



*Parallel Flange Sections (**NEX**)* & *Conventional Structurals from SAIL*



NEX

From SAIL

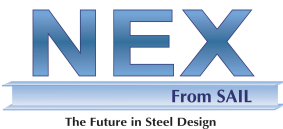
The Future in Steel Design

SAIL is one of India's largest and leading steel manufacturer and possesses a robust knowhow and expertise to produce a wide variety of prime steel products such as plates, sheets, coils, bars, structural, rails, pipes etc. for various applications. With the installation of a new state-of-the-art Universal Section Mill at IISCO Steel Plant, Burnpur and Medium Structural Mill at Durgapur Steel Plant, SAIL is now in a position to supply a wide variety of Parallel Flange Sections and Conventional Structurals with high quality and consistent dimension to meet the requirement of the construction and infrastructure demand of the country.

SAIL is continuously thriving in its endeavor through investment in technology up gradation, research & development and services to ensure the quality of high performing end products.

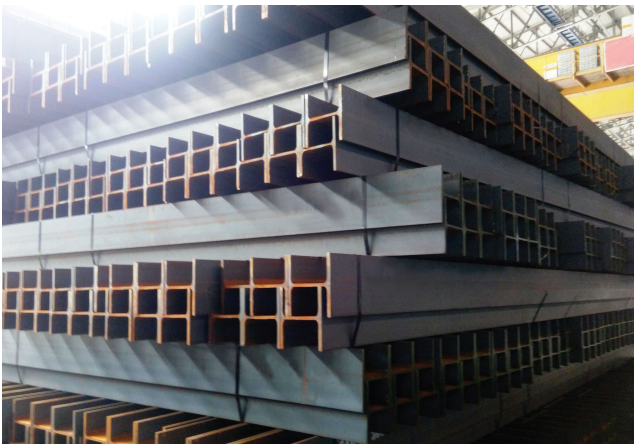


PRODUCT RANGE
Parallel Flange Sections



Section	Weight (Kg/m)	Plant	Mill	Equivalent European I Beam
Narrow Parallel Flange Beams				
NPB 100 x 55	8.10	DSP	MSM	IPE 100
NPB 200 x 100	22.36/25.09	DSP	MSM	IPE 200/IPE 200O
NPB 250 x 125	30.11	DSP	MSM	
NPB 300 x 150	36.53/42.24/49.32	ISP	USM	IPE 300A/IPE 300/IPE 300O
NPB 400 x 180	57.38/66.31/75.67/84.00	ISP	USM	IPE 400A/IPE 400/IPE 400O/IPE 400V
NPB 450 x 190	67.16/77.58/92.37/95.20/104	ISP	USM	IPE 450A/IPE 450/IPE 450O/IPE 450R/IPE 450V
NPB 500 x 200	79.36/90.69/107.32	ISP	USM	IPE 500A/IPE 500/IPE 500O
NPB 600 x 220	107.57/122.45/154.47/184.00	ISP	USM	IPE 600/IPE 600O/IPE 600V
NPB 750 x 270	173.00/174.54/185.00/196.00/202.49	ISP	USM	IPE 750
Wide Parallel Flange Beams				
Section	Weight(Kg/m)	Plant	Mill	Equivalent European H Beam
WPB 160 x 160	22.75/30.44/42.59/76.19	DSP	MSM	HE 160AA/HE 160A/HE 160B/HE 160M
WPB 200 x 200	37.34	ISP	USM	
WPB 200 x 200	34.65/42.26/61.30	ISP	USM	HE 200AA/HE 200A/HE 200B
WPB 240 x 240	47.40/60.32/83.20/156.68	ISP	USM	HE 240AA/HE 240A/HE 240B/HE 240M
WPB 300 x 300	100.85	ISP	USM	
WPB 300 x 300	117.03/237.92	ISP	USM	HE 300B/HE 300M

