

**VORACO** GYPSUM · GRC · DECOR

فوراكو جيپسوم · جي آر سي · ديڪور

Material Specifications

Property	Unit	Percentage
White Cement (JK White)	% by wt	42
Sand Double Wash	% by wt	38
Fiber Content (ACS 25PH-901X(20)/V) (JAPAN)	% by wt	5
Water Content	% by wt	15

Principal Mechanical Properties

Property	Unit	Hand/Machine	
		Spray	Premix
Fibre Content	% by wt	(mx) 5	(mx) 3
Density	Tonnes/mm ³	2.1	2.0
Compressive Stgth	N/mm ²	50 - 75	40 - 44
Bending Stgth (MDR)	N/mm ²	20 - 30	10 - 14
Bending Elastic Lmt (KIO)	N/mm ²	7 - 11	5 - 8

Typical Design Stresses

Property	Unit	Hand/Machine	
		Spray	Premix
Compressive	N/mm ²	12	12
Bending	N/mm ²	6	4
Shear	N/mm ²	1	1

it should be noted that generally mechanical properties of GRC varies from their original levels with time depending on the environment. there is little or no change in dry conditions but in moist or wet conditions there is a tendency for some loss of strength on ageing.

Physical Properties

	Property	Performance
Thermal	expansion / conductivity	negligible / max 10 W/MK
Fire	combustibility / ignitability	non combustible / very low
Moisture	Permeability / absorption	negligible / max 15% up to saturation
Acoustic	Sound absorption	very low

Material Sample Example

GRC Material Description	Material Breakup	Weight/Vol.	% /Vol.
GRC Cube	White Cement	1.410 Kg	60.0%
size: 100x100x100mm	Aggregates (Sand)	0.705 Kg	30.0%
Volume: 0.001 Cu Mt	Glass fiber (Chopped)	0.070 Kg	3.0%
Weight: 2.350 Kg	Water	0.160 Lit	6.8%
	Admixtures	0.005 kg	0.2%
	Total Wet Weight:	2.350 Kg	100%



MATERIAL APPROVAL CERTIFICATE (MAC)

PROJECT TITLE		Proposed New Coast Guard Base At Muharraq.	
CONTRACTOR		Projects Construction Co. W.L.L	
JOB NO.		112491/D	
WD SUPERVISOR		Adel Ahmadi Associates.	DATE: 19-09-2018
Civil	C	Elect	E
		Mech	M
Submittal No:			A-016 R-00

We Request approval for the following materials for use in the above Contract

1	Material Description	GRC Panel Raw materials and Accessories
2	Particular Specification/General specification as per Contract	Particular Specification
3	Submitted Sample	No
4	Does the submittal meet the particular Standards/General Specifications	Yes
5	Location	Administration Building
6	Manufacturer	VORACO-Gypsum-GRC-Décor, Kingdom of Bahrain
7	Local Supplier	VORACO-Gypsum-GRC-Décor, Kingdom of Bahrain
8	Standard Reference	MOI Specification
9	Estimated Delivery Time	6 Months
10	Estimated Date Required at site	1 st March 2019
11	Enclosures	GRC Raw materials breakup details, GRC Test reports & GRC Fixing method of statement
12	Warranty	Attached Guarantee Letter From VORACO

QUALITY ASSURANCE ENGINEER / SITE SUPERVISOR

COMMENTS: RAW MATERIALS CONFORM TO SPECIFICATION			<input checked="" type="checkbox"/>	RECOMMENDED
				NOT RECOMMENDED
NAME C.V. THOMAS	SIGNATURE 	DATE: 18-09-2018		RECOMMENDED WITH COMMENTS

ELECTRICAL/MECHANICAL / HVAC ENGINEER

COMMENTS: Apply As per The attached Data Sheets.			<input checked="" type="checkbox"/>	RECOMMENDED
				NOT RECOMMENDED
NAME	SIGNATURE	DATE:	<input checked="" type="checkbox"/>	RECOMMENDED WITH COMMENTS

WD COMMITTEE APPROVAL

NAME M. TA	NAME Riyadh	NAME Subhi		APPROVED
SIGNATURE 	SIGNATURE 	SIGNATURE 		NOT APPROVED
			<input checked="" type="checkbox"/>	APPROVED WITH COMMENTS

NOTES:

1	This approval relates only to identical materials. Not similar materials.
2	Materials which have not been approved are deemed to have been rejected
3	Approval of items does not any way relieve the Contractor from Complying with all the requirements of the contract Terms, Specification and Project Design
4	Approval of Materials is not a Variation Order approval

TEST REPORT

Cert. Number:

UR4 - 7287

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CALIBRATION & TESTING
LABORATORIES**Universal Laboratories (Bahrain) WLL**

