APPENDIX B

DESIGN AIDS FOR REINFORCED MASONRY WALLS

B-1. Purpose. This appendix contains design aids that may be used in the design of reinforced masonry walls. Table B-1 through B-14 provide the properties of wall stiffeners with varying reinforcement, wall thickness and mortar type. Table B-15 through B-50 provide reinforcing steel spacing for varying wall heights, lateral loads, wall thickness, axial load, bar size and eccentricity. The values in the tables were determined using a T-section analysis when applicable.

b_w=7.5 in., d=2.81 in., t'=1.00 in.	6 in. CMU
n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi	f'_m=1350 psi
Increase M_r by 1/3 for wind or seismic load.	Type S Mortar

Stiffener	b in.	bar #	kd in.	I in^4	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	36	3	.55	14.07	967	578
		4	.71	23.24	1231	1030
		5	.85	32.95	1452	1566
		6	.98	42.95	1643	2185
	32	3	.57	13.83	903	576
		4	.74	22.73	1145	1025
		5	.89	32.07	1346	1558
		6	1.03	41.60	1520	2172
	24	3	.65	13.22	761	570
		4	.84	21.41	956	1012
		5	1.00	29.82	1116	1535
		6	1.15	38.19	1245	2142
	16	3	.78	12.27	593	561
		4	.99	19.41	736	992
		5	1.17	26.44	845	1504
		6	1.34	33.15	927	2100
	8	3	1.03	10.40	380	543
		4	1.28	15.65	457	954
		5	1.49	20.40	514	1437
		6	1.66	24.65	558	1992

Table B–1. Properties of Wall Stiffeners With One Reinforcing Bar in Each Reinforced Cell, 6 in CMU, Type S Mortar.

b_w=7.5 in., d=3.81 in., t'=1.25 in.	8 in. CMU
n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi	f'_m=1350 psi
Increase M_r by 1/3 for wind or seismic load.	Type S Mortar

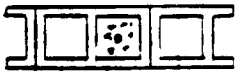
Stiffener	b in.	bar #	kd in.	I in^4	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	48	4	.74	46.98	2377	1425
		5	.90	68.06	2840	2176
		6	1.04	90.52	3252	3047
		7	1.19	115.44	3647	4097
	40	4	.80	45.75	2135	1417
		5	.97	65.88	2541	2161
		6	1.13	87.12	2901	3022
		7	1.28	110.46	3242	4061
	32	4	.89	44.15	1869	1406
		5	1.07	63.06	2214	2141
		6	1.23	82.76	2516	2991
		7	1.40	104.10	2789	4021
	24	4	1.00	41.92	1568	1390
		5	1.20	59.19	1845	2114
		6	1.39	76.82	2078	2951
		7	1.57	95.45	2275	3973
	16	4	1.19	38.48	1216	1366
		5	1.42	53.29	1411	2073
		6	1.63	67.86	1562	2897
		7	1.83	82.66	1690	3895
	8	4	1.56	31.87	767	1317
		5	1.82	42.42	872	1988
		6	2.05	52.17	955	2759
		7	2.25	61.57	1025	3683

Table B–2. Properties of Wall Stiffeners With One Reinforcing Bar in Each Reinforced Cell, 8 in CMU, Type S Mortar.

b_w=7.5 in., d=4.81 in., t'=1.375 in.	10 in. CMU
n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi	f'_m=1350 psi
Increase M_r by 1/3 for wind or seismic load.	Type S Mortar

Stiffener	b in.	bar #	kd in.	I in^4	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	48	4	.84	77.20	3435	1812
		5	1.02	112.63	4121	2770
		6	1.19	150.82	4739	3883
		7	1.36	193.66	5336	5228
	40	4	.91	75.39	3091	1802
		5	1.11	109.40	3696	2753
		6	1.29	145.73	4237	3854
		7	1.47	186.13	4749	5188
	32	4	1.01	73.03	2711	1789
		5	1.22	105.19	3228	2730
		6	1.42	139.16	3684	3818
		7	1.62	176.39	4089	5144
	24	4	1.15	69.72	2282	1771
		5	1.38	99.37	2701	2697
		6	1.60	130.10	3048	3774
		7	1.83	162.97	3342	5089
	16	4	1.36	64.55	1779	1743
		5	1.64	90.39	2071	2652
		6	1.89	116.21	2301	3711
		7	2.15	142.88	2496	4994
	8	4	1.80	54.46	1134	1685
		5	2.12	73.53	1299	2548
		6	2.40	91.58	1431	3538
		7	2.65	109.41	1546	4726

Table B–3. Properties of Wall Stiffeners With One Reinforcing Bar in Each Reinforced Cell, 10 in CMU, Type S Mortar.

b_w=7.5 in., d=5.81 in., t'=1.5 in.	12 in. CMU
n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi	f'_m=1350 psi
Increase M_r by 1/3 for wind or seismic load.	Type S Mortar

Stiffener	b in.	bar #	kd in.	I in^4	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	48	4	.93	115.18	4623	2199
		5	1.14	168.94	5564	3367
		6	1.33	227.34	6417	4723
		7	1.52	293.40	7247	6365
	40	4	1.01	112.72	4165	2189
		5	1.23	164.50	4998	3347
		6	1.44	220.31	5747	4691
		7	1.64	282.91	6454	6322
	32	4	1.12	109.49	3659	2174
		5	1.36	158.70	4373	3321
		6	1.58	211.19	5006	4651
		7	1.81	269.23	5563	6274
	24	4	1.27	104.94	3088	2154
		5	1.54	150.64	3669	3284
		6	1.80	198.49	4147	4603
		7	2.06	250.22	4555	6212
	16	4	1.52	97.80	2416	2122
		5	1.84	138.07	2821	3234
		6	2.13	178.83	3142	4530
		7	2.43	221.50	3418	6101
	8	4	2.02	83.67	1552	2056
		5	2.39	114.18	1788	3113
		6	2.72	143.61	1980	4326
		7	3.02	173.19	2149	5783

