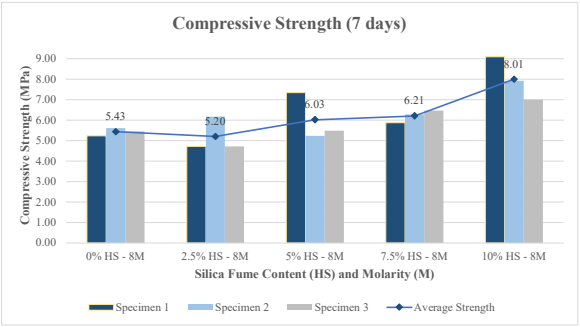
Compressive Strength*															
Code	N° Specimens	Test age (days)	Weight (g)	Width (mm)	Length (mm)	Height (mm)	Area (mm^2)	Load (kN) compression	Compressive Strength (MPa)	Average Compressive Strength (MPa)					
8M	1	7	272.70	40.88	157.91	39.73	6455.36	8.50	5.23	5.43	8M	5.233466801	5.614888265	5.451968161	5.43
	2	7	272.70	40.68	157.47	39.84	6405.88	9.10	5.61						
	3	7	274.30	40.76	158.53	39.15	6461.68	8.70	5.45						
12M	1	7	271.80	40.55	157.57	39.14	6389.46	7.90	4.98	5.62	12M	4.97754748	5.721940035	6.153051377	5.62
	2	7	272.60	39.81	156.80	39.51	6242.21	9.00	5.72						
	3	7	272.80	40.23	157.55	39.59	6338.24	9.80	6.15						
2.5% HS - 8M	1	7	268.50	43.72	157.53	39.77	6886.42	8.20	4.72	5.20	2.5% HS - 8M	4.716586229	6.164840657	4.720820608	5.20
	2	7	272.80	40.90	158.09	40.85	6465.88	10.30	6.16						
	3	7	267.50	39.77	158.09	40.48	6287.24	7.60	4.72						
2.5% HS - 12M	1	7	281.50	41.43	157.77	41.41	6536.41	9.60	5.60	5.78	2.5% HS - 12M	5.595656791	5.766019263	5.983194404	5.78
	2	7	274.70	39.66	156.29	41.98	6198.46	9.60	5.77						
	3	7	280.00	40.40	157.22	41.37	6351.69	10.00	5.98						
5% HS - 8M	1	7	273.50	39.65	157.56	40.48	6247.25	11.80	7.35	6.03	5% HS - 8M	7.351878343	5.236533607	5.487858709	6.03
	2	7	273.10	40.02	157.61	40.56	6307.55	8.50	5.24						
	3	7	278.70	41.20	155.59	40.69	6410.31	9.20	5.49						
5% HS - 12M	1	7	268.60	41.44	156.77	40.64	6496.55	12.10	7.18	6.45	5% HS - 12M	7.184754355	7.610654844	4.55838352	6.45
	2	7	277.90	41.01	157.11	40.37	6443.08	12.60	7.61						
	3	7	286.30	43.11	155.30	40.71	6694.98	8.00	4.56						
7.5% HS - 8M	1	7	274.90	42.00	158.72	41.33	6666.24	10.20	5.88	6.21	7.5% HS - 8M	5.876049912	6.286067065	6.469830123	6.21
	2	7	280.20	40.73	159.58	40.62	6499.69	10.40	6.29						
	3	7	280.10	41.59	157.10	40.88	6533.79	11.00	6.47						
7.5% HS - 12M	1	7	278.70	42.91	160.18	38.91	6873.32	12.20	7.31	6.48	7.5% HS - 12M	7.307016455	7.020516855	5.123082046	6.48
	2	7	268.60	41.00	155.85	40.30	6389.85	11.60	7.02						
	3	7	268.30	39.00	157.93	40.04	6159.27	8.00	5.12						
10% HS - 8M	1	7	250.20	36.96	155.65	39.25	5752.82	13.20	9.10	8.01	10% HS - 8M	9.099181074	7.921615066	6.99486075	8.01
	2	7	257.50	40.09	156.68	40.62	6281.30	12.90	7.92						
	3	7	283.10	42.09	157.07	39.74	6611.08	11.70	6.99						
10% HS - 12M	1	7	287.90	41.48	155.44	40.29	6447.65	12.30	7.36	8.00	10% HS - 12M	7.359852257	8.086007183	8.554425516	8.00
	2	7	280.90	41.13	153.74	39.69	6323.33	13.20	8.09						
	3	7	278.10	40.62	154.75	40.29	6285.95	14.00	8.55						