- MSM - Medium Structural Mill • USM - Universal Section Mill • ISP - IISCO Steel Plant, Burnpur
• DSP - Durgapur Steel Plant • BSP - Bhilai Steel Plant





सेल SAIL

PRODUCT RANGE

Conventional Structural

Section	Weight(Kg/m)	Plant	Mill
Indian Standard Medium Beams (ISMB)			
MB 100 x 50	8.95	DSP	MSM
MB 150 x 75	14.96	DSP	MSM
MB 200 x 100	24.17	DSP	SM
MB 250 x 125	37.30	DSP	MSM
MB 300 x 140	46.02	DSP	MSM
Indian Standard Medium Channel (ISMC)			
MC 75 x 40	7.14	BSP	MM
MC 100 x 50	9.56	DSP/BSP	MSM/MM
MC 125 x 65	13.10	DSP	MSM
MC 150 x 75	16.80	DSP	MSM/SM
MC 200 x 75	22.30	DSP	SM
MC 250 x 82	34.20	ISP	USM
MC 300 x 90	36.30	ISP	USM
Indian Standard Equal Angles			
Angle 50 x 50 x 5/6	3.79/4.49	BSP	MM
Angle 60 x 60 x 5/6/8	4.50/5.40/7.00	BSP	MM
Angle 65 x 65 x 5/6/8/10	4.98/5.91/7.73/9.49	BSP	MM
Angle 70 x 70 x 5/6	5.30/ 6.30	BSP	MM
Angle 75 x 75 x 5/6/8/10	5.77/6.86/9.00/11.07	BSP	MM
Angle 80 x 80 x 6/8/10	7.36/9.65/11.88/14.05	BSP	MM
Angle 90 x 90 x 6/8/10/12	8.32/10.92/13.47/15.95	DSP/BSP	MSM/MM
Angle 100 x 100 x 6/8/10/12	9.26/12.18/15.04/17.83	DSP	MSM
Angle 150 x 150 x 10/12	22.93/27.29	ISP	USM
Angle 200 x 200 x 12/16/18/20/25	36.85/48.53/54.3/59.96/73.90	ISP	USM

Besides our Plant rolled sections, we can also supply the following range through our EPAs

Angle 45 mm to 150 mm

MC 75 x 40 mm to MC 400 x 100 mm

MB 100 mm to MB 600 mm

H Beams : 150 mm , 152 mm & 200 mm

Rail : 15 kg, 30 kg

Flats : 50 x 6 to 150 x 12 mm

Mild Steel Rounds

MSM - Medium Structural Mill

USM - Universal Section Mill

MM - Merchant Mill

ISP - IISCO Steel Plant

DSP - Durgapur Steel Plant

BSP - Bhilai Steel Plant

EPA - External Processing Agency

AVAILABLE GRADES/QUALITIES

- IS 2062 E250BR, 300BR, 350BR, 410BR, 450BR (Copper Bearing Structural and structural in Grade B0 & Grade C can also be supplied with mutual agreement.)
- EN 10025 2 S275 JR, S355 JR

In addition to above structural in FIRE RESISTANT STEEL and WEATHER RESISTANT STEEL can also be supplied.

Sections from MSM & USM are normally supplied in 12 meter length. However specific lengths can be supplied with mutual agreement



Testing facilities available - Tensile, bend, impact testing (including subzero temp testing) and inspection of finished products

Bundling- Automatic strapping & bundling facility with tagging

Mill Certifications available with MSM or DSP

- CE Certificate
- Certificate from CSIR and CBRI, Roorkee for Fire Resistant Steel

OUR LATEST PRODUCT IS



Parallel Flange Sections

From SAIL's state-of-the-art mills

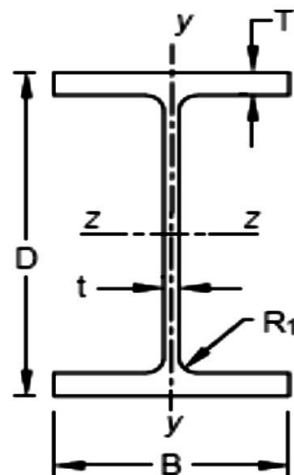
Parallel Flange Sections are hot rolled steel structural sections, with parallel flanges having square toes and curves at the root of flange and web

