Table 5.3 Universal columns (abstracted from the *Steelwork Design Guide to BS 5950: Part 1*, published by the Steel Construction Institute)

(a) Dimensions

Designation		Depth of	Width of	Thickness		Root	Depth	Ratios for local buckling		Dimensions for detailing			Surface area	
Serial size	Mass per metre	section D	section B	Web t	Flange T	radius r	between fillets d	Flange b/T	Web d/t	End clearance C	Notch N	n	Per metre	per tonne
(mm)	(kg)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)			(mm)	(mm)	(mm)	(m^2)	(m^2)
356 × 406	634	474.7	424.1	47.6	77.0	15.2	290.2	2.75	6.10	26	200	94	2.52	3.98
	551	455.7	418.5	42.0	67.5	15.2	290.2	3.10	6.91	23	200	84	2.48	4.49
	467	436.6	412.4	35.9	58.0	15.2	290.2	3.56	8.08	20	200	74	2.42	5.19
	393	419.1	407.0	30.6	49.2	15.2	290.2	4.14	9.48	17	200	66	2.38	6.05
	340	406.4	403.0	26.5	42.9	15.2	290.2	4.70	11.0	15	200	60	2.35	6.90
	287	393.7	399.0	22.6	36.5	15.2	290.2	5.47	12.8	13	200	52	2.31	8.06
	235	381.0	395.0	18.5	30.2	15.2	290.2	6.54	15.7	11	200	46	2.28	9.70
COLCORE	477	427.0	424.4	48.0	53.2	15.2	290.2	3.99	6.05	26	200	70	2.43	5.09
356 × 368	202	374.7	374.4	16.8	27.0	15.2	290.2	6.93	17.3	10	190	44	2.19	10.8
	177	368.3	372.1	14.5	23.8	15.2	290.2	7.82	20.0	9	190	40	2.17	12.3
	153	362.0	370.2	12.6	20.7	15.2	290.2	8.94	23.0	8	190	36	2.15	14.1
	129	355.6	368.3	10.7	17.5	15.2	290.2	10.5	27.1	7	190	34	2.14	16.6
305 × 305	283	365.3	321.8	26.9	44.1	15.2	246.6	3.65	9.17	15	158	60	1.94	6.85
	240	352.6	317.9	23.0	37.7	15.2	246.6	4.22	10.7	14	158	54	1.90	7.93
	198	339.9	314.1	19.2	31.4	15.2	246.6	5.00	12.8	12	158	48	1.87	9.45
	158	327.2	310.6	15.7	25.0	15.2	246.6	6.21	15.7	10	158	42	1.84	11.6
	137	320.5	308.7	13.8	21.7	15.2	246.6	7.11	17.9	9	158	38	1.82	13.3
	118	314.5	306.8	11.9	18.7	15.2	246.6	8.20	20.7	8	158	34	1.81	5.3
	97	307.8	304.8	9.9	15.4	15.2	246.6	9.90	24.9	7	158	32	1.79	18.4
254 × 254	167	289.1	264.5	19.2	31.7	12.7	200.3	4.17	10.4	12	134	46	1.58	9.44
	132	276.4	261.0	15.6	25.3	12.7	200.3	5.16	12.8	10	134	40	1.54	11.7
	107	266.7	258.3	13.0	20.5	12.7	200.3	6.30	15.4	9	134	34	1.52	14.2
	89	260.4	255.9	10.5	17.3	12.7	200.3	7.40	19.1	7	134	32	1.50	16.9
	73	254.0	254.0	8.6	14.2	12.7	200.3	8.94	23.3	6	134	28	1.49	20.3
203 × 203	86	222.3	208.8	13.0	20.5	10.2	160.9	5.09	12.4	9	108	32	1.24	14.4
	71	215.9	206.2	10.3	17.3	10.2	160.9	5.96	15.6	7	108	28	1.22	17.2
	60	209.6	205.2	9.3	14.2	10.2	160.9	7.23	17.3	7	108	26	1.20	20.1
	52	206.2	203.9	8.0	12.5	10.2	160.9	8.16	20.1	6	108	24	1.19	23.0
	46	203.2	203.2	7.3	11.0	10.2	160.9	9.24	22.0	6	108	22	1.19	25.8
152 × 152	37	161.8	154.4	8.1	11.5	7.6	123.5	6.71	15.2	6	84	20	0.912	24.6
	30	157.5	152.9	6.6	9.4	7.6	123.5	8.13	18.7	5	84	18	0.9	30.0
	23	152.4	152.4	6.1	6.8	7.6	123.5	11.2	20.2	5	84	16	0.889	38.7