Table B–4. Properties of Wall Stiffeners With One Reinforcing Bar in Each Reinforced Cell, 12 in CMU, Type S Mortar.

b_w=7.5 in., d=5.31 in., t'=1.25 in.	8 in. CMU
n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi	f'_m=1350 psi
Increase M_r by 1/3 for wind or seismic load.	Type S Mortar

Stiffener	b in.	bar #	kd in.	I in^4	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	48	3	.68	55.68	3091	1119
		4	.89	95.21	4014	2005
		5	1.08	139.31	4824	3068
		6	1.26	187.04	5555	4303
		7	1.45	240.71	6219	5808
	40	3	.74	54.75	2793	1114
		4	.97	93.09	3614	1995
		5	1.17	135.49	4329	3050
		6	1.37	180.99	4958	4276
		7	1.58	231.52	5499	5777
	32	3	.81	53.52	2463	1108
		4	1.07	90.30	3173	1982
		5	1.29	130.51	3784	3025
		6	1.52	173.06	4283	4246
		7	1.75	219.49	4706	5739
	24	3	.93	51.77	2090	1100
		4	1.21	86.39	2674	1962
		5	1.47	123.55	3150	2996
		6	1.73	161.95	3519	4207
		7	1.99	202.88	3832	5682
	16	3	1.11	48.98	1650	1087
		4	1.45	80.25	2079	1934
		5	1.76	112.62	2401	2953
		6	2.05	144.95	2655	4136
		7	2.33	178.35	2872	5569
	8	3	1.50	43.30	1082	1058
		4	1.92	68.20	1334	1871
		5	2.27	92.56	1532	2831
		6	2.57	115.84	1692	3932
		7	2.85	139.05	1832	5254

Table B-5. Properties of Wall Stiffeners With Two Reinforcing Bars in Each Reinforced Cell, 8 in CMU, Type S Mortar.

b_w=7.5 in., d=7.06 in., t'=1.375 in.	10 in. CMU
n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi	f'_m=1350 psi
Increase M_r by 1/3 for wind or seismic load.	Type S Mortar

Stiffener	b in.	bar #	kd in.	I in^4	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	48	4	1.04	173.70	6274	2686
		5	1.27	256.02	7573	4115
		6	1.49	346.15	8740	5781
		7	1.72	448.39	9760	7822
		8	1.97	559.15	10619	10237
	40	4	1.13	170.32	5658	2673
		5	1.38	249.88	6811	4093
		6	1.62	336.24	7790	5753
		7	1.88	433.04	8624	7788
		8	2.16	536.59	9324	10192
	32	4	1.25	165.86	4979	2657
		5	1.52	241.82	5952	4067
		6	1.80	323.09	6725	5721
		7	2.10	412.76	7382	7743
		8	2.40	507.18	7935	10127
	24	4	1.42	159.57	4210	2635
		5	1.74	230.35	4951	4035
		6	2.06	304.46	5531	5674
		7	2.39	384.56	6027	7671
		8	2.72	467.25	6450	10016
	16	4	1.71	149.53	3275	2603
		5	2.10	212.14	3789	3982
		6	2.46	275.78	4201	5584
		7	2.82	342.77	4561	7523
		8	3.16	410.30	4874	9787
	8	4	2.28	129.65	2135	2524
		5	2.71	178.69	2471	3826
		6	3.09	226.81	2751	5322
		7	3.45	275.98	3000	7117
		8	3.78	324.28	3218	9202

Table B–6. Properties of Wall Stiffeners With Two Reinforcing Bars in Each Reinforced Cell, 10 in CMU, Type S Mortar.

b_w=7.5 in., d=8.81 in., t'=1.5 in.	12 in. CMU
n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi	f'_m=1350 psi
Increase M_r by 1/3 for wind or seismic load.	Type S Mortar

Stiffener	b in.	bar #	kd in.	I in.^{4}	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	48	4	1.17	276.40	8863	3368
		5	1.43	409.48	10731	5166
		6	1.68	556.29	12390	7268
		7	1.96	723.94	13821	9846
		8	2.26	906.84	15028	12896
	40	4	1.27	271.56	8003	3354
		5	1.55	400.64	9661	5141
		6	1.84	541.81	11038	7238
		7	2.15	701.23	12212	9808
		8	2.48	873.16	13201	12843
	32	4	1.41	265.17	7054	3336
		5	1.73	388.93	8439	5113
		6	2.06	522.46	9530	7202
		7	2.41	671.08	10461	9756
		8	2.76	829.08	11252	12765
	24	4	1.61	256.10	5972	3311
		5	1.99	372.14	7022	5078
		6	2.36	494.88	7849	7148
		7	2.75	628.96	8563	9670
		8	3.14	768.99	9180	12630
	16	4	1.95	241.47	4650	3276
		5	2.40	345.28	5392	5016
		6	2.83	452.22	5994	7040
		7	3.25	566.34	6528	9490
		8	3.66	683.03	6996	12351
	8	4	2.60	212.33	3065	3182
		5	3.11	295.88	3571	4831
		6	3.56	379.37	3997	6727
		7	3.99	466.26	4382	9006
		8	4.39	553.13	4725	11652

Table B–7. Properties of Wall Stiffeners With Two Reinforcing Bars in Each Reinforced Cell, 12 in CMU, Type S Mortar.

b_w=7.5 in., d=2.81 in., t'=1.00 in.	6 in. CMU
n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi	f'_m=1000 psi
Increase M_r by 1/3 for wind or seismic load.	Type N Mortar

