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Condensed Catalogue

OF

BETHLEHEM
STRUCTURAL
SHAPES

1922

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BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

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Condensed Catalogue
OF
BETHLEHEM
STRUCTURAL
SHAPES *#*

MANUFACTURED BY
BETHLEHEM STEEL COMPANY

1) BETHLEHEM, PA. *#*

2)
Revised to January, 1922. *2*

GENERAL OFFICES:

At the Works, Bethlehem, Pa.

SALES OFFICES:

BOSTON, 141 Milk Street.

NEW YORK, 25 Broadway.

PHILADELPHIA, Morris Building.

ATLANTA, Healey Building.

PITTSBURGH, First National Bank Building.

CLEVELAND, Guardian Building.

CHICAGO, Peoples Gas Building.

SAN FRANCISCO, Monadnock Building.

NOTICE.

This catalogue gives dimensions, weights and properties of all Bethlehem Structural Shapes, revised to date.

All Bethlehem I Beams shown in this catalogue are now available, also all Bethlehem H Columns and Bethlehem Supplementary Columns.

All Bethlehem Girder Beams shown in this catalogue will be available April 1, 1922, after which date the previous sections of girder beams will be discontinued.

Weights of all sections include weights of fillets, in conformity with the established practice adopted by the Association of American Steel Manufacturers.

The sections are numbered throughout the tables for convenience in identification and ordering.

A Handbook containing full tables of safe loads and other information is in course of preparation. The safe load tables given in the 1911 Catalogue are correct as printed for all sections that have not been superseded.

Bethlehem, Pa.
January, 1922.

BETHLEHEM STEEL COMPANY.

EXPLANATORY NOTES.

Large additional mill capacity for the manufacture of wide flange structural shapes has made the production of new sections practical where it had been found desirable for the improvement of the previously established line of Bethlehem Structural Shapes. Several new I beam and column sections were recently added, information concerning which has been published. A further desirable improvement has now been made in modifying Bethlehem Girder Beam sections to provide more than one weight of a section. All additional and modified sections to date are shown in this catalogue, together with all previous sections that have not been superseded.

Bethlehem Girder Beams. In general three weights are provided for each section, the middleweights corresponding to the previous sections of Bethlehem Girder Beams from G8 to G24 a, inclusive. The lighter and heavier weights of each section provide opportunity for greater economy in the selection of sizes for any required purpose. To accomplish this, slight modifications in profile have been made in all girder sections from G8 to G24 a, inclusive. Simplification in the production of the larger girder sections, G26, G28 and G30, has been obtained by changing the profiles to an extent permitting all variations in weights of each girder to be procured from the same set of rolls.

Attention is called to the manner in which the variation in weight of the new girders is obtained by increasing or decreasing the thickness of the flange as well as that of the web, shown in Fig. 3, instead of obtaining the entire variation in weight by increasing or decreasing the thickness of the web only. This method was first successfully applied to the three new I beam sections B18 a, B22 and B24 b, and has now been extended to all the girder beams.

This method of rolling, on which patents are pending, permits obtaining a variation in Section Modulus practically proportional to the variation in weight. Thus G12, 61 lbs., compared with G12, 55.5 lbs., has an increase of 7.2 in Section Modulus, or about 10 per cent increase in modulus, due to the increase of 5.5 lbs. in weight, which is about 10 per cent increase in weight also. The increase or decrease in flange thickness is made at the outside of the flange, thereby slightly varying the depth of the beam; but the total variation in depth from minimum to maximum is not more than the usual allowable tolerance in depth necessary in any method of rolling beams.

The flanges of all girder beams have a bevel of $8\frac{1}{2}$ per cent, or a slope of 1 in 12.

Bethlehem I Beams. No changes have been made in Bethlehem I Beam sections, and the list of sizes is the same as previously, except that the three new I beam sections, recently added, viz.: B18 a, B22 and B24 b, are included. These three new beam sections are increased by the same method as explained for Bethlehem Girder Beams, and their flanges have the same bevel of $8\frac{1}{2}$ per cent, or a slope of 1 in 12.

All other Bethlehem I Beams are increased, as shown in Fig. 1, by spreading the main rolls, which adds an equal amount to the thickness of the web and to the width of the flanges, all other dimensions remaining unchanged. The bevel of the flanges is 9 per cent.

Bethlehem Columns. Four new weights have been added to the series of 12" H Columns, and two new weights to the series of 10" H Columns. Tables are given of properties of 14" H Columns reinforced with cover plates, when columns are required of greater sectional area than the largest 14" H Column rolled.

