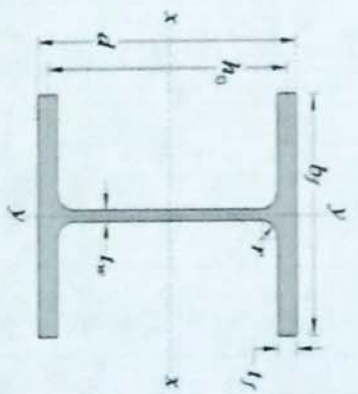
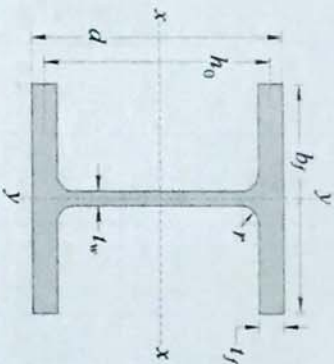


IPE	d (cm)	b <sub>f</sub> (cm)	t <sub>f</sub> (cm)	t <sub>w</sub> (cm)	r (cm)	A (cm <sup>2</sup> )	I <sub>x</sub> (cm <sup>4</sup> )	I <sub>y</sub> (cm <sup>4</sup> )	S <sub>x</sub> (cm <sup>3</sup> )	S <sub>y</sub> (cm <sup>3</sup> )	Z <sub>x</sub> (cm <sup>3</sup> )	Z <sub>y</sub> (cm <sup>3</sup> )	h <sub>0</sub> (cm)	C <sub>w</sub> (cm <sup>6</sup> )	J (cm <sup>4</sup> )	r <sub>s</sub> (cm)	F <sub>y</sub> = 2400 kg/cm <sup>2</sup>		F <sub>y</sub> = 3600 kg/cm <sup>2</sup>	
																	L <sub>p</sub> (cm)	L <sub>t</sub> (cm)	L <sub>p</sub> (cm)	L <sub>t</sub> (cm)
100	10	10	1	0.6	1.2	26	450	167	90.0	33.4	99.6	50.7	9.00	3.382	7.24	2.890	130.0	921	106.2	619.5
120	12	12	1.1	0.65	1.2	34	864	318	144.0	53.0	159.5	80.2	10.90	9.445	11.55	3.469	156.9	1,007	128.1	679.2
140	14	14	1.2	0.7	1.2	43	1510	550	215.7	78.6	238.6	119.0	12.80	22.528	17.45	4.040	183.5	1,090	149.8	738.5
160	16	16	1.3	0.8	1.5	54.3	2490	889	311.3	111.1	341.7	168.5	14.70	48.026	25.72	4.582	207.6	1,170	169.5	795.5
180	18	18	1.4	0.85	1.5	65.3	3830	1360	425.6	151.1	467.4	229.5	16.60	93.690	36.04	5.150	234.2	1,258	191.2	857.7
200	20	20	1.5	0.9	1.8	78.1	5700	2000	570.0	200.0	620.0	303.4	18.50	171.125	49.13	5.697	259.7	1,335	212.0	913.5
220	22	22	1.6	0.95	1.8	91	8090	2840	735.5	258.2	802.0	391.4	20.40	295.474	65.45	6.276	286.7	1,427	234.1	979.7
240	24	24	1.7	1	2.1	106	11260	3920	938.3	326.7	1,016	494.8	22.30	487.344	85.47	6.825	312.0	1,507	254.8	1,038
260	26	26	1.75	1	2.4	118	14920	5130	1,148	394.6	1,230	597.1	24.25	754.190	100.4	7.362	338.3	1,540	276.2	1,067
280	28	28	1.8	1.05	2.4	131	19270	6590	1,376	470.7	1,477	712.3	26.20	1,130.910	118.3	7.920	363.9	1,591	297.2	1,109
300	30	30	1.9	1.1	2.7	149	25170	8560	1,678	570.7	1,790	862.9	28.10	1,689.765	148.8	8.466	388.9	1,674	317.6	1,170
320	32	30	2.05	1.15	2.7	161	30820	9240	1,926	616.0	2,066	931.7	29.95	2,072.076	186.4	8.475	388.7	1,692	317.4	1,181
340	34	30	2.15	1.2	2.7	171	36660	9690	2,156	646.0	2,319	978.2	31.85	2,457.439	215.9	8.459	386.3	1,669	315.4	1,167
360	36	30	2.25	1.25	2.7	181	43190	10140	2,399	676.0	2,588	1,025	33.75	2,887.523	248.3	8.445	384.1	1,650	313.6	1,155
400	40	30	2.4	1.35	2.7	198	57680	10820	2,884	721.3	3,125	1,096	37.60	3,824.221	305.3	8.398	379.3	1,585	309.7	1,116
