



Certificate # 3512.05

Construction Materials Testing Laboratory **FUGRO - SUHAIMI**
Jubail Branch

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

السحيمي - فيفرو

SUMMARY OF TEST REPORT

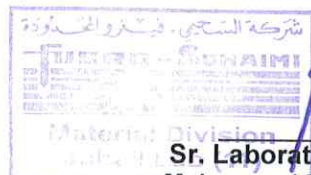
Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	12502
Material	3/4" (20 mm) Coarse Aggregate	Date Sampled	06 Jan 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	21 Jan 2016

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	0.6	5.0 max.
Clay lumps & friable particles %	ASTM C-142	0.4	5.0 Max.
Los Angeles Abrasion	ASTM C-131		
Loss at 100 revolutions %		8.7	--
Loss at 500 revolutions %		31.9	40 max.
Ratio 100/500 rev.		0.27	--
Magnesium sulfate soundness loss (5 cycles) %	ASTM C-88	8.9	25.0 max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.628	--
SSD basis		2.584	--
Dry basis		2.558	--
Absorption		1.1	2.5 max
Acid soluble chloride, (Cl), %	ASTM C 114		
(Cl), %		0.02	0.03 max
Acid soluble sulphate (SO ₃), %	BS-812 Part 118	0.09	0.40 Max
Flakiness index	BS-812	7.63	--
Elongation index	BS-812	9.70	--
Coal & lignite	ASTM C-123	NIL	--

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

Tested By: CBB Reviewed By: Imran Ahmed
CTTA # : 0428 . CTTA # : 0556



Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037

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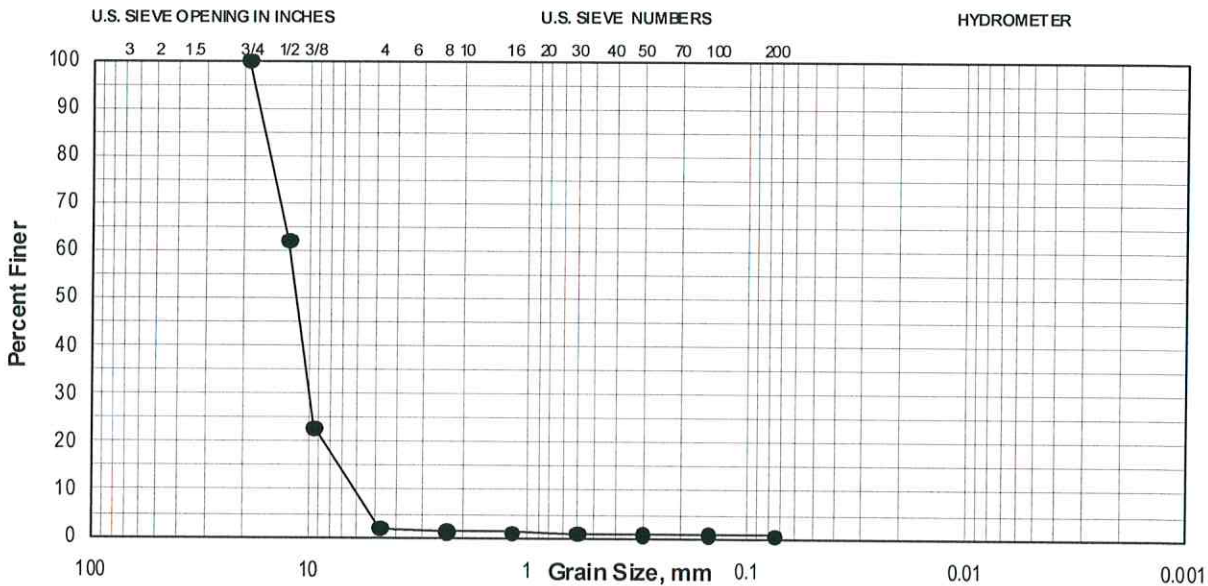
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PARTICLE SIZE ANALYSIS TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	12502
Material	3/4" (20 mm) Coarse Aggregate	Date Sampled	06 Jan 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Tested	10-11 Jan 2016
Method	ASTM C-136/117	Date Reported	21 Jan 2016



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)					
3/4 (19 mm)	100				
1/2 (12.5 mm)	62.1				
3/8 (9.5 mm)	23				
#4 (4.75 mm)	2.0				
#8 (2.36 mm)	1.3				
#16 (1.18 mm)	1.1				
#30 (0.600 mm)	1				
#50 (0.300 mm)	0.9				
#100 (0.150 mm)	0.8				
#200 (0.075 mm)	0.6				

Remarks	
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Tested By: CBB Reviewed By: Imran Ahmed
CTTA # : 0428 CTTA # : 0556



(Handwritten Signature)

**Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037**



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SUMMARY OF TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	12503
Material	3/8" (10- mm) Coarse Aggregate	Date Sampled	06 Jan 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	21 Jan 2016

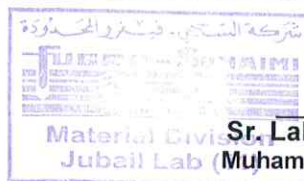
Properties:

Properties Tested	Test Method	Results	S. Aramco Specification
Sieve analysis	ASTM C-136	See Attached	--
Material finer than No. 200 sieve %	ASTM C-117	1.2	5.0 max.
Clay lumps & friable particles %	ASTM C-142	0.6	5.0 max.
Los Angeles Abrasion	ASTM C-131		
Loss at 100 revolutions %		8.5	--
Loss at 500 revolutions %		32.8	40 max.
Ratio 100/500 rev.		0.26	--
Magnesium sulfate soundness loss (5 cycles) %	ASTM C-88	14.7	25.0 max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.623	--
SSD basis		2.567	--
Dry basis		2.532	--
Absorption	1.4	2.5 max	
Acid soluble chloride, (Cl), %	ASTM C 114		
(Cl), %		0.016	0.03 max
Acid soluble sulphate (SO ₃), %	BS-812 Part 118	0.102	0.40 Max
Flakiness index	BS-812	7.8	--
Elongation index	BS-812	10.2	--
Coal & lignite	ASTM C-123	NIL	--

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

Tested By: CBB
CTTA # : 0428

Reviewed By: Imran Ahmed
CTTA # : 0556



Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037

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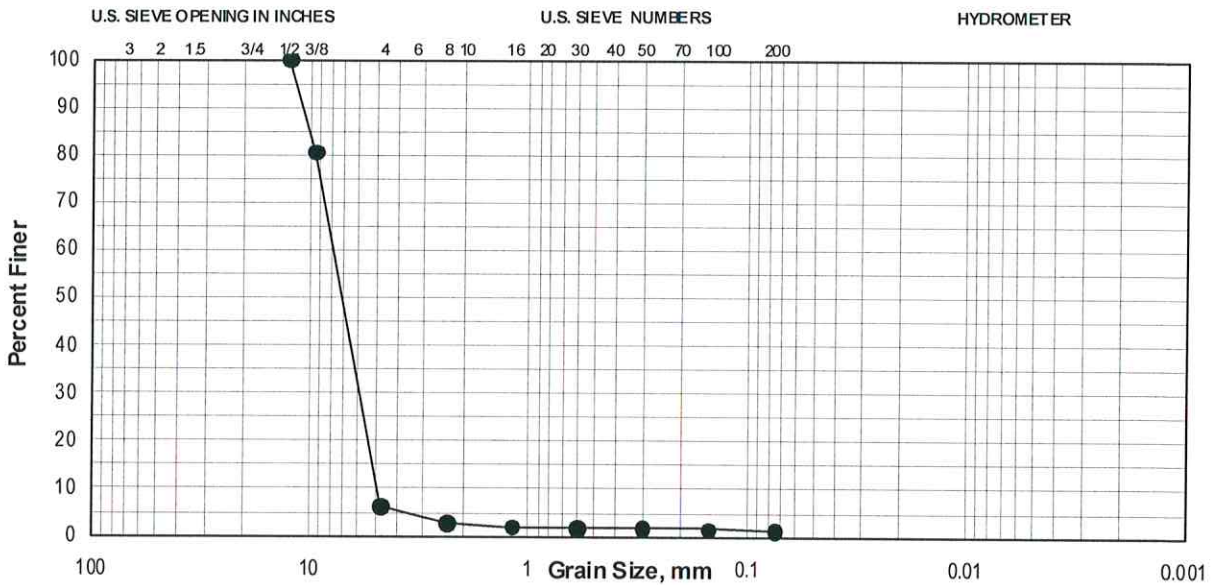
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PARTICLE SIZE ANALYSIS TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	12503
Material	3/8" (10 mm) Coarse Aggregate	Date Sampled	06 Jan 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Tested	10-11 Jan 2016
Method	ASTM C-117/136	Date Reported	21 Jan 2016



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)	80.6				
3/8 (9.5 mm)	6.4				
#4 (4.75 mm)	2.8				
#8 (2.36 mm)	2.0				
#16 (1.18 mm)	1.9				
#30 (0.600 mm)	1.7				
#50 (0.300 mm)	1.6				
#100 (0.15 mm)	1.2				
#200 (75 mm)					

Remarks	
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 CTTA # : 0428 CTTA # : 0556



(Handwritten Signature)

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السحيمي - فيفرو

SUMMARY OF TEST REPORT

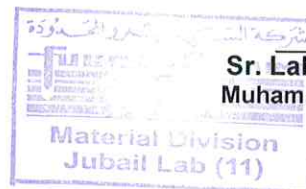
Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	12504
Material	Dune Sand	Date Sampled	06 Jan 2016
Source	Baladiyah, Jubail (Sampled by FSL)	Date Reported	21 Jan 2016

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	1.2	5.0 Max.
Clay lumps & friable particles %	ASTM C-142	-	3.0 Max.
Magnesium sulphate soundness loss (5 cycles) %	ASTM C-88	5.7	25.0 Max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.669	--
SSD basis		2.626	--
Dry basis		2.600	--
Absorption		1.0	
Acid soluble chloride, (Cl), %	ASTM C 114	0.008	0.06 max
Acid soluble sulphate (SO ₃), %			
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: CBB Reviewed By: Imran Ahmed
CTTA # : 0428 . CTTA # : 0556



