

(Sternson 300)

*

2004/10/30

2005/7/8

:

(5±50)

(Stearate Type)
(4:2:1)

[1] (ASTM-C494-98 Type A)
(90,60,28,7)

A

150

96

150 24
16 (Capillary Action)

(200x100x100)

Influence of Locally Produced Waterproofing Admixture (Sternson 300) on Concrete Absorption and Strength

Abstract:

In this work, the influence of waterproofing admixture of stearate type on the water reduction of concrete mix (1:2:4) for a given workability, (50±5)mm slump was investigated. Results indicated that this admixture has a little influence on the water reduction of concrete. Therefore this admixture cannot be considered as a water reducer since it does not conform with the requirements of type (A) admixture in accordance with (ASTM-C494-98 Type A)^[1].

/ *

The same influence on the compressive strength of concrete (f_{cu}) at various ages (7,28,60 and 90) days was studied. Results showed that the use of this admixture at recommended dose specified by the manufacturer has no significant effect on the compressive strength of concrete. On the other hand, overdoses of this admixture lead to a considerable reduction in the compressive strength.

The efficiency of this admixture at different doses in reducing the total water absorption of concrete and the absorption of water by the capillary action was also examined. Results revealed that this admixture is not effective in reducing the water absorption with all doses used in this work and at different ages compared with reference mix without admixture.

-1 :

$C_{17}H_{35}COOH$ (Stearic Acid)

(Oleic Acid)

$C_{17}H_{33}COOH$

(Butyl

Stearate)

-2

(Wax Emulsions)

[2]

-3

(Hydrophobic Materials)

(Waterproofing Admixtures)

(Water

Repellent)

[3]

-0.05)

(0.1

:

·

:

(Waterproofing Admixture)

(Sternson 300)

·

(1.0)

(10)

[4]

:

[5]

(Ordinary Portland Cement Type I)

[6] (ASTM-C150-97a)

·

(2) (1)

[6] (ASTM-C150-97a)

(5)

[7] 1984

()

[8] (ASTM-C33)

(2.84)

[9] 1984 (45)

()

(Sternson 300)

(2.5)	(19)
.	[8] (ASTM-C33)
.	:
/	(4:2:1)
(Slump Test)	20 15 12 10 8 5 0)
(ASTM-	/ (30
[11] C143/C143M-97)	(5 ± 50)
. (5 ± 50)	-:
	-1
(150)	)
(200x100x100)	.(
	-2
	.
	-3
(50)	.
	-4
	.
(24)	
ASTM C192/C192M-)	[10](95
:	.
(Slump Test)	(ASTM-C192/C192M-95)
(4:2:1)	[10]
. (5 ± 50)	

(1) (3)

/ 10)

(

.

(% 2)

(1-0.01)

(

(% 4.2)

/ 20)

/ 10)

.[4]

(

.

(4)

Cement)

(Gel

^[1] (ASTM-C494-98)

(B.S. 5075:

^[12] Part 1:1982)

.

(%5)

^[13] (B.S. 1881: Part 5: 1970)

.

(2+72) °(5+105)

(0.5+24)

(Compression Testing Machine)

(2000) (Avery)

(5)

.

(4)

.

(2)