450	45	30	2.6	1.4	2.7	218	79890	11720	3,551	781.3	3,862	1,190	42.40	5,267.437	387.9	8.365	376.2	1,525	307.2	1,080
500	50	30	2.8	1.45	2.7	239	107200	12620	4,288	841.3	4,679	1,283	47.20	7,028.835	484.2	8.334	372.9	1,477	304.4	1,052
550	55	30	2.9	1.5	2.7	254	136700	13080	4,971	872.0	5,440	1,333	52.10	8,876.121	543.1	8.279	368.2	1,399	300.7	1,007
600	60	30	3	1.55	2.7	270	171000	13530	5,700	902.0	6,260	1,382	57.00	10,989.743	607.0	8.225	363.2	1,337	296.6	970.2
650	65	30	3.1	1.6	2.7	286	210600	13980	6,480	932.0	7,140	1,433	61.90	13,391.477	676.1	8.171	358.8	1,285	292.9	940.2
700	70	30	3.2	1.7	2.7	306	256900	14440	7,340	962.7	8,132	1,486	66.80	16,108.686	759.5	8.106	352.5	1,243	287.8	915.1
800	80	30	3.3	1.75	3	334	359100	14900	8,978	993.3	9,950	1,541	76.70	21,913.765	849.9	7.978	342.7	1,150	279.8	861.1
900	90	30	3.5	1.85	3	371	494100	15820	10,980	1,055	12,269	1,646	86.50	29,592.299	1,033	7.894	335.1	1,104	273.6	833.9
1000	100	30	3.6	1.9	3	400	644700	16280	12,894	1,085	14,502	1,704	96.40	37,822.347	1,145	7.801	327.4	1,053	267.3	804.0

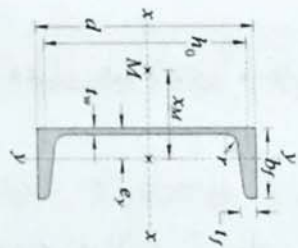


IPBl	d (cm)	by (cm)	t (cm)	tw (cm)	r (cm)	A (cm <sup>2</sup> )	I <sub>x</sub> (cm <sup>4</sup> )	I <sub>y</sub> (cm <sup>4</sup> )	S <sub>x</sub> (cm <sup>3</sup> )	S <sub>y</sub> (cm <sup>3</sup> )	Z <sub>x</sub> (cm <sup>3</sup> )	Z <sub>y</sub> (cm <sup>3</sup> )	h <sub>0</sub> (cm)	C <sub>w</sub> (cm <sup>6</sup> )	J (cm <sup>4</sup> )	r <sub>0</sub> (cm)	F <sub>y</sub> = 2400 kg/cm <sup>2</sup>		F <sub>y</sub> = 3600 kg/cm <sup>2</sup>	
																	L <sub>p</sub> (cm)	L <sub>r</sub> (cm)	L <sub>p</sub> (cm)	L <sub>r</sub> (cm)
100	9.6	10	0.8	0.5	1.2	21.2	349	134	72.7	26.8	78.4	40.5	8.80	2.594	3.75	2.848	129.0	741.4	105.3	503.3
120	11.4	12	0.8	0.5	1.2	25.3	608	231	106.7	38.5	113.8	58.2	10.60	6.489	4.50	3.388	155.0	739.9	126.6	510.2
140	13.3	14	0.85	0.55	1.2	31.4	1,030	389	154.9	55.6	166.7	84.2	12.45	15,074	6.38	3.954	180.6	796.9	147.5	555.3
160	15.2	16	0.9	0.6	1.5	38.8	1,670	616	219.7	77.0	232.9	116.4	14.30	31,491	8.74	4.477	204.5	840.9	166.9	592.6
180	17.1	18	0.95	0.6	1.5	45.3	2,510	925	293.6	102.8	310.8	155.3	16.15	60,315	11.38	5.044	231.9	895.2	189.3	637.5
200	19	20	1	0.65	1.8	53.8	3,690	1,340	388.4	134.0	407.0	201.8	18.00	108,540	14.89	5.572	256.1	946.8	209.1	680.4