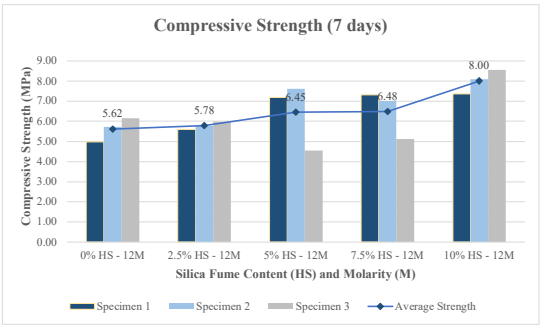
* Compressive Strength according to INEN 198

	SPECIMEN			F´C
0% HS - 8M	5.23	5.61	5.45	5.43
12M	4.98	5.72	6.15	5.62
2.5% HS - 8M	4.72	6.16	4.72	5.20
2.5% HS - 12M	5.60	5.77	5.98	5.78
5% HS - 8M	7.35	5.24	5.49	6.03
5% HS - 12M	7.18	7.61	4.56	6.45
7.5% HS - 8M	5.88	6.29	6.47	6.21
7.5% HS - 12M	7.31	7.02	5.12	6.48
10% HS - 8M	9.10	7.92	6.99	8.01
10% HS - 12M	7.36	8.09	8.55	8.00

CODE	S1	S2	S3	f'c 7 days
0% HS - 8M	5.23	5.61	5.45	5.43
2.5% HS - 8M	4.72	6.16	4.72	5.20
5% HS - 8M	7.35	5.24	5.49	6.03
7.5% HS - 8M	5.88	6.29	6.47	6.21
10% HS - 8M	9.10	7.92	6.99	8.01

CODE	S1	S2	S3	f'c 7 days
0% HS - 12M	4.98	5.72	6.15	5.62
2.5% HS - 12M	5.60	5.77	5.98	5.78
5% HS - 12M	7.18	7.61	4.56	6.45
7.5% HS - 12M	7.31	7.02	5.12	6.48
10% HS - 12M	7.36	8.09	8.55	8.00





