



Certificate # 3512.05

Construction Materials Testing Laboratory - FUGRO - SUHAIMI
Jubail BranchP.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.	13492
Material	3/4" (20 mm) Coarse Aggregate	Date Sampled	04 April 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	16 April 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	0.30	5.0 max.
Clay lumps & friable particles %	ASTM C-142	0.40	5.0 Max.
Los Angeles Abrasion	ASTM C-131		
Loss at 100 revolutions %		7.8	--
Loss at 500 revolutions %		32.7	40 max.
Ratio 100/500 rev.		0.24	--
Magnesium sulfate soundness loss (5 cycles) %	ASTM C-88	10.1	25.0 max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.623	--
SSD basis		2.577	--
Dry basis		2.549	--
Absorption		1.1	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	0.166	0.40 Max
Flakiness index	BS-812	8.6	--
Elongation index	BS-812	11.1	--
Coal & lignite	ASTM C-123	Nil	--

Remarks: All test results indicate compliance with the Saudi Aramco standard 09-SAMSS-088.Tested By: Thomas
CTTA # : 0194Reviewed By: Imran Ahmed
CTTA # : 0556Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037



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Jubail Branch

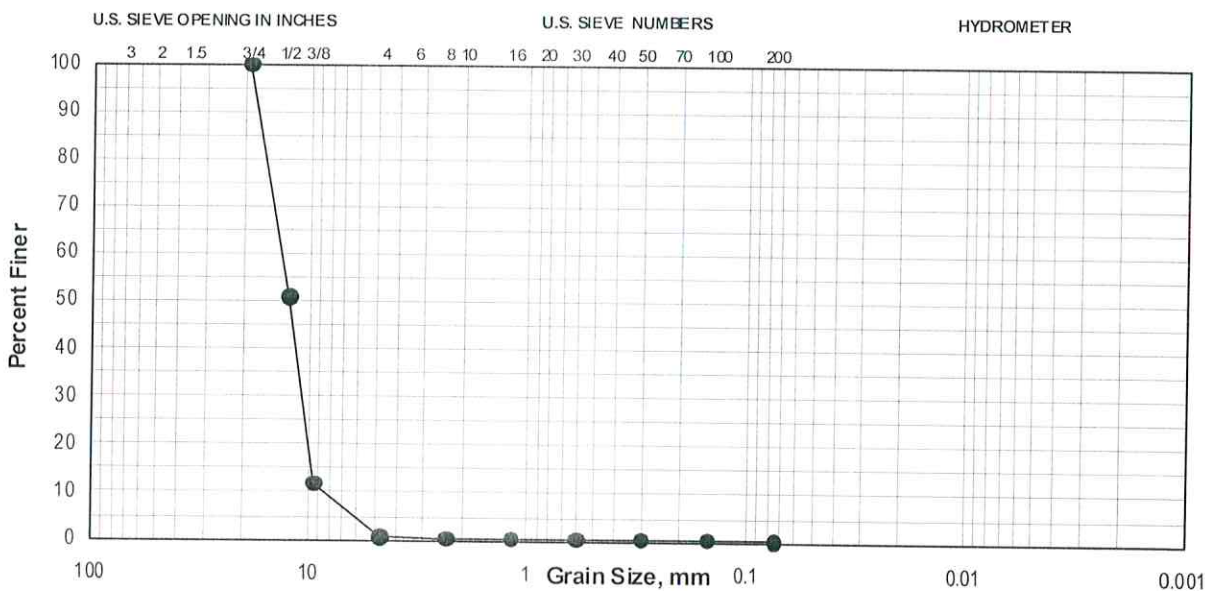
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PARTICLE SIZE ANALYSIS TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	13492
Material	3/4" (20 mm) Coarse Aggregate	Date Sampled	04 April 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Tested	05-06 April 2016
Method	ASTM C-136/117	Date Reported	16 April 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)	51				
3/8 (9.5 mm)	12				
#4 (4.75 mm)	0.5				
#8 (2.36 mm)	0.5				
#16 (1.18 mm)	0.5				
#30 (0.600 mm)	0.5				
#50 (0.300 mm)	0.5				
#100 (0.150 mm)	0.5				
#200 (0.075 mm)	0.3				

Remarks	
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Tested By: Thomas Reviewed By: Imran Ahmed
CTTA # : 0194 CTTA # : 0556

