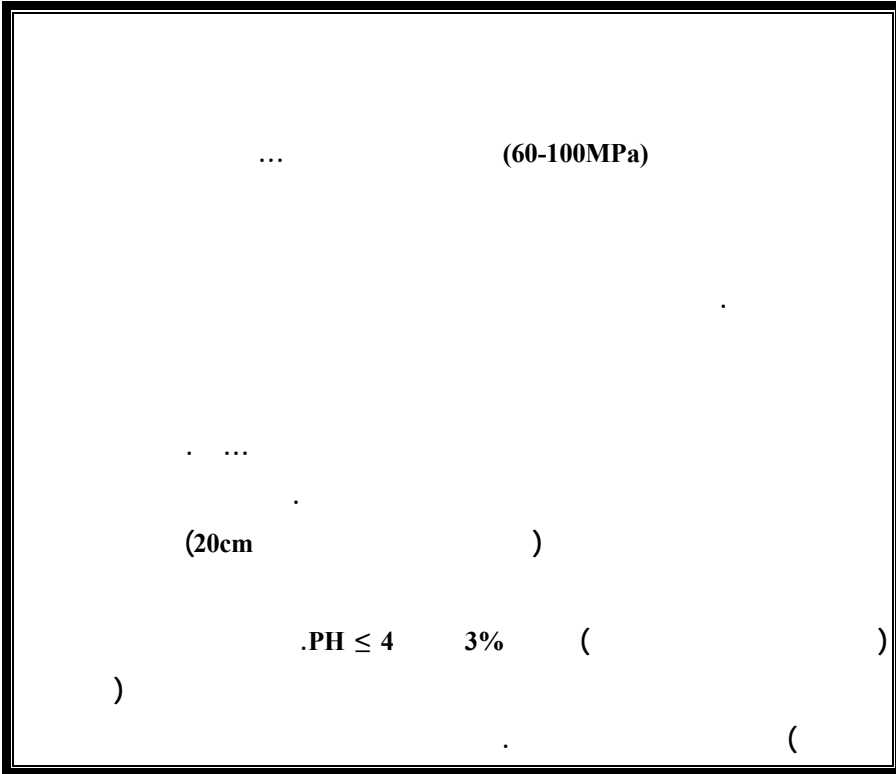


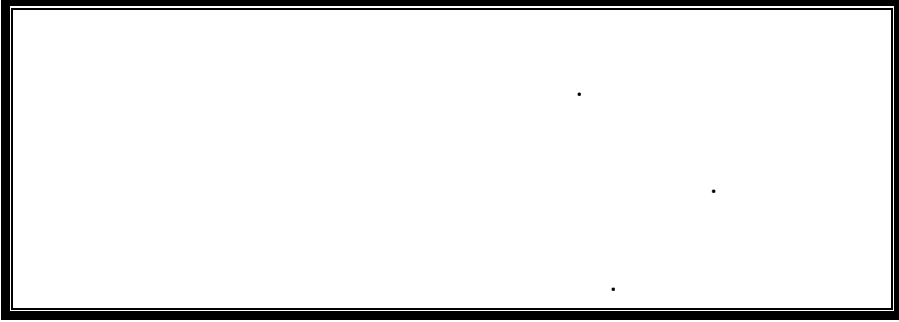
2

1



1

2



: -1

:

. [7, 3] $\text{PH} \leq 4$ 3%

: -2

.() : ()

.
:
.
.W/C •
•
•
•

(100MPa)
(25MPa)
.[6 4]

(20MPa)

(60MPa)

.[6 4]

. [7, 3, 2]

:

. [7, 2]

:

...