Parallel Flange Sections meet international standards of quality and stringent requirements of the infrastructure and construction industries

Parallel sections are preferred by today's structural engineers, architects and construction companies

Parallel Flange Sections have multiple advantages over conventional sections

Higher product flexibility - Wide range of width, flange thickness and web thickness combinations for any nominal depth



- ▶▶ D : Depth
- ▶▶ B : Flange Width
- ▶▶ T : Flange thickness
- ▶▶ t : Web thickness
- ▶▶ R₁ : Root radius

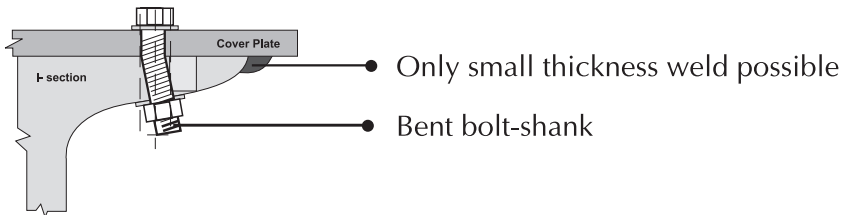
Mechanically more efficient - Higher bending strength for beams and higher axial load carrying capacity for columns

Structurally more stable - Greater radius of gyration lowers slenderness ratio and allows withstanding of buckling to a greater extent

Lighter structures - Higher strength to-weight ratio leads to lighter structures and foundations

Parallel Flange Sections have multiple advantages over conventional sections

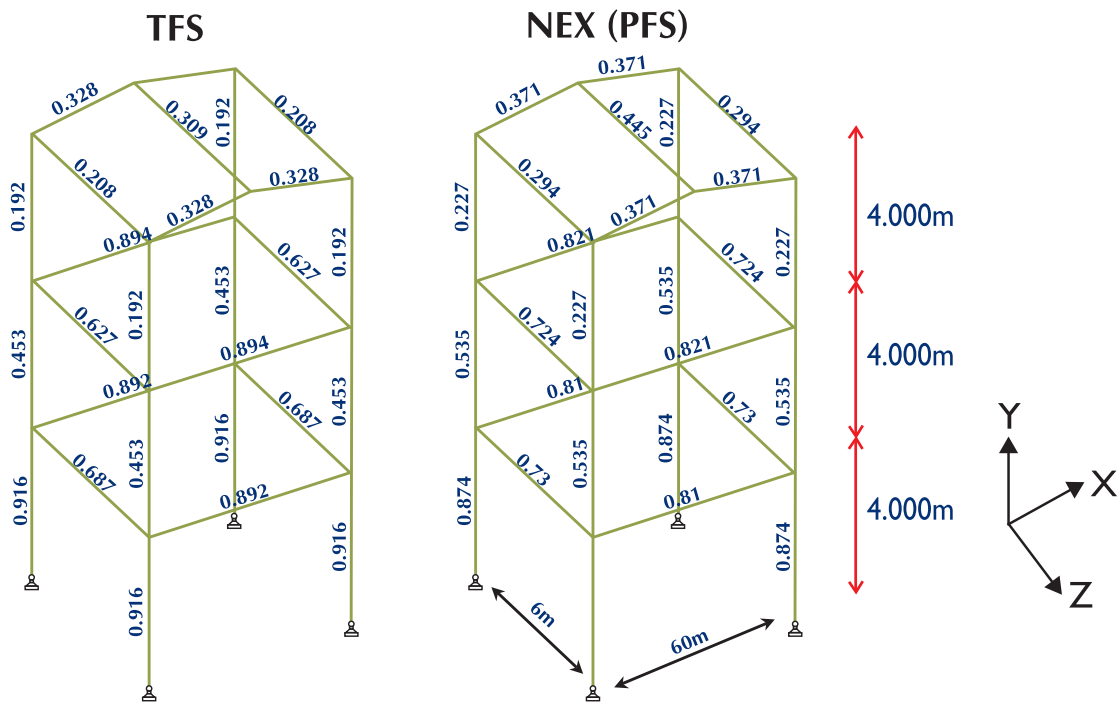
Easier fabrication - Easier connection of joints by direct bolting on flanges without using tapered washes and easier butt welding of plate at edge of flange