Compressive Strength*										
Code	N° Specimens	Test age (days)	Weight (g)	Width (mm)	Length (mm)	Height (mm)	Area (mm^2)	Load (kN) compression	Compressive Strength (MPa)	Average Compressive Strength (MPa)
8M	1	28.00	132.60	48.56	50.64	50.92	2459.08	14.1	5.73	5.64
	2	28.00	136.30	50.69	51.42	48.42	2606.48	15	5.75	
	3	28.00	140.04	50.38	50.67	50.84	2552.75	13.9	5.45	
12M	1	28.00	146.00	53.03	50.63	50.15	2684.91	21.1	7.86	7.39
	2	28.00	138.09	50.56	50.32	49.90	2544.18	20	7.86	
	3	28.00	135.90	50.18	50.04	49.37	2511.01	16.2	6.45	
2.5% HS - 8M	1	28.00	140.80	50.56	50.82	51.35	2569.46	18.7	7.28	7.41
	2	28.00	140.60	50.24	51.72	51.12	2598.41	18.9	7.27	
	3	28.00	137.90	49.85	50.70	51.27	2527.40	19.4	7.68	
2.5% HS - 12M	1	28.00	155.30	52.16	50.61	52.47	2639.82	22.4	8.49	8.45
	2	28.00	139.30	48.90	50.15	51.67	2452.34	21.4	8.73	
	3	28.00	145.40	50.37	50.52	52.25	2544.69	20.7	8.13	
5% HS - 8M	1	28.00	143.40	52.22	51.02	50.84	2664.26	30.9	11.60	10.08
	2	28.00	143.00	51.05	51.33	50.63	2620.40	23.5	8.97	
	3	28.00	139.60	50.48	50.13	50.43	2530.56	24.5	9.68	
5% HS - 12M	1	28.00	144.50	49.98	50.77	50.72	2537.48	24.3	9.58	10.86
	2	28.00	147.90	51.05	50.47	52.27	2576.49	29.9	11.60	
	3	28.00	140.80	51.51	49.91	50.34	2570.86	29.3	11.40	
7.5% HS - 8M	1	28.00	144.80	50.93	50.72	50.75	2583.17	32.8	12.70	10.99
	2	28.00	141.50	50.05	50.78	51.55	2541.54	27	10.62	
	3	28.00	141.60	50.54	50.42	51.24	2548.23	24.6	9.65	
7.5% HS - 12M	1	28.00	144.10	50.88	51.30	50.77	2610.14	31.7	12.14	11.85
	2	28.00	141.70	51.04	50.25	50.82	2564.76	30.6	11.93	
	3	28.00	148.50	51.42	50.91	51.04	2617.79	30	11.46	
10% HS - 8M	1	28.00	144.50	50.92	50.68	51.06	2580.63	32	12.40	12.91
	2	28.00	143.00	49.71	51.31	50.38	2550.62	35.8	14.04	
	3	28.00	143.70	50.35	50.08	50.88	2521.53	31	12.29	
10% HS - 12M	1	28.00	147.50	50.31	51.06	50.31	2568.83	37.8	14.71	14.10
	2	28.00	143.10	49.95	50.07	50.70	2501.00	35.6	14.23	
	3	28.00	149.10	51.69	50.69	50.69	2620.17	35	13.36	

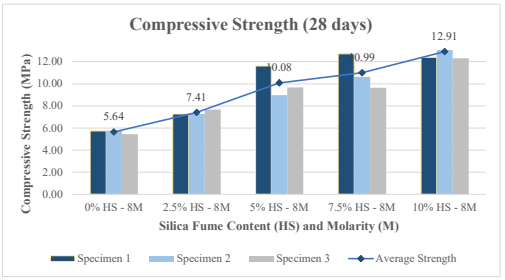
8M	5.733855415	5.75488826	5.445098405	5.64
12M	7.858739639	7.861081484	6.451594404	7.39
2.5% HS - 8M	7.277796044	7.273671066	7.675887623	7.41
2.5% HS - 12M	8.485434751	8.726377106	8.134578466	8.45
5% HS - 8M	11.59794801	8.968108452	9.68164231	10.08
5% HS - 12M	9.576412799	11.60491963	11.39694626	10.86
7.5% HS - 8M	12.69757897	10.62348443	9.653771791	10.99
7.5% HS - 12M	12.1449238	11.93094091	11.46003873	11.85
10% HS - 8M	12.40009399	14.03580251	12.29413276	12.91
10% HS - 12M	14.71487821	14.2343262	13.35793177	14.10

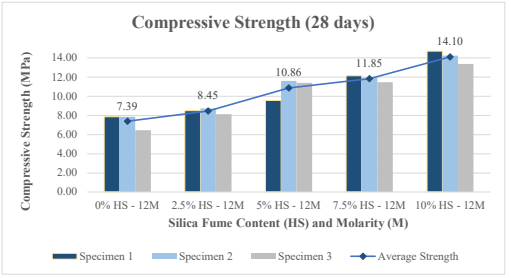
* Compressive Strength according to INEN 488

8M	5.73	5.75	5.45	5.64
12M	7.86	7.86	6.45	7.39
2.5% HS - 8M	7.28	7.27	7.68	7.41
2.5% HS - 12M	8.49	8.73	8.13	8.45
5% HS - 8M	11.60	8.97	9.68	10.08
5% HS - 12M	9.58	11.60	11.40	10.86
7.5% HS - 8M	12.70	10.62	9.65	10.99
7.5% HS - 12M	12.14	11.93	11.46	11.85
10% HS - 8M	12.40	14.04	12.29	12.91
10% HS - 12M	14.71	14.23	13.36	14.10