: [7 6]

•



•

•

•

(20MPa)

)

(
(20MPa)

[7,2]

()

(20MPa)

[9,7]

60-

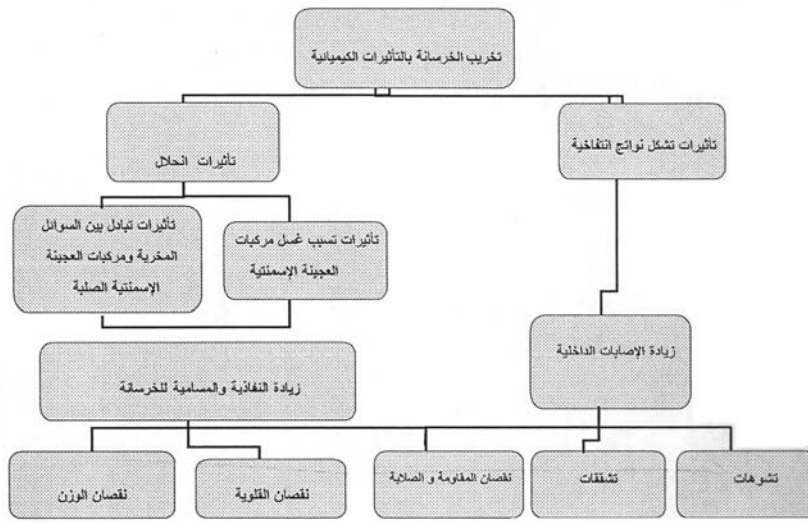
(100MPa)

(W/C)

[2، 7].

(1)

[6].



(1)

:

-3

:

-1-3

:

./ (1) /

•

•

./ (2) /

/

•

./

(2) (1)

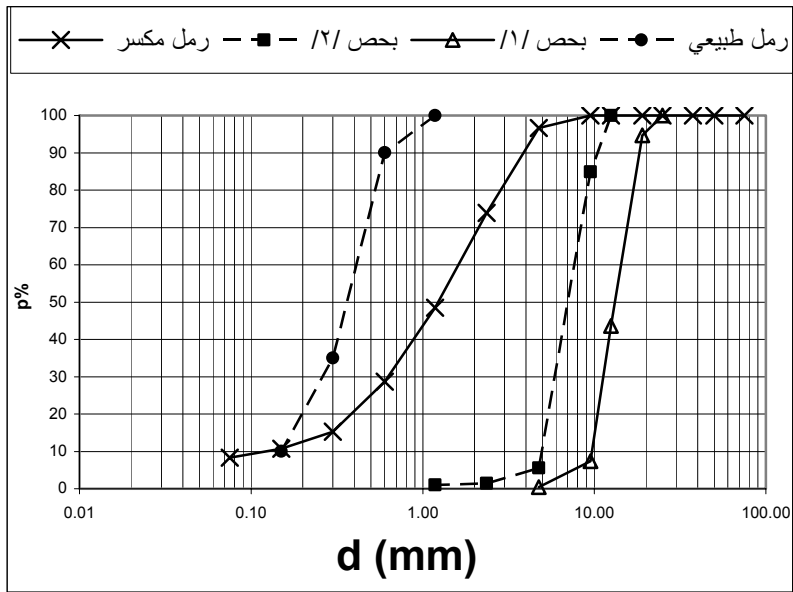
:(1)

%	%	No.200 %	kg/m ³		%	%	mm	
18.7	-	0.5	1.445	2.825	1.3	1.46	5 - 25	(1)
18.7	-	1.2	1.46	2.825	1.3	1.33	0 - 12.5	(2)
-	76	8.7	1.475	2.795	1.57	2.06	0 - 10	
-	-	2.7	1.505	2.685	1.6	-	0 - 1	

:(2)

الفاقد بالحرق	K ₂ O	Na ₂ O	cl	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MgO	CaO	
46.68	0.03	0.35	0.3	0.7	0.13	0.2	19.56	31.68	
46.44	0.02	0.34	0.11	0.43	0.25	0.2	19.75	32.25	(2)
46.43	0.03	0.37	0.10	0.83	0.25	0.2	19.15	32.25	(1)
0.33	0.05	0.036	-	97.77	0.13	0.4	0.1	0.56	

(2)



(2):

(1) (2) (2) :

