



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

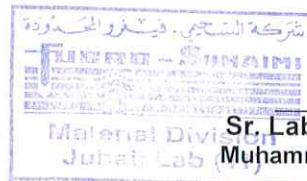
السحيمي - فيغرو

SUMMARY OF TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	13238
Material	3/4" (20 mm) Coarse Aggregate	Date Sampled	06 Mar 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	15 Mar 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	0.36	5.0 Max.
Los Angeles Abrasion	ASTM C-131		
Loss at 100 revolutions %		8.0	--
Loss at 500 revolutions %		33.1	40 max.
Ratio 100/500 rev.		0.24	--
Magnesium sulfate soundness loss (5 cycles) %	ASTM C-88	9.8	25.0 max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.625	--
SSD basis		2.584	--
Dry basis		2.558	--
Absorption		1.0	2.5 max
Acid soluble chloride, (Cl), %	ASTM C 114		
(Cl), %		0.011	0.03 max
Acid soluble sulphate (SO ₃), %	BS-812 Part 118	0.018	
		0.090	0.40 Max
Flakiness index	BS-812	8.3	--
Elongation index	BS-812	10.5	--
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



Certificate # 3512.05

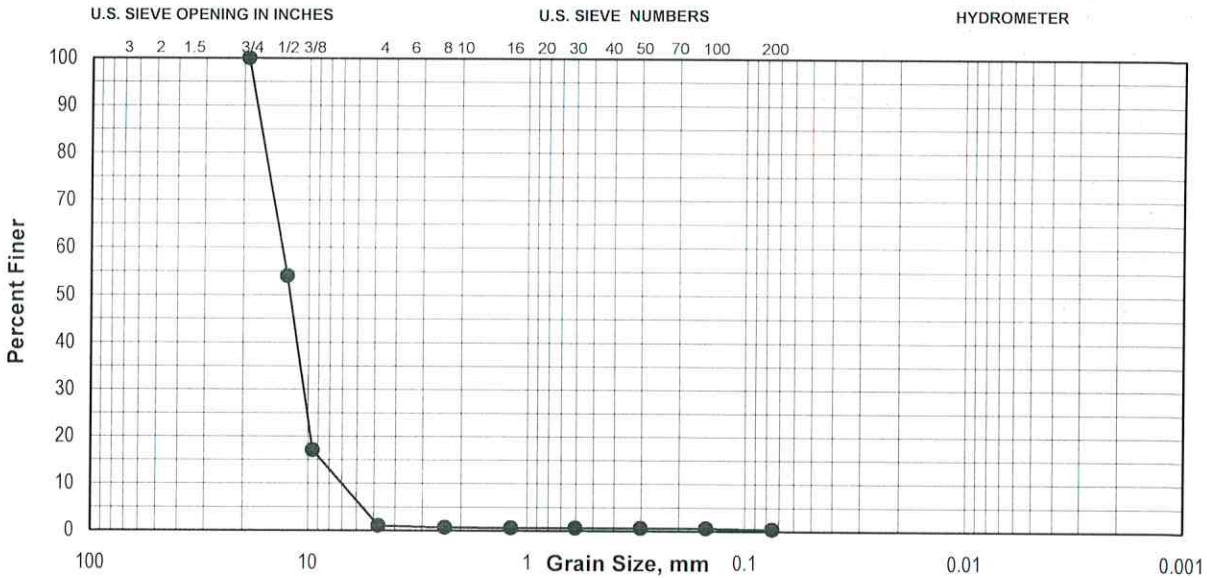
**Construction Materials Testing Laboratory
Jubail Branch**

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



PARTICLE SIZE ANALYSIS TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	13238
Material	3/4" (20 mm) Coarse Aggregate	Date Sampled	06 Mar 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Tested	07-08 Mar 2016
Method	ASTM C-136/117	Date Reported	15 Mar 2016



Gravel		Sand			Silt or Clay
Coarse	fine	Coarse	medium	fine	

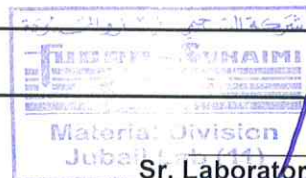
Description of Sand / Gravel Particles:

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)	54				
3/8 (9.5 mm)	17				
#4 (4.75 mm)	1				
#8 (2.36 mm)	0.7				
#16 (1.18 mm)	0.6				
#30 (0.600 mm)	0.6				
#50 (0.300 mm)	0.6				
#100 (0.150 mm)	0.6				
#200 (0.075 mm)	0.4				

