



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](mailto: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.	10171
Material	3/4" (20 mm) Coarse Aggregate	Date Sampled	02 March, 2015
Source	Al Osais, Abuhadriya (Sampled by FSL)	Date Reported	14 March, 2015

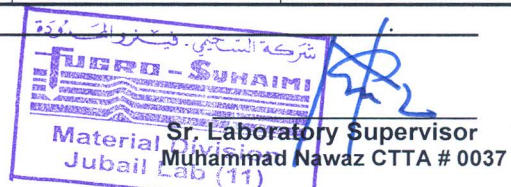
Properties:

Properties Tested	Test Method	Results	SCECO Specs.
Sieve analysis	ASTM C-136	See Attached	--
Material finer than No. 200 sieve %	ASTM C-117	0.3	5.0 Max.
Clay lumps & friable particles %	ASTM C-142	0.20	1.0 Max.
Los Angeles Abrasion	ASTM C-131		
Loss at 100 revolutions %		7.8	--
Loss at 500 revolutions %		33.5	35 Max.
Ratio 100/500 rev.		0.23	0.25 max
Magnesium sulfate soundness loss (5 cycles) %	ASTM C-88	13.4	18 Max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.629	--
SSD basis		2.585	--
Dry basis		2.558	--
Absorption		1.1	2.5 max
Acid soluble chloride, (Cl), %	ASTM C 114		
(NaCl), %		0.015	0.03 max
Acid soluble sulphate (SO <sub>3</sub> ), %	BS-812 Part 118		
(SO <sub>4</sub> ), %		0.018	
Flakiness index	BS-812	10.7	30 Max.
Elongation index	BS-812	13.4	45 Max.
Coal & lignite	ASTM C-123	NIL	0.5 Max.

Remarks:

Tested By: Jose Daniel  
CTTA # : 0195

Reviewed By: Imran Ahmed  
CTTA # : 0556



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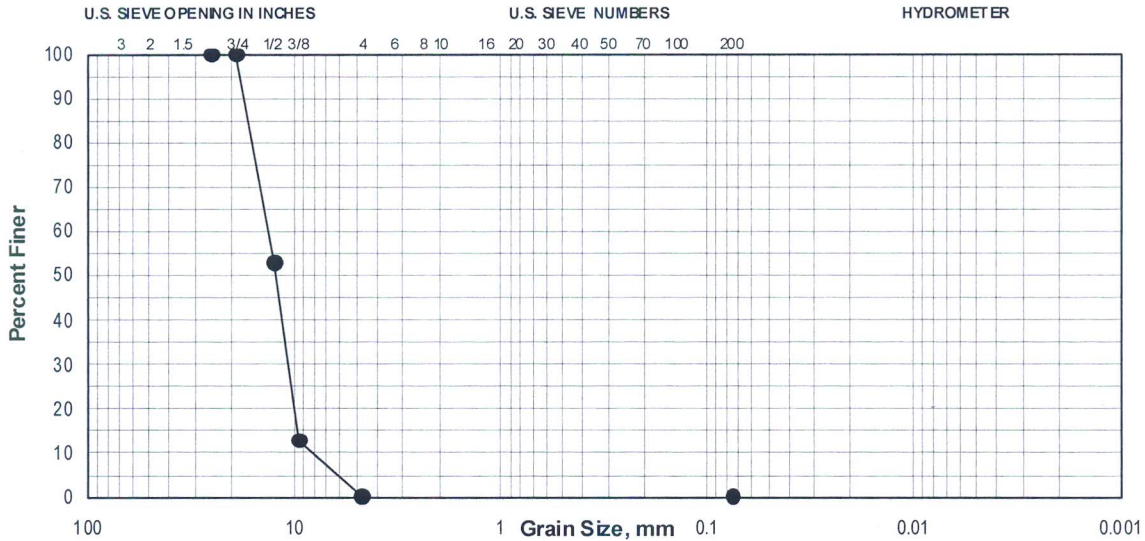
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**PARTICLE SIZE ANALYSIS TEST REPORT**