All Supplementary Column Sections, which were recently added, are given in this catalogue.

Bethlehem column sections are increased, as shown in Fig. 2, by spreading both sets of rolls; the thickness of the web and the width of the flanges are increased equally, the thickness of the flanges being increased a proportionate amount.

Flanges of all column sections have a slope of 2 per cent.

Fig. 1

Fig. 2

Fig. 3

Bending Factors. To aid in the selection of columns subjected to direct loads and also to bending, produced by eccentric loads or by other means, bending factors are given, which furnish a convenient and practical method of converting the bending moment into an equivalent direct central load.

P' —centrally applied load, in lbs.

P'' —eccentric load, in lbs.

m —bending moment, in inch lbs., produced by P'' .

P''' —an equivalent central load, in lbs., producing the same maximum stress as bending moment.

P —total equivalent load on column, in lbs.

f —fiber stress, lbs. per sq. in., due to bending.

S —section modulus about axis of bending.

A —area of section, square inches.

k —bending factor — $A \div S$.

Then, $f = \frac{m}{S}$, and, by assumption, $\frac{P'''}{A} = f$.

But as $k = \frac{A}{S}$, then $f = \frac{mk}{A} = \frac{P'''}{A}$, and $P''' = mk$.

Therefore, $P = P' + P'' + P''' = P' + P'' + mk$.

Hence, if the bending moment, in inch lbs., is multiplied by the bending factor, k , the product is an equivalent central load on the column producing the same compressive stress as the bending moment.

Material. All Bethlehem Structural Shapes are of open hearth steel exclusively, conforming to Manufacturers' Standard specifications; and also to American Railway Engineering and Maintenance of Way Association specifications. Material complying with any other standard specifications may be furnished by special arrangement.

GENERAL CONDITIONS.

Shapes will be cut to ordered length within an allowable variation either way, as follows: Bethlehem I Beams 8" to 24", inclusive, within $\frac{3}{8}$ inch; all other sections, within $\frac{1}{2}$ inch. For cutting with less variation, or to exact length, an extra price is charged.

Sections are furnished only at catalogue weight. Shapes may have an allowable variation of $2\frac{1}{2}$ per cent from nominal section.

WEIGHTS AND DIMENSIONS OF

BETHLEHEM GIRDER BEAMS.

DIMENSIONS, IN INCHES.

Section Number.	Weight, Lbs. per Foot.	DIMENSIONS, IN INCHES.					
		Nominal Depth.	Flange Width.	Web Thickness.	Flange Thickness.		Radius of Fillet.
					At Edge.	At Root.	
		D	B	W	M	N	R
G30	200.0	30 $\frac{1}{8}$	15.04	.76	.950	1.545	.85
	190.0	30	15.00	.72	.890	1.485	.85
	181.0	29 $\frac{7}{8}$	14.97	.69	.830	1.425	.85
G28	175.0	28 $\frac{1}{8}$	14.29	.70	.870	1.436	.80
	165.0	28	14.25	.66	.810	1.376	.80
G26	160.0	26 $\frac{1}{8}$	13.79	.67	.845	1.392	.75
	151.0	26	13.75	.63	.785	1.332	.75
	144.0	25 $\frac{7}{8}$	13.73	.61	.725	1.272	.75
G24 a	149.0	24 $\frac{1}{8}$	13.29	.65	.840	1.367	.70
	141.0	24	13.25	.61	.780	1.307	.70
	133.0	23 $\frac{7}{8}$	13.22	.58	.720	1.247	.70
G24	129.0	24 $\frac{1}{8}$	12.29	.58	.770	1.258	.65
	121.0	24	12.25	.54	.710	1.198	.65
	114.0	23 $\frac{7}{8}$	12.22	.51	.650	1.138	.65
G20 a	149.0	20 $\frac{1}{8}$	12.78	.69	.970	1.475	.75
	142.0	20	12.75	.66	.910	1.415	.75
	135.0	19 $\frac{7}{8}$	12.72	.63	.850	1.355	.75
G20	120.0	20 $\frac{1}{8}$	12.03	.59	.770	1.247	.65
	113.0	20	12.00	.56	.710	1.187	.65
	107.0	19 $\frac{7}{8}$	11.98	.54	.650	1.127	.65
G18	100.0	18 $\frac{1}{8}$	11.54	.52	.670	1.129	.60
	93.0	18	11.50	.48	.610	1.069	.60
	87.5	17 $\frac{7}{8}$	11.48	.46	.550	1.009	.60

WEIGHTS AND DIMENSIONS OF

BETHLEHEM GIRDER BEAMS.

