



## گروه آموزشی ایست عمران

$F_y = 195 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	194.99	41	181.91	81	148.67	121	106.44	161	66.78
2	194.97	42	181.28	82	147.67	122	105.38	162	65.96
3	194.93	43	180.65	83	146.67	123	104.32	163	65.16
4	194.87	44	180.00	84	145.66	124	103.26	164	64.36
5	194.80	45	179.34	85	144.64	125	102.20	165	63.59
6	194.71	46	178.66	86	143.62	126	101.15	166	62.82
7	194.61	47	177.98	87	142.60	127	100.09	167	62.07
8	194.48	48	177.28	88	141.57	128	99.04	168	61.34
9	194.35	49	176.57	89	140.54	129	98.00	169	60.61
10	194.20	50	175.85	90	139.50	130	96.95	170	59.90
11	194.03	51	175.12	91	138.46	131	95.91	171	59.20
12	193.84	52	174.37	92	137.42	132	94.87	172	58.52
13	193.64	53	173.62	93	136.37	133	93.84	173	57.84
14	193.43	54	172.85	94	135.32	134	92.81	174	57.18
15	193.19	55	172.07	95	134.27	135	91.78	175	56.53
16	192.95	56	171.29	96	133.21	136	90.76	176	55.89
17	192.68	57	170.49	97	132.15	137	89.74	177	55.26
18	192.41	58	169.68	98	131.09	138	88.73	178	54.64
19	192.11	59	168.86	99	130.03	139	87.72	179	54.03
20	191.80	60	168.03	100	128.96	140	86.71	180	53.43
21	191.48	61	167.19	101	127.90	141	85.71	181	52.84
22	191.14	62	166.34	102	126.83	142	84.71	182	52.26
23	190.78	63	165.49	103	125.76	143	83.72	183	51.69
24	190.41	64	164.62	104	124.68	144	82.73	184	51.13
25	190.03	65	163.74	105	123.61	145	81.75	185	50.58
26	189.62	66	162.86	106	122.54	146	80.77	186	50.04
27	189.21	67	161.97	107	121.46	147	79.80	187	49.50
28	188.78	68	161.06	108	120.39	148	78.83	188	48.98
29	188.34	69	160.16	109	119.31	149	77.87	189	48.46
30	187.88	70	159.24	110	118.24	150	76.91	190	47.95
31	187.40	71	158.31	111	117.16	151	75.92	191	47.45
32	186.92	72	157.38	112	116.09	152	74.93	192	46.96
33	186.41	73	156.44	113	115.01	153	73.95	193	46.47
34	185.90	74	155.49	114	113.94	154	72.99	194	46.00
35	185.37	75	154.53	115	112.86	155	72.06	195	45.53
36	184.83	76	153.57	116	111.79	156	71.13	196	45.06
37	184.27	77	152.60	117	110.72	157	70.23	197	44.61
38	183.70	78	151.63	118	109.65	158	69.35	198	44.16
39	183.11	79	150.65	119	108.58	159	68.48	199	43.71
40	182.52	80	149.66	120	107.51	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 205 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	204.99	41	190.55	81	154.13	121	108.48	161	66.78
2	204.96	42	189.87	82	153.04	122	107.34	162	65.96
3	204.92	43	189.17	83	151.95	123	106.21	163	65.16
4	204.86	44	188.45	84	150.85	124	105.07	164	64.36
5	204.78	45	187.73	85	149.75	125	103.94	165	63.59
6	204.68	46	186.99	86	148.64	126	102.81	166	62.82
7	204.56	47	186.23	87	147.53	127	101.69	167	62.07
8	204.43	48	185.46	88	146.41	128	100.57	168	61.34
9	204.28	49	184.68	89	145.29	129	99.45	169	60.61
10	204.11	50	183.89	90	144.16	130	98.34	170	59.90
11	203.92	51	183.08	91	143.03	131	97.23	171	59.20
12	203.72	52	182.27	92	141.90	132	96.12	172	58.52
13	203.50	53	181.44	93	140.76	133	95.02	173	57.84
14	203.26	54	180.59	94	139.62	134	93.92	174	57.18
15	203.00	55	179.74	95	138.48	135	92.83	175	56.53
16	202.73	56	178.88	96	137.33	136	91.75	176	55.89
17	202.44	57	178.00	97	136.19	137	90.66	177	55.26
18	202.13	58	177.11	98	135.04	138	89.59	178	54.64
19	201.81	59	176.21	99	133.88	139	88.51	179	54.03
20	201.47	60	175.30	100	132.73	140	87.45	180	53.43
21	201.11	61	174.38	101	131.58	141	86.39	181	52.84
22	200.73	62	173.45	102	130.42	142	85.33	182	52.26
23	200.34	63	172.52	103	129.26	143	84.28	183	51.69
24	199.93	64	171.57	104	128.11	144	83.23	184	51.13
25	199.51	65	170.61	105	126.95	145	82.19	185	50.58
26	199.06	66	169.64	106	125.79	146	81.16	186	50.04
27	198.61	67	168.66	107	124.63	147	80.13	187	49.50
28	198.13	68	167.67	108	123.47	148	79.03	188	48.98
29	197.64	69	166.68	109	122.31	149	77.98	189	48.46
30	197.13	70	165.67	110	121.15	150	76.94	190	47.95
31	196.61	71	164.66	111	119.99	151	75.92	191	47.45
32	196.08	72	163.64	112	118.84	152	74.93	192	46.96
33	195.52	73	162.61	113	117.68	153	73.95	193	46.47
34	194.95	74	161.58	114	116.52	154	72.99	194	46.00
35	194.37	75	160.53	115	115.37	155	72.06	195	45.53
36	193.77	76	159.48	116	114.22	156	71.13	196	45.06
37	193.16	77	158.43	117	113.07	157	70.23	197	44.61
38	192.53	78	157.36	118	111.92	158	69.35	198	44.16
39	191.88	79	156.29	119	110.77	159	68.48	199	43.71
40	191.23	80	155.22	120	109.63	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 216 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	215.99	41	199.99	81	159.94	121	110.47	161	66.78
2	215.96	42	199.24	82	158.75	122	109.24	162	65.96
3	215.91	43	198.46	83	157.55	123	108.02	163	65.16
4	215.84	44	197.67	84	156.35	124	106.81	164	64.36
5	215.75	45	196.87	85	155.15	125	105.60	165	63.59
6	215.64	46	196.05	86	153.94	126	104.39	166	62.82
7	215.52	47	195.22	87	152.72	127	103.19	167	62.07
8	215.37	48	194.37	88	151.50	128	101.99	168	61.34
9	215.20	49	193.51	89	150.28	129	100.80	169	60.61
10	215.01	50	192.63	90	149.05	130	99.61	170	59.90
11	214.81	51	191.74	91	147.82	131	98.42	171	59.20
12	214.58	52	190.84	92	146.59	132	97.25	172	58.52
13	214.33	53	189.92	93	145.35	133	96.07	173	57.84
14	214.07	54	189.00	94	144.11	134	94.91	174	57.18
15	213.79	55	188.05	95	142.87	135	93.74	175	56.53
16	213.48	56	187.10	96	141.62	136	92.59	176	55.89
17	213.16	57	186.13	97	140.38	137	91.44	177	55.26
18	212.82	58	185.16	98	139.13	138	90.29	178	54.64
19	212.46	59	184.17	99	137.88	139	89.15	179	54.03
20	212.08	60	183.17	100	136.63	140	88.02	180	53.43
21	211.68	61	182.15	101	135.38	141	86.90	181	52.84
22	211.26	62	181.13	102	134.12	142	85.78	182	52.26
23	210.83	63	180.10	103	132.87	143	84.66	183	51.69
24	210.38	64	179.05	104	131.62	144	83.48	184	51.13
25	209.90	65	178.00	105	130.36	145	82.34	185	50.58
26	209.41	66	176.93	106	129.11	146	81.21	186	50.04
27	208.91	67	175.86	107	127.86	147	80.11	187	49.50
28	208.38	68	174.77	108	126.60	148	79.03	188	48.98
29	207.84	69	173.68	109	125.35	149	77.98	189	48.46
30	207.28	70	172.58	110	124.10	150	76.94	190	47.95
31	206.70	71	171.47	111	122.85	151	75.92	191	47.45
32	206.10	72	170.35	112	121.60	152	74.93	192	46.96
33	205.49	73	169.22	113	120.36	153	73.95	193	46.47
34	204.86	74	168.09	114	119.11	154	72.99	194	46.00
35	204.21	75	166.94	115	117.87	155	72.06	195	45.53
36	203.55	76	165.79	116	116.63	156	71.13	196	45.06
37	202.87	77	164.63	117	115.39	157	70.23	197	44.61
38	202.18	78	163.47	118	114.15	158	69.35	198	44.16
39	201.46	79	162.30	119	112.92	159	68.48	199	43.71