Table 5.3 Universal columns *continued* (abstracted from the *Steelwork Design Guide to BS 5950: Part 1*, published by the Steel Construction Institute)

(b) Properties

Designation		Second moment of area		Radius of gyration		Elastic modulus		Plastic modulus		Buckling parameter	Torsional index	Warping constant	Torsional constant	Area of section
Serial size	Mass per metre	Axis x–x	Axis y–y	Axis x–x	Axis y–y	Axis x–x	Axis y–y	Axis x–x	Axis y–y	u	x	H	J	A
(mm)	(kg)	(cm^4)	(cm^4)	(cm)	(cm)	(cm^3)	(cm^3)	(cm^3)	(cm^3)			(dm^6)	(cm^4)	(cm^2)
356 × 406	634	275 000	98 200	18.5	11.0	11 600	4630	14 200	7110	0.843	5.46	38.8	13 700	808
	551	227 000	82 700	18.0	10.9	9960	3950	12 100	6060	0.841	6.05	31.1	9240	702
	467	183 000	67 900	17.5	10.7	8390	3290	10 000	5040	0.839	6.86	24.3	5820	595
	393	147 000	55 400	17.1	10.5	7000	2720	8230	4160	0.837	7.86	19.0	3550	501
	340	122 000	46 800	16.8	10.4	6030	2320	6990	3540	0.836	8.85	15.5	2340	433
	287	100 000	38 700	16.5	10.3	5080	1940	5820	2950	0.835	10.2	12.3	1440	366
	235	79 100	31 000	16.2	10.2	4150	1570	4690	2380	0.834	12.1	9.54	812	300
COLCORE	477	172 000	68 100	16.8	10.6	8080	3210	9700	4980	0.815	6.91	23.8	5700	607
356 × 368	202	66 300	23 600	16.0	9.57	3540	1260	3980	1920	0.844	13.3	7.14	560	258
	177	57 200	20 500	15.9	9.52	3100	1100	3460	1670	0.844	15.0	6.07	383	226
	153	48 500	17 500	15.8	9.46	2680	944	2960	1430	0.844	17.0	5.09	251	195
	129	40 200	14 600	15.6	9.39	2260	790	2480	1200	0.843	19.9	4.16	153	165
305 × 305	283	78 800	24 500	14.8	8.25	4310	1530	5100	2340	0.855	7.65	6.33	2030	360
	240	64 200	20 200	14.5	8.14	3640	1270	4250	1950	0.854	8.73	5.01	1270	306
	198	50 800	16 200	14.2	8.02	2990	1030	3440	1580	0.854	10.2	3.86	734	252
	158	38 700	12 500	13.9	7.89	2370	806	2680	1230	0.852	12.5	2.86	379	201
	137	32 800	10 700	13.7	7.82	2050	691	2300	1050	0.851	14.1	2.38	250	175
	118	27 600	9010	13.6	7.75	1760	587	1950	892	0.851	16.2	1.97	160	150
	97	22 200	7270	13.4	7.68	1440	477	1590	723	0.850	19.3	1.55	91.1	123
254 × 254	167	29 900	9 800	11.9	6.79	2070	741	2420	1130	0.852	8.49	1.62	625	212
	132	22 600	7520	11.6	6.67	1630	576	1870	879	0.850	10.3	1.18	322	169
	107	17 500	5900	11.3	6.57	1310	457	1490	695	0.848	12.4	0.894	173	137
	89	14 300	4850	11.2	6.52	1100	379	1230	575	0.849	14.4	0.716	104	114
	73	11 400	3870	11.1	6.46	894	305	989	462	0.849	17.3	0.557	57.3	92.9
203 × 203	86	9460	3120	9.27	5.32	851	299	979	456	0.85	10.2	0.317	138	110
	71	7650	2540	9.16	5.28	708	246	802	374	0.852	11.9	0.25	81.5	91.1
	60	6090	2040	8.96	5.19	581	199	652	303	0.847	14.1	0.195	46.6	75.8
	52	5260	1770	8.90	5.16	510	174	568	264	0.848	15.8	0.166	32.0	66.4
	46	4560	1540	8.81	5.11	449	151	497	230	0.846	17.7	0.142	22.2	58.8
152 × 152	37	2220	709	6.84	3.87	274	91.8	310	140	0.848	13.3	0.04	19.5	47.4
	30	1740	558	6.75	3.82	221	73.1	247	111	0.848	16.0	0.0306	10.5	38.2
	23	1260	403	6.51	3.68	166	52.9	184	80.9	0.837	20.4	0.0214	4.87	29.8