Gate No: 1006, Villa No.2 Road 3221, Mahooz-332

Tel: +973 17720117 Fax: +973 17162830

E-mail: bahrain@universallab.co

Approved Signatory

K.T.Noushad

WORK ORDER NO.	:	65129
Client	:	VORACO – Gypsum – GRC - Decor
Address	:	Building 1349,Road 1224, Block 1012, Al Hamala, Bahrain
Date Received	:	22 February 2018
Certificate issued on	:	25 February 2018
PROJECT	:	General Purposes
SAMPLE DESCRIPTION	:	GLASSFIBRE REINFORCED CONCRETE
TYPE OF TEST	:	FLEXURAL PROPERTIES OF GLASSFIBRE REINFORCED
PLACE OF TEST	:	Universal Permanent Laboratory
DATE OF TEST	:	25 February 2018
METHOD OF COMPACTION	:	Premix
METHOD / STANDARD	:	GCRA Methods of Testing Glassfibre Reinforced Concrete (GRC) Material
CONDITION OF SPECIMEN WHEN RECEIVED	:	SATISFACTORY
ENVIRONMENTAL CONDITION	:	Temperature 22.0 °C Relative Humidity 48.0 %

SAMPLE NO	DIMENSIONS(mm)			SPAN mm	MOR LOAD N	LIMIT OF PROPORTIONALITY N/mm ²	MODULUS OF RUPTURE N/mm ²	DIRECTION OF LOADING
	L	x	W x T					
11-02-18/1	301	x	102 x 30.2	252	5550	14.6	18.0	x
11-02-18/2	303	x	101 x 30.3	251	6450	15.2	21.1	x
24-02-18/3	302	x	101 x 30.4	254	7950	16.8	25.7	y
24-02-18/4	302	x	103 x 30.1	251	7000	13.8	22.7	y

NOTE: x mould face of the specimen in contact with the major span rollers
y mould face of the specimen in contact with the minor span rollers



Seal: _____

Verified by: _____
Testing LaboratoryApproved by: _____
General Manager

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Results only related to the sample tested.
Reports without the signature and the seal of the issuing laboratory are not valid.
This report complies with the requirements of ISO 17025

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Address	:	Building 1349, Road 1224, Block 1012, Al Hamala, Bahrain
Date Received	:	22 February 2018
Certificate issued on	:	25 February 2018
PROJECT	:	General Purposes
SAMPLE DESCRIPTION	:	GLASSFIBRE REINFORCED CONCRETE
TYPE OF TEST	:	COMPRESSIVE STRENGTH OF GLASSFIBRE REINFORCED
PLACE OF TEST	:	Universal Permanent Laboratory
DATE OF TEST	:	25 February 2018
METHOD OF COMPACTION	:	Premix
METHOD / STANDARD	:	BS EN 12390 - 3
CONDITION OF SPECIMEN WHEN RECEIVED	:	SATISFACTORY
ENVIRONMENTAL CONDITION	:	Temperature 22.0 ° C Relative Humidity 48.0 %

SAMPLE NO.	DIMENSIONS (mm)	MAXIMUM LOAD @ FAILURE N	COMPRESSIVE STRENGTH N/mm ²
	L x W x H		
11-02-18/1	101 x 102 x 100	425050	41.3
11-02-18/2	100 x 101 x 102	431050	41.8
24-02--18/3	102 x 101 x 100	435100	42.2
24-02-18/4	101 x 100 x 102	435900	42.3



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Project / Location : K.F.C.D. – The Avenues
 Test Location : Concrete Filled Blocks
 Sample Description : Fischer Anchor SXR 10x80 A4
 Source : Fischer
 Weather Condition : Clear
 Equipment used : Proceq Z16
 Date Received : 06.10.2016
 Date Tested : 06.10.2016

RESULTS:

	Test 1	Test 2
Age of Curing, Days	-	-
Diameter of the specimen, mm	10	10
Test Conditions	Smooth	Smooth
Location of test	Exterior Wall	Exterior Wall
Surface Temperatures, °C	32	32
Tensile Load, kN	3	4
Failure Mode	No visual defect was observed	No visual defect was observed
Remarks	Satisfactory	Satisfactory



NITIL K. SHRIVASTAVA
Material Laboratory Manager

Checked by:

DISCLAIMER

The test reports / certificates issued by AAS are records of the actual test conducted on sample and the details submitted to us for testing and the results thereof. The results are applicable only to those sample/s, which have been tested and do not apply to other sample/s even though declared to be identical. Test report / certificate if reproduced, for any purpose commercial or otherwise, should be reproduced in full. AAS shall not be liable for any changes in reported factual data due to any cause related to sample tested after the report / certificate, in respect of it, has been issued. The results reported in the test report / certificates are valid only at the time of and under the stated conditions of the testing. Measurements are traceable to National/International Standard.