40	200.74	80	161.12	120	111.69	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 225 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	224.99	41	207.66	81	164.53	121	111.90	161	66.78
2	224.96	42	206.84	82	163.25	122	110.61	162	65.96
3	224.90	43	206.00	83	161.97	123	109.32	163	65.16
4	224.83	44	205.15	84	160.69	124	108.04	164	64.36
5	224.73	45	204.28	85	159.40	125	106.77	165	63.59
6	224.61	46	203.39	86	158.10	126	105.50	166	62.82
7	224.47	47	202.49	87	156.80	127	104.23	167	62.07
8	224.31	48	201.58	88	155.50	128	102.97	168	61.34
9	224.13	49	200.65	89	154.19	129	101.71	169	60.61
10	223.93	50	199.70	90	152.88	130	100.47	170	59.90
11	223.70	51	198.74	91	151.57	131	99.22	171	59.20
12	223.46	52	197.77	92	150.25	132	97.99	172	58.52
13	223.19	53	196.78	93	148.93	133	96.75	173	57.84
14	222.91	54	195.78	94	147.61	134	95.53	174	57.18
15	222.60	55	194.76	95	146.28	135	94.31	175	56.53
16	222.27	56	193.73	96	144.95	136	93.10	176	55.89
17	221.92	57	192.69	97	143.63	137	91.90	177	55.26
18	221.55	58	191.64	98	142.30	138	90.70	178	54.64
19	221.16	59	190.57	99	140.96	139	89.51	179	54.03
20	220.75	60	189.49	100	139.63	140	88.32	180	53.43
21	220.32	61	188.40	101	138.30	141	87.07	181	52.84
22	219.86	62	187.30	102	136.97	142	85.85	182	52.26
23	219.39	63	186.19	103	135.63	143	84.66	183	51.69
24	218.90	64	185.06	104	134.30	144	83.48	184	51.13
25	218.39	65	183.93	105	132.97	145	82.34	185	50.58
26	217.86	66	182.78	106	131.64	146	81.21	186	50.04
27	217.31	67	181.62	107	130.31	147	80.11	187	49.50
28	216.74	68	180.46	108	128.98	148	79.03	188	48.98
29	216.15	69	179.28	109	127.65	149	77.98	189	48.46
30	215.54	70	178.10	110	126.32	150	76.94	190	47.95
31	214.92	71	176.90	111	125.00	151	75.92	191	47.45
32	214.27	72	175.70	112	123.67	152	74.93	192	46.96
33	213.61	73	174.49	113	122.35	153	73.95	193	46.47
34	212.93	74	173.27	114	121.03	154	72.99	194	46.00
35	212.23	75	172.04	115	119.72	155	72.06	195	45.53
36	211.51	76	170.81	116	118.41	156	71.13	196	45.06
37	210.77	77	169.56	117	117.10	157	70.23	197	44.61
38	210.02	78	168.32	118	115.79	158	69.35	198	44.16
39	209.25	79	167.06	119	114.49	159	68.48	199	43.71
40	208.46	80	165.80	120	113.19	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 235 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	234.99	41	216.12	81	169.47	121	113.30	161	66.78
2	234.95	42	215.23	82	168.10	122	111.94	162	65.96
3	234.89	43	214.32	83	166.72	123	110.58	163	65.16
4	234.81	44	213.39	84	165.34	124	109.22	164	64.36
5	234.71	45	212.44	85	163.95	125	107.88	165	63.59
6	234.58	46	211.48	86	162.56	126	106.54	166	62.82
7	234.43	47	210.51	87	161.16	127	105.20	167	62.07
8	234.25	48	209.51	88	159.77	128	103.87	168	61.34
9	234.05	49	208.50	89	158.36	129	102.55	169	60.61
10	233.83	50	207.48	90	156.96	130	101.24	170	59.90
11	233.59	51	206.43	91	155.55	131	99.93	171	59.20
12	233.32	52	205.38	92	154.14	132	98.63	172	58.52
13	233.03	53	204.31	93	152.72	133	97.33	173	57.84
14	232.72	54	203.22	94	151.30	134	96.05	174	57.18
15	232.38	55	202.12	95	149.89	135	94.77	175	56.53
16	232.02	56	201.00	96	148.47	136	93.50	176	55.89
17	231.64	57	199.87	97	147.05	137	92.23	177	55.26
18	231.24	58	198.73	98	145.62	138	90.90	178	54.64
19	230.81	59	197.58	99	144.20	139	89.60	179	54.03
20	230.36	60	196.41	100	142.78	140	88.32	180	53.43
21	229.89	61	195.23	101	141.36	141	87.07	181	52.84
22	229.40	62	194.04	102	139.93	142	85.85	182	52.26
23	228.89	63	192.83	103	138.51	143	84.66	183	51.69
24	228.35	64	191.61	104	137.09	144	83.48	184	51.13
25	227.79	65	190.39	105	135.67	145	82.34	185	50.58
26	227.22	66	189.15	106	134.25	146	81.21	186	50.04
27	226.62	67	187.90	107	132.83	147	80.11	187	49.50
28	226.00	68	186.64	108	131.42	148	79.03	188	48.98
29	225.36	69	185.37	109	130.00	149	77.98	189	48.46
30	224.69	70	184.09	110	128.59	150	76.94	190	47.95
31	224.01	71	182.80	111	127.18	151	75.92	191	47.45
32	223.31	72	181.50	112	125.78	152	74.93	192	46.96
33	222.59	73	180.20	113	124.38	153	73.95	193	46.47
34	221.85	74	178.88	114	122.98	154	72.99	194	46.00
35	221.08	75	177.56	115	121.58	155	72.06	195	45.53
36	220.30	76	176.23	116	120.19	156	71.13	196	45.06
37	219.50	77	174.89	117	118.80	157	70.23	197	44.61
38	218.68	78	173.54	118	117.42	158	69.35	198	44.16
39	217.85	79	172.19	119	116.04	159	68.48	199	43.71
40	216.99	80	170.83	120	114.67	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 245 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	244.99	41	224.51	81	174.24	121	114.51	161	66.78
2	244.95	42	223.55	82	172.77	122	113.07	162	65.96
3	244.89	43	222.56	83	171.29	123	111.64	163	65.16
4	244.80	44	221.56	84	169.81	124	110.22	164	64.36
5	244.68	45	220.54	85	168.33	125	108.80	165	63.59
6	244.54	46	219.50	86	166.84	126	107.39	166	62.82
7	244.38	47	218.44	87	165.35	127	105.99	167	62.07
8	244.19	48	217.36	88	163.85	128	104.60	168	61.34
9	243.97	49	216.27	89	162.35	129	103.21	169	60.61
10	243.73	50	215.16	90	160.85	130	101.83	170	59.90
11	243.46	51	214.03	91	159.34	131	100.46	171	59.20
12	243.17	52	212.89	92	157.84	132	99.10	172	58.52
13	242.86	53	211.73	93	156.33	133	97.74	173	57.84
14	242.52	54	210.56	94	154.81	134	96.39	174	57.18
15	242.15	55	209.37	95	153.30	135	94.99	175	56.53
16	241.76	56	208.17	96	151.79	136	93.59	176	55.89
17	241.35	57	206.95	97	150.27	137	92.23	177	55.26
18	240.91	58	205.72	98	148.76	138	90.90	178	54.64
19	240.45	59	204.47	99	147.25	139	89.60	179	54.03
20	239.96	60	203.21	100	145.73	140	88.32	180	53.43
21	239.45	61	201.94	101	144.22	141	87.07	181	52.84
22	238.92	62	200.65	102	142.70	142	85.85	182	52.26
23	238.36	63	199.35	103	141.19	143	84.66	183	51.69
24	237.78	64	198.04	104	139.68	144	83.48	184	51.13
25	237.17	65	196.72	105	138.17	145	82.34	185	50.58
26	236.55	66	195.38	106	136.67	146	81.21	186	50.04
27	235.90	67	194.04	107	135.16	147	80.11	187	49.50
28	235.22	68	192.68	108	133.66	148	79.03	188	48.98
29	234.53	69	191.32	109	132.16	149	77.98	189	48.46
30	233.81	70	189.94	110	130.67	150	76.94	190	47.95
31	233.07	71	188.55	111	129.18	151	75.92	191	47.45
32	232.31	72	187.16	112	127.69	152	74.93	192	46.96
33	231.52	73	185.75	113	126.21	153	73.95	193	46.47
34	230.72	74	184.34	114	124.73	154	72.99	194	46.00
35	229.89	75	182.92	115	123.25	155	72.06	195	45.53
36	229.05	76	181.49	116	121.78	156	71.13	196	45.06
37	228.18	77	180.05	117	120.32	157	70.23	197	44.61
38	227.29	78	178.61	118	118.86	158	69.35	198	44.16
39	226.39	79	177.16	119	117.40	159	68.48	199	43.71