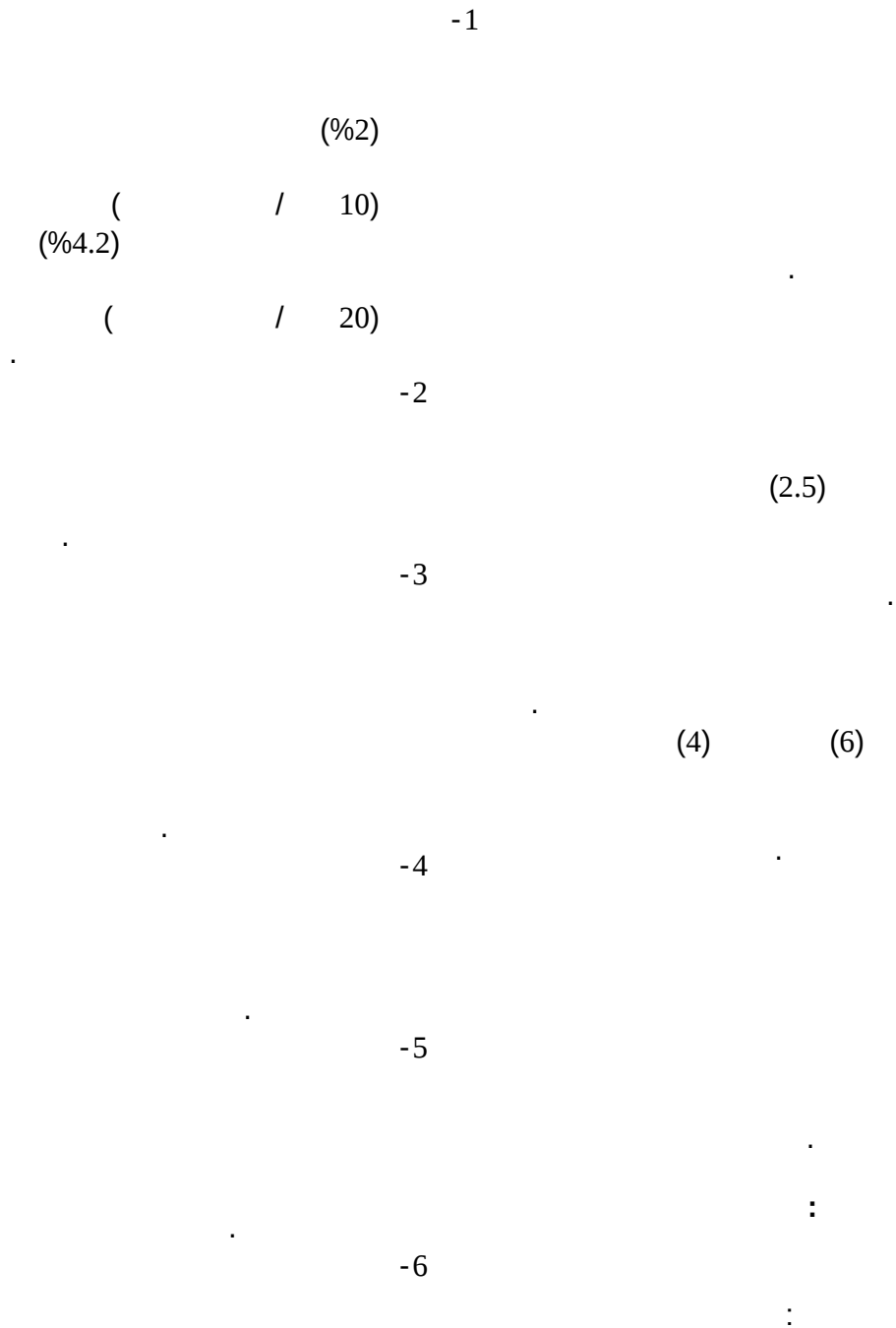
(3)

(90 60 28 7)

24 7 3 1 0.5)

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(3 2



" (5) -7

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" (45) -9

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- 10- ASTM Designation C192/C192M-95, "Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory", 1996 Annual Book of ASTM Standards, American Society for Testing and Materials, Philadelphia, Pennsylvania, Section 4, Vol.04.02, 8 pp.
- 11- ASTM Designation C143/C143M-97, "Standard Test Method for Slump of Hydraulic-Cement Concrete", 1998 Annual Book of ASTM Standards, American Society for Testing and Materials, Philadelphia, Pennsylvania, Section 4, Vol.04.02, 3 pp.

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- 1- ASTM Designation C494-98, "Standard Specification for Chemical Admixtures for Concrete", 1998 Annual Book of ASTM Standards, American Society for Testing and Materials, Philadelphia, Pennsylvania, Section 4, Vol.04.02, 8 pp.