220	21	22	1.1	0.7	1.8	64.3	5,410	1,950	515.2	177.3	543.4	268.5	19.90	193,055	21.67	6.137	282.6	1,040	230.7	747.7
240	23	24	1.2	0.75	2.1	76.8	7,760	2,770	674.8	230.8	707.4	348.5	21.80	329,104	30.54	6.689	308.2	1,127	251.6	811.1
260	25	26	1.25	0.75	2.4	86.8	10,450	3,670	836.0	282.3	866.8	425.7	23.75	517,527	37.02	7.220	333.7	1,173	272.4	851.2
280	27	28	1.3	0.8	2.4	97.3	13,670	4,760	1,013	340.0	1,055	513.5	25.70	785,983	45.17	7.772	358.9	1,233	293.0	900.5
300	29	30	1.4	0.85	2.7	113	18,260	6,310	1,289	420.7	1,305	634.7	27.60	1,201,676	60.24	8.315	383.4	1,319	313.1	963.1
320	31	30	1.55	0.9	2.7	124	22,930	6,990	1,479	466.0	1,545	703.1	29.45	1,515,611	81.26	8.341	385.3	1,355	314.6	983.5
340	33	30	1.65	0.95	2.7	133	27,690	7,440	1,678	496.0	1,761	749.2	31.35	1,828,050	98.33	8.336	383.8	1,355	313.4	983.4
360	35	30	1.75	1	2.7	143	33,090	7,890	1,891	526.0	1,994	795.4	33.25	2,180,722	117.7	8.329	381.1	1,354	311.2	983.0
400	39	30	1.9	1.1	2.7	159	45,070	8,560	2,311	570.7	2,455	865.6	37.10	2,945,517	152.8	8.289	376.5	1,326	307.4	966.4
450	44	30	2.1	1.15	2.7	178	63,720	9,470	2,896	631.3	3,095	968.2	41.90	4,156,407	205.4	8.276	374.3	1,303	305.6	953.2
500	49	30	2.3	1.2	2.7	198	86,970	10,370	3,550	691.3	3,814	1,051	46.70	5,653,967	268.9	8.259	371.3	1,284	303.2	942.0
550	54	30	2.4	1.25	2.7	212	111,900	10,820	4,144	721.3	4,472	1,099	51.60	7,202,225	308.5	8.207	366.6	1,233	299.3	912.7
600	59	30	2.5	1.3	2.7	226	141,200	11,270	4,786	751.3	5,185	1,148	56.50	8,994,164	352.0	8.156	362.4	1,192	295.9	888.9
650	64	30	2.6	1.35	2.7	242	175,200	11,720	5,475	781.3	5,956	1,197	61.40	11,045,983	399.7	8.107	357.1	1,158	291.6	869.2
700	69	30	2.7	1.45	2.7	260	215,300	12,180	6,241	812.0	6,837	1,248	66.30	13,384,876	458.3	8.044	351.2	1,130	286.8	852.2
800	79	30	2.8	1.5	3	266	303,400	12,640	7,681	842.7	8,421	1,301	76.20	18,348,350	521.6	7.918	353.7	1,062	288.8	812.4
900	89	30	3	1.6	3	321	422,100	13,550	9,485	903.3	10,496	1,403	86.00	25,053,950	653.3	7.837	333.4	1,031	272.2	793.3
1000	99	30	3.1	1.65	3	347	553,800	14,000	11,188	933.3	12,471	1,458	95.90	32,188,835	734.8	7.746	325.9	993.3	266.1	770.3

طراحی سازه‌های فولادی به روش حالات حدی (LRFD)



