxide MgO	****	****	5.97%
Available Alkalies Na_2O	1.50%Max	****	1.25%

We certify the above was tested in accordance with ASTM C-618 & AASHTO-M295

Analytical Testing Service Laboratories, Inc.

John K. Cupp, Manager

Mar 2, 2015

QUARRY LEDGE INFORMATION SUMMARY - Source

Bussen #1, Koch Quarry

PH# (314)487-2300

1.0 Mi S/O Jefferson Barrack Bridge | **63129** | **St. Louis** | **St. Louis County**

LL 090 17 01 038 28 38

PS#: 3005700116

Ledge	Formation/ Member	Description/Components					MoDOT		
	Lab ID#	Date	LA	SPG	Abs	Unit Weight	T14	T104	T161
16-21	St. Louis-Salem Material represents Ledges 16-21 St. Louis-Salem Formation Sample complies with Specification 1002 coarse aggregate for HMA								
100210..LD1	076SEE006	2007 0122	23	2.552	2.3			16	
16-21	St. Louis-Salem Material represents Ledges 16-21 St. Louis-Salem Formation Sample complies with Specification 1002 coarse aggregate for HMA.								
100205..LD1	05686W334	2005 1017	24	2.552	2.4				
16-21	St. Louis-Salem Material represents Ledge 16-21 St. Louis-Salem Formation Sample complies with Specification 1002.1 coarse aggregate for HMA								
100210..LD1	036R3M055	2003 0227	22	2.643	1.1				
16-21	St. Louis-Salem Sample represents Ledge 16-21 St. Louis-Salem Formation Sample complies with Specification 1002.1 coarse aggregate for asphaltic concrete								
1002C2ACLS	006J6C200	2000 0712	30	2.502	3.2				
22-23	Salem Material represents Ledges 22-23 Salem Formation Sample complies with Specification 1005 Gradation D coarse aggregate for PCCM.								
1005GDCMLS	096L2R153	2009 1221	25	2.491	3.3	94	8.6	14	
5-15	St. Louis Material represents Ledges 5-15 St. Louis Formation Sample complies with Specification 1005,1" max. coarse aggregate for PCCP or PCCM.								
100510..CPCMLD	14SLR3M069	2014 0522	21	2.646	1.0	100	14.4	5	

STATE OF MISSOURI
MARK SIMON
RG
2015000683
REGISTERED LAND SURVEYOR

Signed (Seal) _____

Revised 9/20/13

Winter Bros. Material Company

13098 Gravois Road
St. Louis, Mo. 63127

314/843-1400
fax 314/843-1403

~ Producers of Meramec Sand & Gravel for over 55 years. ~

Source - Meramec River - Hagemann Plant
Aggregate Type - Bulk Meramec Torpedo Gravel
Illinois Department of Transportation 040CM-16 11/05/14
Sieve Analysis - Gradation by Weight

SIEVE ANALYSIS - I.D.O.T. CM-16

** Note - We are not responsible for segregation during the transport of any fine or coarse aggregate.

U.S. Standard Specification* Sieve Size	Cumulative percent Retained	Passing	Percent Passing
1/2"	0.0	100.0	100
3/8"	0.0	100.0	95 - 100
1/4"	10.2	89.8	----------
# 4	49.5	50.5	25 - 75
# 8	95.1	4.9	----------
# 16	99.4	0.6	0 - 8
# 200	100.0	0.0	----------

SPECIFIC GRAVITY AND ABSORPTION OF COARSE AGGREGATE - ASTM C 128

Fineness Modulus = 5.433	Absorption, 2.6%	Apparent Specific Gravity = 2.62
Effective Grain Size = 2.6mm	Bulk Specific Gravity = 2.45	Bulk Specific Gravity, SSD = 2.51
Uniformity Coefficient = 1.885	Loose, pcf = 90.0 lbs.	Dry Rodded, pcf = 92.2

Winter Bros. Material Company

13098 Gravois Road
St. Louis, Mo. 63127

314/843-1400
fax 314/843-1403

~ Producers of Meramec Sand & Gravel for over 50 years. ~

Source - Meramec River
Aggregate Type - Bulk Medium Meramec Sand ***1/12/2016***
Sieve Analysis - Gradation by Weight

SIEVE ANALYSIS - ASTM C 33 Fine Aggregate Specification E 11 & I.D.O.T. FA-1

**** Note - We are not responsible for segregation during the transport of any fine or coarse aggregate.****

U.S. Standard Specification Sieve Size*	*Cumulative percent Retained*	*Passing*	*Percent Passing*
3/8"	0.0	100.0	100
# 4	0.0	100.0	95 - 100
# 8	13.6	86.4	80 - 100
# 16	35.4	64.6	50 - 85
# 30	44.1	54.9	25 - 60
# 50	77.2	22.8	10 - 30
# 100	98.5	1.5	2 - 10
# 200	99.9	0.1	3.0 Max.

SPECIFIC GRAVITY AND ABSORPTION OF COARSE AGGREGATE - ASTM C 128

Fineness Modulus = 2.698 Absorption, % 2.0 Apparent Specific Gravity = 2.655

Effective Grain Size = 0.22 mm Bulk Specific Gravity = 2.52 Bulk Specific Gravity, SSD = 2.571

Uniformity Coefficient = 4.0 Weight per C.F. (Loose) = 102.9 lbs. Weight per C.F. (Dry Rodded) = 112.2 lbs.