Stiffener	b in.	bar #	kd in.	I in^4	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	36	3	.62	18.16	810	573
		4	.80	29.58	1022	1017
		5	.96	41.39	1196	1544
		6	1.10	53.27	1341	2153
	32	3	.66	17.81	755	570
		4	.84	28.83	949	1011
		5	1.01	40.12	1107	1534
		6	1.16	51.35	1234	2142
	24	3	.74	16.91	633	564
		4	.95	26.92	788	998
		5	1.13	36.90	909	1513
		6	1.29	46.52	999	2115
	16	3	.88	15.52	491	554
		4	1.11	24.05	601	977
		5	1.32	32.13	678	1483
		6	1.49	39.54	736	2071
	8	3	1.15	12.85	310	534
		4	1.42	18.83	368	936
		5	1.63	24.02	408	1408
		6	1.80	28.48	439	1951

Table B–8. Properties of Wall Stiffeners With One Reinforcing Bar in Each Reinforced Cell, 6 in CMU, Type N Mortar.

b_w=7.5 in., d=3.81 in., t'=1.25 in.	8 in. CMU
n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi	f'_m=1000 psi
Increase M_r by 1/3 for wind or seismic load.	Type N Mortar

Stiffener	b in.	bar #	kd in.	I in^4	M_r Mas ft.-lb	M_r Steel ft.-lb.
	48	4	.85	60.64	1990	1411
		5	1.02	86.96	2364	2151
		6	1.18	114.55	2692	3006
		7	1.34	144.64	2997	4040
	40	4	.92	58.82	1784	1402
		5	1.10	83.77	2109	2134
		6	1.27	109.63	2393	2980
		7	1.45	137.47	2642	4009
	32	4	1.01	56.46	1556	1390
		5	1.21	79.67	1831	2112
		6	1.39	103.35	2060	2950
		7	1.58	128.31	2251	3974
	24	4	1.14	53.20	1300	1372
		5	1.36	74.08	1515	2084
		6	1.57	94.80	1681	2914
		7	1.77	116.00	1818	3927
	16	4	1.34	48.22	1000	1346
		5	1.60	65.63	1141	2045
		6	1.83	82.16	1249	2858
		7	2.04	98.39	1337	3842
	8	4	1.74	38.88	622	1294
		5	2.02	50.71	698	1950
		6	2.25	61.26	757	2703
		7	2.45	71.11	806	3607

Table B–9. Properties of Wall Stiffeners With One Reinforcing Bar in Each Reinforced Cell, 8 in CMU, Type N Mortar.

b_w=7.5 in., d=4.81 in., t'=1.375 in.	10 in CMU
n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi	f'_m=1000 psi
Increase M_r by 1/3 for wind or seismic load.	Type N Mortar

Stiffener	b in.	bar #	kd in.	I in^4	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	48	4	.96	100.13	2885	1795
		5	1.17	144.74	3442	2741
		6	1.36	192.12	3938	3835
		7	1.55	244.43	4391	5165
	40	4	1.04	97.43	2590	1785
		5	1.26	139.97	3079	2721
		6	1.46	184.69	3506	3806
		7	1.67	233.38	3873	5132
	32	4	1.15	93.92	2265	1770
		5	1.39	133.80	2680	2696
		6	1.61	175.07	3019	3774
		7	1.84	219.11	3303	5092
	24	4	1.30	89.03	1899	1750
		5	1.57	125.29	2221	2664
		6	1.82	161.82	2469	3733
		7	2.07	199.74	2675	5036
	16	4	1.54	81.48	1466	1721
		5	1.86	112.23	1680	2620
		6	2.14	141.96	1844	3664
		7	2.41	171.74	1982	4928
	8	4	2.02	67.08	923	1657
		5	2.36	88.85	1046	2501
		6	2.65	108.81	1142	3468
		7	2.90	127.92	1223	4630

Table B-10. Properties of Wall Stiffeners With One Reinforcing Bar in Each Reinforced Cell, 10 in CMU, Type N Mortar.

b_w=7.5 in., d=5.81 in., t'=1.5 in. n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi Increase M_r by 1/3 for wind or seismic load.	12 in. CMU f'_m=1000 psi Type N Mortar

Stiffener	b in.	bar #	kd in.	I in^4	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	48	4	1.07	149.91	3891	2181
		5	1.30	218.01	4659	3334
		6	1.51	291.02	5347	4669
		7	1.73	372.33	5969	6297
	40	4	1.16	146.22	3498	2169
		5	1.41	211.42	4174	3311
		6	1.64	280.66	4764	4638
		7	1.88	356.74	5270	6261
	32	4	1.28	141.39	3065	2153
		5	1.55	202.87	3640	3283
		6	1.81	267.17	4107	4603
		7	2.08	336.48	4500	6217
	24	4	1.45	134.64	2577	2130
		5	1.76	190.98	3022	3249
		6	2.05	248.40	3365	4557
		7	2.35	308.75	3652	6151
	16	4	1.73	124.13	1995	2097
		5	2.09	172.52	2294	3198
		6	2.42	220.02	2525	4476
		7	2.74	268.30	2722	6023
	8	4	2.27	103.80	1269	2024
		5	2.67	139.13	1446	3058
		6	3.01	172.19	1588	4243
		7	3.32	204.46	1710	5666

Table B-11. Properties of Wall Stiffeners With One Reinforcing Bar in Each Reinforced Cell, 12 in CMU, Type N Mortar.

b_w=7.5 in., d=5.31 in., t'=1.25 in. n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi Increase M_r by 1/3 for wind or seismic load.	8 in. CMU f'_m=1000 psi Type N Mortar