PBv	d (cm)	b <sub>f</sub> (cm)	t <sub>f</sub> (cm)	l <sub>w</sub> (cm)	r (cm)	A (cm <sup>2</sup> )	I <sub>x</sub> (cm <sup>4</sup> )	I <sub>y</sub> (cm <sup>4</sup> )	S <sub>x</sub> (cm <sup>3</sup> )	S <sub>y</sub> (cm <sup>3</sup> )	Z <sub>x</sub> (cm <sup>3</sup> )	Z <sub>y</sub> (cm <sup>3</sup> )	h <sub>o</sub> (cm)	C <sub>w</sub> (cm <sup>6</sup> )	J (cm <sup>4</sup> )	r <sub>s</sub> (cm)	F <sub>y</sub> = 2400 kg/cm <sup>2</sup>		F <sub>y</sub> = 3600 kg/cm <sup>2</sup>	
																	L <sub>p</sub> (cm)	L <sub>r</sub> (cm)	L <sub>p</sub> (cm)	L <sub>r</sub> (cm)
100	12	10.6	2	1.2	1.2	53.2	1,140	399	190.0	75.3	231.2	115.2	10.00	9,975	61.1	3,240	140.5	1,948	114.7	1,299
120	14	12.6	2.1	1.25	1.2	66.4	2,020	703	288.6	111.6	344.9	170.5	11.90	24,888	84.2	3,807	167.0	1,998	136.3	1,334
140	16	14.6	2.2	1.3	1.2	80.6	3,290	1,140	411.3	156.2	487.0	239.4	13.80	54,275	112.1	4,373	193.0	2,062	157.6	1,377
160	18	16.6	2.3	1.4	1.5	97.1	5,100	1,760	566.7	212.0	662.3	323.5	15.70	108,456	146.9	4,938	218.5	2,129	178.4	1,423
180	20	18.6	2.4	1.45	1.5	113	7,480	2,580	748.0	277.4	869.4	423.1	17.60	199,795	186.9	5,509	245.2	2,204	200.2	1,475
200	22	20.6	2.5	1.5	1.8	131	10,640	3,650	967.3	354.4	1,113	540.0	19.50	346,978	233.7	6,066	270.9	2,269	221.2	1,520
220	24	22.6	2.6	1.55	1.8	149	14,600	5,010	1,217	443.4	1,394	675.3	21.40	573,595	288.1	6,638	297.5	2,349	242.9	1,575
240	27	24.8	3.2	1.8	2.1	200	24,290	8,150	1,799	657.3	2,080	1,001	23.80	1,154,122	581.8	7,342	327.6	2,875	267.4	1,924
260	29	26.8	3.25	1.8	2.4	220	31,310	10,450	2,159	779.9	2,471	1,185	25.75	1,732,251	657.1	7,894	353.6	2,885	288.8	1,933
280	31	28.8	3.3	1.85	2.4	240	39,550	13,160	2,552	913.9	2,908	1,389	27.70	2,524,384	741.5	8,452	380.0	2,914	310.2	1,955
300	34	31	3.9	2.1	2.7	303	59,200	19,400	3,482	1,252	3,999	1,903	30.10	4,394,149	1,307	9,157	410.6	3,436	335.2	2,301
320	35.9	30.9	4	2.1	2.7	312	68,130	19,710	3,796	1,276	4,352	1,940	31.90	5,014,273	1,405	9,101	407.8	3,296	333.0	2,209
340	37.7	30.9	4	2.1	2.7	316	76,370	19,710	4,051	1,276	4,628	1,942	33.70	5,596,112	1,410	9,054	405.2	3,097	330.9	2,078
360	39.5	30.8	4	2.1	2.7	319	84,870	19,520	4,297	1,268	4,895	1,932	35.50	6,150,020	1,411	8,979	401.4	2,911	327.7	1,956
400	43.2	30.7	4	2.1	2.7	326	104,100	19,340	4,819	1,260	5,464	1,924	39.20	7,429,654	1,419	8,869	395.2	2,599	322.7	1,753
450	47.8	30.7	4	2.1	2.7	336	131,500	19,340	5,502	1,260	6,210	1,929	43.80	9,275,657	1,433	8,774	389.3	2,301	317.9	1,561