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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.	13493
Material	3/8" (10- mm) Coarse Aggregate	Date Sampled	04 April 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	16 April 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	0.4	5.0 max.
Clay lumps & friable particles %	ASTM C-142	0.44	5.0 max.
Los Angeles Abrasion	ASTM C-131		
Loss at 100 revolutions %		8.4	--
Loss at 500 revolutions %		34.9	40 max.
Ratio 100/500 rev.		0.24	--
Magnesium sulfate soundness loss (5 cycles) %	ASTM C-88	14.7	25.0 max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.627	--
SSD basis		2.573	--
Dry basis		2.540	--
Absorption		1.3	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	0.030	0.40 Max
Flakiness index	BS-812	9.0	--
Elongation index	BS-812	12.9	--
Coal & lignite	ASTM C-123	Nil	--

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

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 CTTA # : 0194 CTTA # : 0556

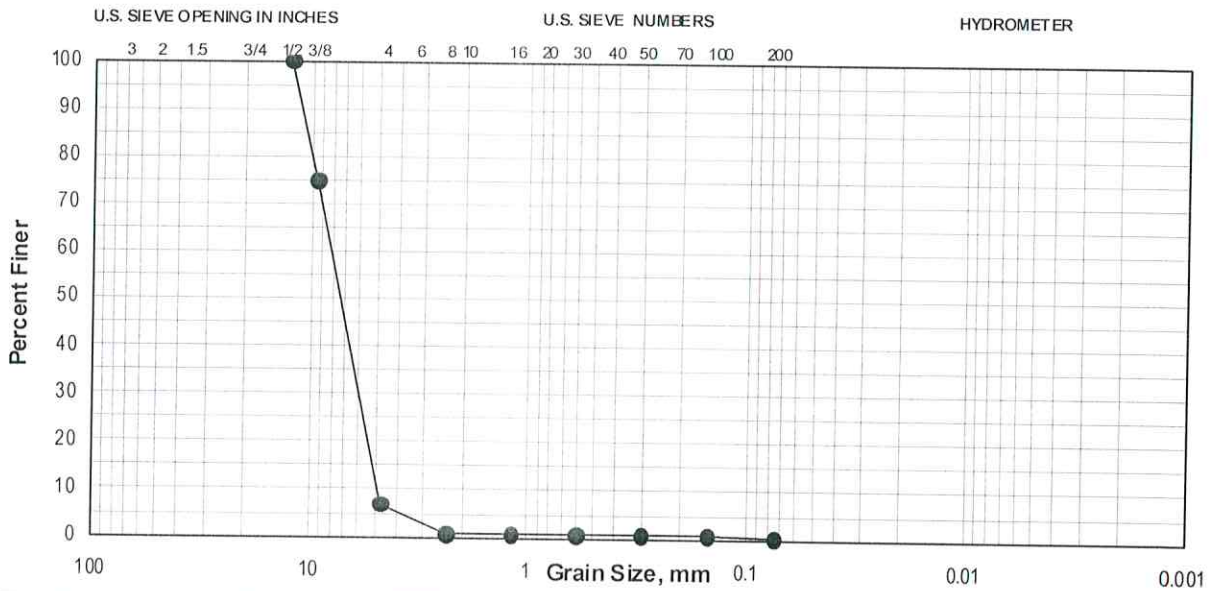
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PARTICLE SIZE ANALYSIS TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	13493
Material	3/8" (10 mm) Coarse Aggregate	Date Sampled	04 April 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Tested	05-06 April 2016
Method	ASTM C-117/136	Date Reported	16 April 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)					
1/2 (12.5 mm)	100				
3/8 (9.5 mm)	75				
#4 (4.75 mm)	7				
#8 (2.36 mm)	0.7				
#16 (1.18 mm)	0.7				
#30 (0.600 mm)	0.7				
#50 (0.300 mm)	0.7				
#100 (0.15 mm)	0.7				
#200 (75 mm)	0.4				

Remarks	
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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.	13502
Material	Dune Sand	Date Sampled	04 April 2016
Source	Baladiyah, Jubail (Sampled by FSL)	Date Reported	16 April 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	1.8	5.0 Max.
Clay lumps & friable particles %	ASTM C-142	N/A	3.0 Max.
Magnesium sulphate soundness loss (5 cycles) %	ASTM C-88	5.5	25.0 Max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.654	--
SSD basis		2.615	--
Dry basis		2.599	--
Absorption		0.8	
Acid soluble chloride, (Cl), %	ASTM C 114	0.007	0.06 max
Acid soluble sulphate (SO ₃), %			
	BS-812 Part 118	0.081	0.40 Max
Organic impurities	ASTM C-40	Lighter then std	Light then std.