Stiffener	b in.	bar #	kd in.	I $in.^4$	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	48	3	.78	73.05	2614	1111
		4	1.02	123.72	3375	1988
		5	1.24	179.42	4034	3037
		6	1.44	238.79	4591	4260
		7	1.67	304.06	5059	5760
	40	3	.84	71.64	2358	1106
		4	1.10	120.55	3032	1977
		5	1.34	173.76	3606	3017
		6	1.57	229.73	4061	4238
		7	1.82	290.31	4439	5731
	32	3	.93	69.78	2075	1100
		4	1.22	116.39	2655	1962
		5	1.48	166.35	3121	2996
		6	1.74	217.86	3476	4210
		7	2.01	272.52	3771	5691
	24	3	1.06	67.15	1755	1090
		4	1.38	110.59	2223	1942
		5	1.69	155.95	2568	2969
		6	1.98	201.45	2831	4168
		7	2.26	248.54	3050	5626
	16	3	1.27	62.99	1378	1075
		4	1.65	101.47	1704	1914
		5	2.00	139.97	1940	2920
		6	2.32	177.20	2123	4086
		7	2.62	214.54	2277	5495
	8	3	1.70	54.66	893	1044
		4	2.15	84.30	1088	1841
		5	2.52	112.31	1237	2779
		6	2.84	138.26	1354	3855
		7	3.12	163.35	1454	5147

Table B–12. Properties of Wall Stiffeners With Two Reinforcing Bars in Each Reinforced Cell, 8 in CMU, Type N Mortar.

b_w=7.5 in., d=7.06 in., t'=1.375 in	10 in. CMU
n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi	f'_m=1000 psi
Increase M_r by 1/3 for wind or seismic load.	Type N Mortar

Stiffener	b in.	bar #	kd in.	I in^4	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	48	4	1.19	226.81	5290	2665
		5	1.45	331.71	6349	4079
		6	1.71	444.72	7205	5737
		7	2.00	570.21	7922	7771
		8	2.29	703.07	8514	10173
	40	4	1.29	221.72	4763	2652
		5	1.58	322.47	5668	4059
		6	1.87	429.58	6368	5712
		7	2.19	546.85	6952	7736
		8	2.50	669.29	7435	10123
	32	4	1.43	215.03	4179	2634
		5	1.76	310.22	4901	4035
		6	2.09	409.58	5452	5680
		7	2.43	516.47	5914	7686
		8	2.76	626.17	6298	10047
	24	4	1.63	205.57	3495	2613
		5	2.02	292.82	4036	4003
		6	2.38	381.74	4453	5627
		7	2.75	475.30	4806	7601
		8	3.10	569.36	5103	9914
	16	4	1.97	190.45	2686	2580
		5	2.41	265.90	3068	3941
		6	2.81	340.44	3370	5519
		7	3.19	416.79	3631	7425
		8	3.55	491.71	3853	9648
	8	4	2.57	161.91	1751	2486
		5	3.04	219.43	2008	3761
		6	3.44	274.30	2216	5223
		7	3.81	328.86	2398	6977
		8	4.14	381.04	2554	9014

Table B–13. Properties of Wall Stiffeners With Two Reinforcing Bars in Each Reinforced Cell, 10 in CMU, Type N Mortar.

b_w=7.5 in., d=8.81 in., t'=1.5 in.	12 in. CMU
n=29000/f'_m, F_m=0.33f'_m psi, F_s=24000 psi	f'_m=1000 psi
Increase M_r by 1/3 for wind or seismic load.	Type N Mortar

Stiffener	b in.	bar #	kd in.	I in^4	M_r Mas ft.-lb.	M_r Steel ft.-lb.
	48	4	1.34	362.14	7489	3345
		5	1.64	532.70	9002	5127
		6	1.95	717.89	10204	7222
		7	2.29	925.17	11211	9790
		8	2.64	1146.55	12046	12824
	40	4	1.46	354.83	6751	3329
		5	1.80	519.24	8033	5105
		6	2.14	695.51	9018	7194
		7	2.51	890.29	9844	9749
		8	2.89	1095.65	10532	12763
	32	4	1.62	345.17	5926	3310
		5	2.00	501.23	6945	5080
		6	2.39	665.78	7727	7156
		7	2.80	844.70	8386	9690
		8	3.20	1030.43	8942	12670
	24	4	1.86	331.38	4957	3287
		5	2.31	475.52	5727	5042
		6	2.74	624.22	6326	7093
		7	3.18	782.71	6840	9585
		8	3.60	944.18	7279	12505
	16	4	2.25	309.15	3820	3249
		5	2.76	435.52	4376	4968
		6	3.24	562.35	4822	6962
		7	3.70	694.33	5214	9370
		8	4.13	825.95	5552	12178
	8	4	2.94	267.12	2524	3138
		5	3.49	366.48	2915	4753
		6	3.98	463.25	3237	6608
		7	4.43	561.45	3523	8835
		8	4.84	657.22	3771	11419

Table B–14. Properties of Wall Stiffeners With Two Reinforcing Bars in Each Reinforced Cell, 12 in CMU, Type N Mortar.