Economical - Substantial saving in material weight when used as compression member (columns) or flexural member (beams)

Type	Size	Weight Kg/m	Area (Sq.cm.)	Radius of Gyration (cm.)	Section	Mass (Kg/m)	Section Modulus about major axis (cm ³)
ISMB	600x210	121.00	154	4.08	MB 400	61.55	1020
NPB	600x210	122.45	155	4.66	NPB 400x180x57.38	57.38	1020
WPB	400x300	124.80	158	7.33			

NEX Parallel Flange Sections are more efficient and provide more economic designs.
e.g. UTILISATION RATIO of sections



Max utilisation ratio of the Conventional section used:

- Top Beams: MB250 - 0.328
- Mid Beams: MB350 - 0.894
- Lower Beams: MB450 - 0.892
- Columns: MB600 - 0.916

Max utilisation ratio of the Parallel Flange section used:

- Top Beams: NPB250x30.11 - 0.371
- Mid Beams: NPB300x49.32 - 0.821
- Lower Beams: NPB400x66.31 - 0.81
- Columns: WPB240x83.2 - 0.874

The ratio of calculated design load on any structural member to its load-carrying capacity is known as UTILISATION RATIO which should normally be less than one

Loading conditions

- Dead Load of 400 kg/m on floor beams & 100 kg/m on roof beams.
- Live Load of 1000 kg/m² on lower level floor beams & 600 kng/m² on mid level floor and 200 kg/m on roof beams.
- Wind Load of 300 kg/m on each column in both X & Z direction.
- Comparison of the weight of structure, for the above example, is given below:

Conventional Section	Weight in Tons	Parallel Flange Section	Weight in Tons
MB 600 x 123.0	5.79	WPB 240 x 83.20	3.985
MB 450 x 72.4	1.735	WPB 400 x 66.31	1.588
MB 350 x 52.4	1.254	WPB 300 x 49.32	1.181
MB 250 x 37.3	1.125	NPB 250 x 30.11	0.906
Total	9.904	Total	7.661

23% saving in weight is realised by using NEX Parallel Flange Section insted of Conventional sections for the example shown

- Greater efficiency of the Parallel Flange Sections is primarily due to better distribution of material across the section. This leads to greater moment of inertia, section modulus and radius of gyration. Consequently PFS has more load carrying capacity.

ADVANTAGES OF USING HIGH TENSILE SECTIONS

- Lighter super structure
- Upfront savings in cost due to lesser weight of steel
- Reduced depth of beams
- Greater load carrying capacity for same depth of columns used in mild steel
- Lower transportation, handling and erection costs due to lower weight of structure

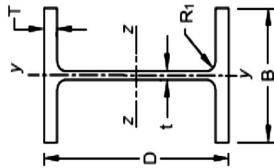
NEX AS ELECTRIC POLE (WPB 160)

Section	Mass (Kg/m)	Sectional Area (cm ²)	Dimensions (mm)						
			D (Depth)	B (Width)	t (Web thick)	T (Flange thick)	Flange Slope, a deg	R ₁ (Root Radius)	R ₂
WPB 160	30.44	38.78	152	160	6	9	-	15	-

Section	Mass (Kg/m)	Sectional Properties							
		Moment of Inertia		Radius of Gyration		Section Modulus		Plastic Section Modulus	
		I _x (cm ⁴)	I _y (cm ⁴)	R _x (cm)	R _y (cm)	Z _x (cm ³)	Z _y (cm ³)	Z _{px} (cm ³)	Z _{py} (cm ³)
WPB 160x160	30.44	1670	615	6.56	3.98	220	76.9	245	117

