

I_{LB}
W24-W21

Table 3-19 (continued)
Lower-Bound
Elastic Moment of
Inertia, I_{LB} , for Plastic
Composite Sections, in.⁴

$F_y = 50$ ksi

Shape ^[a]	PNA ^[b]	$\gamma_1^{[c]}$	ΣQ_n	$\gamma_2^{[d]}$, in.										
		in.	kips	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7
W24×55 (1350)	TFL	0	810	2890	3010	3120	3250	3370	3500	3640	3770	3920	4060	4210
	2	0.126	721	2800	2910	3020	3140	3250	3380	3500	3630	3770	3900	4050
	3	0.253	633	2700	2800	2910	3010	3120	3240	3360	3480	3600	3730	3860
	4	0.379	544	2590	2680	2780	2870	2970	3080	3190	3300	3410	3530	3650
	BFL	0.505	456	2460	2540	2630	2720	2810	2900	3000	3100	3200	3300	3410
	6	3.46	329	2240	2310	2370	2450	2520	2590	2670	2750	2830	2920	3000
	7	6.67	203	1970	2010	2060	2110	2160	2210	2270	2320	2380	2440	2500
W21×73 (1600)	TFL	0	1080	3310	3450	3590	3740	3900	4060	4220	4390	4570	4750	4940
	2	0.185	921	3170	3300	3430	3570	3710	3860	4010	4170	4330	4500	4670
	3	0.370	768	3020	3140	3260	3380	3510	3640	3780	3920	4070	4220	4380
	4	0.555	614	2840	2940	3050	3150	3270	3380	3500	3630	3750	3890	4020
	BFL	0.740	461	2620	2710	2790	2880	2980	3070	3170	3270	3380	3490	3600
	6	2.58	365	2470	2540	2610	2680	2760	2840	2930	3010	3100	3190	3290
	7	4.69	269	2280	2340	2400	2460	2520	2580	2650	2720	2790	2860	2930
W21×68 (1480)	TFL	0	1000	3060	3180	3320	3450	3600	3750	3900	4060	4220	4390	4560
	2	0.171	858	2930	3050	3180	3300	3440	3570	3710	3860	4010	4160	4320
	3	0.343	717	2800	2900	3010	3130	3250	3370	3500	3630	3770	3910	4050
	4	0.514	575	2630	2720	2820	2920	3030	3130	3250	3360	3480	3600	3730
	BFL	0.685	434	2430	2510	2590	2670	2760	2850	2940	3040	3140	3240	3340
	6	2.60	342	2280	2350	2420	2490	2560	2630	2710	2790	2880	2960	3050
	7	4.74	250	2110	2160	2210	2270	2330	2390	2450	2510	2580	2640	2710
W21×62 (1330)	TFL	0	915	2760	2880	3000	3120	3250	3390	3530	3670	3820	3970	4130
	2	0.154	788	2650	2760	2870	2990	3110	3240	3360	3500	3640	3780	3920
	3	0.308	662	2530	2630	2730	2840	2950	3060	3180	3300	3420	3550	3680
	4	0.461	535	2390	2470	2560	2650	2750	2850	2950	3060	3170	3280	3400
	BFL	0.615	408	2210	2280	2360	2440	2520	2600	2690	2770	2870	2960	3060
	6	2.54	318	2070	2130	2190	2260	2320	2390	2460	2540	2610	2690	2780
	7	4.78	229	1900	1950	2000	2050	2100	2150	2210	2270	2330	2390	2450
W21×57 (1170)	TFL	0	835	2490	2590	2700	2820	2940	3060	3190	3320	3460	3600	3740
	2	0.163	728	2400	2490	2600	2710	2820	2930	3050	3170	3300	3430	3570
	3	0.325	622	2290	2380	2480	2580	2680	2780	2890	3010	3120	3240	3370
	4	0.488	515	2170	2250	2340	2430	2520	2610	2710	2810	2910	3020	3130
	BFL	0.650	409	2030	2110	2180	2250	2330	2410	2500	2580	2670	2770	2860
	6	2.93	309	1880	1940	2000	2060	2120	2190	2260	2330	2410	2480	2560
	7	5.40	209	1700	1740	1780	1830	1880	1930	1980	2030	2090	2140	2200

^[a]Value in parentheses is I_x (in.⁴) of noncomposite steel shape.
^[b]See Figure 3-3(c) for PNA locations.
^[c] Y_1 = distance from top of the steel beam to plastic neutral axis.
^[d] Y_2 = distance from top of the steel beam to concrete flange force.