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- 3- Neville, A.M., "Properties of Concrete", Fourth and Final Edition, Prentice Hall, 1995, 844 pp.
- 4- Rixom, M.R., and Mailvaganam, N.P., "Chemical Admixtures for Concrete", Second Edition, E. & F.N. Spon Ltd., London, 1986, 306 pp.
- 5- ACI Committee 212, "Chemical Admixtures for Concrete", ACI Materials Journal, Vol.86, No.3, May-June 1989, pp 297-327.
- 6- ASTM Designation C150-97a, "Standard Specification for Portland Cement", 1998 Annual Book of ASTM Standards, American Society for Testing and Materials, Philadelphia, Pennsylvania, Section 4, Vol.04.01, 5 pp.

- 13- B.S. 1881: Part 5: 1970, “Methods of Testing Concrete for Other Than Strength: Test for Water Absorption”, British Standards Institution, London, 3 pp.

- 12- B.S. 5075: Part 1: 1982, “Specification for Concrete Admixtures: Accelerating Admixtures, Retarding Admixtures and Water Reducing Admixtures”, British Standards Institution, London, 3 pp.

-(1)

(5)	ASTM-C150-97a	(%)		
		23.05	(SiO ₂)	1
		61.20	(CaO)	2
5.0*	6.0*	2.55	(MgO)	3
		3.40	(Fe ₂ O ₃)	4
		4.60	(Al ₂ O ₃)	5
2.8*	3.0*	1.77	(SO ₃)	6
4.0*	3.0*	2.06		7
1.5*	0.75*	0.03		8
0.66-1.02		0.83	(L.S.P.)	9
		0.23	(Na ₂ O)	10
		0.61	(K ₂ O)	11
		41.16	(C ₂ S)	12
		33.15	(C ₃ S)	13
5.0**		6.44	(C ₃ A)	14
		10.35	(C ₄ AF)	15

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*

-(2)

(5)	ASTM-C150-97a			
		3280	/ ² (Blaine)	1
10*		2	()	2
(26-33)%		27%		3
			:	4

45 ^{**}	45 ^{**}	60	() -	
600 [*]	375 [*]	270	() -	
15 ^{**}	12 ^{**}	15.65	(/) ² :	5
23 ^{**}	19 ^{**}	23.67	-	
			-	

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-(3)**. (5 ± 50)**

(%)	()	W/C (5±50)	(/) ()
-	50	0.48	0
2.0	48	0.47	5
2.0	54	0.47	8
2.0	52	0.47	10
2.0	52	0.47	12
3.1	54	0.465	15
4.2	50	0.46	20
2.0	51	0.47	30

-(4)**. (5 ± 50)**

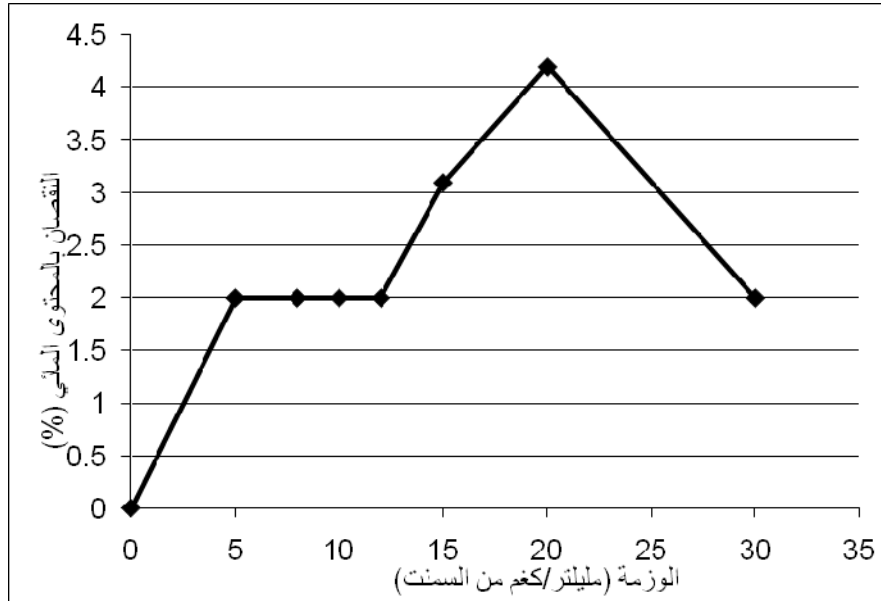
(² /) (f _{cu})				W/C (5±50)	(/) ()
90	60	28	7		
43.0	40.5	38.2	20.7	0.48	0
39.6	38.3	34.5	21.0	0.47	5
40.4	36.4	32.7	21.6	0.47	8
48.2	46.7	36.3	22.6	0.47	10
34.2	26.5	22.1	12.9	0.47	12
32.2	26.4	23.4	13.6	0.465	15
42.2	38.1	28.8	15.8	0.46	20
40.0	27.3	22.1	13.9	0.47	30
(96)					