Advantages of using NEX (WPB 160) as electric pole

1. Comparatively lighter steel member with higher section modulus
2. Saving in cost due to lower weight of steel member
3. Easier connection due to parallel flanges
4. Lower transportation, handling and erection cost owing to lighter members
5. Superior finish from state-of-the-art mills
6. Supply in specific lengths as per requirement



- D : Depth
- B : Flange Width
- T : Flange thickness
- t : Web thickness
- R₁ : Root radius

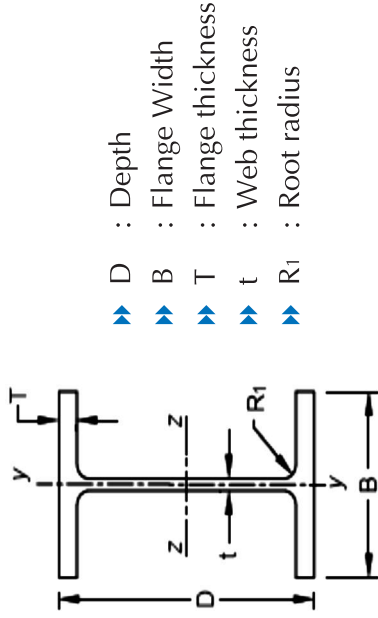


PARALLEL FLANGE SECTIONS FROM SAIL

Dimensional & Sectional Properties (Conforming to IS 808:2021)

Designation	Mass M	Area A	Dimensions					Properties										
			D	B	t	T	Flange Slope (α)	R1	R2	I _{zz}	I _{yy}	r _z	r _y	Z _{zz}	Z _{yy}	Z _{yz}	I _t	I _w
Narrow Parallel Flange Beams	kg/m	Åx10 ² mm ²	mm	mm	mm	mm	degrees	mm	mm	Åx10 ⁴ mm ⁴	Åx10 ⁴ mm ⁴	mm	mm	Åx10 ³ mm ³	Åx10 ³ mm ³	Åx10 ³ mm ³	Åx10 ⁴ mm ⁴	Åx10 ⁶ mm ⁶
NPB100X55	8.10	10.3	100	55	4.1	5.7	90	7	0	171	15.9	40.7	12.4	34.2	5.78	39.4	1.15	351
NPB200X100	22.36	28.4	200	100	5.6	8.5	90	12	0	1940	142	82.6	22.3	194	28.4	220	6.92	12900
NPB200X100	25.09	31.9	202	102	6.2	9.5	90	12	0	2210	168	83.1	22.9	218	33.1	249	9.36	15500
NPB250X125	30.11	38.3	250	125	6	9	90	15	0	4130	294	103	27.7	331	47	373	11.1	42500
NPB300X150	36.53	46.5	297	150	6.1	9.2	90	15	0	7170	518	124	33.4	483	69.1	541	13.3	107000
NPB300X150	42.24	53.8	300	150	7.1	10.7	90	15	0	8350	603	124	33.5	557	80.5	628	19.9	125000
NPB300X150	49.32	62.8	304	152	8	12.7	90	15	0	9990	745	126	34.4	657	98.1	743	30.9	157000
NPB400X180	57.38	73	397	180	7	12	90	21	0	20200	1170	166	40	1020	130	1140	36.1	432000
NPB400X180	66.31	84.4	400	180	8.6	13.5	90	21	0	23100	1310	165	39.5	1150	146	1300	51.3	490000
NPB400X180	75.67	96.3	404	182	9.7	15.5	90	21	0	26700	1560	166	40.2	1320	171	1500	73.3	587000
NPB450X190	67.16	85.5	447	190	7.6	13.1	90	21	0	29700	1500	186	41.9	1330	158	1490	47.1	704000
NPB450X190	77.58	98.8	450	190	9.4	14.6	90	21	0	33700	1670	184	41.1	1490	176	1700	66.7	791000
NPB450X190	92.37	117	456	192	11	17.6	90	21	0	40900	2080	186	42.1	1790	217	2040	109	997000
NPB500X200	79.36	101	497	200	8.4	14.5	90	21	0	42900	1930	206	43.8	1720	193	1940	301	1120000
NPB500X200	90.69	115	500	200	10.2	16	90	21	0	48100	2140	204	43	1920	214	2190	335	1240000
NPB500X200	107.32	136	506	202	12	19	90	21	0	57700	2620	205	43.7	2280	259	2610	442	1540000
NPB600X220	107.57	137	597	220	9.8	17.5	90	24	0	82900	3110	246	47.6	2770	283	3140	442	2600000
NPB600X220	122.45	155	600	220	12	19	90	24	0	92000	3380	242	46.6	3060	307	3510	485	2840000
NPB600X220	154.47	196	610	224	15	24	90	24	0	118000	4520	245	47.9	3870	403	4470	640	3850000
NPB750X270	174.54	222	760	270	14.4	21.6	90	17	0	206000	7100	304	56.5	5430	526	6240	827	9650000
NPB750X270	202.49	257	770	270	15.6	26.6	90	17	0	249000	8750	311	58.2	6480	648	7430	1010	12000000