500	52.4	30.6	4	2.1	2.7	344	161,900	19,150	6,179	1,252	6,959	1,922	48.40	11,215,006	1,443	8,660	382.8	2,061	312.6	1,409
550	57.2	30.6	4	2.1	2.7	354	198,000	19,160	6,923	1,252	7,783	1,927	53.20	13,556,850	1,457	8,580	377.5	1,868	308.2	1,289
600	62	30.5	4	2.1	2.7	364	237,400	18,980	7,658	1,245	8,607	1,920	58.00	15,962,180	1,468	8,478	370.5	1,708	302.5	1,191
650	66.8	30.5	4	2.1	2.7	374	281,700	18,980	8,434	1,245	9,477	1,925	62.80	18,713,521	1,483	8,406	365.5	1,583	298.5	1,115
700	71.6	30.4	4	2.1	2.7	383	329,300	18,800	9,198	1,237	10,344	1,918	67.60	21,477,872	1,493	8,312	359.5	1,475	293.5	1,051
800	81.4	30.3	4	2.1	3	404	442,600	18,630	10,875	1,230	12,209	1,917	77.40	27,901,965	1,519	8,142	348.4	1,308	284.5	952
900	91	30.2	4	2.1	3	424	570,400	18,450	12,536	1,222	14,126	1,916	87.00	34,912,013	1,545	8,001	338.5	1,196	276.4	887
1000	100.8	30.2	4	2.1	3	444	722,300	18,460	14,331	1,223	16,215	1,926	96.80	43,243,658	1,575	7,896	330.9	1,115	270.1	840



UNP	d (cm)	bf (cm)	tw (cm)	Lw (cm)	r (cm)	A (cm <sup>2</sup> )	I <sub>x</sub> (cm <sup>4</sup> )	I <sub>y</sub> (cm <sup>4</sup> )	e <sub>x</sub> (cm)	e <sub>y</sub> (cm)	X <sub>0</sub> (cm)	S <sub>x</sub> (cm <sup>3</sup> )	S <sub>y</sub> (cm <sup>3</sup> )	Z <sub>x</sub> (cm <sup>3</sup> )	Y <sub>0</sub> (cm)	Z <sub>y</sub> (cm <sup>3</sup> )	h <sub>0</sub> (cm)	C <sub>w</sub> (cm <sup>6</sup> )	J (cm <sup>4</sup> )	r <sub>0</sub> (cm)	c	F <sub>y</sub> = 2400 kg/cm <sup>2</sup>		F <sub>y</sub> = 3600 kg/cm <sup>2</sup>	
																						L <sub>x</sub> (cm)	L <sub>y</sub> (cm)	L <sub>z</sub> (cm)	L <sub>w</sub> (cm)
30*15	3	15	0.45	0.4	0.45	2.21	2.53	0.38	0.52	0.74	1.69	0.388	2.16	0.37	0.76	2.55	0.50	0.14	0.509	1.108	21.3	319.2	17.4	212.9	
30	3	3.3	0.7	0.5	0.7	5.44	6.39	5.33	1.31	2.22	4.26	2.678	5.63	1.37	4.82	2.30	6.29	0.82	1.166	1.059	50.8	1.163	41.5	775.4	
40*20	4	2	0.55	0.5	0.55	3.66	7.58	1.14	0.67	1.01	3.79	0.857	4.85	0.46	1.69	3.45	2.61	0.34	0.675	1.139	28.6	390.7	23.4	260.7	
40	4	3.5	0.7	0.5	0.7	6.21	14.1	6.68	1.33	2.32	7.05	3.078	8.93	1.29	5.94	3.30	15.26	0.91	1.197	1.092	53.2	827.7	43.5	552.0	
50*25	5	2.5	0.6	0.5	0.6	4.92	16.8	2.49	0.81	1.34	6.72	1.473	8.41	0.49	2.90	4.40	9.12	0.52	0.842	1.150	36.5	400.9	29.8	267.7	
50	5	3.8	0.7	0.5	0.7	7.12	26.4	9.12	1.37	2.47	10.56	3.753	13.06	1.26	7.45	4.30	33.68	1.02	1.288	1.119	58.1	684.2	47.4	456.6	