Table B–15. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
18	6	88	48	32	8		6 in. CMU		
	5	80	40	16	8				
	4	64	32	8			P=0 lb./ft.		
	3	32	16	8					
17	6	96	56	40	16	8	e=0		
	5	96	48	32	16	8			
	4	72	40	24	8		Type S Mortar		
	3	40	16	8					
16	6	96	64	48	32	16	8		
	5	96	56	40	24	8			
	4	88	40	24	16	8			
	3	48	24	16	8				
15	6	96	80	48	40	24	16	8	
	5	96	72	48	32	16	8		
	4	96	48	32	24	8	8		
	3	56	24	16	8	8			
14	6	96	88	64	48	32	24	16	8
	5	96	80	56	40	32	16	8	
	4	96	56	40	24	16	8	8	
	3	64	32	16	16	8			
13	6	96	96	72	56	40	32	24	16
	5	96	96	64	48	40	24	16	8
	4	96	72	48	32	24	16	8	8
	3	80	40	24	16	8	8		
12	6	96	96	88	64	56	40	40	32
	5	96	96	80	56	48	40	32	24
	4	96	88	56	40	32	24	16	8
	3	96	48	32	24	16	16	8	8
11	6	96	96	96	80	64	56	48	40
	5	96	96	96	72	56	48	40	32
	4	96	96	64	48	40	32	24	24
	3	96	56	32	24	16	16	16	8
10	6	96	96	96	96	80	64	56	48
	5	96	96	96	88	72	56	48	40
	4	96	96	80	64	48	40	32	24
	3	96	72	48	32	24	16	16	16

Table B–16. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
18	6	72	40	16	8		6 in. CMU		
	5	64	32	8					
	4	48	24	8			P=500 lb./ft.		
	3	24	16						
17	6	88	48	32	8	8	e=0		
	5	80	40	24	8				
	4	64	32	16	8		Type S Mortar		
	3	32	16	8					
16	6	96	56	40	24	8	8		
	5	88	48	32	16	8			
	4	80	40	24	8				
	3	40	16	8	8				

Table B–16. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell—Continued.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
15	6	96	64	48	32	16	8	8	
	5	96	56	40	24	16	8		
	4	88	48	32	16	8			
	3	48	24	16	8				
14	6	96	80	56	40	32	16	8	8
	5	96	72	48	32	24	8	8	
	4	96	56	32	24	16	8		
	3	64	32	16	8	8			
13	6	96	88	64	48	40	32	16	8
	5	96	80	56	40	32	24	16	8
	4	96	64	40	32	24	16	8	
	3	72	32	24	16	8	8		
12	6	96	96	80	64	48	40	32	24
	5	96	96	72	56	40	32	24	16
	4	96	80	48	40	32	24	16	8
	3	88	40	24	16	16	8	8	8
11	6	96	96	96	72	56	48	40	32
	5	96	96	88	64	56	40	40	32
	4	96	96	64	48	40	32	24	16
	3	96	48	32	24	16	16	8	8
10	6	96	96	96	96	72	64	48	48
	5	96	96	96	80	64	56	48	40
	4	96	96	80	56	48	40	32	24
	3	96	64	40	32	24	16	16	16

Table B–17. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
18	6	56	32	8	8		6 in. CMU		
	5	56	24	8					
	4	40	16	8			P=500 lb./ft.		
	3	24	8						
17	6	72	40	24	8		e=t/3		
	5	64	40	16	8				
	4	56	24	8			Type S Mortar		
	3	32	16	8					
16	6	88	48	32	16	8			
	5	72	48	32	16	8			
	4	64	32	16	8				
	3	32	16	8					
15	6	96	56	40	32	16	8		
	5	88	48	40	24	8	8		
	4	72	40	24	16	8			
	3	40	24	16	8				
14	6	96	64	48	40	24	16	8	
	5	96	56	40	32	16	8	8	
	4	80	48	32	24	8	8		
	3	48	24	16	8	8			
13	6	96	80	56	40	32	24	16	8
	5	96	72	48	40	32	16	8	8
	4	88	56	40	24	16	8	8	
	3	56	32	16	16	8	8		

Table B–17. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell—Continued.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
12	6	96	96	72	56	48	40	32	24
	5	96	88	64	48	40	32	24	16
	4	96	64	48	32	24	24	16	8
	3	56	32	24	16	16	8	8	
11	6	96	96	88	64	56	48	40	32
	5	96	96	72	56	48	40	32	24
	4	96	72	56	40	32	24	24	16
	3	64	40	24	24	16	16	8	8
10	6	96	96	96	80	64	56	48	40
	5	96	96	88	72	56	48	40	32
	4	96	88	64	48	40	32	24	24
	3	72	48	32	24	24	16	16	8

Table B–18. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
18	6	56	32	8	8		6 in. CMU		
	5	48	24	8					
	4	40	16	8					
	3	24	8				P=500 lb./ft.		
17	6	64	40	24	8				
	5	64	32	16	8		e=t/2		
	4	48	24	8					
	3	24	16	8			Type S Mortar		
16	6	80	48	32	16	8			
	5	72	40	24	8	8			
	4	56	32	16	8				
	3	32	16	8					
15	6	88	56	40	24	16	8		
	5	80	48	32	16	8	8		
	4	64	40	24	8	8			
	3	32	16	8	8				
14	6	96	64	48	32	24	16	8	
	5	88	56	40	32	16	8	8	
	4	72	40	32	16	8	8		
	3	40	24	16	8	8			
13	6	96	72	56	40	32	24	16	8
	5	96	64	48	40	24	16	8	8
	4	80	48	32	24	16	8	8	
	3	48	24	16	16	8			
12	6	96	96	64	56	40	32	32	16
	5	96	80	56	48	40	32	16	16
	4	88	56	40	32	24	16	8	8
	3	48	32	24	16	16	8	8	
11	6	96	96	80	64	48	40	40	32
	5	96	96	72	56	48	40	32	24
	4	96	64	48	40	32	24	24	16
	3	48	32	24	16	16	16	8	8
10	6	96	96	96	72	64	48	48	40
	5	96	96	80	64	56	48	40	32
	4	96	72	56	48	40	32	24	24
	3	48	40	32	24	16	16	16	8