<b>Client</b>	A.H. Al Marhoon & Bros. Co.	<b>Job No.</b>	SA08-3012
<b>Project</b>	Concrete Batch Plant, Rahima	<b>Lab No.</b>	10171
<b>Material</b>	3/4" (20 mm) Coarse Aggregate	<b>Date Sampled</b>	02 March 2015
<b>Source</b>	Al Osais, Abuhadriya (Sampled by FSL)	<b>Date Tested</b>	04 March 2015
<b>Method</b>	ASTM C-117/136	<b>Date Reported</b>	14 March 2015



<b>Gravel</b>		<b>Sand</b>			<b>Silt or Clay</b>
Coarse	fine	Coarse	medium	fine	

Description of Sand / Gravel Particles:

<b>Shape</b>	<b>Hardness</b>	<b>Specific Gravity</b>

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)	53				
3/8 (9.5 mm)	13				
#4 (4.75 mm)	0.4				
#8 (2.36 mm)	-				
#16 (1.18 mm)	-				
#100 (0.15 mm)	-				
#200 (75 mm)	0.3				

<b>Remarks</b>	
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Tested By: Jose Daniel  
CTTA # : 0195

Reviewed By: Imran Ahmed  
CTTA # : 0556

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

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**SUMMARY OF TEST REPORT**

<b>Client</b>	A.H. Al Marhoon & Bros. Co.	<b>Job No.</b>	SA08-3012
<b>Project</b>	Concrete Batch Plant, Rahima	<b>Lab No.</b>	10172
<b>Material</b>	3/8" (10- mm) Coarse Aggregate	<b>Date Sampled</b>	02 March. 2015
<b>Source</b>	Al Osais, Abuhadriya (Sampled by FSL)	<b>Date Reported</b>	14 March. 2015

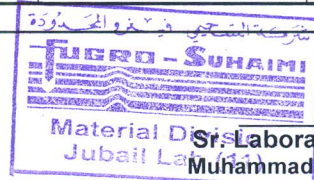
**Properties:**

Properties Tested	Test Method	Results	SCECO Specs.
Sieve analysis	ASTM C-136	See Attached	--
Material finer than No. 200 sieve %	ASTM C-117	0.9	5.0 Max.
Clay lumps & friable particles %	ASTM C-142	0.25	1.0 Max.
Los Angeles Abrasion	ASTM C-131		
Loss at 100 revolutions %		8.2	--
Loss at 500 revolutions %		34.3	35 Max.
Ratio 100/500 rev.		0.24	0.25 max
Magnesium sulfate soundness loss (5 cycles) %	ASTM C-88	15.4	18 Max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.626	--
SSD basis		2.570	--
Dry basis		2.536	--
Absorption		1.4	2.5 max
Acid soluble chloride, (Cl), %	ASTM C 114	0.011	0.03 max
(NaCl), %		0.013	
Acid soluble sulphate (SO <sub>3</sub> ), %	BS-812 Part 118	0.285	
(SO <sub>4</sub> ), %		0.285	0.5 max
Flakiness index	BS-812	15	30 Max.
Elongation index	BS-812	10	45 Max.
Coal & lignite	ASTM C-123	Nil	0.5 Max.