ASTMC33-90

No200

ASTM C33

) 76

40%

60%

.(

. ASTM C33

: -2-3

.(32.5 N/mm²)

: -3-3

: -4-3

F (Super Plasticizer)

1.2 g/cm³

(ASTMC494)

38.5%

: -5-3

.1 - 7.3

: -6-3

98%

	:	-4
ASTM	:	:1-4
	-	
:		
$G = 0.5$		-1
$Gc = 3.1$		-2
$(350 - 500 \text{ kg/m}^3)$		-3
	36 N/mm^2	-4
	20 cm	-5
20 MPa	28	-6
	$C 20$	
:	$W/C = 0.6$	-7
[4]	$\sigma_{28} = G\sigma_c (C/W-0.5)$	
	2.65	-8
[5]	ASTM C33	
	:	: 2-3
	ASTMC33	(2)
(3)		
$.350\text{kg/m}^3$		

(3)

(kg/m^3)		
565.5	30 %	(1)
565.5	30%	(2)
447.5	24%	
286.5	16%	

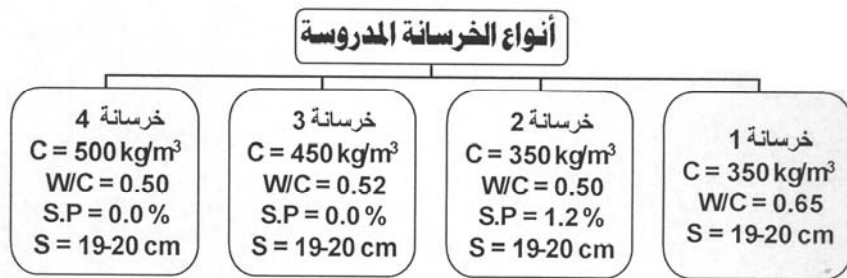
.ASTM C192

:

-5

:

(3)



(3)

(10x10x10cm)

90

/24/

/6/ (7 , 28 , 60 , 90)

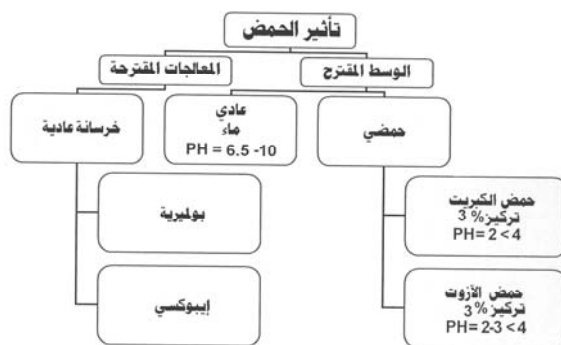
(90)

:

(4)

(50)

(50)



(4)

-5

:1-5

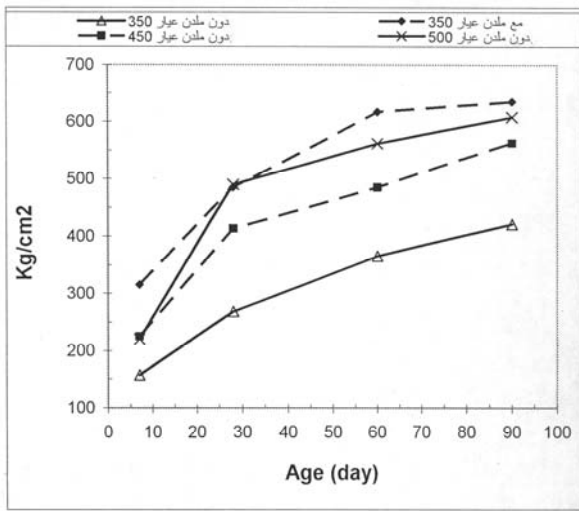
(5)

1.2%

23% (W/C)

90%

28



(5)

150 kg

.43%

: -2-6

: (ASTM C267-82)

•

•

•

: :1-2-6

:

•

•

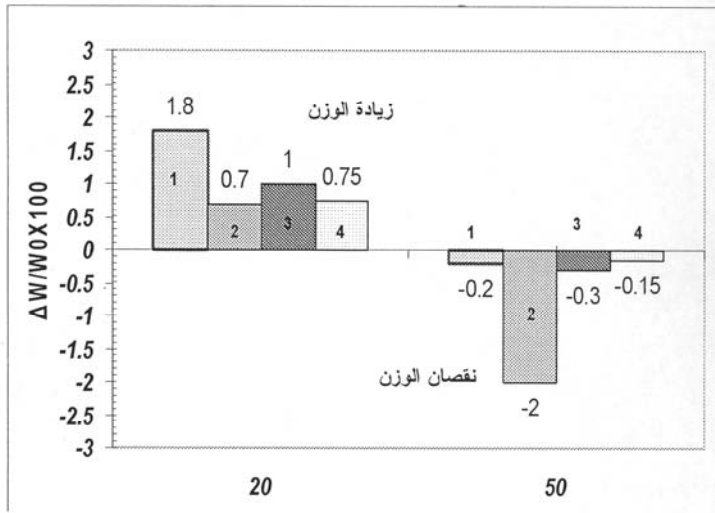
•

: :2-2-6

(7, 6)

50 20

. 140 110



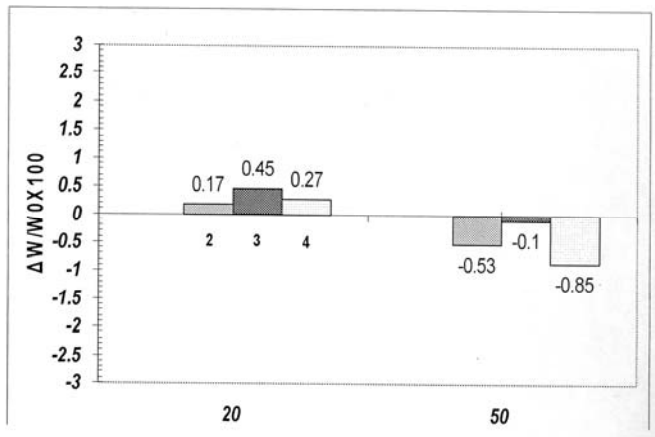
(6)

(4)

50 20

(4)

(g)			(g)			
50	20		50	20		
2786.2	2785.9	2725.0	2846.2	2847.7	2770.0	
2554.6	2554.7	2546.0	2545.5	2545.6	2528.0	



(7)

:

(4)

(7)

(6)

20

50

[7*6]

:3-2-6

:

90

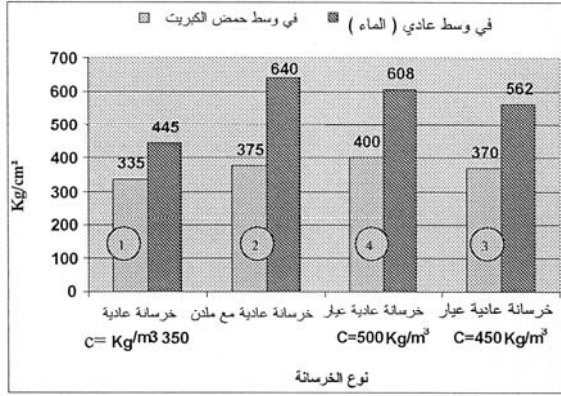
PH≤4

50

(9) (8)

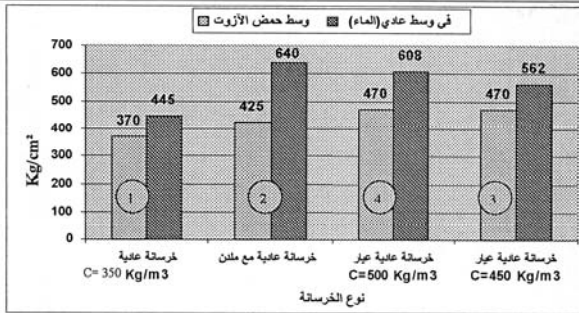
140

PH ≤ 2 - الحفظ في حمض الكبريت - Age = 140 days - Slump= 20 cm



(8)