-(5)**. (5 ± 50)**

: (%)							W/C	(/)
3	2	24	7	3	1	0.5	(5+50)	(
2.96	2.89	2.78	2.56	2.46	2.09	1.73	0.48	0
3.34	3.26	3.19	2.87	2.56	2.09	1.59	0.47	5
3.48	3.35	3.29	2.93	2.79	2.52	1.80	0.47	8
3.15	3.04	3.00	2.59	2.44	1.82	1.33	0.47	10
2.56	2.52	2.41	2.13	2.06	1.67	1.30	0.47	12
3.28	3.13	3.07	2.71	2.44	1.83	1.41	0.465	15
2.75	2.64	2.60	2.28	2.15	1.71	1.27	0.46	20
3.54	3.44	3.30	2.77	2.47	1.80	1.36	0.47	30
(24)								

-(6)**. (5 ± 50)**

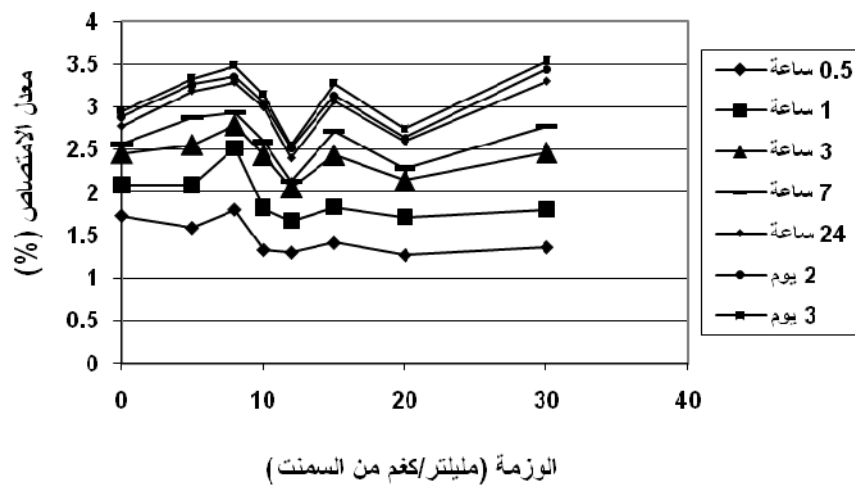
()	W/C (5+50)	(/)
5.59	0.48	0
5.31	0.47	5
5.00	0.47	8
5.00	0.47	10
4.46	0.47	12
5.31	0.465	15
5.50	0.46	20
5.71	0.47	30
(16)		



شكل (1)- تأثير محتوى المضاف المانع لنفاذ الماء على مقدار النقصان بالمحتوى المائي لخلطات ذات قابلية تشغيل ثابتة هطولها (5 ± 50) مم.



شكل (2)- تأثير محتوى المضاف المانع لنفاذ الماء على مقاومة الانضغاط لخلطات ذات قابلية تشغيل ثابتة هطولها (5 ± 50) مم.



شكل (3)- تأثير محتوى المضاف المانع لنفاذ الماء على الامتصاص الكلي لخلطات ذات قابلية تشغيل ثابتة هطولها (5 ± 50) مم.



شكل (4)- تأثير محتوى المضاف المانع لنفاذ الماء على الامتصاص بالخاصية الشعرية لخلطات ذات قابلية تشغيل ثابتة هطولها (5 ± 50) مم.