40	225.46	80	175.70	120	115.95	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 255 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	254.99	41	232.84	81	178.84	121	115.54	161	66.78
2	254.94	42	231.80	82	177.27	122	114.03	162	65.96
3	254.88	43	230.74	83	175.70	123	112.53	163	65.16
4	254.78	44	229.66	84	174.12	124	111.04	164	64.36
5	254.66	45	228.55	85	172.54	125	109.55	165	63.59
6	254.50	46	227.43	86	170.95	126	108.08	166	62.82
7	254.33	47	226.29	87	169.36	127	106.61	167	62.07
8	254.12	48	225.13	88	167.76	128	105.15	168	61.34
9	253.89	49	223.95	89	166.16	129	103.70	169	60.61
10	253.62	50	222.76	90	164.56	130	102.26	170	59.90
11	253.34	51	221.55	91	162.96	131	100.82	171	59.20
12	253.02	52	220.31	92	161.36	132	99.35	172	58.52
13	252.68	53	219.07	93	159.75	133	97.86	173	57.84
14	252.31	54	217.80	94	158.14	134	96.41	174	57.18
15	251.92	55	216.52	95	156.54	135	94.99	175	56.53
16	251.49	56	215.23	96	154.93	136	93.59	176	55.89
17	251.05	57	213.92	97	153.32	137	92.23	177	55.26
18	250.57	58	212.59	98	151.71	138	90.90	178	54.64
19	250.07	59	211.25	99	150.10	139	89.60	179	54.03
20	249.54	60	209.90	100	148.50	140	88.32	180	53.43
21	248.99	61	208.53	101	146.89	141	87.07	181	52.84
22	248.41	62	207.14	102	145.29	142	85.85	182	52.26
23	247.81	63	205.75	103	143.69	143	84.66	183	51.69
24	247.18	64	204.34	104	142.09	144	83.48	184	51.13
25	246.53	65	202.92	105	140.49	145	82.34	185	50.58
26	245.85	66	201.49	106	138.90	146	81.21	186	50.04
27	245.14	67	200.04	107	137.31	147	80.11	187	49.50
28	244.42	68	198.59	108	135.72	148	79.03	188	48.98
29	243.66	69	197.12	109	134.14	149	77.98	189	48.46
30	242.89	70	195.65	110	132.56	150	76.94	190	47.95
31	242.09	71	194.16	111	130.98	151	75.92	191	47.45
32	241.26	72	192.67	112	129.41	152	74.93	192	46.96
33	240.42	73	191.16	113	127.85	153	73.95	193	46.47
34	239.55	74	189.65	114	126.29	154	72.99	194	46.00
35	238.66	75	188.13	115	124.73	155	72.06	195	45.53
36	237.74	76	186.60	116	123.19	156	71.13	196	45.06
37	236.81	77	185.06	117	121.64	157	70.23	197	44.61
38	235.85	78	183.52	118	120.11	158	69.35	198	44.16
39	234.87	79	181.96	119	118.58	159	68.48	199	43.71
40	233.87	80	180.41	120	117.06	160	67.62	200	43.28





## گروه آموزشی ایست عمران

$F_y = 265 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	264.99	41	241.11	81	183.29	121	116.40	161	66.78
2	264.94	42	239.99	82	181.62	122	114.82	162	65.96
3	264.87	43	238.85	83	179.94	123	113.25	163	65.16
4	264.76	44	237.68	84	178.26	124	111.69	164	64.36
5	264.63	45	236.50	85	176.58	125	110.14	165	63.59
6	264.46	46	235.29	86	174.89	126	108.60	166	62.82
7	264.27	47	234.07	87	173.20	127	107.06	167	62.07
8	264.05	48	232.82	88	171.50	128	105.54	168	61.34
9	263.80	49	231.55	89	169.80	129	104.03	169	60.61
10	263.52	50	230.27	90	168.10	130	102.43	170	59.90
11	263.20	51	228.97	91	166.40	131	100.88	171	59.20
12	262.86	52	227.65	92	164.70	132	99.35	172	58.52
13	262.50	53	226.31	93	163.00	133	97.86	173	57.84
14	262.10	54	224.95	94	161.29	134	96.41	174	57.18
15	261.67	55	223.58	95	159.59	135	94.99	175	56.53
16	261.22	56	222.19	96	157.89	136	93.59	176	55.89
17	260.73	57	220.78	97	156.18	137	92.23	177	55.26
18	260.22	58	219.36	98	154.48	138	90.90	178	54.64
19	259.68	59	217.92	99	152.78	139	89.60	179	54.03
20	259.11	60	216.47	100	151.08	140	88.32	180	53.43
21	258.51	61	215.00	101	149.39	141	87.07	181	52.84
22	257.89	62	213.52	102	147.69	142	85.85	182	52.26
23	257.24	63	212.03	103	146.00	143	84.66	183	51.69
24	256.56	64	210.52	104	144.31	144	83.48	184	51.13
25	255.85	65	209.00	105	142.63	145	82.34	185	50.58
26	255.12	66	207.47	106	140.95	146	81.21	186	50.04
27	254.36	67	205.92	107	139.27	147	80.11	187	49.50
28	253.58	68	204.36	108	137.60	148	79.03	188	48.98
29	252.77	69	202.80	109	135.93	149	77.98	189	48.46
30	251.93	70	201.22	110	134.27	150	76.94	190	47.95
31	251.07	71	199.63	111	132.61	151	75.92	191	47.45
32	250.18	72	198.03	112	130.96	152	74.93	192	46.96
33	249.27	73	196.43	113	129.31	153	73.95	193	46.47
34	248.33	74	194.81	114	127.67	154	72.99	194	46.00
35	247.37	75	193.19	115	126.04	155	72.06	195	45.53
36	246.39	76	191.55	116	124.42	156	71.13	196	45.06
37	245.38	77	189.91	117	122.80	157	70.23	197	44.61
38	244.35	78	188.27	118	121.19	158	69.35	198	44.16
39	243.29	79	186.61	119	119.58	159	68.48	199	43.71
40	242.21	80	184.95	120	117.99	160	67.62	200	43.28





## گروه آموزشی ایست عمران

$F_y = 275$ Mpa مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	274.98	41	249.32	81	187.58	121	117.10	161	66.78
2	274.94	42	248.12	82	185.80	122	115.45	162	65.96
3	274.86	43	246.89	83	184.02	123	113.82	163	65.16
4	274.74	44	245.64	84	182.24	124	112.19	164	64.36
5	274.60	45	244.37	85	180.45	125	110.57	165	63.59
6	274.42	46	243.08	86	178.66	126	108.96	166	62.82
7	274.22	47	241.76	87	176.87	127	107.37	167	62.07
8	273.98	48	240.43	88	175.07	128	105.66	168	61.34
9	273.70	49	239.07	89	173.28	129	104.03	169	60.61
10	273.40	50	237.70	90	171.48	130	102.43	170	59.90
11	273.07	51	236.30	91	169.68	131	100.88	171	59.20
12	272.70	52	234.89	92	167.88	132	99.35	172	58.52
13	272.30	53	233.45	93	166.07	133	97.86	173	57.84
14	271.87	54	232.00	94	164.27	134	96.41	174	57.18
15	271.42	55	230.53	95	162.47	135	94.99	175	56.53
16	270.93	56	229.04	96	160.67	136	93.59	176	55.89
17	270.40	57	227.54	97	158.88	137	92.23	177	55.26
18	269.85	58	226.02	98	157.08	138	90.90	178	54.64
19	269.27	59	224.48	99	155.29	139	89.60	179	54.03
20	268.66	60	222.93	100	153.49	140	88.32	180	53.43
21	268.02	61	221.36	101	151.71	141	87.07	181	52.84
22	267.35	62	219.78	102	149.92	142	85.85	182	52.26
23	266.65	63	218.18	103	148.14	143	84.66	183	51.69
24	265.92	64	216.57	104	146.36	144	83.48	184	51.13
25	265.16	65	214.95	105	144.59	145	82.34	185	50.58
26	264.37	66	213.31	106	142.82	146	81.21	186	50.04
27	263.56	67	211.67	107	141.06	147	80.11	187	49.50
28	262.71	68	210.01	108	139.30	148	79.03	188	48.98
29	261.84	69	208.34	109	137.55	149	77.98	189	48.46
30	260.94	70	206.65	110	135.80	150	76.94	190	47.95
31	260.01	71	204.96	111	134.06	151	75.92	191	47.45
32	259.06	72	203.26	112	132.33	152	74.93	192	46.96
33	258.08	73	201.55	113	130.61	153	73.95	193	46.47
34	257.07	74	199.83	114	128.89	154	72.99	194	46.00
35	256.04	75	198.10	115	127.18	155	72.06	195	45.53
36	254.98	76	196.36	116	125.48	156	71.13	196	45.06
37	253.90	77	194.62	117	123.79	157	70.23	197	44.61
38	252.79	78	192.87	118	122.10	158	69.35	198	44.16
39	251.66	79	191.11	119	120.43	159	68.48	199	43.71
