



Certificate # 3512.05

Construction Materials Testing Laboratory
Jubail Branch

P.O. Box 2165 – Tel.: (013) 341 2700
Dammam 31451 – Fax.: (013) 341 2701
Saudi Arabia – E-mail.: fsljubail@fugro-suhaimi.com



SUMMARY OF TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	10408
Material	3/4" (20 mm) Coarse Aggregate	Date Sampled	01 Apr. 2015
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	13 Apr. 2015

Properties:

Properties Tested	Test Method	Results	S. Aramco Specification
Sieve analysis	ASTM C-136	See Attached	--
Material finer than No. 200 sieve %	ASTM C-117	0.5	5.0 max.
Clay lumps & friable particles %	ASTM C-142	0.45	5.0 Max.
Los Angeles Abrasion	ASTM C-131		
Loss at 100 revolutions %		7.6	--
Loss at 500 revolutions %		32	40 max.
Ratio 100/500 rev.		0.24	--
Magnesium sulfate soundness loss (5 cycles) %	ASTM C-88	12.5	25.0 max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.653	--
SSD basis		2.595	--
Dry basis		2.550	--
Absorption		1.3	2.5 max
Acid soluble chloride, (Cl), %	ASTM C 114		
(Cl), %		0.015	0.03 max
Acid soluble sulphate (SO ₃), %	BS-812 Part 118	0.046	0.40 Max
Flakiness index	BS-812	11	--
Elongation index	BS-812	7	--
Coal & lignite	ASTM C-123	NIL	--

Remarks: All test results indicate compliance with the Saudi Aramco standard 09-SAMSS-088.

Tested By: Jose Daniel
CTTA # : 0195

Reviewed By: Imran Ahmed
CTTA # : 0556



(Signature)

Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037

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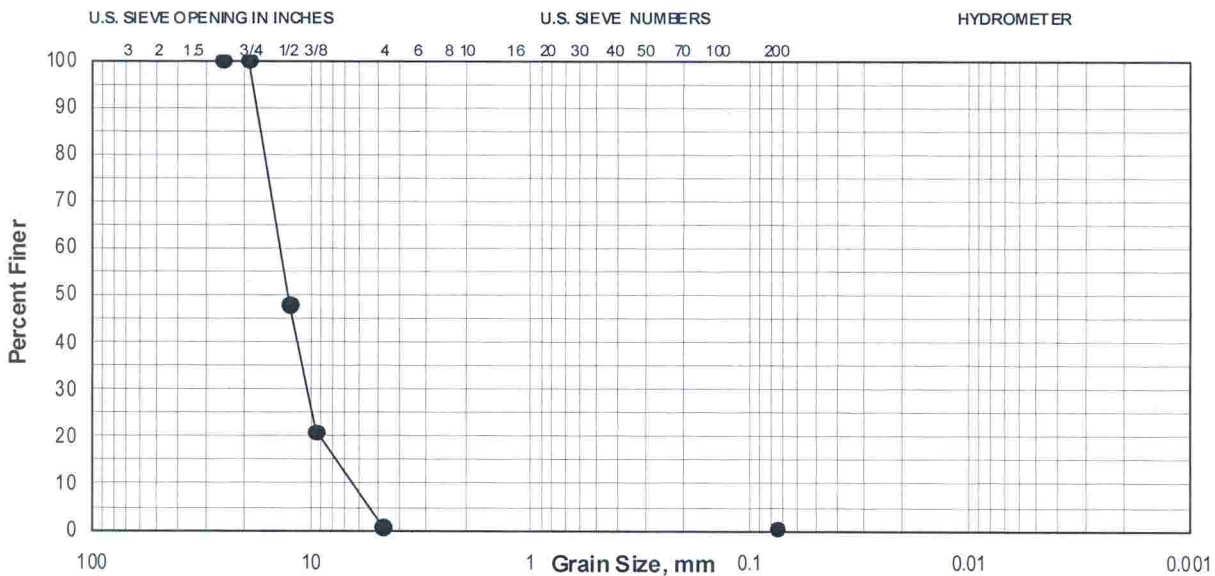
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السحيمي - فيغرو

PARTICLE SIZE ANALYSIS TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	10408
Material	3/4" (20 mm) Coarse Aggregate	Date Sampled	01 Apr. 2015
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Tested	05 Apr. 2015
Method	ASTM C-117/136	Date Reported	13 Apr. 2015