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Jubail Branch**

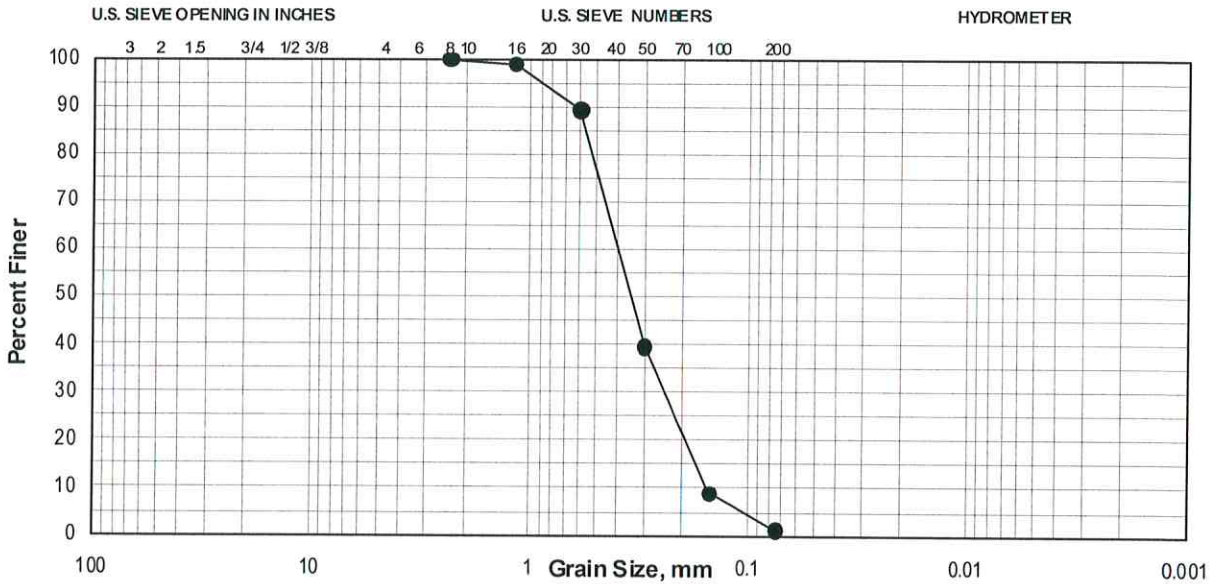
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Saudi Arabia – E-mail.: fsljubail@fugro-suhaimi.com



PARTICLE SIZE ANALYSIS TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	12504
Material	Sand	Date Sampled	06 Jan 2016
Source	Baladiyah, Jubail (Sampled by FSL)	Date Tested	10-11 Jan 2016
Method	ASTM C-117/136	Date Reported	21 Jan 2016



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)	98.9				
#30 (0.600 mm)	89.4				
#50 (0.300 mm)	39.5				
#100 (0.15 mm)	9.1				
#200 (0.075 mm)	1.2				

Remarks	
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Tested By: CBB Reviewed By: Imran Ahmed
CTTA # : 0428 CTTA # : 0556



(Signature)

Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037

TEST REPORT FOR CHEMICAL ANALYSIS ON WATER

Client	A.H. Al Marhoon & Bros. Co.	Report Date	21 Jan 2016
Project	Concrete Batch Plant, Rahima	Job No.	SA08-3012
Source	Sampled by FSL/ Al Kawther	Lab No.	12505/7382
		Sampled by	CBB/0428

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:

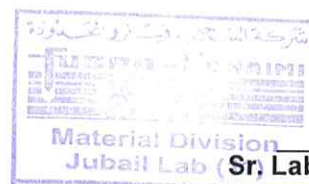
Test results

Serial No.	Determination	Test Results	S. Aramco Specification
2.	pH	7.25	6 - 8
3.	Chloride as Cl ⁻ , ppm	92.17	--
4.	Sulfate as SO ₃ , ppm	12.0	--
5.	Total Dissolved Solids- TDS, ppm	140.5	500 max

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

Tested By: CBB
CTTA # : 0428

Reviewed By: WN
CTTA # : -



Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037

SUMMARY OF TEST REPORT COMBINED AGGREGATE

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	12502/12503
Material	3/4" - 3/8" Coarse Aggregate	Date Sampled	06 Jan 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	21 Jan 2016

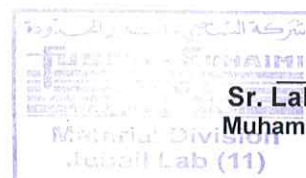
Combined Grading

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	62.1	100	79.2	--
9.5	22.5	80.6	48.6	20 – 55
4.75	1.6	6.4	3.8	0 – 10
2.36	1.3	2.8	2.0	0 – 5

Combined Soundness Loss By Magnesium Sulfate		
Aggregate Size :	20 mm	10 mm
Individual Loss %	8.9	14.7
Combined loss @ 55: 45%	11.5	

Remarks: _____

Tested By: CBB Reviewed By: Imran Ahmed
CTTA # : 0428 . CTTA # : 0556



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