40	250.50	80	189.35	120	118.76	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 285 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	284.98	41	257.47	81	191.71	121	117.65	161	66.78
2	284.93	42	256.18	82	189.83	122	115.93	162	65.96
3	284.85	43	254.87	83	187.95	123	114.23	163	65.16
4	284.72	44	253.53	84	186.06	124	112.54	164	64.36
5	284.57	45	252.17	85	184.17	125	110.79	165	63.59
6	284.38	46	250.79	86	182.28	126	109.04	166	62.82
7	284.16	47	249.38	87	180.38	127	107.33	167	62.07
8	283.90	48	247.96	88	178.49	128	105.66	168	61.34
9	283.61	49	246.51	89	176.59	129	104.03	169	60.61
10	283.28	50	245.04	90	174.69	130	102.43	170	59.90
11	282.92	51	243.55	91	172.79	131	100.88	171	59.20
12	282.53	52	242.04	92	170.89	132	99.35	172	58.52
13	282.10	53	240.50	93	168.99	133	97.86	173	57.84
14	281.64	54	238.95	94	167.09	134	96.41	174	57.18
15	281.15	55	237.39	95	165.19	135	94.99	175	56.53
16	280.62	56	235.80	96	163.29	136	93.59	176	55.89
17	280.07	57	234.19	97	161.40	137	92.23	177	55.26
18	279.47	58	232.57	98	159.51	138	90.90	178	54.64
19	278.85	59	230.93	99	157.62	139	89.60	179	54.03
20	278.19	60	229.28	100	155.74	140	88.32	180	53.43
21	277.50	61	227.61	101	153.86	141	87.07	181	52.84
22	276.78	62	225.92	102	151.98	142	85.85	182	52.26
23	276.03	63	224.22	103	150.11	143	84.66	183	51.69
24	275.25	64	222.51	104	148.24	144	83.48	184	51.13
25	274.44	65	220.78	105	146.38	145	82.34	185	50.58
26	273.59	66	219.04	106	144.53	146	81.21	186	50.04
27	272.72	67	217.29	107	142.68	147	80.11	187	49.50
28	271.81	68	215.52	108	140.84	148	79.03	188	48.98
29	270.88	69	213.74	109	139.00	149	77.98	189	48.46
30	269.91	70	211.96	110	137.18	150	76.94	190	47.95
31	268.92	71	210.16	111	135.36	151	75.92	191	47.45
32	267.90	72	208.35	112	133.54	152	74.93	192	46.96
33	266.85	73	206.53	113	131.74	153	73.95	193	46.47
34	265.77	74	204.70	114	129.95	154	72.99	194	46.00
35	264.66	75	202.87	115	128.16	155	72.06	195	45.53
36	263.53	76	201.03	116	126.38	156	71.13	196	45.06
37	262.37	77	199.18	117	124.62	157	70.23	197	44.61
38	261.18	78	197.32	118	122.86	158	69.35	198	44.16
39	259.97	79	195.46	119	121.11	159	68.48	199	43.71
40	258.73	80	193.59	120	119.38	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 295 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	294.98	41	265.56	81	195.70	121	118.06	161	66.78
2	294.93	42	264.18	82	193.71	122	116.27	162	65.96
3	294.83	43	262.78	83	191.72	123	114.42	163	65.16
4	294.70	44	261.35	84	189.73	124	112.59	164	64.36
5	294.54	45	259.90	85	187.74	125	110.79	165	63.59
6	294.34	46	258.43	86	185.74	126	109.04	166	62.82
7	294.10	47	256.93	87	183.74	127	107.33	167	62.07
8	293.82	48	255.41	88	181.74	128	105.66	168	61.34
9	293.51	49	253.86	89	179.74	129	104.03	169	60.61
10	293.16	50	252.29	90	177.74	130	102.43	170	59.90
11	292.78	51	250.71	91	175.74	131	100.88	171	59.20
12	292.35	52	249.10	92	173.74	132	99.35	172	58.52
13	291.90	53	247.46	93	171.74	133	97.86	173	57.84
14	291.41	54	245.81	94	169.74	134	96.41	174	57.18
15	290.88	55	244.14	95	167.75	135	94.99	175	56.53
16	290.31	56	242.45	96	165.75	136	93.59	176	55.89
17	289.72	57	240.75	97	163.76	137	92.23	177	55.26
18	289.08	58	239.02	98	161.78	138	90.90	178	54.64
19	288.41	59	237.28	99	159.80	139	89.60	179	54.03
20	287.71	60	235.52	100	157.82	140	88.32	180	53.43
21	286.97	61	233.74	101	155.85	141	87.07	181	52.84
22	286.20	62	231.95	102	153.88	142	85.85	182	52.26
23	285.40	63	230.14	103	151.92	143	84.66	183	51.69
24	284.56	64	228.32	104	149.97	144	83.48	184	51.13
25	283.69	65	226.49	105	148.02	145	82.34	185	50.58
26	282.79	66	224.64	106	146.08	146	81.21	186	50.04
27	281.85	67	222.78	107	144.14	147	80.11	187	49.50
28	280.88	68	220.91	108	142.22	148	79.03	188	48.98
29	279.88	69	219.02	109	140.30	149	77.98	189	48.46
30	278.85	70	217.12	110	138.39	150	76.94	190	47.95
31	277.79	71	215.22	111	136.49	151	75.92	191	47.45
32	276.70	72	213.30	112	134.60	152	74.93	192	46.96
33	275.57	73	211.38	113	132.72	153	73.95	193	46.47
34	274.42	74	209.44	114	130.85	154	72.99	194	46.00
35	273.24	75	207.50	115	128.99	155	72.06	195	45.53
36	272.03	76	205.55	116	127.14	156	71.13	196	45.06
37	270.79	77	203.59	117	125.30	157	70.23	197	44.61
38	269.52	78	201.63	118	123.47	158	69.35	198	44.16
39	268.23	79	199.65	119	121.65	159	68.48	199	43.71
40	266.90	80	197.68	120	119.85	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 315 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	314.98	41	281.55	81	203.23	121	118.24	161	66.78
2	314.92	42	279.99	82	201.03	122	116.31	162	65.96
3	314.81	43	278.40	83	198.83	123	114.42	163	65.16
4	314.66	44	276.79	84	196.62	124	112.59	164	64.36
5	314.47	45	275.15	85	194.42	125	110.79	165	63.59
6	314.24	46	273.48	86	192.21	126	109.04	166	62.82
7	313.97	47	271.79	87	190.00	127	107.33	167	62.07
8	313.66	48	270.07	88	187.79	128	105.66	168	61.34
9	313.30	49	268.33	89	185.58	129	104.03	169	60.61
10	312.90	50	266.56	90	183.38	130	102.43	170	59.90
11	312.46	51	264.77	91	181.17	131	100.88	171	59.20
12	311.98	52	262.95	92	178.97	132	99.35	172	58.52
13	311.46	53	261.11	93	176.78	133	97.86	173	57.84
14	310.90	54	259.25	94	174.58	134	96.41	174	57.18
15	310.30	55	257.37	95	172.39	135	94.99	175	56.53
16	309.66	56	255.47	96	170.21	136	93.59	176	55.89
17	308.98	57	253.55	97	168.03	137	92.23	177	55.26
18	308.26	58	251.61	98	165.85	138	90.90	178	54.64
19	307.50	59	249.65	99	163.68	139	89.60	179	54.03
20	306.70	60	247.68	100	161.52	140	88.32	180	53.43
21	305.86	61	245.68	101	159.37	141	87.07	181	52.84
22	304.98	62	243.67	102	157.22	142	85.85	182	52.26
23	304.06	63	241.65	103	155.08	143	84.66	183	51.69
24	303.11	64	239.60	104	152.95	144	83.48	184	51.13
25	302.12	65	237.55	105	150.83	145	82.34	185	50.58
26	301.09	66	235.48	106	148.72	146	81.21	186	50.04
27	300.03	67	233.40	107	146.62	147	80.11	187	49.50
28	298.93	68	231.30	108	144.53	148	79.03	188	48.98
29	297.79	69	229.19	109	142.45	149	77.98	189	48.46
30	296.62	70	227.08	110	140.38	150	76.94	190	47.95
31	295.42	71	224.95	111	138.33	151	75.92	191	47.45
32	294.18	72	222.81	112	136.28	152	74.93	192	46.96
33	292.90	73	220.66	113	134.25	153	73.95	193	46.47
34	291.59	74	218.51	114	132.23	154	72.99	194	46.00
35	290.25	75	216.34	115	130.22	155	72.06	195	45.53
36	288.88	76	214.17	116	128.23	156	71.13	196	45.06
37	287.47	77	211.99	117	126.25	157	70.23	197	44.61
38	286.04	78	209.81	118	124.28	158	69.35	198	44.16
39	284.57	79	207.62	119	122.25	159	68.48	199	43.71
40	283.07	80	205.43	120	120.22	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 325 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	324.98	41	289.45	81	206.79	121	118.24	161	66.78