Gravel		Sand			Silt or Clay
Coarse	fine	Coarse	medium	fine	

Description of Sand / Gravel Particles:

Shape	Hardness	Specific Gravity

Sieve Size Inch(mm)	Passing %	Specification	Properties Tested		
			Item	Description	Result
1 (25.0 mm)	100				
3/4 (19 mm)	100				
1/2 (12.5 mm)	48				
3/8 (9.5 mm)	21				
#4 (4.75 mm)	0.7				
#8 (2.36 mm)	-				
#16 (1.18 mm)	-				
#100 (0.15 mm)	-				
#200 (75 mm)	0.5				

Remarks	
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Tested By: Jose Daniel
CTTA # : 0195

Reviewed By: Imran Ahmed
CTTA # : 0556



Laboratory Supervisor
Muhammad Nawaz CTTA # 0037

SUMMARY OF TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	10409
Material	3/8" (10- mm) Coarse Aggregate	Date Sampled	01 Apr. 2015
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	13 Apr. 2015

Properties:

Properties Tested	Test Method	Results	S. Aramco Specification
Sieve analysis	ASTM C-136	See Attached	--
Material finer than No. 200 sieve %	ASTM C-117	0.7	5.0 max.
Clay lumps & friable particles %	ASTM C-142	0.38	5.0 max.
Los Angeles Abrasion	ASTM C-131		
Loss at 100 revolutions %		8.1	--
Loss at 500 revolutions %		33.96	40 max.
Ratio 100/500 rev.		0.24	--
Magnesium sulfate soundness loss (5 cycles) %	ASTM C-88	14.5	25.0 max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.631	--
SSD basis		2.563	--
Dry basis		2.522	--
Absorption		1.7	2.5 max
Acid soluble chloride, (Cl), %	ASTM C 114		
(Cl), %		0.018	0.03 max
Acid soluble sulphate (SO ₃), %	BS-812 Part 118		
(SO ₃), %		0.321	0.40 Max
Flakiness index	BS-812	12	--
Elongation index	BS-812	17	--
Coal & lignite	ASTM C-123	NIL	--

Remarks: All test results indicate compliance with the Saudi Aramco standard 09-SAMSS-088.

Tested By: Jose Daniel
CTTA # : 0195

Reviewed By: Imran Ahmed
CTTA # : 0556

شركة السحيمي - فيفرو المحدودة
FUGRO - SUHAIMI
Material Sr. Laboratory Supervisor
Jubail Muhammad Nawaz CTTA # 0037

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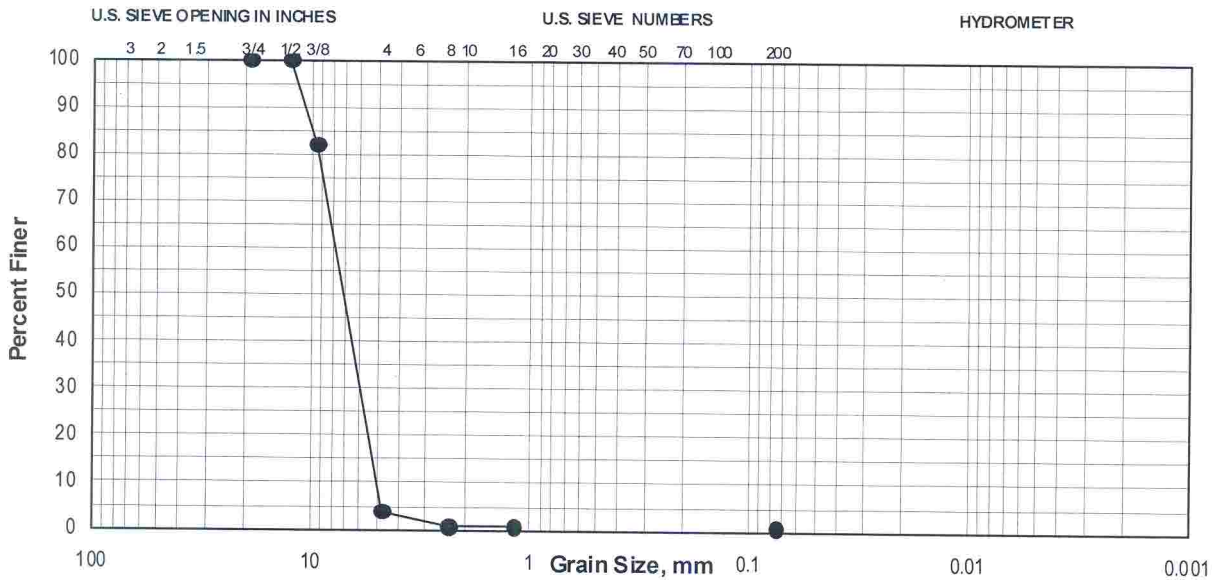
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PARTICLE SIZE ANALYSIS TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	10409
Material	3/8" (10 mm) Coarse Aggregate	Date Sampled	01 Apr. 2015
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Tested	05 Apr. 2015
Method	ASTM C-117/136	Date Reported	13 Apr. 2015