CODE	S1	S2	S3	f'c 28 days
0% HS - 8M	5.73	5.75	5.45	5.64
2.5% HS - 8M	7.28	7.27	7.68	7.41
5% HS - 8M	11.60	8.97	9.68	10.08
7.5% HS - 8M	12.70	10.62	9.65	10.99
10% HS - 8M	12.40	14.04	12.29	12.91

CODE	S1	S2	S3	f'c 28 days
0% HS - 12M	7.86	7.86	6.45	7.39
2.5% HS - 12M	8.49	8.73	8.13	8.45
5% HS - 12M	9.58	11.60	11.40	10.86
7.5% HS - 12M	12.14	11.93	11.46	11.85
10% HS - 12M	14.71	14.23	13.36	14.10





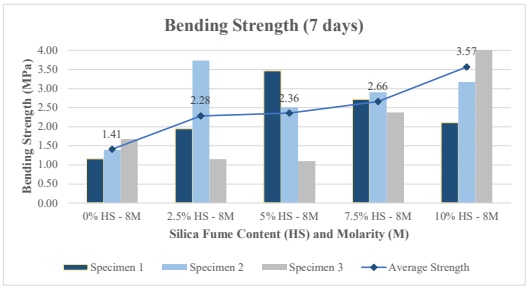
Bending Strength										
Code	N° Specimens	Test age (days)	Weight (g)	Width (mm)	Length (mm)	Height (mm)	Area (mm^2)	Load (kN) to bending	Bending Strength (MPa)	Average Bending Strength (MPa)
8M	1	7	272.70	40.88	157.91	39.73	6455.36	0.5	1.16	1.41
	2	7	272.70	40.68	157.47	39.84	6405.88	0.6	1.39	
	3	7	274.30	40.76	158.53	39.15	6461.68	0.7	1.68	
12M	1	7	271.80	40.55	157.57	39.14	6389.46	1.3	3.14	2.41
	2	7	272.60	39.81	156.80	39.51	6242.21	1	2.41	
	3	7	272.80	40.23	157.55	39.59	6338.24	0.7	1.67	
2.5% HS - 8M	1	7	268.50	43.72	157.53	39.77	6886.42	0.9	1.95	2.28
	2	7	272.80	40.90	158.09	40.85	6465.88	1.7	3.74	
	3	7	267.50	39.77	158.09	40.48	6287.24	0.5	1.15	
2.5% HS - 12M	1	7	281.50	41.43	157.77	41.41	6536.41	1.3	2.74	2.64
	2	7	274.70	39.66	156.29	41.98	6198.46	1.1	2.36	
	3	7	280.00	40.40	157.22	41.37	6351.69	1.3	2.82	
5% HS - 8M	1	7	273.50	39.65	157.56	40.48	6247.25	1.5	3.46	2.36
	2	7	273.10	40.02	157.61	40.56	6307.55	1.1	2.51	
	3	7	278.70	41.20	155.59	40.69	6410.31	0.5	1.10	
5% HS - 12M	1	7	268.60	41.44	156.77	40.64	6496.55	1.2	2.63	2.74
	2	7	277.90	41.01	157.11	40.37	6443.08	1	2.24	
	3	7	286.30	43.11	155.30	40.71	6694.98	1.6	3.36	
7.5% HS - 8M	1	7	274.90	42.00	158.72	41.33	6666.24	1.3	2.72	2.66
	2	7	280.20	40.73	159.58	40.62	6499.69	1.3	2.90	
	3	7	280.10	41.59	157.10	40.88	6533.79	1.1	2.37	
7.5% HS - 12M	1	7	278.70	42.91	160.18	38.91	6873.32	1.2	2.77	3.00
	2	7	268.60	41.00	155.85	40.30	6389.85	1.6	3.60	
	3	7	268.30	39.00	157.93	40.04	6159.27	1.1	2.64	
10% HS - 8M	1	7	250.20	36.96	155.65	39.25	5752.82	0.8	2.11	3.57
	2	7	257.50	40.09	156.68	40.62	6281.30	1.4	3.17	
	3	7	283.10	42.09	157.07	39.74	6611.08	2.4	5.42	
10% HS - 12M	1	7	287.90	41.48	155.44	40.29	6447.65	2.2	4.90	3.84
	2	7	280.90	41.13	153.74	39.69	6323.33	0.6	1.39	
	3	7	278.10	40.62	154.75	40.29	6285.95	2.3	5.23	