2	324.91	42	287.80	82	204.48	122	116.31	162	65.96
3	324.80	43	286.12	83	202.16	123	114.42	163	65.16
4	324.64	44	284.41	84	199.85	124	112.59	164	64.36
5	324.44	45	282.67	85	197.54	125	110.79	165	63.59
6	324.19	46	280.90	86	195.22	126	109.04	166	62.82
7	323.90	47	279.11	87	192.91	127	107.33	167	62.07
8	323.57	48	277.29	88	190.60	128	105.66	168	61.34
9	323.19	49	275.44	89	188.29	129	104.03	169	60.61
10	322.77	50	273.57	90	185.98	130	102.43	170	59.90
11	322.30	51	271.67	91	183.67	131	100.88	171	59.20
12	321.79	52	269.75	92	181.37	132	99.35	172	58.52
13	321.24	53	267.80	93	179.07	133	97.86	173	57.84
14	320.64	54	265.83	94	176.78	134	96.41	174	57.18
15	320.00	55	263.85	95	174.49	135	94.99	175	56.53
16	319.32	56	261.83	96	172.21	136	93.59	176	55.89
17	318.59	57	259.80	97	169.94	137	92.23	177	55.26
18	317.82	58	257.75	98	167.67	138	90.90	178	54.64
19	317.01	59	255.68	99	165.41	139	89.60	179	54.03
20	316.16	60	253.59	100	163.15	140	88.32	180	53.43
21	315.27	61	251.49	101	160.91	141	87.07	181	52.84
22	314.34	62	249.37	102	158.67	142	85.85	182	52.26
23	313.37	63	247.23	103	156.45	143	84.66	183	51.69
24	312.35	64	245.07	104	154.23	144	83.48	184	51.13
25	311.30	65	242.90	105	152.03	145	82.34	185	50.58
26	310.21	66	240.72	106	149.83	146	81.21	186	50.04
27	309.08	67	238.53	107	147.65	147	80.11	187	49.50
28	307.91	68	236.32	108	145.48	148	79.03	188	48.98
29	306.70	69	234.10	109	143.32	149	77.98	189	48.46
30	305.46	70	231.86	110	141.17	150	76.94	190	47.95
31	304.17	71	229.62	111	139.04	151	75.92	191	47.45
32	302.86	72	227.37	112	136.92	152	74.93	192	46.96
33	301.50	73	225.11	113	134.81	153	73.95	193	46.47
34	300.11	74	222.84	114	132.72	154	72.99	194	46.00
35	298.69	75	220.56	115	130.64	155	72.06	195	45.53
36	297.23	76	218.28	116	128.58	156	71.13	196	45.06
37	295.74	77	215.99	117	126.46	157	70.23	197	44.61
38	294.22	78	213.70	118	124.33	158	69.35	198	44.16
39	292.66	79	211.40	119	122.25	159	68.48	199	43.71
40	291.07	80	209.09	120	120.22	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 335 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	334.98	41	297.29	81	210.20	121	118.24	161	66.78
2	334.90	42	295.55	82	207.78	122	116.31	162	65.96
3	334.79	43	293.77	83	205.36	123	114.42	163	65.16
4	334.62	44	291.96	84	202.94	124	112.59	164	64.36
5	334.41	45	290.12	85	200.52	125	110.79	165	63.59
6	334.14	46	288.25	86	198.10	126	109.04	166	62.82
7	333.84	47	286.35	87	195.68	127	107.33	167	62.07
8	333.48	48	284.42	88	193.26	128	105.66	168	61.34
9	333.08	49	282.47	89	190.85	129	104.03	169	60.61
10	332.63	50	280.49	90	188.44	130	102.43	170	59.90
11	332.13	51	278.49	91	186.03	131	100.88	171	59.20
12	331.59	52	276.46	92	183.63	132	99.35	172	58.52
13	331.00	53	274.40	93	181.23	133	97.86	173	57.84
14	330.37	54	272.33	94	178.84	134	96.41	174	57.18
15	329.69	55	270.22	95	176.45	135	94.99	175	56.53
16	328.96	56	268.10	96	174.08	136	93.59	176	55.89
17	328.19	57	265.96	97	171.70	137	92.23	177	55.26
18	327.38	58	263.80	98	169.34	138	90.90	178	54.64
19	326.52	59	261.61	99	166.99	139	89.60	179	54.03
20	325.62	60	259.41	100	164.65	140	88.32	180	53.43
21	324.67	61	257.19	101	162.31	141	87.07	181	52.84
22	323.68	62	254.95	102	159.99	142	85.85	182	52.26
23	322.65	63	252.70	103	157.68	143	84.66	183	51.69
24	321.57	64	250.43	104	155.37	144	83.48	184	51.13
25	320.45	65	248.15	105	153.08	145	82.34	185	50.58
26	319.29	66	245.85	106	150.81	146	81.21	186	50.04
27	318.09	67	243.54	107	148.54	147	80.11	187	49.50
28	316.85	68	241.21	108	146.29	148	79.03	188	48.98
29	315.57	69	238.87	109	144.05	149	77.98	189	48.46
30	314.25	70	236.53	110	141.83	150	76.94	190	47.95
31	312.89	71	234.17	111	139.62	151	75.92	191	47.45
32	311.50	72	231.80	112	137.43	152	74.93	192	46.96
33	310.06	73	229.43	113	135.25	153	73.95	193	46.47
34	308.59	74	227.05	114	133.08	154	72.99	194	46.00
35	307.08	75	224.66	115	130.94	155	72.06	195	45.53
36	305.54	76	222.26	116	128.65	156	71.13	196	45.06
37	303.96	77	219.86	117	126.46	157	70.23	197	44.61
38	302.34	78	217.45	118	124.33	158	69.35	198	44.16
39	300.69	79	215.04	119	122.25	159	68.48	199	43.71
40	299.01	80	212.62	120	120.22	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 345 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	344.97	41	305.08	81	213.49	121	118.24	161	66.78
2	344.90	42	303.23	82	210.96	122	116.31	162	65.96
3	344.77	43	301.35	83	208.43	123	114.42	163	65.16
4	344.60	44	299.44	84	205.90	124	112.59	164	64.36
5	344.37	45	297.50	85	203.37	125	110.79	165	63.59
6	344.09	46	295.52	86	200.84	126	109.04	166	62.82
7	343.77	47	293.52	87	198.31	127	107.33	167	62.07
8	343.39	48	291.49	88	195.79	128	105.66	168	61.34
9	342.96	49	289.43	89	193.27	129	104.03	169	60.61
10	342.49	50	287.34	90	190.76	130	102.43	170	59.90
11	341.96	51	285.22	91	188.25	131	100.88	171	59.20
12	341.38	52	283.08	92	185.74	132	99.35	172	58.52
13	340.76	53	280.92	93	183.25	133	97.86	173	57.84
14	340.09	54	278.73	94	180.76	134	96.41	174	57.18
15	339.37	55	276.51	95	178.28	135	94.99	175	56.53
16	338.60	56	274.28	96	175.80	136	93.59	176	55.89
17	337.78	57	272.02	97	173.34	137	92.23	177	55.26
18	336.92	58	269.74	98	170.88	138	90.90	178	54.64
19	336.01	59	267.44	99	168.44	139	89.60	179	54.03
20	335.05	60	265.12	100	166.00	140	88.32	180	53.43
21	334.05	61	262.79	101	163.58	141	87.07	181	52.84
22	333.00	62	260.43	102	161.17	142	85.85	182	52.26
23	331.90	63	258.06	103	158.77	143	84.66	183	51.69
24	330.76	64	255.67	104	156.38	144	83.48	184	51.13
25	329.58	65	253.27	105	154.01	145	82.34	185	50.58
26	328.35	66	250.86	106	151.65	146	81.21	186	50.04
27	327.08	67	248.43	107	149.31	147	80.11	187	49.50
28	325.77	68	245.99	108	146.98	148	79.03	188	48.98
29	324.41	69	243.53	109	144.66	149	77.98	189	48.46
30	323.02	70	241.07	110	142.36	150	76.94	190	47.95
31	321.58	71	238.60	111	140.08	151	75.92	191	47.45
32	320.10	72	236.11	112	137.81	152	74.93	192	46.96
33	318.58	73	233.62	113	135.56	153	73.95	193	46.47
34	317.02	74	231.12	114	133.20	154	72.99	194	46.00
35	315.43	75	228.62	115	130.90	155	72.06	195	45.53
36	313.79	76	226.11	116	128.65	156	71.13	196	45.06
37	312.12	77	223.59	117	126.46	157	70.23	197	44.61
38	310.42	78	221.07	118	124.33	158	69.35	198	44.16
39	308.67	79	218.54	119	122.25	159	68.48	199	43.71
40	306.89	80	216.02	120	120.22	160	67.62	200	43.28