**Remarks:** \_\_\_\_\_

Tested By: Jose Daniel  
CTTA #: 0195

Reviewed By: Imran Ahmed  
CTTA #: 0556



**Material Director / Laboratory Supervisor**  
**Muhammad Nawaz CTTA # 0037**

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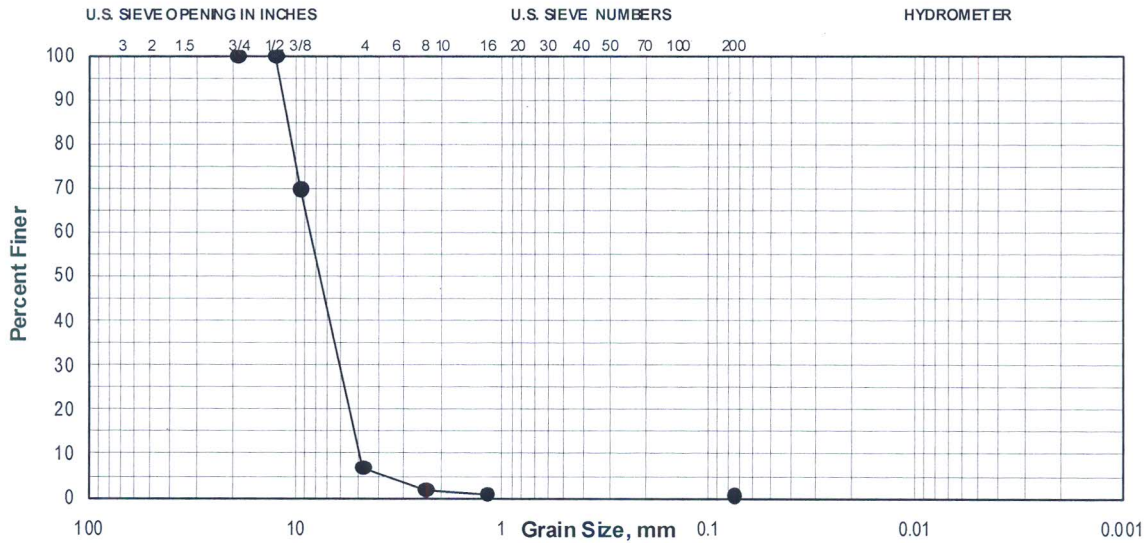
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السحيمي - فيفرو

**PARTICLE SIZE ANALYSIS TEST REPORT**

<b>Client</b>	A.H. Al Marhoon & Bros. Co.	<b>Job No.</b>	SA08-3012
<b>Project</b>	Concrete Batch Plant, Rahima	<b>Lab No.</b>	10172
<b>Material</b>	3/8" (10 mm) Coarse Aggregate	<b>Date Sampled</b>	02 March 2015
<b>Source</b>	Al Osais, Abuhadriya (Sampled by FSL)	<b>Date Tested</b>	04 March 2015
<b>Method</b>	ASTM C-117/136	<b>Date Reported</b>	14 March 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)	70				
#4 (4.75 mm)	7				
#8 (2.36 mm)	2				
#16 (1.18 mm)	1				
#30 (0.600 mm)	-				
#50 (0.300 mm)	-				
#100 (0.15 mm)	-				
#200 (75 mm)	0.9				

<b>Remarks</b>	
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Tested By: Jose Daniel  
CTTA # : 0195

Reviewed By: Imran Ahmed  
CTTA # : 0556

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

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## SUMMARY OF TEST REPORT

<b>Client</b>	A.H. Al Marhoon & Bros. Co.	<b>Job No.</b>	SA08-3012
<b>Project</b>	Concrete Batch Plant, Rahima	<b>Lab No.</b>	10173
<b>Material</b>	Dune Sand	<b>Date Sampled</b>	02 March, 2015
<b>Source</b>	Baladiyah, Jubail (Sampled by FSL)	<b>Date Reported</b>	14 March, 2015

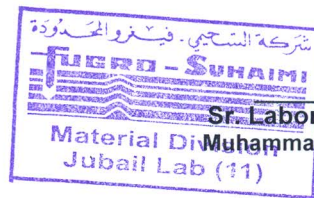
**Properties:**

Properties Tested	Test Method	Results	SCECO Specs.
Sieve analysis	ASTM C-136	See Attached	--
Material finer than No. 200 sieve %	ASTM C-117	1.7	2.0 Max.
Clay lumps & friable particles %	ASTM C-142	N/A	2.0 Max.
Magnesium sulfate soundness loss (5 cycles) %	ASTM C-88	6.2	15 Max.
Specific gravity and absorption	ASTM C-127		
Apparent		2.659	--
SSD basis		2.625	--
Dry basis		2.603	--
Absorption		0.9	1.0 max
Acid soluble chloride, (Cl), %	ASTM C 114		
(NaCl), %		0.008	0.05 max
Acid soluble sulphate (SO <sub>3</sub> ), %	BS-812 Part 118		
(SO <sub>4</sub> ), %		0.081	0.4 Max
Organic impurities	ASTM C-40	Light then std.	