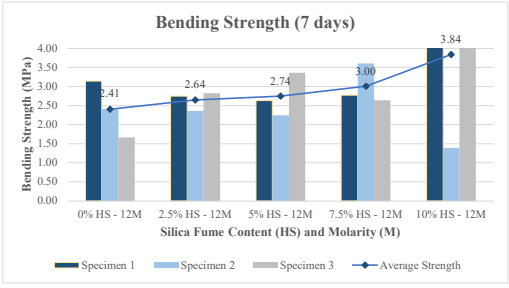
8M	1.162286641	1.393872037	1.680705383	1.41	
12M	3.139078021	2.413709624	1.665207135	2.41	
2.5% HS - 8M	1.952504771	3.736222665	1.150865748	2.28	
2.5% HS - 12M	2.744790596	2.360730254	2.820214911	2.64	
5% HS - 8M	3.463046466	2.506172541	1.099483377	2.36	
5% HS - 12M	2.629937089	2.244315924	3.359162505	2.74	
7.5% HS - 8M	2.718031655	2.901618845	2.373959194	2.66	
7.5% HS - 12M	2.770712914	3.604269798	2.63895023	3.00	
10% HS - 8M	2.10751154	3.174705178	5.41586524	3.57	
10% HS - 12M	4.900954351	1.389061909	5.232203672	3.84	

8M	1.16	1.39	1.68	1.41
12M	3.14	2.41	1.67	2.41
2.5% HS - 8M	1.95	3.74	1.15	2.28
2.5% HS - 12M	2.74	2.36	2.82	2.64
5% HS - 8M	3.46	2.51	1.10	2.36
5% HS - 12M	2.63	2.24	3.36	2.74
7.5% HS - 8M	2.72	2.90	2.37	2.66
7.5% HS - 12M	2.77	3.60	2.64	3.00
10% HS - 8M	2.11	3.17	5.42	3.57
10% HS - 12M	4.90	1.39	5.23	3.84

CODE	S1	S2	S3	7 days
0% HS - 8M	1.16	1.39	1.68	1.41
2.5% HS - 8M	1.95	3.74	1.15	2.28
5% HS - 8M	3.46	2.51	1.10	2.36
7.5% HS - 8M	2.72	2.90	2.37	2.66
10% HS - 8M	2.11	3.17	5.42	3.57

CODE	S1	S2	S3	7 days
0% HS - 12M	3.14	2.41	1.67	2.41
2.5% HS - 12M	2.74	2.36	2.82	2.64
5% HS - 12M	2.63	2.24	3.36	2.74
7.5% HS - 12M	2.77	3.60	2.64	3.00
10% HS - 12M	4.90	1.39	5.23	3.84