DIMENSIONS, IN INCHES.

Section Number.	Weight, Lbs. per Foot.	DIMENSIONS, IN INCHES.					
		Nominal Depth.	Flange Width.	Web Thickness.	Flange Thickness.		Radius of Fillet.
					At Edge.	At Root.	
		D	B	W	M	N	R
G15 b	147.0	15 $\frac{1}{8}$	11.78	.83	1.150	1.606	.90
	141.0	15	11.75	.80	1.090	1.546	.90
	135.0	14 $\frac{7}{8}$	11.72	.77	1.030	1.486	.90
G15 a	111.0	15 $\frac{1}{8}$	11.29	.64	.845	1.289	.70
	105.0	15	11.25	.60	.785	1.229	.70
	99.0	14 $\frac{7}{8}$	11.22	.57	.725	1.169	.70
G15	80.5	15 $\frac{1}{8}$	10.79	.48	.570	1.000	.55
	74.0	15	10.75	.44	.510	.940	.55
	69.0	14 $\frac{7}{8}$	10.73	.42	.450	.880	.55
G12 a	76.5	12 $\frac{1}{8}$	10.29	.51	.620	1.027	.55
	70.5	12	10.25	.47	.560	.967	.55
	66.0	11 $\frac{7}{8}$	10.23	.45	.500	.907	.55
G12	61.0	12 $\frac{1}{8}$	10.03	.41	.465	.866	.45
	55.5	12	10.00	.38	.405	.806	.45
	51.5	11 $\frac{3}{4}$	9.98	.36	.360	.761	.45
G10	50.0	10 $\frac{1}{8}$	9.04	.36	.445	.807	.40
	44.5	10	9.00	.32	.385	.747	.40
	41.5	9 $\frac{3}{4}$	8.99	.31	.340	.702	.40
G9	43.5	9 $\frac{1}{8}$	8.54	.35	.405	.746	.40
	38.5	9	8.50	.31	.345	.686	.40
	36.0	8 $\frac{1}{2}$	8.48	.29	.315	.656	.40
G8	37.0	8 $\frac{1}{8}$	8.03	.33	.365	.686	.40
	33.0	8	8.00	.30	.305	.626	.40
	31.0	7 $\frac{1}{2}$	7.99	.29	.275	.596	.40

WEIGHTS AND DIMENSIONS OF
BETHLEHEM I BEAMS.

Section Number.	Weight, Lbs. per Foot.	DIMENSIONS, IN INCHES.					
		Depth.	Flange Width.	Web Thickness.	Flange Thickness.		Radius of Fillet.
					At Edge.	At Root.	
		D	B	W	M	N	R
B30	121.0	30	10.500	.540	.735	1.183	.65
B28	106.0	28	10.000	.500	.675	1.102	.60
B26	91.0	26	9.500	.460	.600	1.007	.55
B24 b*	104.5	24 $\frac{3}{32}$	9.775	.550	.750	1.134	.60
	99.5	24	9.750	.525	.705	1.089	.60
	95.5	23 $\frac{29}{32}$	9.730	.505	.660	1.044	.60
B24 a	84.5	24	9.250	.460	.585	.980	.55
B24	83.0	24	9.130	.520	.510	.897	.50
	73.5	24	9.000	.390	.510	.897	.50
B22*	71.5	22 $\frac{1}{8}$	8.535	.420	.545	.883	.50
	68.5	22 $\frac{1}{16}$	8.520	.405	.515	.853	.50
	65.5	22	8.500	.385	.485	.823	.50
B20 a	82.0	20	8.890	.570	.580	.955	.55
	73.0	20	8.750	.430	.580	.955	.55
B20	69.0	20	8.145	.520	.475	.818	.45
	64.5	20	8.075	.450	.475	.818	.45
	59.5	20	8.000	.375	.475	.818	.45

Note: All Bethlehem I Beams have a slope of flange of 9% except those marked * which have a slope of 8 $\frac{1}{2}$ %.

WEIGHTS AND DIMENSIONS OF.
BETHLEHEM I BEAMS.