Tolerances will be conforming IS 12779 : 1989



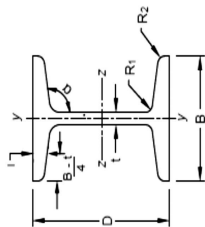
- D : Depth
- B : Flange Width
- T : Flange thickness
- t : Web thickness
- R₁ : Root radius

PARALLEL FLANGE SECTIONS FROM SAIL

Dimensional & Sectional Properties (Conforming to IS 808:2021)

Designation	Mass M	Area A	Dimensions					Properties										
			D	B	t	T	Flange Slope (α)	R1	R2	I _{zz} Åx10 ⁴ mm ⁴	I _{yy} Åx10 ⁴ mm ⁴	r _z mm	r _y mm	Z _{zz} Åx10 ³ mm ³	Z _{yy} Åx10 ³ mm ³	Z _{yz} Åx10 ³ mm ³	I _t Åx10 ⁴ mm ⁴	I _w Åx10 ⁶ mm ⁶
Wide Parallel Flange Beams	kg/m	Åx10 ² mm ²	mm	mm	mm	mm	degrees	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
WPB160X160	22.75	28.9	148	160	4.5	7	90	8	0	1220	478	65	40.6	165	59.7	181	90.5	23700
WPB160X160	30.44	38.7	152	160	6	9	90	15	0	1670	615	65.6	39.8	220	76.9	245	117	31400
WPB160X160	42.59	54.2	160	160	8	13	90	15	0	2490	889	67.7	40.4	311	111	353	169	47900
WPB160X160	76.19	97	180	166	14	23	90	15	0	5090	1750	72.4	42.5	566	211	674	325	108000
WPB200X200	34.65	44.1	186	200	5.5	8	90	18	0	2940	1060	81.6	49.2	316	106	347	163	84400
WPB200X200	37.34	47.6	200	200	6.1	8.9	90	10	0	3628	1187	87.3	50	363	119	398	180	13.3
WPB200X200	42.26	53.8	190	200	6.5	10	90	18	0	3690	1330	82.8	49.8	388	133	429	203	108000
WPB200X200	61.30	78	200	200	9	15	90	18	0	5690	2000	85.4	50.6	569	200	642	305	171000
WPB240X240	47.40	60.3	224	240	6.5	9	90	21	0	5830	2070	98.3	58.6	520	173	570	264	239000
WPB240X240	60.32	76.8	230	240	7.5	12	90	21	0	7760	2760	100	60	675	230	744	351	328000
WPB240X240	83.20	105	240	240	10	17	90	21	0	11200	3920	103	60.8	938	326	1050	498	486000
WPB240X240	156.68	199	270	248	18	32	90	21	0	24200	8150	110	63.9	1790	657	2110	1000	1150000
WPB300X300	100.85	128	294	300	10	16	90	27	0	21000	7210	128	74.9	1430	480	1580	733	1390000
WPB300X300	117.03	149	300	300	11	19	90	27	0	25100	8560	129	75.7	1670	570	1860	870	1680000
WPB300X300	237.92	303	340	310	21	39	90	27	0	59200	19400	139	80	3480	1250	4070	1910	4380000