Table B–19. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
18	6	56	24	8			6 in. CMU		
	5	48	24	8					
	4	40	16	8			P=1000 lb./ft.		
	3	24	8						
17	6	72	40	16	8		e=0		
	5	72	32	16	8				
	4	56	24	8			Type S Mortar		
	3	32	16	8					
16	6	88	48	32	16	8			
	5	80	40	24	8	8			
	4	64	32	16	8				
	3	40	16	8					
15	6	96	56	40	24	16	8		
	5	96	48	32	16	8	8		
	4	80	40	24	8	8			
	3	48	24	16	8				
14	6	96	64	48	32	24	16	8	
	5	96	64	40	32	16	8	8	
	4	96	48	32	16	8	8		
	3	56	24	16	8	8			
13	6	96	80	56	40	32	24	16	8
	5	96	72	48	40	24	16	8	8
	4	96	56	40	24	16	8	8	
	3	64	32	24	16	8	8		
12	6	96	96	80	56	48	40	32	24
	5	96	96	72	48	40	32	24	16
	4	96	72	48	32	24	24	16	8
	3	80	40	24	16	16	8	8	
11	6	96	96	96	72	56	48	40	32
	5	96	96	80	64	48	40	32	24
	4	96	88	56	40	32	24	24	16
	3	96	48	32	24	16	16	8	8
10	6	96	96	96	88	72	56	48	40
	5	96	96	96	72	64	48	40	40
	4	96	96	72	56	40	32	32	24
	3	96	56	40	32	24	16	16	16

Table B–20. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
18	6	40	16	8			6 in. CMU		
	5	40	16	8					
	4	24	8				P=1000 lb./ft.		
	3	16	8						
17	6	56	32	16	8		e=t/3		
	5	48	24	8					
	4	40	16	8			Type S Mortar		
	3	24	8						
16	6	64	40	24	8	8			
	5	56	32	16	8				
	4	48	24	8	8				
	3	24	16	8					

Table B–20. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell—Continued.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
15	6	72	48	32	16	8	8		
	5	64	40	24	16	8			
	4	56	32	16	8				
	3	32	16	8					
14	6	80	56	40	32	16	8	8	
	5	72	48	32	24	8	8		
	4	56	40	24	16	8			
	3	32	16	16	8				
13	6	88	64	48	40	24	16	8	8
	5	80	56	40	32	16	8	8	
	4	64	40	32	24	8	8		
	3	32	24	16	8	8			
12	6	96	80	56	48	40	32	24	16
	5	88	72	48	40	32	24	16	8
	4	64	48	40	32	24	16	8	8
	3	32	24	16	16	8	8		
11	6	96	88	72	56	48	40	32	24
	5	88	80	64	48	40	32	24	16
	4	64	56	40	32	24	24	16	8
	3	32	32	24	16	16	8	8	8
10	6	96	96	80	64	56	48	40	32
	5	88	88	72	56	48	40	32	32
	4	64	64	48	40	32	24	24	16
	3	32	32	24	24	16	16	8	8

Table B–21. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
18	6	40	16	8			6 in. CMU		
	5	32	8						
	4	24	8				P=1000 lb./ft.		
	3	16	8						
17	6	48	24	8	8		e=t/2		
	5	40	16	8					
	4	32	16	8			Type S Mortar		
	3	16	8						
16	6	56	32	16	8				
	5	48	32	16	8				
	4	40	24	8					
	3	16	8	8					
15	6	64	40	32	16	8			
	5	56	40	24	8	8			
	4	40	24	16	8				
	3	24	16	8					
14	6	64	48	40	24	16	8		
	5	56	40	32	16	8	8		
	4	40	32	24	8	8			
	3	24	16	8	8				
13	6	64	56	40	32	24	16	8	8
	5	56	48	40	24	16	8	8	
	4	40	40	24	16	8	8		
	3	24	16	16	8	8			

Table B–21. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell—Continued.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
12	6	64	64	56	40	32	24	16	8
	5	56	56	48	40	32	16	16	8
	4	40	40	32	24	16	8	8	8
	3	24	24	16	16	8	8		
11	6	64	64	56	48	40	32	32	24
	5	56	56	56	40	40	32	24	16
	4	40	40	40	32	24	16	16	8
	3	24	24	16	16	16	8	8	
10	6	64	64	64	56	48	40	40	32
	5	56	56	56	48	40	40	32	24
	4	40	40	40	32	32	24	24	16
	3	24	24	24	16	16	16	8	8

Table B–22. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
18	6	32	16	8			6 in. CMU		
	5	32	16	8					
	4	24	8						
	3	16	8				P=1500 lb./ft.		
17	6	64	32	16	8				
	5	56	32	8			e=0		
	4	40	24	8					
	3	24	8				Type S Mortar		
16	6	80	40	24	8	8			
	5	72	40	16	8				
	4	56	32	8	8				
	3	32	16	8					
15	6	88	48	32	16	8	8		
	5	88	48	32	16	8			
	4	72	40	24	8	8			
	3	40	16	8	8				
14	6	96	64	40	32	16	8	8	
	5	96	56	40	24	16	8		
	4	88	48	32	16	8			
	3	48	24	16	8				
13	6	96	72	48	40	32	16	8	8
	5	96	64	48	32	24	16	8	8
	4	96	56	32	24	16	8	8	
	3	56	32	16	16	8			
12	6	96	96	72	56	40	32	24	16
	5	96	96	64	48	40	32	16	8
	4	96	64	48	32	24	16	8	8
	3	72	40	24	16	16	8	8	
11	6	96	96	88	64	48	40	40	32
	5	96	96	80	56	48	40	32	24
	4	96	80	56	40	32	24	24	16
	3	88	48	32	24	16	16	8	8
10	6	96	96	96	80	64	56	48	40
	5	96	96	96	72	56	48	40	32
	4	96	96	64	48	40	32	24	24
	3	96	56	40	24	24	16	16	8