Section Number.	Weight, Lbs. per Foot.	DIMENSIONS, IN INCHES.					
		Depth.	Flange Width.	Web Thickness.	Flange Thickness.		Radius of Fillet.
					At Edge.	At Root.	
		D	B	W	M	N	R
B18 a*	74.0	18 $\frac{1}{8}$	8.770	.440	.645	.992	.50
	69.0	18	8.750	.420	.585	.932	.50
	64.5	17 $\frac{7}{8}$	8.730	.400	.525	.872	.50
B18	59.0	18	7.675	.495	.430	.753	.40
	54.5	18	7.590	.410	.430	.753	.40
	52.0	18	7.555	.375	.430	.753	.40
	49.0	18	7.500	.320	.430	.753	.40
B15 b	71.5	15	7.500	.520	.785	1.099	.60
B15 a	64.0	15	7.195	.605	.590	.887	.50
	54.5	15	7.000	.410	.590	.887	.50
B15	46.0	15	6.810	.440	.400	.686	.40
	41.0	15	6.710	.340	.400	.686	.40
	38.5	15	6.660	.290	.400	.686	.40
B12 a	36.5	12	6.300	.310	.440	.710	.40
B12	32.0	12	6.205	.335	.330	.594	.35
	28.5	12	6.120	.250	.330	.594	.35
B10	28.5	10	5.990	.390	.270	.522	.30
	23.5	10	5.850	.250	.270	.522	.30
B9	24.0	9	5.555	.365	.245	.479	.30
	20.5	9	5.440	.250	.245	.479	.30
B8	19.5	8	5.325	.325	.205	.430	.30
	17.5	8	5.250	.250	.205	.430	.30

Note: All Bethlehem I Beams have a slope of flange of 9% except those marked * which have a slope of 8 $\frac{1}{2}$ %.

PROPERTIES OF

BETHLEHEM GIRDER BEAMS.

Section Number.	Nominal Depth of Beam, Inches.	Weight, Lbs. per Foot.	Area of Section, Square Inches.	Thickness of Web, Inches.	Width of Flange, Inches.	AXIS XX.		
						Moment of Inertia.	Radius of Gyration.	Section Modulus
						I	r	S
G30	30 $\frac{1}{8}$	200.0	58.52	.76	15.04	9148.8	12.50	607.5
	30	190.0	55.52	.72	15.00	8651.1	12.48	576.7
	29 $\frac{7}{8}$	181.0	52.82	.69	14.97	8181.0	12.45	547.6
G28	28 $\frac{1}{8}$	175.0	51.02	.70	14.29	6988.7	11.70	497.1
	28	165.0	48.19	.66	14.25	6577.9	11.68	469.9
G26	26 $\frac{1}{8}$	160.0	46.85	.67	13.79	5576.6	10.91	427.0
	26	151.0	44.16	.63	13.75	5237.1	10.89	402.9
	25 $\frac{7}{8}$	144.0	41.99	.61	13.73	4930.6	10.84	381.0
G24 a	24 $\frac{1}{8}$	149.0	43.57	.65	13.29	4451.1	10.11	369.1
	24	141.0	41.02	.61	13.25	4174.2	10.09	347.9
	23 $\frac{7}{8}$	133.0	38.71	.58	13.22	3912.4	10.05	327.7
G24	24 $\frac{1}{8}$	129.0	37.74	.58	12.29	3844.8	10.09	318.8
	24	121.0	35.30	.54	12.25	3585.3	10.08	298.8
	23 $\frac{7}{8}$	114.0	33.12	.51	12.22	3340.6	10.04	279.8
G20 a	20 $\frac{1}{8}$	149.0	43.44	.69	12.78	3106.6	8.46	308.8
	20	142.0	41.31	.66	12.75	2932.3	8.43	293.2
	19 $\frac{7}{8}$	135.0	39.18	.63	12.72	2760.6	8.39	277.7
G20	20 $\frac{1}{8}$	120.0	34.95	.59	12.03	2505.5	8.47	249.1
	20	113.0	32.90	.56	12.00	2340.2	8.43	234.0
	19 $\frac{7}{8}$	107.0	31.06	.54	11.98	2184.0	8.39	219.7
G18	18 $\frac{1}{8}$	100.0	29.25	.52	11.54	1725.7	7.68	190.5
	18	93.0	27.14	.48	11.50	1593.4	7.66	177.0
	17 $\frac{7}{8}$	87.5	25.40	.46	11.48	1472.8	7.61	164.7

W = Safe load in pounds, uniformly distributed, including weight of beam.

L = Span, in feet.