**Remarks:** Not applicable: Material is finer than test size i.e. retained on Sieve No.16 hence the test is not applicable

Tested By: Jose Daniel  
CTTA # : 0195

Reviewed By: Imran Ahmed  
CTTA # : 0556



Sr. Laboratory Supervisor  
Muhammad Nawaz CTTA # 0037

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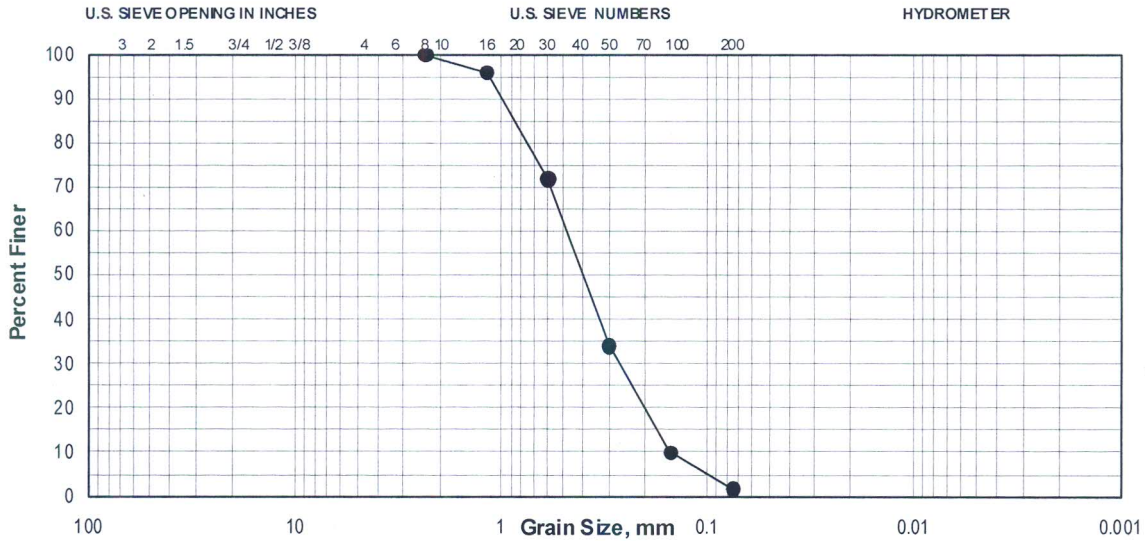
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السحيمي - فيغرو

**PARTICLE SIZE ANALYSIS TEST REPORT**

<b>Client</b>	A.H. Al Marhoon & Bros. Co.	<b>Job No.</b>	SA08-3012
<b>Project</b>	Concrete Batch Plant, Rahima	<b>Lab No.</b>	10173
<b>Material</b>	Dune Sand	<b>Date Sampled</b>	02 March 2015
<b>Source</b>	Baladiyah, Jubail (Sampled by FSL)	<b>Date Tested</b>	04 March 2015
<b>Method</b>	ASTM C-117/136	<b>Date Reported</b>	14 March 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)	96				
#30 (0.600 mm)	72				
#50 (0.300 mm)	34				
#100 (0.15 mm)	10				
#200 (75 mm)	1.7				

<b>Remarks</b>	
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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  
Sr. Laboratory Supervisor  
Muhammad Nawaz CTTA # 0037

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## TEST REPORT FOR CHEMICAL ANALYSIS ON WATER

<b>Client</b>	A.H. Al Marhoon & Bros. Co.	<b>Report Date</b>	14 March 2015
<b>Project</b>	Concrete Batch Plant, Rahima	<b>Job No.</b>	SA08-3012
<b>Source</b>	Sampled by FSL	<b>Lab No.</b>	10174
		<b>Sampled by</b>	FSL Jubail

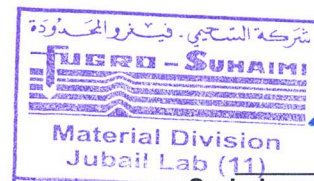
Fugro-Suhaimi Ltd. (FSL) has performed chemical analysis on a water sample based on client request. The testing was carried out in accordance with the relevant ASTM and APHA Methods. The results and pertinent information are as follows:

### Test results

Serial No.	Determination	Test Results	S. Aramco Specification
2.	pH	6.62	6 - 8
3.	Chloride as Cl <sup>-</sup> , ppm	54.4	--
4.	Sulfate as SO <sub>3</sub> , ppm	7.0	--
5.	Total Dissolved Solids- TDS, ppm	122.7	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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