$F_y = 50 \text{ ksi}$

Table 3-19 (continued)

Lower-Bound

Elastic Moment of

Inertia, I_{LB} , for Plastic

Composite Sections, in.⁴

I_{LB}

W21-W18

Shape ^[a]	PNA ^[b]	$Y1^{[c]}$	ΣQ_n	$Y2^{[d]}$, in.										
		in.	kips	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7
W21×55 (1140)	TFL	0	810	2390	2490	2590	2710	2820	2940	3060	3190	3320	3450	3590
	2	0.131	703	2300	2390	2490	2590	2700	2810	2930	3040	3160	3290	3420
	3	0.261	595	2190	2280	2370	2470	2560	2660	2770	2870	2990	3100	3220
	4	0.392	488	2080	2150	2230	2320	2400	2490	2580	2680	2780	2880	2980
	BFL	0.522	381	1940	2000	2070	2140	2210	2290	2370	2450	2530	2620	2710
	6	2.62	292	1800	1850	1910	1970	2030	2090	2160	2230	2290	2370	2440
	7	5.00	203	1640	1680	1720	1770	1810	1860	1910	1960	2010	2070	2120
W21×50 (984)	TFL	0	735	2110	2210	2300	2400	2510	2620	2730	2840	2960	3080	3210
	2	0.134	648	2040	2130	2220	2310	2410	2510	2620	2730	2840	2950	3070
	3	0.268	560	1960	2040	2130	2210	2300	2400	2490	2590	2690	2800	2910
	4	0.401	473	1870	1940	2020	2100	2180	2260	2350	2440	2530	2630	2730
	BFL	0.535	386	1760	1830	1890	1960	2030	2110	2180	2260	2350	2430	2520
	6	2.91	285	1620	1670	1720	1780	1840	1900	1960	2020	2090	2160	2230
	7	5.56	184	1440	1470	1510	1550	1590	1640	1680	1730	1780	1820	1880
W21×48 (959)	TFL	0	705	2030	2110	2210	2300	2400	2500	2610	2720	2830	2950	3070
	2	0.108	617	1950	2040	2120	2210	2300	2400	2500	2600	2710	2820	2930
	3	0.215	530	1870	1950	2030	2110	2200	2280	2380	2470	2570	2670	2770
	4	0.323	442	1780	1850	1920	1990	2070	2150	2230	2320	2400	2490	2590
	BFL	0.430	355	1670	1730	1790	1860	1920	1990	2060	2140	2210	2290	2370
	6	2.71	266	1540	1590	1640	1690	1750	1810	1860	1920	1990	2050	2120
	7	5.26	176	1390	1420	1460	1500	1540	1580	1620	1660	1710	1750	1800
W21×44 (843)	TFL	0	650	1830	1920	2000	2090	2180	2280	2370	2480	2580	2690	2800
	2	0.113	577	1780	1850	1930	2020	2100	2190	2280	2380	2480	2580	2680
	3	0.225	504	1710	1780	1850	1930	2010	2100	2180	2270	2360	2460	2550
	4	0.338	431	1630	1700	1770	1840	1910	1990	2060	2150	2230	2310	2400
	BFL	0.450	358	1550	1610	1670	1730	1790	1860	1930	2000	2080	2150	2230
	6	2.92	260	1410	1460	1500	1560	1610	1660	1720	1780	1840	1900	1960
	7	5.71	163	1240	1270	1310	1340	1380	1420	1460	1500	1540	1580	1630
W18×60 (984)	TFL	0	880	2070	2170	2270	2380	2490	2610	2730	2860	2990	3130	3270
	2	0.174	749	1980	2070	2170	2270	2370	2480	2590	2710	2830	2950	3080
	3	0.348	617	1880	1960	2050	2140	2230	2330	2430	2530	2640	2750	2860
	4	0.521	486	1760	1830	1900	1980	2060	2140	2230	2320	2410	2510	2610
	BFL	0.695	355	1610	1660	1720	1790	1850	1920	1990	2060	2140	2220	2300
	6	2.18	287	1520	1570	1620	1670	1730	1780	1840	1910	1970	2040	2110
	7	3.80	220	1420	1460	1500	1540	1590	1640	1680	1730	1790	1840	1900

^[a]Value in parentheses is I_x (in.⁴) of noncomposite steel shape.
^[b]See Figure 3-3(c) for PNA locations.
^[c] $Y1$ = distance from top of the steel beam to plastic neutral axis.
^[d] $Y2$ = distance from top of the steel beam to concrete flange force.