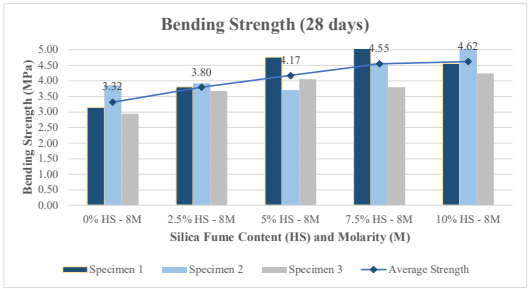


Bending Strength										
Code	N° Specimens	Test age (days)	Weight (g)	Width (mm)	Length (mm)	Height (mm)	Area (mm^2)	Load (kN) to bending	Bending Strength (MPa)	Average Bending Strength (MPa)
8M	1	28	276.00	41.09	158.73	40.30	6522.22	1.4	3.15	3.32
	2	28	277.00	41.28	157.34	40.01	6495.00	1.7	3.86	
	3	28	274.10	41.69	158.40	39.85	6603.70	1.3	2.95	
12M	1	28	267.00	39.98	157.39	39.42	6292.45	1.9	4.59	3.93
	2	28	278.70	41.20	157.97	39.50	6508.36	1.6	3.73	
	3	28	276.20	41.72	158.19	39.37	6599.69	1.5	3.48	
2.5% HS - 8M	1	28	272.70	40.89	158.60	40.44	6485.15	1.7	3.81	3.80
	2	28	279.50	40.38	159.10	41.32	6424.46	1.8	3.92	
	3	28	286.00	41.04	159.50	41.15	6545.88	1.7	3.67	
2.5% HS - 12M	1	28	284.00	41.15	155.72	39.98	6407.88	1.8	4.10	4.11
	2	28	260.70	39.05	155.54	40.09	6073.84	1.8	4.30	
	3	28	276.70	41.54	155.09	39.59	6442.44	1.7	3.92	
5% HS - 8M	1	28	273.90	40.87	155.70	40.22	6363.46	2.1	4.76	4.17
	2	28	279.00	41.80	155.92	40.58	6517.46	1.7	3.70	
	3	28	283.90	41.27	156.82	41.30	6471.96	1.9	4.05	
5% HS - 12M	1	28	285.60	41.52	157.10	49.72	6522.79	2	2.92	4.33
	2	28	272.20	40.99	158.32	39.77	6489.54	2.4	5.55	
	3	28	299.90	43.67	156.56	40.95	6836.98	2.2	4.51	
7.5% HS - 8M	1	28	264.08	39.45	156.51	39.83	6174.32	2.2	5.27	4.55
	2	28	264.50	40.92	155.79	40.00	6374.93	2	4.58	
	3	28	280.90	41.58	155.93	41.38	6483.57	1.8	3.79	
7.5% HS - 12M	1	28	268.10	42.07	159.78	39.43	6721.94	2.2	5.05	4.66
	2	28	287.60	41.07	158.66	39.21	6516.17	2	4.75	
	3	28	276.40	41.72	155.48	39.30	6486.63	1.8	4.19	
10% HS - 8M	1	28	284.30	41.44	157.09	39.83	6509.81	2	4.56	4.62
	2	28	281.80	40.05	158.23	40.32	6337.11	2.2	5.07	
	3	28	289.00	40.48	157.48	40.76	6374.79	1.9	4.24	
10% HS - 12M	1	28	288.10	40.88	157.84	40.66	6452.50	2.1	4.66	4.78
	2	28	280.30	40.29	158.00	40.36	6365.82	2	4.57	
	3	28	275.50	41.98	157.13	40.10	6596.32	2.3	5.11	

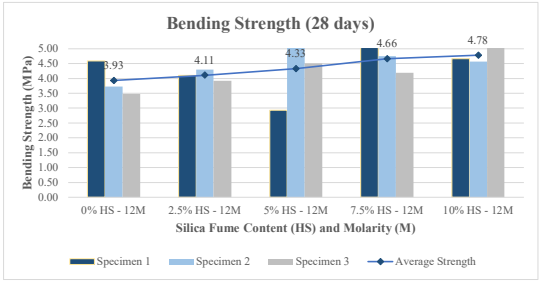
8M	3.146828401	3.858898798	2.945412088	3.32
12M	4.587423451	3.733531625	3.479424272	3.93
2.5% HS - 8M	3.813298267	3.916307856	3.669383884	3.80
2.5% HS - 12M	4.104954475	4.302002054	3.916541067	4.11
5% HS - 8M	4.764548845	3.704587127	4.048650499	4.17
5% HS - 12M	2.922817305	5.552817505	4.506329416	4.33
7.5% HS - 8M	5.272860959	4.582111437	3.792261758	4.55
7.5% HS - 12M	5.045310208	4.751195132	4.190196248	4.66
10% HS - 8M	4.563319692	5.068394052	4.237756567	4.62
10% HS - 12M	4.660847765	4.571109998	5.110788579	4.78