Remarks	
----------------	--

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



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



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

السحيمي - فيغرو

SUMMARY OF TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	13239
Material	3/8" (10- mm) Coarse Aggregate	Date Sampled	06 Mar 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	15 Mar 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	0.5	5.0 max.
Clay lumps & friable particles %	ASTM C-142	0.52	5.0 max.
Los Angeles Abrasion	ASTM C-131		
Loss at 100 revolutions %		8.5	--
Loss at 500 revolutions %		34.7	40 max.
Ratio 100/500 rev.		0.24	--
Magnesium sulfate soundness loss (5 cycles) %	ASTM C-88	15.5	25.0 max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.624	--
SSD basis		2.570	--
Dry basis		2.537	--
Absorption		1.3	2.5 max
Acid soluble chloride, (Cl), %	ASTM C 114		
		0.007	0.03 max
Acid soluble sulphate (SO ₃), %	BS-812 Part 118	0.158	0.40 Max
Flakiness index	BS-812	10.0	--
Elongation index	BS-812	13.6	--
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

The copyright of this document is owned by Fugro-Suhaimi Ltd. It may not be reproduced except with prior written approval from the company.



Certificate # 3512.05

Construction Materials Testing Laboratory Jubail Branch

P.O. Box 2165 – Tel.: (013) 341 2700
Dammam 31451 – Fax.: (013) 341 2701

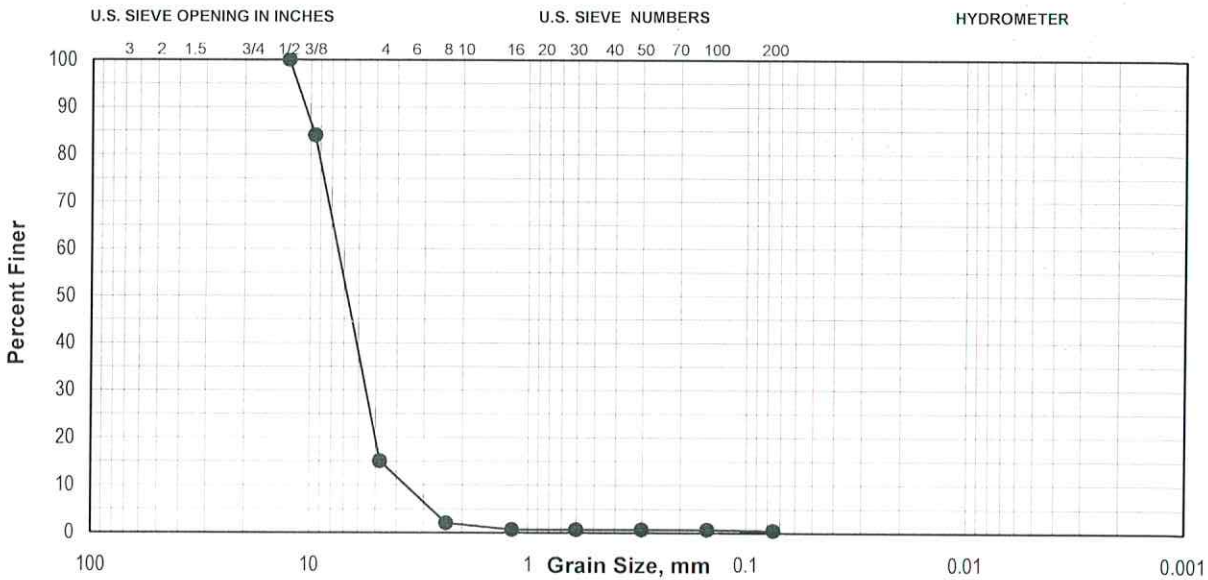
Saudi Arabia – E-mail.: fsljubail@fugro-suhaimi.com



السحيمي - فيفرو

PARTICLE SIZE ANALYSIS TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	13239
Material	3/8" (10 mm) Coarse Aggregate	Date Sampled	06 Mar 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Tested	07-08 Mar 2016
Method	ASTM C-117/136	Date Reported	15 Mar 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)	84				
3/8 (9.5 mm)	84				
#4 (4.75 mm)	15				
#8 (2.36 mm)	2				
#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 (0.075 mm)	0.5				

Remarks	
----------------	--

Tested By: Thomas
CTTA # : 0194

Reviewed By: Imran Ahmed
CTTA # : 0556



Material Sr. Laboratory Supervisor
Jubail Muhammad Nawaz CTTA # 0037

The copyright of this document is owned by Fugro-Suhaimi Ltd. It may not be reproduced except with prior written approval from the company.