## گروه آموزشی ایست عمران

$F_y = 355 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	354.97	41	312.81	81	216.64	121	118.24	161	66.78
2	354.89	42	310.86	82	214.00	122	116.31	162	65.96
3	354.76	43	308.87	83	211.36	123	114.42	163	65.16
4	354.57	44	306.86	84	208.72	124	112.59	164	64.36
5	354.33	45	304.81	85	206.08	125	110.79	165	63.59
6	354.04	46	302.73	86	203.44	126	109.04	166	62.82
7	353.69	47	300.62	87	200.81	127	107.33	167	62.07
8	353.29	48	298.47	88	198.18	128	105.66	168	61.34
9	352.84	49	296.30	89	195.56	129	104.03	169	60.61
10	352.34	50	294.10	90	192.94	130	102.43	170	59.90
11	351.78	51	291.88	91	190.33	131	100.88	171	59.20
12	351.17	52	289.62	92	187.73	132	99.35	172	58.52
13	350.51	53	287.34	93	185.13	133	97.86	173	57.84
14	349.80	54	285.04	94	182.54	134	96.41	174	57.18
15	349.04	55	282.71	95	179.97	135	94.99	175	56.53
16	348.22	56	280.36	96	177.40	136	93.59	176	55.89
17	347.36	57	277.98	97	174.84	137	92.23	177	55.26
18	346.45	58	275.58	98	172.29	138	90.90	178	54.64
19	345.48	59	273.17	99	169.75	139	89.60	179	54.03
20	344.47	60	270.73	100	167.23	140	88.32	180	53.43
21	343.41	61	268.28	101	164.72	141	87.07	181	52.84
22	342.30	62	265.81	102	162.22	142	85.85	182	52.26
23	341.14	63	263.32	103	159.74	143	84.66	183	51.69
24	339.94	64	260.81	104	157.27	144	83.48	184	51.13
25	338.69	65	258.29	105	154.81	145	82.34	185	50.58
26	337.39	66	255.76	106	152.37	146	81.21	186	50.04
27	336.04	67	253.21	107	149.95	147	80.11	187	49.50
28	334.66	68	250.65	108	147.54	148	79.03	188	48.98
29	333.22	69	248.08	109	145.15	149	77.98	189	48.46
30	331.75	70	245.49	110	142.78	150	76.94	190	47.95
31	330.23	71	242.90	111	140.42	151	75.92	191	47.45
32	328.66	72	240.30	112	138.00	152	74.93	192	46.96
33	327.06	73	237.69	113	135.57	153	73.95	193	46.47
34	325.41	74	235.08	114	133.20	154	72.99	194	46.00
35	323.73	75	232.46	115	130.90	155	72.06	195	45.53
36	322.00	76	229.83	116	128.65	156	71.13	196	45.06
37	320.24	77	227.20	117	126.46	157	70.23	197	44.61
38	318.44	78	224.56	118	124.33	158	69.35	198	44.16
39	316.60	79	221.92	119	122.25	159	68.48	199	43.71
40	314.72	80	219.28	120	120.22	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 380 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	379.97	41	331.86	81	223.97	121	118.24	161	66.78
2	379.88	42	329.65	82	221.05	122	116.31	162	65.96
3	379.72	43	327.40	83	218.13	123	114.42	163	65.16
4	379.51	44	325.11	84	215.21	124	112.59	164	64.36
5	379.24	45	322.79	85	212.30	125	110.79	165	63.59
6	378.90	46	320.43	86	209.40	126	109.04	166	62.82
7	378.50	47	318.04	87	206.50	127	107.33	167	62.07
8	378.05	48	315.62	88	203.61	128	105.66	168	61.34
9	377.53	49	313.16	89	200.72	129	104.03	169	60.61
10	376.95	50	310.67	90	197.85	130	102.43	170	59.90
11	376.31	51	308.15	91	194.99	131	100.88	171	59.20
12	375.62	52	305.61	92	192.13	132	99.35	172	58.52
13	374.86	53	303.03	93	189.29	133	97.86	173	57.84
14	374.05	54	300.43	94	186.46	134	96.41	174	57.18
15	373.17	55	297.80	95	183.64	135	94.99	175	56.53
16	372.24	56	295.15	96	180.84	136	93.59	176	55.89
17	371.25	57	292.48	97	178.05	137	92.23	177	55.26
18	370.21	58	289.78	98	175.27	138	90.90	178	54.64
19	369.11	59	287.06	99	172.51	139	89.60	179	54.03
20	367.95	60	284.32	100	169.77	140	88.32	180	53.43
21	366.73	61	281.56	101	167.04	141	87.07	181	52.84
22	365.47	62	278.78	102	164.33	142	85.85	182	52.26
23	364.14	63	275.99	103	161.64	143	84.66	183	51.69
24	362.77	64	273.18	104	158.96	144	83.48	184	51.13
25	361.34	65	270.36	105	156.31	145	82.34	185	50.58
26	359.86	66	267.52	106	153.67	146	81.21	186	50.04
27	358.32	67	264.67	107	151.06	147	80.11	187	49.50
28	356.74	68	261.80	108	148.46	148	79.03	188	48.98
29	355.10	69	258.93	109	145.71	149	77.98	189	48.46
30	353.42	70	256.04	110	143.07	150	76.94	190	47.95
31	351.69	71	253.15	111	140.50	151	75.92	191	47.45
32	349.91	72	250.25	112	138.00	152	74.93	192	46.96
33	348.08	73	247.35	113	135.57	153	73.95	193	46.47
34	346.20	74	244.43	114	133.20	154	72.99	194	46.00
35	344.28	75	241.52	115	130.90	155	72.06	195	45.53
36	342.32	76	238.60	116	128.65	156	71.13	196	45.06
37	340.31	77	235.67	117	126.46	157	70.23	197	44.61
38	338.26	78	232.75	118	124.33	158	69.35	198	44.16
39	336.17	79	229.82	119	122.25	159	68.48	199	43.71
40	334.04	80	226.90	120	120.22	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 390 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	389.97	41	339.39	81	226.69	121	118.24	161	66.78
2	389.87	42	337.06	82	223.65	122	116.31	162	65.96
3	389.71	43	334.70	83	220.62	123	114.42	163	65.16
4	389.48	44	332.30	84	217.60	124	112.59	164	64.36
5	389.19	45	329.87	85	214.58	125	110.79	165	63.59
6	388.84	46	327.39	86	211.56	126	109.04	166	62.82
7	388.42	47	324.89	87	208.56	127	107.33	167	62.07
8	387.94	48	322.34	88	205.56	128	105.66	168	61.34
9	387.40	49	319.77	89	202.58	129	104.03	169	60.61
10	386.79	50	317.16	90	199.60	130	102.43	170	59.90
11	386.12	51	314.52	91	196.63	131	100.88	171	59.20
12	385.38	52	311.85	92	193.68	132	99.35	172	58.52
13	384.59	53	309.16	93	190.74	133	97.86	173	57.84
14	383.73	54	306.44	94	187.81	134	96.41	174	57.18
15	382.81	55	303.69	95	184.90	135	94.99	175	56.53
16	381.83	56	300.91	96	182.00	136	93.59	176	55.89
17	380.79	57	298.11	97	179.12	137	92.23	177	55.26
18	379.69	58	295.29	98	176.26	138	90.90	178	54.64
19	378.53	59	292.45	99	173.41	139	89.60	179	54.03
20	377.31	60	289.58	100	170.58	140	88.32	180	53.43
21	376.03	61	286.70	101	167.77	141	87.07	181	52.84
22	374.70	62	283.80	102	164.97	142	85.85	182	52.26
23	373.31	63	280.88	103	162.20	143	84.66	183	51.69
24	371.86	64	277.95	104	159.45	144	83.48	184	51.13
25	370.35	65	275.00	105	156.71	145	82.34	185	50.58
26	368.80	66	272.03	106	154.00	146	81.21	186	50.04
27	367.18	67	269.06	107	151.20	147	80.11	187	49.50
28	365.52	68	266.07	108	148.42	148	79.03	188	48.98
29	363.80	69	263.07	109	145.71	149	77.98	189	48.46
30	362.03	70	260.07	110	143.07	150	76.94	190	47.95
31	360.21	71	257.05	111	140.50	151	75.92	191	47.45
32	358.33	72	254.03	112	138.00	152	74.93	192	46.96
33	356.41	73	251.00	113	135.57	153	73.95	193	46.47
34	354.44	74	247.97	114	133.20	154	72.99	194	46.00
35	352.43	75	244.93	115	130.90	155	72.06	195	45.53
36	350.36	76	241.89	116	128.65	156	71.13	196	45.06
37	348.26	77	238.85	117	126.46	157	70.23	197	44.61
38	346.10	78	235.81	118	124.33	158	69.35	198	44.16
39	343.91	79	232.77	119	122.25	159	68.48	199	43.71
40	341.67	80	229.73	120	120.22	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 400$ Mpa مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	399.97	41	346.85	81	229.29	121	118.24	161	66.78