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

Tested By: Thomas Reviewed By: Imran Ahmed
CTTA # : 0194 CTTA # : 0556


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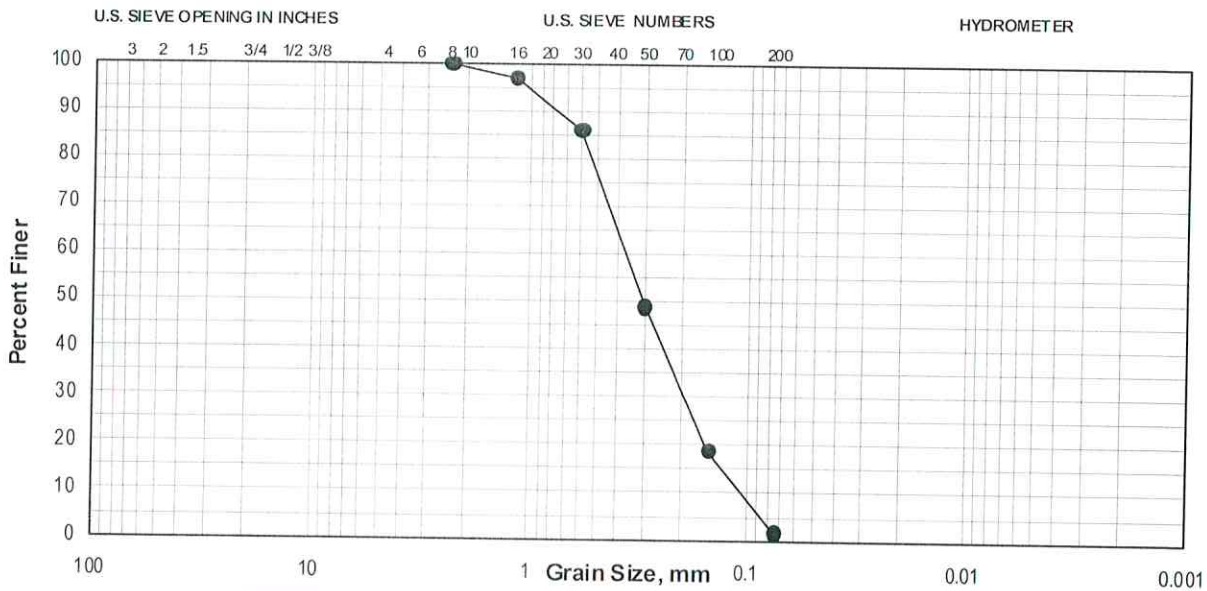
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PARTICLE SIZE ANALYSIS TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	13502
Material	Sand	Date Sampled	04 April 2016
Source	Baladiyah, Jubail (Sampled by FSL)	Date Tested	05-06 April 2016
Method	ASTM C-117/136	Date Reported	16 April 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)	97				
#30 (0.600 mm)	86				
#50 (0.300 mm)	49				
#100 (0.15 mm)	19				
#200 (0.075 mm)	1.8				

Remarks	
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Tested By: Thomas _____ Reviewed By: Imran Ahmed _____
CTTA # : 0194 _____ CTTA # : 0556 _____

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**TEST REPORT FOR CHEMICAL ANALYSIS ON WATER**

Client	A.H. Al Marhoon & Bros. Co.	Report Date	16 April 2016
Project	Concrete Batch Plant, Rahima	Job No.	SA08-3012
Source	Sampled by FSL/ Al Kawther	Lab No.	13503
		Sampled by	FSL

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	7.17	6 - 8
3.	Chloride as Cl ⁻ , ppm	49.6	--
4.	Sulfate as SO ₃ , ppm	17.0	--
5.	Total Dissolved Solids- TDS, ppm	119.7	500 max

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

Tested By: Thomas
CTTA # : 0194

Reviewed By: Imran Ahmed
CTTA # : 0556

شركة السحيمي - فيفرو للمختبرات
FUGRO - SUHAIMI
Material Division
Jubail
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.	13492/13493
Material	3/4" - 3/8" Coarse Aggregate	Date Sampled	04 April 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	16 April 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	51	100	73	--
9.5	12	7.5	40	20 – 55
4.75	0.5	7	3	0 – 10
2.36	-	0.7	0.3	0 – 5

Combined Soundness Loss By Magnesium Sulfate		
Aggregate Size :	20 mm	10 mm
Individual Loss %	10.1	14.7
Combined loss @ 55: 45%	12.2	

Remarks: _____

Tested By: Thomas Reviewed By: Imran Ahmed
CTTA # : 0194 CTTA # : 0556


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