

N-M classification

For a bi-symmetric I section

$$\alpha = \frac{1}{2} \left(1 + \frac{N_{Ed}}{f_y t_w d} \right)$$

$$\alpha = \frac{1}{2} \left(1 + \frac{590 \times 10^3}{355 \times 7.2 \times 160.8} \right) = 1.21$$

But limited to 1.0

when $\alpha > 0.5$: $c/t \leq \frac{456\epsilon}{13\alpha - 1}$

when $\alpha \leq 0.5$: $c/t \leq \frac{41.5\epsilon}{\alpha}$

$$c/t = \frac{456 \times 0.81}{13 \times 1.0 - 1} = 30.8$$

N-M classification

Section Designation	Mass per Metre kg/m	Depth of Section h mm	Width of Section b mm	Thickness		Root Radius r mm	Depth between Fillets d mm	Ratios for Local Buckling		Dimensions for Detailing			Surface Area	
				Web t _w mm	Flange t _f mm			Flange c _f /t _f	Web c _w /t _w	End Clearance C mm	Notch		Per Metre m ²	Per Tonne m ²
											N mm	n mm		
203x203x127 +	127.5	241.4	213.9	18.1	30.1	10.2	160.8	2.91	8.88	11	108	42	1.28	10.0
203x203x113 +	113.5	235.0	212.1	16.3	26.9	10.2	160.8	3.26	9.87	10	108	38	1.27	11.2
203x203x100 +	99.6	228.6	210.3	14.5	23.7	10.2	160.8	3.70	11.1	9	108	34	1.25	12.6
203x203x86	86.1	222.2	209.1	12.7	20.5	10.2	160.8	4.29	12.7	8	110	32	1.24	14.4
203x203x71	71.0	215.8	206.4	10.0	17.3	10.2	160.8	5.09	16.1	7	110	28	1.22	17.2
203x203x60	60.0	209.6	205.8	9.4	14.2	10.2	160.8	6.20	17.1	7	110	26	1.21	20.2
203x203x52	52.0	206.2	204.3	7.9	12.5	10.2	160.8	7.04	20.4	6	110	24	1.20	23.1
203x203x46	46.1	203.2	203.6	7.2	11.0	10.2	160.8	8.00	22.3	6	110	22	1.19	25.8

Limit is 30.8, actual is 22.3, web is at least Class 2