Gravel		Sand			Silt or Clay
Coarse	fine	Coarse	medium	fine	

Description of Sand / Gravel Particles:

Shape	Hardness	Specific Gravity

Sieve Size Inch(mm)	Passing %	Specification	Properties Tested		
			Item	Description	Result
3/4 (19.0 mm)	100				
1/2 (12.5 mm)	100				
3/8 (9.5 mm)	82				
#4 (4.75 mm)	4				
#8 (2.36 mm)	0.9				
#16 (1.18 mm)	0.8				
#30 (0.600 mm)	-				
#50 (0.300 mm)	-				
#100 (0.15 mm)	-				
#200 (75 mm)	0.7				

Remarks	
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Tested By: Jose Daniel
CTTA #: 0195

Reviewed By: Imran Ahmed
CTTA #: 0556

شركة السحيمي - فيغرو المحدودة
FUGRO - SUHAIMI
Material Division
Jubail Lab (11)
Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037

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السحيمي - فيفرو

SUMMARY OF TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	10410
Material	Dune Sand	Date Sampled	01 Apr. 2015
Source	Baladiyah, Jubail (Sampled by FSL)	Date Reported	13 Apr. 2015

Properties:

Properties Tested	Test Method	Results	S. Aramco Specification
Sieve analysis	ASTM C-136	See Attached	--
Material finer than No. 200 sieve %	ASTM C-117	1.7	5.0 Max.
Clay lumps & friable particles %	ASTM C-142	N/A	3.0 Max.
Magnesium sulphate soundness loss (5 cycles) %	ASTM C-88	6.9	25.0 Max.
Specific gravity and absorption	ASTM C-127	2.648	
Apparent		2.625	--
SSD basis		2.611	--
Dry basis		0.6	--
Absorption			
Acid soluble chloride, (Cl), %	ASTM C 114	0.004	0.06 max
Acid soluble sulphate (SO ₃), %			0.40 Max
Organic impurities	ASTM C-40	Lighter than std.	Light than std.

Remarks: All test results indicate compliance with the Saudi Aramco standard 09-SAMSS-088.Tested By: Jose Daniel
CTTA # : 0195Reviewed By: Imran Ahmed
CTTA # : 0556

شركة السحيمي - فيفرو المحدودة
FUGRO - SUHAIMI
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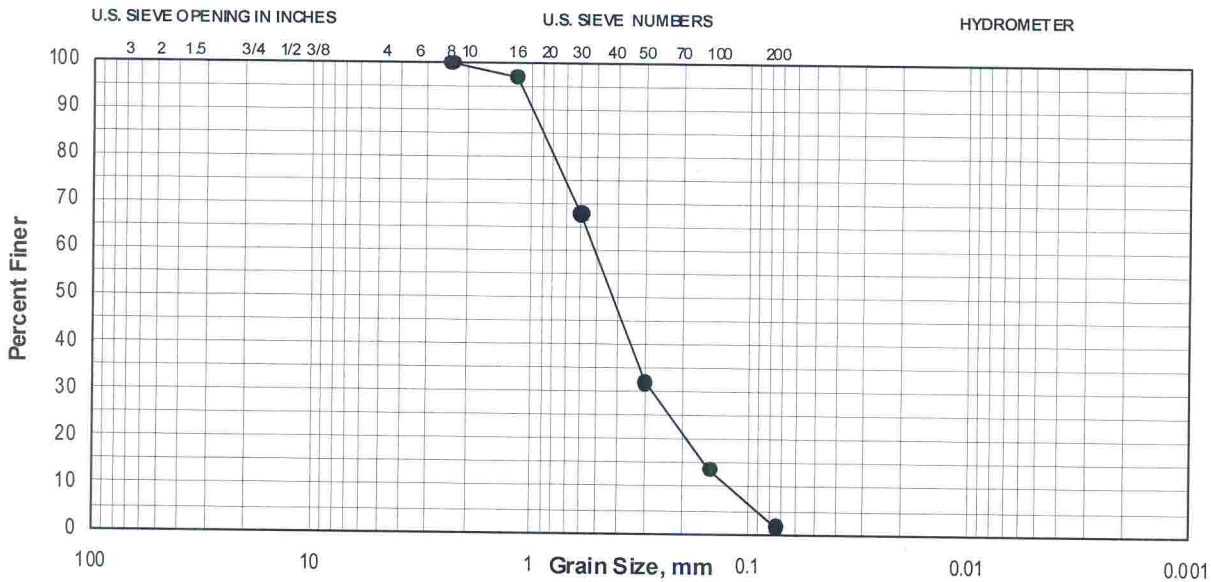
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PARTICLE SIZE ANALYSIS TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	10410
Material	Dune Sand	Date Sampled	01 Apr. 2015
Source	Baladiyah, Jubail (Sampled by FSL)	Date Tested	05 Apr. 2015
Method	ASTM C-117/136	Date Reported	13 Apr. 2015