Tolerances will be conforming IS 12779 : 1989



- ▶▶ D : Depth
- ▶▶ B : Flange Width
- ▶▶ t : Web thickness
- ▶▶ R₁ : Root radius
- ▶▶ R₂ : Toe radius
- ▶▶ α : Flange Slope



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TAPERED FLANGE BEAMS FROM SAIL

Dimensional & Sectional Properties (Conforming to IS 808:2021)

Designation	Mass	Area	Dimensions					Properties											
	M	A	D	B	t	T	FlangeSlope(α)	R1	R2	Izz	Iyy	rz	ry	Zzz	Zyy	Zpz	Zpy	It	Iw
ISMB	kg/m	Åx10 ² mm ²	mm	mm	mm	mm	degrees	mm	mm	Åx10 ⁴ mm ⁴	Åx10 ⁴ mm ⁴	mm	mm	Åx10 ³ mm ³	Åx10 ³ mm ³	Åx10 ³ mm ³	Åx10 ³ mm ³	Åx10 ⁴ mm ⁴	Åx10 ⁶ mm ⁶
MB100	8.95	11.4	100	50	4.7	7	98	9	4.5	182	12.5	39.9	10.4	36.4	5.01	42.6	8.58	2.15	315
MB125	13.35	17	125	70	5	8	98	9	4.5	445	38.4	51.1	15	71.3	10.9	82.1	18.4	3.99	1560
MB150	14.96	19	150	75	5	8	98	9	4.5	718	46.7	61.3	15.6	95.7	12.4	109	21	4.36	2830
MB175	19.50	24.8	175	85	5.8	9	98	10	5	1260	76.6	71.2	17.5	144	18	165	30.5	7.17	6340
MB200	24.17	30.8	200	100	5.7	10	98	11	5.5	2110	136	82.8	21	211	27.3	240	46	10.7	15000
MB250	37.30	47.5	250	125	6.9	12.5	98	13	6.5	5130	334	103	26.5	410	53.5	465	89.7	25.5	57300
MB300	46.02	58.6	300	140	7.7	13.1	98	14	7	8990	486	123	28.7	599	69.4	681	117	34.7	123000
MB350	52.33	66.7	350	140	8.1	14.2	98	14	7	13600	537	142	28.3	779	76.8	889	129	43.1	183000
MB400	61.55	78.4	400	140	8.9	16	98	14	7	20400	622	161	28.1	1020	88.8	1170	149	59.6	269000
MB450	72.38	92.2	450	150	9.4	17.4	98	15	7.5	30400	834	181	30	1350	111	1550	187	81	457000
MB500	86.88	110	500	180	10.2	17.2	98	17	8.5	45200	1360	202	35.1	1800	152	2070	259	103	974000
MB600	121.00	154	600	210	12	20.3	98	20	10	90200	2570	241	40.8	3000	245	3450	418	198	2630000

Designation	Mass	Area	Dimensions						Properties										
Column Section	M	A	D	B	t	T	FlangeSlope(α _t)	R1	R2	Izz	Iyy	rz	ry	Zzz	Zyy	Zpz	Zpy	It	Iw
	kg/m	Åx10 ² mm ²	mm	mm	mm	mm	degrees	mm	mm	Åx10 ⁴ mm ⁴	Åx10 ⁴ mm ⁴	mm	mm	Åx10 ³ mm ³	Åx10 ³ mm ³	Åx10 ³ mm ³	Åx10 ³ mm ³	Åx10 ⁴ mm ⁴	Åx10 ⁶ mm ⁶
SC 150	36.93	47	152	152	7.9	11.9	98	11.7	3	1920	554	63.9	34.3	253	72.9	288	122	27.6	34100