PH ≤ 2 - الحفظ في حمض الأزوت - Age = 140 days - Slump= 20 cm



(9)

)

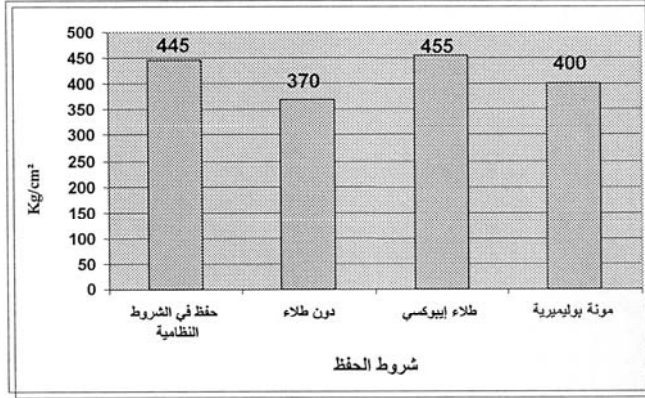
(11, 10)

140

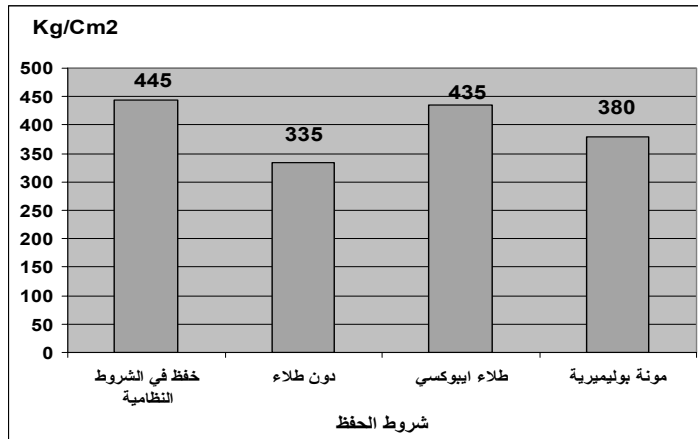
(

/6/

لخرسانة عادية - $C = 350 \text{ kg/m}^3$ - دون إضافات - Age = 140 days - الحفظ بحمض الآزوت - $\text{PH} \leq 2$



() - (10)



() - (11)

: (11 , 10 , 9 , 8)

4 , 3 , 2 , 1 •

34.2% , 34.2% , 41.4% , 24.7%

.()

4 , 3 , 2 , 1 •

22.6% , 16.4% , 33.6% , 16.8%

.10%

12%

: -7

(1

(2

(50d)



(3

34.2% 16.8%

(4

: **-8**

(W/C ≥ 0.50)

. [7 ,6 ,4]

0.40

:

-1
1992
-2

. 2005

:

- 3- A.M. Neville-properties of concrete- Longman. 1999.
- 4- G. Dreux. Guide pratique du Beton, S.D.T.B.T.P France 1985.
- 5- ASTM C267-82, ASTM Standards in Building Codes U.S.A 1994 .
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- 7- ACI Manual of concrete practice, ACI Standard 201, 2R-92 (1993), Guide to durable concrete.
- 8-V.M. Malhotra, Matériaux Complémentaires en Cimentation, CANMET, CANADA 1987.
- 9- J. HICKS and al, Determination of Acceptance permeability characteristics for performance-related specifications for Portland cement concrete, final report, Florida Department of Transportation, July 2003 .



:(1)



:(2)



(3)



() : (4)



() (5):



الصورة (6) : عينة مغلفة بالإيبوكسي في مرحلة الكسر (حمض الكبريت).



() : (7)



: (8)

.2006/11/29