Gravel		Sand			Silt or Clay
Coarse	fine	Coarse	medium	fine	

Description of Sand / Gravel Particles:

Shape	Hardness	Specific Gravity

Sieve Size Inch(mm)	Passing %	Specification	Properties Tested		
			Item	Description	Result
#8 (2.36 mm)	100				
#16 (1.18 mm)	97				
#30 (0.600 mm)	68				
#50 (0.300 mm)	32				
#100 (0.15 mm)	14				
#200 (75 mm)	1.7				

Remarks	
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Tested By: Jose Daniel
CTTA # : 0195

Reviewed By: Imran Ahmed
CTTA # : 0556

FUGRO - SUHAIMI
Material Division
Jubail Lab (11)
Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037

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TEST REPORT FOR CHEMICAL ANALYSIS ON WATER

Client	A.H. Al Marhoon & Bros. Co.	Report Date	13 April 2015
Project	Concrete Batch Plant, Rahima	Job No.	SA08-3012
Source	Sampled by FSL	Lab No.	10511
		Sampled by	FSL Jubail

Fugro-Suhaimi Ltd. (FSL) has performed chemical analysis on a water sample based on client request. The testing was carried out in accordance with the relevant ASTM and APHA Methods. The results and pertinent information are as follows:

Test results

Serial No.	Determination	Test Results	S. Aramco Specification
2.	pH	7.69	6 - 8
3.	Chloride as Cl ⁻ , ppm	24.8	--
4.	Sulfate as SO ₃ , ppm	3	--
5.	Total Dissolved Solids- TDS, ppm	70.7	500 max

Remarks: All test results indicate compliance with the Saudi Aramco standard 09-SAMSS-088.

Tested By: CPN Reviewed By: WN
CTTA # : -- CTTA # : --



Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037

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SUMMARY OF TEST REPORT COMBINED AGGREGATE

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	10408-10409
Material	3/4" - 3/8" Coarse Aggregate	Date Sampled	01 Apr. 2015
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	13 Apr. 2015

Combined Grading

Sieve Size (mm)	Percent passing by weight			
	20-mm Size	10-mm size	55:45% 20:10-mm Blended	ASTM C 33 Size 67 limits
25	100	100	100	100
19	100	100	100	90 -100
12.5	48	100	71	--
9.5	21	82	49	20 – 55
4.75	0.7	4	2	0 – 10
2.36	-	0.9	1	0 – 5

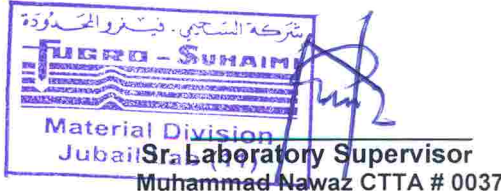
Combined Soundness Loss By Magnesium Sulfate

Aggregate Size :	20 mm	10 mm
Individual Loss %	12.5	14.5
Combined loss @ 55: 45%	13.4	

Remarks: _____

Tested By: Jose Daniel
CTTA # : 0195

Reviewed By: Imran Ahmed
CTTA # : 0556



Material Division
Jubail Laboratory Supervisor
Muhammad Nawaz CTTA # 0037