M = Moment of forces, in foot pounds.

f = Allowable Fiber Stress, in lbs. per square inch.

S = Section Modulus about axis XX.

PROPERTIES OF

BETHLEHEM GIRDER BEAMS.

COEFFICIENTS OF STRENGTH.			Maximum Safe Shear on Web, in Pounds.	AXIS YY.			Section Number.
For Fiber Stress of 16,000 Lbs. per Sq. In. Usual Building Code Requirement.	For Fiber Stress of 12,000 Lbs. per Sq. In. For Moving Loads.	For Fiber Stress of 18,000 Lbs. per Sq. In. For Quiescent Loads.		Moment of Inertia.	Radius of Gyration.	Section Modulus.	
C	C'	C''		I'	r'	S'	
6,480,000	4,860,000	7,290,000	193,200	628.5	3.28	83.6	G30
6,152,000	4,614,000	6,921,000	176,400	589.4	3.26	78.6	
5,841,000	4,381,000	6,571,000	163,700	552.0	3.23	73.7	
5,302,000	3,976,000	5,965,000	164,800	496.2	3.12	69.4	G28
5,012,000	3,759,000	5,638,000	149,100	462.8	3.10	65.0	
4,555,000	3,416,000	5,124,000	149,500	432.8	3.04	62.8	G26
4,297,000	3,223,000	4,834,000	134,900	402.7	3.02	58.6	
4,064,000	3,048,000	4,572,000	127,300	375.0	2.99	54.6	
3,937,000	2,953,000	4,429,000	138,200	383.3	2.97	57.7	G24 a
3,710,000	2,783,000	4,174,000	124,600	356.4	2.95	53.8	
3,495,000	2,621,000	3,932,000	114,400	330.7	2.92	50.0	
3,401,000	2,550,000	3,826,000	114,800	278.2	2.72	45.3	G24
3,187,000	2,390,000	3,585,000	101,400	256.9	2.70	41.9	
2,984,000	2,238,000	3,357,000	91,400	236.7	2.67	38.7	
3,294,000	2,470,000	3,706,000	138,100	384.5	2.97	60.2	G20 a
3,128,000	2,346,000	3,519,000	129,200	360.9	2.96	56.6	
2,962,000	2,222,000	3,333,000	120,500	337.6	2.94	53.1	
2,657,000	1,992,000	2,989,000	109,800	260.1	2.73	43.2	G20
2,496,000	1,872,000	2,808,000	101,000	240.8	2.71	40.1	
2,344,000	1,758,000	2,637,000	95,100	222.3	2.68	37.1	
2,032,000	1,524,000	2,286,000	86,300	202.6	2.63	35.1	G18
1,888,000	1,416,000	2,125,000	76,000	185.1	2.61	32.2	
1,757,000	1,318,000	1,977,000	70,700	168.9	2.58	29.4	

C, C', and C''=Coefficients given in the table.

$$W = \frac{C}{L}, \text{ or } \frac{C'}{L}, \text{ or } \frac{C''}{L}; \quad M = \frac{C}{8}, \text{ or } \frac{C'}{8}, \text{ or } \frac{C''}{8}$$

$$C, \text{ or } C', \text{ or } C'' = WL = 8M = \frac{1}{8} f S$$

PROPERTIES OF

BETHLEHEM GIRDER BEAMS.