2	399.86	42	344.42	82	226.14	122	116.31	162	65.96
3	399.69	43	341.94	83	223.00	123	114.42	163	65.16
4	399.46	44	339.43	84	219.86	124	112.59	164	64.36
5	399.15	45	336.88	85	216.73	125	110.79	165	63.59
6	398.78	46	334.28	86	213.61	126	109.04	166	62.82
7	398.34	47	331.66	87	210.50	127	107.33	167	62.07
8	397.83	48	329.00	88	207.40	128	105.66	168	61.34
9	397.26	49	326.30	89	204.31	129	104.03	169	60.61
10	396.62	50	323.57	90	201.23	130	102.43	170	59.90
11	395.92	51	320.81	91	198.17	131	100.88	171	59.20
12	395.14	52	318.02	92	195.11	132	99.35	172	58.52
13	394.31	53	315.20	93	192.08	133	97.86	173	57.84
14	393.41	54	312.36	94	189.05	134	96.41	174	57.18
15	392.44	55	309.48	95	186.05	135	94.99	175	56.53
16	391.41	56	306.58	96	183.06	136	93.59	176	55.89
17	390.31	57	303.66	97	180.09	137	92.23	177	55.26
18	389.16	58	300.71	98	177.13	138	90.90	178	54.64
19	387.94	59	297.74	99	174.20	139	89.60	179	54.03
20	386.66	60	294.75	100	171.28	140	88.32	180	53.43
21	385.31	61	291.74	101	168.39	141	87.07	181	52.84
22	383.91	62	288.71	102	165.51	142	85.85	182	52.26
23	382.45	63	285.67	103	162.66	143	84.66	183	51.69
24	380.93	64	282.61	104	159.83	144	83.48	184	51.13
25	379.35	65	279.53	105	157.02	145	82.34	185	50.58
26	377.71	66	276.44	106	154.07	146	81.21	186	50.04
27	376.02	67	273.34	107	151.20	147	80.11	187	49.50
28	374.27	68	270.23	108	148.42	148	79.03	188	48.98
29	372.46	69	267.11	109	145.71	149	77.98	189	48.46
30	370.60	70	263.98	110	143.07	150	76.94	190	47.95
31	368.69	71	260.84	111	140.50	151	75.92	191	47.45
32	366.73	72	257.70	112	138.00	152	74.93	192	46.96
33	364.71	73	254.55	113	135.57	153	73.95	193	46.47
34	362.64	74	251.39	114	133.20	154	72.99	194	46.00
35	360.53	75	248.23	115	130.90	155	72.06	195	45.53
36	358.36	76	245.08	116	128.65	156	71.13	196	45.06
37	356.15	77	241.92	117	126.46	157	70.23	197	44.61
38	353.89	78	238.76	118	124.33	158	69.35	198	44.16
39	351.59	79	235.60	119	122.25	159	68.48	199	43.71
40	349.24	80	232.44	120	120.22	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 410 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	409.96	41	354.26	81	231.78	121	118.24	161	66.78
2	409.86	42	351.71	82	228.51	122	116.31	162	65.96
3	409.68	43	349.12	83	225.26	123	114.42	163	65.16
4	409.43	44	346.49	84	222.01	124	112.59	164	64.36
5	409.11	45	343.82	85	218.77	125	110.79	165	63.59
6	408.72	46	341.11	86	215.55	126	109.04	166	62.82
7	408.26	47	338.36	87	212.33	127	107.33	167	62.07
8	407.73	48	335.58	88	209.12	128	105.66	168	61.34
9	407.12	49	332.76	89	205.93	129	104.03	169	60.61
10	406.45	50	329.91	90	202.75	130	102.43	170	59.90
11	405.71	51	327.02	91	199.58	131	100.88	171	59.20
12	404.90	52	324.11	92	196.43	132	99.35	172	58.52
13	404.02	53	321.16	93	193.30	133	97.86	173	57.84
14	403.07	54	318.19	94	190.18	134	96.41	174	57.18
15	402.06	55	315.19	95	187.08	135	94.99	175	56.53
16	400.98	56	312.16	96	184.00	136	93.59	176	55.89
17	399.83	57	309.11	97	180.94	137	92.23	177	55.26
18	398.61	58	306.04	98	177.90	138	90.90	178	54.64
19	397.33	59	302.94	99	174.88	139	89.60	179	54.03
20	395.99	60	299.82	100	171.88	140	88.32	180	53.43
21	394.58	61	296.68	101	168.90	141	87.07	181	52.84
22	393.11	62	293.53	102	165.95	142	85.85	182	52.26
23	391.57	63	290.36	103	163.02	143	84.66	183	51.69
24	389.97	64	287.17	104	160.11	144	83.48	184	51.13
25	388.32	65	283.96	105	157.02	145	82.34	185	50.58
26	386.60	66	280.75	106	154.07	146	81.21	186	50.04
27	384.82	67	277.52	107	151.20	147	80.11	187	49.50
28	382.99	68	274.28	108	148.42	148	79.03	188	48.98
29	381.09	69	271.04	109	145.71	149	77.98	189	48.46
30	379.14	70	267.78	110	143.07	150	76.94	190	47.95
31	377.14	71	264.52	111	140.50	151	75.92	191	47.45
32	375.08	72	261.25	112	138.00	152	74.93	192	46.96
33	372.96	73	257.98	113	135.57	153	73.95	193	46.47
34	370.80	74	254.70	114	133.20	154	72.99	194	46.00
35	368.58	75	251.42	115	130.90	155	72.06	195	45.53
36	366.31	76	248.14	116	128.65	156	71.13	196	45.06
37	364.00	77	244.87	117	126.46	157	70.23	197	44.61
38	361.63	78	241.59	118	124.33	158	69.35	198	44.16
39	359.22	79	238.31	119	122.25	159	68.48	199	43.71
40	356.76	80	235.04	120	120.22	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 430 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	429.96	41	368.90	81	236.41	121	118.24	161	66.78
2	429.84	42	366.12	82	232.92	122	116.31	162	65.96
3	429.65	43	363.29	83	229.45	123	114.42	163	65.16
4	429.37	44	360.42	84	225.98	124	112.59	164	64.36
5	429.02	45	357.51	85	222.52	125	110.79	165	63.59
6	428.59	46	354.55	86	219.08	126	109.04	166	62.82
7	428.08	47	351.56	87	215.65	127	107.33	167	62.07
8	427.50	48	348.53	88	212.24	128	105.66	168	61.34
9	426.84	49	345.46	89	208.84	129	104.03	169	60.61
10	426.10	50	342.35	90	205.46	130	102.43	170	59.90
11	425.28	51	339.21	91	202.10	131	100.88	171	59.20
12	424.39	52	336.04	92	198.75	132	99.35	172	58.52
13	423.42	53	332.84	93	195.43	133	97.86	173	57.84
14	422.38	54	329.61	94	192.12	134	96.41	174	57.18
15	421.27	55	326.35	95	188.84	135	94.99	175	56.53
16	420.08	56	323.06	96	185.58	136	93.59	176	55.89
17	418.82	57	319.75	97	182.34	137	92.23	177	55.26
18	417.48	58	316.42	98	179.13	138	90.90	178	54.64
19	416.08	59	313.06	99	175.94	139	89.60	179	54.03
20	414.60	60	309.68	100	172.78	140	88.32	180	53.43
21	413.05	61	306.28	101	169.64	141	87.07	181	52.84
22	411.44	62	302.87	102	166.39	142	85.85	182	52.26
23	409.75	63	299.44	103	163.18	143	84.66	183	51.69
24	408.00	64	295.99	104	160.05	144	83.48	184	51.13
25	406.18	65	292.53	105	157.02	145	82.34	185	50.58
26	404.30	66	289.06	106	154.07	146	81.21	186	50.04
27	402.35	67	285.57	107	151.20	147	80.11	187	49.50
28	400.34	68	282.08	108	148.42	148	79.03	188	48.98
29	398.26	69	278.58	109	145.71	149	77.98	189	48.46
30	396.12	70	275.07	110	143.07	150	76.94	190	47.95
31	393.93	71	271.55	111	140.50	151	75.92	191	47.45
32	391.67	72	268.04	112	138.00	152	74.93	192	46.96
33	389.36	73	264.52	113	135.57	153	73.95	193	46.47
34	386.98	74	260.99	114	133.20	154	72.99	194	46.00
35	384.56	75	257.47	115	130.90	155	72.06	195	45.53
36	382.08	76	253.95	116	128.65	156	71.13	196	45.06
37	379.54	77	250.43	117	126.46	157	70.23	197	44.61
38	376.95	78	246.92	118	124.33	158	69.35	198	44.16
39	374.32	79	243.41	119	122.25	159	68.48	199	43.71
40	371.63	80	239.91	120	120.22	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 440 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	439.96	41	376.13	81	238.57	121	118.24	161	66.78