60	6	3	0.6	0.6	0.6	6.46	31.6	4.51	0.91	1.5	10.53	2.158	13.18	0.54	4.51	5.40	24.83	0.78	1.002	1.151	42.9	421.9	35.0	282.1	
65	6.5	4.2	0.75	0.55	0.75	9.03	57.5	14.1	1.42	2.6	17.69	5.072	21.55	1.18	10.37	5.75	90.05	1.46	1.419	1.138	64.1	608.2	52.4	406.6	
80	8	4.5	0.8	0.6	0.8	11	106	19.4	1.45	2.67	26.50	6.361	32.06	1.04	13.28	7.20	190.8	2.00	1.515	1.148	68.1	558.3	55.6	374.0	
100	10	5	0.85	0.6	0.85	13.5	206	29.3	1.55	2.93	41.20	8.493	49.22	1.04	17.93	9.15	461.4	2.64	1.680	1.153	75.6	510.3	61.7	343.6	
120	12	5.5	0.9	0.7	0.9	17	364	43.2	1.6	3.03	60.67	11.08	73.15	0.76	23.67	11.10	983.8	3.84	1.843	1.163	81.8	509.0	66.8	344.3	
140	14	6	1	0.7	1	20.4	605	62.7	1.75	3.37	86.43	14.75	103.2	0.90	31.44	13.00	1.961	5.37	2.014	1.162	90.0	511.7	73.5	348.0	
160	16	6.5	1.05	0.75	1.05	24	925	85.3	1.84	3.56	115.6	18.30	138.3	0.75	37.40	14.95	3.529	6.97	2.178	1.162	96.7	511.6	79.0	350.1	
180	18	7	1.1	0.8	1.1	28	1.350	114	1.92	3.75	150.0	22.44	180.1	0.78	45.99	16.90	5.982	8.91	2.346	1.166	103.5	518.9	84.5	357.3	
200	20	7.5	1.15	0.85	1.15	32.2	1.910	148	2.01	3.94	191.0	26.96	229.2	0.81	55.75	18.85	9.656	11.23	2.502	1.167	110.0	525.2	89.8	363.9	
220	22	8	1.25	0.9	1.25	37.4	2.690	197	2.14	4.2	244.5	33.62	293.1	0.85	68.77	20.75	15.626	15.16	2.679	1.165	117.8	551.6	96.2	363.2	
240	24	8.5	1.3	0.95	1.3	42.3	3.600	248	2.23	4.39	300.0	39.55	362	0.88	81.39	22.70	23.532	18.57	2.838	1.165	124.2	562.5	101.4	392.9	
260	26	9	1.4	1	1.4	48.3	4.820	317	2.36	4.66	370.8	47.74	444.5	0.93	98.00	24.60	35.183	24.20	3.001	1.168	131.5	588.7	107.3	411.9	
280	28	9.5	1.5	1	1.5	53.3	6.280	399	2.53	5.02	448.6	57.25	533.9	0.95	115.9	26.50	51.814	29.71	3.184	1.163	140.4	608.5	114.6	427.5	
300	30	10	1.6	1	1.6	58.8	8.030	495	2.7	5.41	535.3	67.81	634.0	0.98	135.9	28.40	73.467	36.24	3.356	1.166	148.9	630.1	121.6	444.1	
320	32	10	1.75	1.4	1.75	75.8	10.870	597	2.6	4.82	679.4	80.68	813.7	1.18	153.8	30.25	102.967	61.80	3.397	1.152	144.0	698.2	117.6	485.2	
350	35	10	1.6	1.4	1.6	77.3	12.840	570	2.4	4.45	733.7	75.00	888.3	1.10	148.6	33.40	120.488	56.39	3.361	1.148	139.3	618.7	113.8	437.6	
380	38	10.2	1.6	1.35	1.6	80.4	15.760	615	2.38	4.55	829.5	78.64	1.003	1.06	152.9	36.40	150.586	58.39	3.406	1.153	141.9	582.9	115.9	418.2	
400	40	11	1.8	1.4	1.8	91.5	20.350	846	2.65	5.11	1018	101.3	1.220	1.14	195.3	38.20	229.869	76.06	3.702	1.159	156.0	643.3	127.4	460.1	