8M	3.15	3.86	2.95	3.32
12M	4.59	3.73	3.48	3.93
2.5% HS - 8M	3.81	3.92	3.67	3.80
2.5% HS - 12M	4.10	4.30	3.92	4.11
5% HS - 8M	4.76	3.70	4.05	4.17
5% HS - 12M	2.92	5.55	4.51	4.33
7.5% HS - 8M	5.27	4.58	3.79	4.55
7.5% HS - 12M	5.05	4.75	4.19	4.66
10% HS - 8M	4.56	5.07	4.24	4.62
10% HS - 12M	4.66	4.57	5.11	4.78

CODE	S1	S2	S3	28 days
0% HS - 8M	3.15	3.86	2.95	3.32
2.5% HS - 8M	3.81	3.92	3.67	3.80
5% HS - 8M	4.76	3.70	4.05	4.17
7.5% HS - 8M	5.27	4.58	3.79	4.55
10% HS - 8M	4.56	5.07	4.24	4.62



CODE	S1	S2	S3	28 days
0% HS - 12M	4.59	3.73	3.48	3.93
2.5% HS - 12M	4.10	4.30	3.92	4.11
5% HS - 12M	2.92	5.55	4.51	4.33
7.5% HS - 12M	5.05	4.75	4.19	4.66
10% HS - 12M	4.66	4.57	5.11	4.78



DENSIDAD Y ABSORCIÓN

Code	N° Specimens	Test age (days)	Dry Weight (g)	Submerged weight after 48 hours	Submerged weight/ basket (g)	Bulk density (kg/m³)	Average bulk density (kg/m³)	% Absorption	% Average absorption
8M	1	28	134.10	178.70	54.50	1684.67	1649.55	33.26	33.17
	2	28	141.10	187.50	54.80	1634.99		32.88	
	3	28	142.70	190.30	55.10	1629.00		33.36	
12M	1	28	145.50	191.80	55.00	1607.73	1644.46	31.82	31.34
	2	28	136.70	178.60	54.40	1661.00		30.65	
	3	28	137.00	180.20	54.70	1664.64		31.53	
2.5% HS - 8M	1	28	139.00	184.50	56.80	1691.00	1684.57	32.73	31.69
	2	28	140.50	185.60	56.00	1662.72		32.10	
	3	28	146.20	190.40	60.20	1700.00		30.23	
2.5% HS - 12M	1	28	145.20	190.30	60.10	1706.23	1725.98	31.06	31.37
	2	28	143.40	188.90	60.60	1731.88		31.73	
	3	28	141.10	185.30	60.00	1739.83		31.33	
5% HS - 8M	1	28	143.70	189.20	58.40	1684.64	1676.12	31.66	31.66
	2	28	138.90	183.10	55.40	1663.47		31.82	
	3	28	140.30	184.50	56.80	1680.24		31.50	
5% HS - 12M	1	28	151.40	196.90	62.40	1701.12	1702.53	30.05	29.42
	2	28	145.60	187.60	59.80	1696.97		28.85	
	3	28	142.40	184.20	59.10	1709.48		29.35	
7.5% HS - 8M	1	28	141.90	183.80	57.30	1677.30	1674.22	29.53	29.88
	2	28	144.50	188.70	56.90	1649.54		30.59	
	3	28	141.60	183.40	58.10	1695.81		29.52	
7.5% HS - 12M	1	28	147.00	191.20	58.60	1662.90	1681.19	30.07	30.50
	2	28	142.70	188.70	58.70	1698.81		32.24	
	3	28	143.80	185.80	58.30	1681.87		29.21	
10% HS - 8M	1	28	142.40	184.40	58.90	1705.39	1699.15	29.49	29.83
	2	28	143.10	181.10	56.90	1660.09		26.55	
	3	28	144.10	192.30	60.90	1731.97		33.45	
10% HS - 12M	1	28	145.50	187.40	60.70	1715.80	1703.64	28.80	29.06
	2	28	145.90	190.10	59.90	1696.51		30.29	
	3	28	147.10	188.40	60.50	1698.61		28.08	