

OFFER 1: OPC 42.5 CEM I
Origin: Pakistan

Packaging: in 50 kg bags or in bulk

We hereby certify that the Ordinary Portland Cement conforms and surpasses the British Standard Specifications BS-12 /96, Pakistan Standard PS-232-1983(R) and American Standard ASTM C-150 Type I.

Chemical composition	Falcon brand (42.5 N)	BS 12-96	PS-232/1983 (R)
Calcium Oxide, % CaD	63.46	-	-
Silicon Oxide, % SiO ₂	21.78	-	-
Aluminium Oxide, % Al ₂ O ₃	5.04	-	-
Iron Oxide, % Fe ₂ O ₃	4.02	-	-
Magnesium Oxide, % MgO	1.46	-	4.00 max.
Sulphur Oxide, % SO ₃	2.13	3.50 max	2.50 - 3.50
Loss on Ignition % (LOI)	1.20	3.00 max	3 - 4 max
Insoluble Residue % (I.R)	0.21	1.50 max	1.50 max
Silica Modulus (S.M)	2.40	-	-
Alumina Modulus (A.M)	1.25	-	-
Lime Saturation Factor (LSF)	0.89	-	0.66-1.02
Total Alkalies as Na ₂ O	0.65-0.80	0.60 max.	-
Chloride %	0.01	0.01 max.	-

Physical test			
Fineness (Blaine cm ² /gm)	2645	-	2250 min.
Residue on 90 mic.	3.60	-	-
Setting Time:			
Initial (minutes)	135	60 min.	45 min.
Final (hours)	3.25	-	10 hrs. max.
Soundness Expn. (Le Chatlier mm)	1.00	10 max.	10 max.

Compressive strength:			
2- Days (PSI)	1839	1450 min.	-
3-Days (PSI)	3285	-	2000 min.
7-Days (PSI)	4438	-	3400 min.
*28-Days (PSI)	6357	6162 min.	5000 min.

* Average Results of 28-Days strength for the previous month.

OFFER 1 - TEST CERTIFICATE ORDINARY PORTLAND CEMENT B.S. 12 : 1996

Consultant	No Specific Consultant	Request No.	WQ09-08021
Project name	No Specific Project	Client's ref.	Req. dtd. 08.07.2009
Sample description Source	Ordinary Portland Cement (OPC) Attock Cement Pakistan Limited	Date Received	09.07.2009
Sampling date	Not Given	Date Reported	07.09.2009
Date tested	09.08.2009 – 06.09.2009	Tested by	AS/PM/PK

S. No.	Constituent	BS 12 : 96 Sp. Limits	Results
CHEMICAL COMPOSITION			
1	Loss on ignition %	LOI	Max. 3.0 2.77
2	Insoluble residue %	IR	Max. 1.5 0.30
3	Silicon Dioxide %	SiO ₂	- 21.69
4	Aluminum oxide %	Al ₂ O ₃	- 4.69
5	Iron oxide %	Fe ₂ O ₃	- 3.84
6	Calcium oxide %	CaO	- 63.00
7	Magnesium oxide %	MgO	Max. 5.0 1.44
8	Sulphuric anhydride %	SO ₃	Max. 3.5 1.23
9	Chloride %	Cl	Max. 0.10 0.01
10	Sodium oxide %	Na ₂ O	- 0.14
11	Potassium oxide %	K ₂ O	- 0.47
12	Tricalcium aluminate %	C ₃ A	- 5.93
13	Total alkalis as Na ₂ O %		Max. 0.60 0.45
PHYSICAL PROPERTIES			
1	Specific surface (Blaine)	m ² /kg	- 394
2	Standard Consistency %		- 25
3	Setting time (Vicat method)		
	Initial (Minutes)		Min. 60 140
	Final (Minutes)		205
4	Soundness by Lechatelier Method	mm	Max. 10 0.5
5	Compressive Strength		
	(a) 2 days	N/mm ²	Min. 10 18.1
	(b) 7 days		35.4
	(c) 28 days		42.5 - 62.5 50.8

Remarks: Test Method: BS EN 196

For and on behalf of Al Futtaim Bodycote Testing (L.L.C)

Sampled by the client, Certificate of sampling was not given.

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Samples will be retained for a period of one month only, unless otherwise requested.

The test results relate only to the samples tested.

V.K. Pillai
Chemical Laboratory Manager

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OFFER 2: OPC 42.5 CEM I
Origin: Pakistan

Packaging: in 50 kg bags or in bulk

Ordinary Portland Cement is being manufactured in accordance with B.S 12 : 1996 and PS-232-1983 (R) and also conforms to strength class 42.5 N.