2	439.84	42	373.23	82	234.97	122	116.31	162	65.96
3	439.63	43	370.28	83	231.38	123	114.42	163	65.16
4	439.34	44	367.29	84	227.80	124	112.59	164	64.36
5	438.97	45	364.25	85	224.24	125	110.79	165	63.59
6	438.52	46	361.17	86	220.69	126	109.04	166	62.82
7	437.99	47	358.05	87	217.15	127	107.33	167	62.07
8	437.38	48	354.89	88	213.64	128	105.66	168	61.34
9	436.69	49	351.70	89	210.14	129	104.03	169	60.61
10	435.91	50	348.46	90	206.66	130	102.43	170	59.90
11	435.06	51	345.19	91	203.20	131	100.88	171	59.20
12	434.13	52	341.89	92	199.76	132	99.35	172	58.52
13	433.12	53	338.56	93	196.34	133	97.86	173	57.84
14	432.03	54	335.20	94	192.94	134	96.41	174	57.18
15	430.86	55	331.81	95	189.57	135	94.99	175	56.53
16	429.62	56	328.39	96	186.22	136	93.59	176	55.89
17	428.29	57	324.94	97	182.90	137	92.23	177	55.26
18	426.90	58	321.48	98	179.60	138	90.90	178	54.64
19	425.43	59	317.99	99	176.33	139	89.60	179	54.03
20	423.88	60	314.47	100	173.09	140	88.32	180	53.43
21	422.26	61	310.94	101	169.70	141	87.07	181	52.84
22	420.57	62	307.40	102	166.39	142	85.85	182	52.26
23	418.81	63	303.83	103	163.18	143	84.66	183	51.69
24	416.98	64	300.25	104	160.05	144	83.48	184	51.13
25	415.08	65	296.66	105	157.02	145	82.34	185	50.58
26	413.11	66	293.06	106	154.07	146	81.21	186	50.04
27	411.07	67	289.44	107	151.20	147	80.11	187	49.50
28	408.96	68	285.82	108	148.42	148	79.03	188	48.98
29	406.80	69	282.19	109	145.71	149	77.98	189	48.46
30	404.56	70	278.56	110	143.07	150	76.94	190	47.95
31	402.27	71	274.91	111	140.50	151	75.92	191	47.45
32	399.91	72	271.27	112	138.00	152	74.93	192	46.96
33	397.49	73	267.63	113	135.57	153	73.95	193	46.47
34	395.01	74	263.98	114	133.20	154	72.99	194	46.00
35	392.48	75	260.34	115	130.90	155	72.06	195	45.53
36	389.89	76	256.69	116	128.65	156	71.13	196	45.06
37	387.24	77	253.06	117	126.46	157	70.23	197	44.61
38	384.54	78	249.42	118	124.33	158	69.35	198	44.16
39	381.79	79	245.80	119	122.25	159	68.48	199	43.71
40	378.99	80	242.18	120	120.22	160	67.62	200	43.28





## گروه آموزشی ایست عمران

$F_y = 450 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	449.96	41	383.31	81	240.62	121	118.24	161	66.78
2	449.83	42	380.29	82	236.90	122	116.31	162	65.96
3	449.61	43	377.22	83	233.20	123	114.42	163	65.16
4	449.31	44	374.10	84	229.52	124	112.59	164	64.36
5	448.93	45	370.93	85	225.85	125	110.79	165	63.59
6	448.46	46	367.73	86	222.19	126	109.04	166	62.82
7	447.90	47	364.48	87	218.55	127	107.33	167	62.07
8	447.26	48	361.19	88	214.93	128	105.66	168	61.34
9	446.54	49	357.86	89	211.33	129	104.03	169	60.61
10	445.73	50	354.50	90	207.76	130	102.43	170	59.90
11	444.83	51	351.10	91	204.20	131	100.88	171	59.20
12	443.86	52	347.66	92	200.66	132	99.35	172	58.52
13	442.80	53	344.20	93	197.15	133	97.86	173	57.84
14	441.66	54	340.70	94	193.67	134	96.41	174	57.18
15	440.44	55	337.18	95	190.20	135	94.99	175	56.53
16	439.14	56	333.62	96	186.77	136	93.59	176	55.89
17	437.76	57	330.05	97	183.36	137	92.23	177	55.26
18	436.30	58	326.44	98	179.98	138	90.90	178	54.64
19	434.76	59	322.82	99	176.63	139	89.60	179	54.03
20	433.15	60	319.18	100	173.11	140	88.32	180	53.43
21	431.46	61	315.51	101	169.70	141	87.07	181	52.84
22	429.69	62	311.83	102	166.39	142	85.85	182	52.26
23	427.85	63	308.13	103	163.18	143	84.66	183	51.69
24	425.94	64	304.42	104	160.05	144	83.48	184	51.13
25	423.95	65	300.70	105	157.02	145	82.34	185	50.58
26	421.89	66	296.96	106	154.07	146	81.21	186	50.04
27	419.76	67	293.22	107	151.20	147	80.11	187	49.50
28	417.56	68	289.47	108	148.42	148	79.03	188	48.98
29	415.30	69	285.71	109	145.71	149	77.98	189	48.46
30	412.97	70	281.94	110	143.07	150	76.94	190	47.95
31	410.57	71	278.17	111	140.50	151	75.92	191	47.45
32	408.11	72	274.40	112	138.00	152	74.93	192	46.96
33	405.59	73	270.63	113	135.57	153	73.95	193	46.47
34	403.00	74	266.86	114	133.20	154	72.99	194	46.00
35	400.36	75	263.10	115	130.90	155	72.06	195	45.53
36	397.66	76	259.33	116	128.65	156	71.13	196	45.06
37	394.90	77	255.57	117	126.46	157	70.23	197	44.61
38	392.08	78	251.82	118	124.33	158	69.35	198	44.16
39	389.21	79	248.08	119	122.25	159	68.48	199	43.71
40	386.29	80	244.34	120	120.22	160	67.62	200	43.28



## گروه آموزشی ایست عمران

$F_y = 460 \text{ Mpa}$ مقدار $F_{cr}$ برای حالت حدی کمانش خمشی با									
$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$	$\lambda$	$F_{cr}$
1	459.96	41	390.44	81	242.57	121	118.24	161	66.78
2	459.82	42	387.29	82	238.74	122	116.31	162	65.96
3	459.60	43	384.09	83	234.93	123	114.42	163	65.16
4	459.28	44	380.84	84	231.13	124	112.59	164	64.36
5	458.88	45	377.55	85	227.35	125	110.79	165	63.59
6	458.39	46	374.22	86	223.59	126	109.04	166	62.82
7	457.81	47	370.84	87	219.85	127	107.33	167	62.07
8	457.14	48	367.42	88	216.13	128	105.66	168	61.34
9	456.38	49	363.96	89	212.43	129	104.03	169	60.61
10	455.54	50	360.46	90	208.76	130	102.43	170	59.90
11	454.60	51	356.93	91	205.10	131	100.88	171	59.20
12	453.58	52	353.36	92	201.47	132	99.35	172	58.52
13	452.48	53	349.76	93	197.87	133	97.86	173	57.84
14	451.29	54	346.13	94	194.29	134	96.41	174	57.18
15	450.01	55	342.47	95	190.75	135	94.99	175	56.53
16	448.66	56	338.78	96	187.23	136	93.59	176	55.89
17	447.21	57	335.06	97	183.73	137	92.23	177	55.26
18	445.69	58	331.33	98	180.27	138	90.90	178	54.64
19	444.08	59	327.57	99	176.63	139	89.60	179	54.03
20	442.40	60	323.79	100	173.11	140	88.32	180	53.43
21	440.63	61	319.99	101	169.70	141	87.07	181	52.84
22	438.79	62	316.17	102	166.39	142	85.85	182	52.26
23	436.87	63	312.34	103	163.18	143	84.66	183	51.69
24	434.87	64	308.50	104	160.05	144	83.48	184	51.13
25	432.80	65	304.64	105	157.02	145	82.34	185	50.58
26	430.65	66	300.77	106	154.07	146	81.21	186	50.04
27	428.43	67	296.89	107	151.20	147	80.11	187	49.50
28	426.14	68	293.01	108	148.42	148	79.03	188	48.98
29	423.77	69	289.12	109	145.71	149	77.98	189	48.46
30	421.34	70	285.23	110	143.07	150	76.94	190	47.95
31	418.84	71	281.33	111	140.50	151	75.92	191	47.45
32	416.28	72	277.44	112	138.00	152	74.93	192	46.96
33	413.64	73	273.54	113	135.57	153	73.95	193	46.47
34	410.95	74	269.64	114	133.20	154	72.99	194	46.00
35	408.19	75	265.75	115	130.90	155	72.06	195	45.53
36	405.38	76	261.87	116	128.65	156	71.13	196	45.06
37	402.50	77	257.99	117	126.46	157	70.23	197	44.61
38	399.57	78	254.12	118	124.33	158	69.35	198	44.16
39	396.58	79	250.26	119	122.25	159	68.48	199	43.71
40	393.53	80	246.41	120	120.22	160	67.62	200	43.28