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.	13240
Material	Dune Sand	Date Sampled	06 Mar 2016
Source	Baladiyah, Jubail (Sampled by FSL)	Date Reported	15 Mar 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	1.9	5.0 Max.
Clay lumps & friable particles %	ASTM C-142	N/A	3.0 Max.
Magnesium sulphate soundness loss (5 cycles) %	ASTM C-88	5.2	25.0 Max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.661	--
SSD basis		2.625	--
Dry basis		2.602	--
Absorption		0.9	
Acid soluble chloride, (Cl), %	ASTM C 114	0.004	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: Thomas
CTTA # : 0194Reviewed By: Imran Ahmed
CTTA # : 0556**Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037**



Certificate # 3512.05

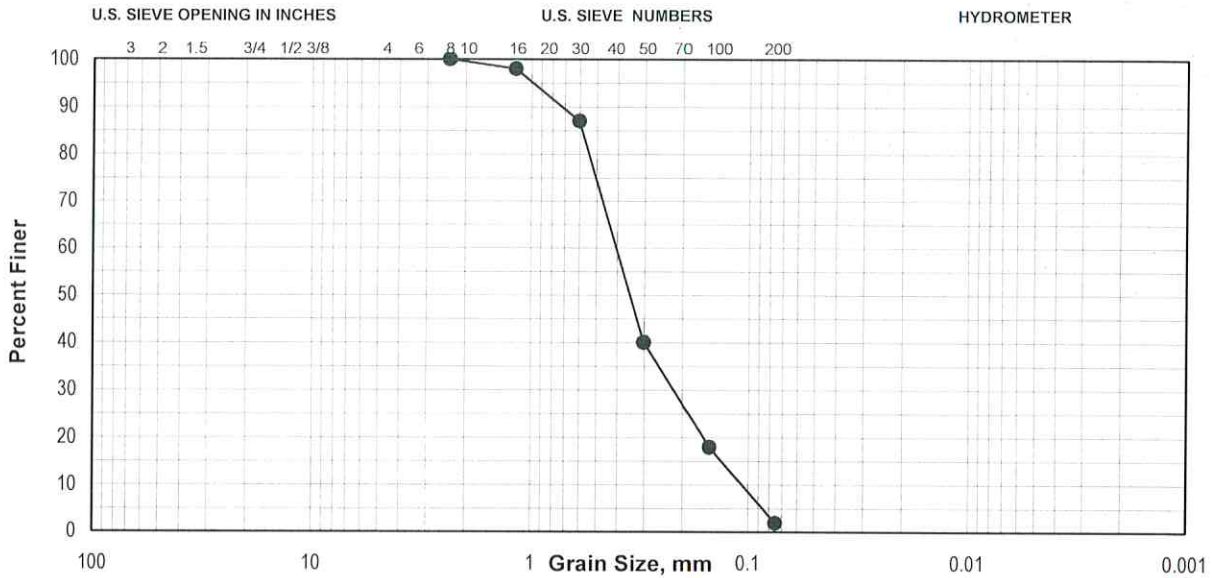
**Construction Materials Testing Laboratory
Jubail Branch**

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



PARTICLE SIZE ANALYSIS TEST REPORT

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	13240
Material	Sand	Date Sampled	06 Mar 2016
Source	Baladiyah, Jubail (Sampled by FSL)	Date Tested	07-08 Mar 2016
Method	ASTM C-117/136	Date Reported	15 Mar 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				
#30 (0.600 mm)	87				
#50 (0.300 mm)	40				
#100 (0.15 mm)	18				
#200 (0.075 mm)	1.9				

Remarks	
----------------	--

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



(Signature)
Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037



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



TEST REPORT FOR CHEMICAL ANALYSIS ON WATER

Client	A.H. Al Marhoon & Bros. Co.	Report Date	15 Mar 2016
Project	Concrete Batch Plant, Rahima	Job No.	SA08-3012
Source	Sampled by FSL/ Al Kawther	Lab No.	13241
		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	7.8	6 - 8
3.	Chloride as Cl ⁻ , ppm	10.6	--
4.	Sulfate as SO ₃ , ppm	1.1	--
5.	Total Dissolved Solids- TDS, ppm	53.5	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



Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037



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



السحيمي - فيفرو

**SUMMARY OF TEST REPORT
COMBINED AGGREGATE**

Client	A.H. Al Marhoon & Bros. Co.	Job No.	SA08-3012
Project	Concrete Batch Plant, Rahima	Lab No.	13238/13239
Material	3/4" - 3/8" Coarse Aggregate	Date Sampled	06 Mar 2016
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	15 Mar 2016

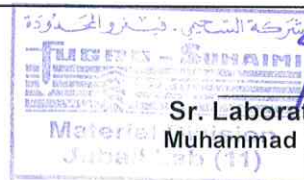
Combined Grading

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	54	100	75	--
9.5	17	84	47	20 – 55
4.75	1	15	7	0 – 10
2.36	0.4	2	1	0 – 5

Combined Soundness Loss By Magnesium Sulfate		
Aggregate Size :	20 mm	10 mm
Individual Loss %	9.8	15.5
Combined loss @ 55: 45%	12.4	

Remarks:

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



Sr. Laboratory Supervisor
Muhammad Nawaz CTTA # 0037