Table B–23. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell—Continued.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
18	6	24	8				6 in. CMU		
	5	24	8						
	4	16	8				P=1500 lb./ft.		
	3	8							
17	6	40	16	8			e=t/3		
	5	40	16	8					
	4	24	8				Type S Mortar		
	3	16	8						
16	6	48	32	16	8				
	5	40	24	8	8				
	4	32	16	8					
	3	16	8						
15	6	56	40	24	8	8			
	5	48	32	16	8				
	4	32	24	8	8				
	3	16	16	8					
14	6	56	40	32	16	8	8		
	5	48	40	24	16	8			
	4	32	32	16	8	8			
	3	16	16	8					
13	6	56	48	40	32	16	8	8	
	5	48	48	32	24	8	8		
	4	40	32	24	16	8	8		
	3	16	16	16	8				
12	6	56	56	48	40	32	24	16	8
	5	56	56	40	32	24	16	8	8
	4	40	40	32	24	16	8	8	
	3	16	16	16	8	8	8		
11	6	64	64	56	48	40	32	24	16
	5	56	56	48	40	32	24	16	16
	4	40	40	32	24	24	16	8	8
	3	24	24	16	16	8	8	8	
10	6	64	64	64	56	48	40	32	32
	5	56	56	56	48	40	32	32	24
	4	40	40	40	32	24	24	16	16
	3	24	24	24	16	16	8	8	8

Table B–24. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
18	6	16	8				6 in. CMU		
	5	8	8						
	4	8					P=1500 lb./ft.		
	3	8							
17	6	24	16	8			e=t/2		
	5	16	8						
	4	16	8				Type S Mortar		
	3	8							
16	6	32	24	8	8				
	5	24	16	8					
	4	16	8	8					
	3	8	8						

Table B-24. Reinforcement spacing in inches for 6 inch CMU wall with one reinforcing bar in each reinforced cell—Continued.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
15	6	32	32	16	8	8			
	5	32	24	8	8				
	4	24	16	8					
	3	8	8						
14	6	40	40	24	16	8			
	5	32	32	16	8	8			
	4	24	24	8	8				
	3	8	8	8					
13	6	40	40	32	24	16	8	8	
	5	32	32	24	16	8	8		
	4	24	24	16	8	8			
	3	8	8	8	8				
12	6	40	40	40	32	24	16	8	8
	5	32	32	32	24	16	8	8	8
	4	24	24	24	16	8	8	8	
	3	16	16	16	8	8			
11	6	40	40	40	40	32	24	16	16
	5	32	32	32	32	24	16	16	8
	4	24	24	24	24	16	8	8	8
	3	16	16	16	8	8	8		
10	6	40	40	40	40	40	32	32	24
	5	32	32	32	32	32	24	24	16
	4	24	24	24	24	24	16	16	8
	3	16	16	16	16	8	8	8	8

Table B-25. Reinforcement spacing in inches for 8 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
23	7	96	64	40	16	8			
	6	96	56	32	8	8	8 in. CMU		
	5	88	40	24	8				
	4	56	24	16			P=0 lb./ft.		
21	7	96	88	56	40	16			
	6	96	72	48	24	16	e=0		
	5	96	56	32	16	8			
	4	72	32	16	8	8	Type S Mortar		
19	7	96	96	72	56	40	24	8	8
	6	96	88	64	48	32	16	8	
	5	96	64	40	32	16	8	8	
	4	88	40	24	16	8	8		
18	7	96	96	80	64	48	32	16	8
	6	96	96	72	48	40	24	16	8
	5	96	72	48	32	24	16	8	8
	4	96	48	32	24	16	8	8	
17	7	96	96	96	72	56	48	32	16
	6	96	96	80	56	48	32	24	16
	5	96	88	56	40	32	24	16	8
	4	96	56	32	24	16	16	8	8
16	7	96	96	96	80	64	56	48	32
	6	96	96	96	72	56	48	32	24
	5	96	96	64	48	40	32	24	16
	4	96	64	40	32	24	16	16	8

Table B-25. Reinforcement spacing in inches for 8 inch CMU wall with one reinforcing bar in each reinforced cell—Continued.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
15	7	96	96	96	96	72	64	56	48
	6	96	96	96	80	64	48	40	32
	5	96	96	72	56	40	32	32	24
	4	96	72	48	32	24	24	16	16
14	7	96	96	96	96	88	72	64	56
	6	96	96	96	88	72	56	48	48
	5	96	96	88	64	48	40	32	32
	4	96	88	56	40	32	24	24	16
13	7	96	96	96	96	96	80	72	64
	6	96	96	96	96	88	72	56	48
	5	96	96	96	72	56	48	40	32
	4	96	96	64	48	40	32	24	24
12	7	96	96	96	96	96	88	72	64
	6	96	96	96	96	96	80	72	64
	5	96	96	96	88	72	56	48	40
	4	96	96	80	56	48	40	32	24
11	7	96	96	96	96	96	96	80	72
	6	96	96	96	96	96	96	80	72
	5	96	96	96	96	88	72	64	56
	4	96	96	96	72	56	48	40	32