Designation	Mass	Area	Dimensions						Properties										
	M	A	D	B	t	T	Flangeslope(α)	R1	R2	Izz	Iyy	rz	ry	Zzz	Zyy	Zpz	Zpy	It	Iw
NHeavy Weight	kg/m	Åx10 ² mm ²	mm	mm	mm	mm	degrees	mm	mm	Åx10 ⁴ mm ⁴	Åx10 ⁴ mm ⁴	mm	mm	Åx10 ³ mm ³	Åx10 ³ mm ³	Åx10 ³ mm ³	Åx10 ³ mm ³	Åx10 ⁴ mm ⁴	Åx10 ⁶ mm ⁶
HB 150x150	27.06	34.4	150	150	5.4	9	94	8	4	1450	431	64.9	35.3	194	57.5	215	92.7	10.1	25100
HB 150x150	30.15	38.4	150	150	8.4	9	94	8	4	1510	435	62.7	33.6	201	58	228	94.7	12.6	25100
HB 150x150	33.66	42.9	150	150	11.8	9	94	8	4	1570	439	60.6	32	210	58.6	243	97.6	17.4	25100
HB 200x200	37.31	47.5	200	200	6.1	9	94	9	4.5	3600	967	87.1	45.1	360	96.7	397	159	14.9	109000
HB 200x200	39.73	50.6	200	200	7.8	9	94	9	4.5	3690	971	85.4	43.8	369	97.1	411	160	16.6	109000

Tolerances will be conforming IS 1852 : 1985

Application of NEX

Flyovers

Stadiums

Metro Rails / Indian Railways

Foot Over Bridges

Multi-level Car Parks

Industrial Buildings

Raw Material Handling Plants

Residential Complexes

Commercial Complexes

Power Plants

Ports / Offshore Structures

Oil Refineries / Petrochemical Plants

Electric Poles (Masts)

Trailer and Truck Bed Frames

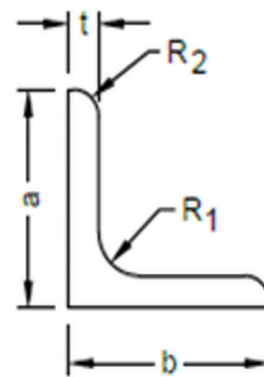
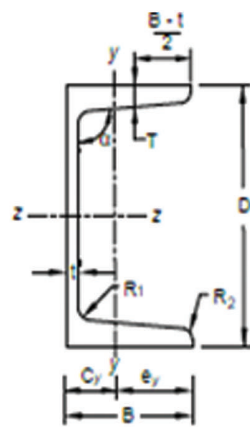
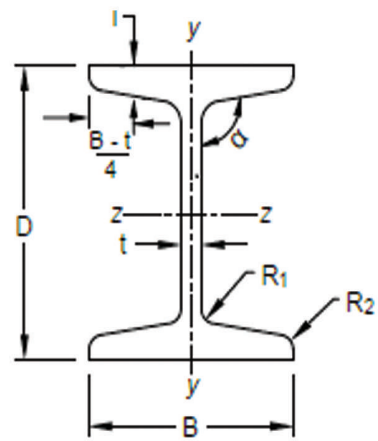
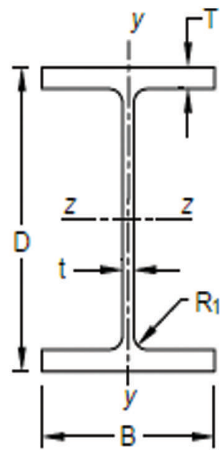
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