Chemical composition	Limits as per PS-232-1983 (R)	Limits as per BS 12 : 1996 (42.5 N)	Results
LOI	3.00% max.	3.00% max.	1.00 - 2.00
LR	1.50% max.	1.50% max.	0.50 - 1.00
SiO ₂	-		20.50 - 22.00
Al ₂ O ₃	-		5.00 - 5.50
Fe ₂ O ₃	-		3.40 - 4.00
CaO	-		62.50 - 63.00
MgO	4.00% max.	3.50% max.	2.00 - 2.50
SO ₃	2.50% max. when C ₃ A ≤ 5		1.80 - 2.60
	3.00% when C ₃ A > 5		-
LSF	0.66 – 1.02	0.66 – 1.02	0.90 - 0.92
Na ₂ O	-		0.13-0.18
K ₂ O	-		0.65 - 0.80
Free Lime	-		1.50 - 2.00
Alkali Eq.	-		0.55 - 0.60
C ₃ S	-		49.00 - 54.00
C ₂ S	-		21.00 - 24.00
C ₃ A	-		6.00 – 8.00
CAF	-		10.00 - 12.00
Cl	-	≤ 0.10%	Traces

Physical tests:

Initial Setting Time (Min)	45 min.	45 min.	90 - 120
Final Setting (Min)	600 max.	600 max.	150 - 220
Blain cm ² /gm	2250 min.	2250 min.	2800 - 3200
Expansion (mm)	10 max.	10 max.	0.00 - 1.50 mm

Compressive strength of mortar cubes:

2 Days (PSI)	-	1450 min.	2000 - 2500
3 Days (PSI)	2200 min.	-	3500 - 4000
7 Days (PSI)	3400 min.		4500 - 4900
28 Days (PSI)	5000 min.	6100 min.	6300 - 7000

OFFER 2 - TEST CERTIFICATE ORDINARY PORTLAND CEMENT B.S. 12 : 1996

REPORT ON ANALYSIS OF CEMENT BY X-RAY FLUORESCENCE SPECTROMETRY			
SECTION	: ENGINEERING MATERIALS LAB.		
UNIT	: CHEMICAL ANALYSIS UNIT		
REPORT NO.	: 2008104143	DATE	: 19/06/2008

WEB REQUEST NO. : -
REQUEST NO. : 2008070457 **SAMPLE NO.** : 2008106050
PROJECT NO. : PS-860
PROJECT NAME : TESTING SERVICE FOR DESERT & SEA HORIZON TRAD.FZE.
CONSULTANT : NO SPECIFIC CONSULTANT
CONTRACTOR : NO SPECIFIC CONTRACTOR
LOCATION : NG
SAMPLE DESC. : ORDINARY PORTLAND CEMENT (OPC)

Date of Sampling	: 28/05/2008	Time	: -	Lot No.	: NG
Date of Recv Sample	: 03/06/2008	Time	: 13:00	Lot Size	: NG
Size of Sample	: 50 kg	Sender No.			: NG

COMPONENT	AVERAGE CONTENT(%)
SiO ₂	21.7
Al ₂ O ₃	4.97
Fe ₂ O ₃	3.33
CaO	61.8
MgO	2.80
SO ₃	2.64
TiO ₂	0.32
P ₂ O ₅	0.06

COMPONENT	AVERAGE CONTENT(%)
RESIDUE INSOLUBLE IN HCL AND SODIUM CARBONATE	0.41
LOSS ON IGNITION	2.42
TRICALCIUM ALUMINATE (C3A)	7.5
TOTAL ALKALI CONTENT	0.7

SAMPLED BY : A RASHEED **TESTED BY** : NAZIR AHMED
SAMPLES BROUGHT IN BY : A RASHEED **DATE OF TEST** : 15/06/2008
SAMPLING METHOD : NOT GIVEN
SAMPLING REPORT NO. : NG
TEST METHOD : BS EN 196 - 2 : 2005
TEST METHOD VARIATION : NIL
REMARKS : 1) C3A% = (2.65 * %Al₂O₃) - (1.692 * %Fe₂O₃)
 2) TOTAL ALKALI % = %Na₂O + (0.658 * %K₂O)
 THIS REPORT IS REPRESENTED TO THE SAMPLE SUBMITTED ONLY.

VERIFIED BY : FRM-EM-3029-3 REV.3
HEAD OF UNIT : ISSUE DATE : 01/05/2008

This report is computer approved, it does not require any signature

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