Table B-26. Reinforcement spacing in inches for 8 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
23	7	96	56	32	8	8	8 in. CMU		
	6	96	48	24	8		P=500 lb./ft.		
	5	72	32	16	8		e=0		
	4	48	24	8			Type S Mortar		
21	7	96	72	48	32	16			
	6	96	64	40	24	8			
	5	96	48	32	16	8			
	4	64	32	16	8				
19	7	96	96	64	48	32	16	8	8
	6	96	80	56	40	24	8	8	
	5	96	64	40	24	16	8		
	4	80	40	24	16	8	8		
18	7	96	96	72	56	48	24	16	8
	6	96	96	64	48	32	16	8	8
	5	96	72	48	32	24	16	8	
	4	96	48	32	16	16	8		
17	7	96	96	88	64	48	40	24	16
	6	96	96	72	56	40	32	16	8
	5	96	80	56	40	32	16	8	8
	4	96	56	32	24	16	8	8	
16	7	96	96	96	80	64	48	40	24
	6	96	96	88	64	48	40	32	16
	5	96	96	64	48	32	32	24	16
	4	96	64	40	32	24	16	16	8
15	7	96	96	96	88	72	56	48	40
	6	96	96	96	72	56	48	40	32
	5	96	96	72	56	40	32	32	24
	4	96	72	48	32	24	24	16	16

Table B–26. Reinforcement spacing in inches for 8 inch CMU wall with one reinforcing bar in each reinforced cell—Continued.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
14	7	96	96	96	96	80	72	56	48
	6	96	96	96	88	72	56	48	40
	5	96	96	80	64	48	40	32	32
	4	96	80	56	40	32	24	24	16
13	7	96	96	96	96	96	80	72	56
	6	96	96	96	96	80	64	56	48
	5	96	96	96	72	56	48	40	32
	4	96	96	64	48	40	32	24	24
12	7	96	96	96	96	96	88	72	64
	6	96	96	96	96	96	80	64	56
	5	96	96	96	88	64	56	48	40
	4	96	96	72	56	40	32	32	24
11	7	96	96	96	96	96	96	80	72
	6	96	96	96	96	96	96	80	72
	5	96	96	96	96	80	64	56	48
	4	96	96	88	64	56	40	40	32

Table B–27. Reinforcement spacing in inches for 8 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
23	7	96	56	24	8		8 in. CMU		
	6	80	48	16	8				
	5	64	32	16	8		P=500 lb./ft.		
	4	40	16	8					
21	7	96	64	48	24	8	e=t/3		
	6	96	56	40	16	8			
	5	80	40	24	8	8	Type S Mortar		
	4	56	24	16	8				
19	7	96	88	64	48	24	16	8	
	6	96	72	48	40	16	8	8	
	5	96	56	40	24	16	8		
	4	64	32	24	16	8			
18	7	96	96	64	56	40	24	16	8
	6	96	80	56	40	32	16	8	8
	5	96	64	40	32	16	8	8	
	4	72	40	24	16	8	8		
17	7	96	96	80	56	48	32	24	16
	6	96	96	64	48	40	24	16	8
	5	96	72	48	32	24	16	8	8
	4	80	48	32	24	16	8	8	
16	7	96	96	96	72	56	48	40	24
	6	96	96	80	56	48	40	24	16
	5	96	80	56	40	32	24	16	8
	4	88	48	32	24	24	16	8	8
15	7	96	96	96	80	64	56	48	40
	6	96	96	88	72	56	48	40	24
	5	96	88	64	48	40	32	24	16
	4	96	56	40	32	24	16	16	8
14	7	96	96	96	96	80	64	56	48
	6	96	96	96	80	64	56	48	40
	5	96	96	72	56	48	40	32	24
	4	96	64	48	32	24	24	16	16

Table B–27. Reinforcement spacing in inches for 8 inch CMU wall with one reinforcing bar in each reinforced cell—Continued.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
13	7	96	96	96	96	88	72	64	56
	6	96	96	96	88	72	64	56	48
	5	96	96	80	64	48	40	40	32
	4	96	72	56	40	32	24	24	16
12	7	96	96	96	96	96	88	72	64
	6	96	96	96	96	88	72	64	56
	5	96	96	96	72	64	48	40	40
	4	96	88	64	48	40	32	24	24
11	7	96	96	96	96	96	96	80	72
	6	96	96	96	96	96	88	72	64
	5	96	96	96	88	72	64	48	48
	4	96	96	72	56	48	40	32	32

Table B–28. Reinforcement spacing in inches for 8 inch CMU wall with one reinforcing bar in each reinforced cell.

Wall Ht. Ft.	Bar #	Wind Load, psf 5	10	15	20	25	30	35	40
23	7	88	48	24	8		8 in. CMU		
	6	80	40	16	8				
	5	56	32	8	8		P=500 lb./ft.		
	4	40	16	8					
21	7	96	64	48	24	8	e=t/2		
	6	96	56	40	16	8			
	5	72	40	24	8	8	Type S Mortar		
	4	48	24	16	8				
19	7	96	80	56	48	24	16	8	
	6	96	72	48	32	16	8	8	
	5	96	56	32	24	8	8		
	4	64	32	24	16	8			
18	7	96	88	64	48	40	24	8	8
	6	96	80	56	40	24	16	8	8
	5	96	56	40	32	16	8	8	
	4	64	40	24	16	8	8		
17	7	96	96	72	56	48	32	16	8
	6	96	88	64	48	40	24	16	8
	5	96	64	48	32	24	16	8	8
	4	72	40	32	24	16	8	8	
16	7	96	96	88	72	56	48	32	24
	6	96	96	72	56	48	40	24	16
	5	96	72	56	40	32	24	16	8
	4	80	48	32	24	16	16	8	8
15	7	96	96	96	80	64	56	48	32
	6	96	96	88	64	56	48	40	24
	5	96	80	56	48	40	32	24	16
	4	88	56	40	32	24	16	16	8
14	7	96	96	96	88	72	64	56	48
	6	96	96	96	72	64	48	48	40
	5	96	96	64	56	40	32	32	24
	4	96	56	40	32	24	24	16	16
13	7	96	96	96	96	88	72	64	56
	6	96	96	96	88	72	56	48	48
	5	96	96	80	56	48	40	32	32
	4	96	64	48	40	32	24	24	16