Section Number.	Nominal Depth of Beam, Inches.	Weight, Lbs. per Foot.	Area of Section, Square Inches.	Thick-ness of Web, Inches.	Width of Flange, Inches.	AXIS XX.		
						Moment of Inertia.	Radius of Gyration.	Section Modulus.
						I	r	S
G15 b	15 $\frac{1}{8}$	147.0	42.73	.83	11.78	1666.2	6.24	220.4
	15	141.0	40.86	.80	11.75	1577.7	6.21	210.4
	14 $\frac{7}{8}$	135.0	39.01	.77	11.72	1490.7	6.18	200.4
G15 a	15 $\frac{1}{8}$	111.0	32.40	.64	11.29	1306.3	6.35	172.8
	15	105.0	30.45	.60	11.25	1218.2	6.32	162.4
	14 $\frac{7}{8}$	99.0	28.65	.57	11.22	1134.7	6.29	152.5
G15	15 $\frac{1}{8}$	80.5	23.44	.48	10.79	968.5	6.43	128.1
	15	74.0	21.55	.44	10.75	883.8	6.40	117.8
	14 $\frac{7}{8}$	69.0	19.96	.42	10.73	806.4	6.36	108.4
G12 a	12 $\frac{1}{8}$	76.5	22.29	.51	10.29	589.0	5.14	97.2
	12	70.5	20.57	.47	10.25	538.4	5.12	89.7
	11 $\frac{7}{8}$	66.0	19.11	.45	10.23	491.7	5.07	82.8
G12	12 $\frac{1}{8}$	61.0	17.77	.41	10.03	479.9	5.20	79.2
	12	55.5	16.21	.38	10.00	431.8	5.16	72.0
	11 $\frac{3}{4}$	51.5	15.07	.36	9.98	396.9	5.13	66.6
G10	10 $\frac{1}{8}$	50.0	14.51	.36	9.04	275.5	4.36	54.4
	10	44.5	13.03	.32	9.00	244.7	4.33	48.9
	9 $\frac{3}{4}$	41.5	12.12	.31	8.99	223.8	4.30	45.2
G9	9 $\frac{1}{8}$	43.5	12.62	.35	8.54	193.8	3.92	42.5
	9	38.5	11.23	.31	8.50	170.3	3.89	37.9
	8 $\frac{1}{2}$	36.0	10.55	.29	8.48	158.9	3.88	35.5
G8	8 $\frac{1}{8}$	37.0	10.77	.33	8.03	131.1	3.49	32.3
	8	33.0	9.57	.30	8.00	114.2	3.45	28.6
	7 $\frac{1}{2}$	31.0	9.01	.29	7.99	106.2	3.43	26.7

W = Safe load in pounds, uniformly distributed, including weight of beam.

L = Span, in feet.

M = Moment of forces, in foot pounds.

f = Allowable Fiber Stress, in lbs. per square inch.

S = Section Modulus about axis XX.

PROPERTIES OF

BETHLEHEM GIRDER BEAMS.

COEFFICIENTS OF STRENGTH.			Maximum Safe Shear on Web, in Pounds.	AXIS YY.			Section Number.
For Fiber Stress of 16,000 Lbs. per Sq. In. Usual Building Code Requirement.	For Fiber Stress of 12,000 Lbs. per Sq. In. For Moving Loads.	For Fiber Stress of 18,000 Lbs. per Sq. In. For Quiescent Loads.		Moment of Inertia.	Radius of Gyration.	Section Modulus.	
C	C'	C''		I'	r'	S'	
2,351,000	1,763,000	2,645,000	125,500	347.3	2.85	59.0	G15b
2,244,000	1,683,000	2,524,000	120,000	328.3	2.83	55.9	
2,137,000	1,603,000	2,404,000	114,600	309.5	2.82	52.8	
1,843,000	1,382,000	2,074,000	96,800	231.2	2.67	41.0	G15a
1,733,000	1,299,000	1,949,000	90,000	214.3	2.65	38.1	
1,627,000	1,220,000	1,830,000	84,800	198.4	2.63	35.4	
1,367,000	1,025,000	1,537,000	69,700	143.0	2.47	26.5	G15
1,257,000	942,800	1,414,000	61,100	128.9	2.45	24.0	
1,156,000	867,100	1,301,000	56,600	115.8	2.41	21.6	
1,037,000	777,600	1,166,000	61,800	132.1	2.43	25.7	G12a
957,100	717,800	1,077,000	56,400	119.7	2.41	23.4	
883,000	662,300	993,400	53,500	108.3	2.38	21.2	
844,700	633,500	950,300	49,100	95.8	2.32	19.1	G12
767,700	575,800	863,600	43,800	84.9	2.29	17.0	
710,800	533,100	799,700	40,300	76.9	2.26	15.4	
580,800	435,600	653,300	36,400	66.4	2.14	14.7	G10
522,100	391,500	587,300	31,100	58.2	2.11	12.9	
481,900	361,400	542,100	29,500	52.6	2.08	11.7	
453,400	340,000	510,000	31,900	51.3	2.02	12.0	G9
403,800	302,800	454,300	27,900	44.4	1.99	10.4	
379,200	284,400	426,600	25,300	41.0	1.97	9.67	
344,500	258,400	387,600	26,800	38.7	1.90	9.65	G8
304,500	228,400	342,600	24,000	33.2	1.86	8.29	
285,200	213,900	320,900	23,000	30.5	1.84	7.63	

C, C', and C'' = Coefficients given in the table.

$$W = \frac{C}{L}, \text{ or } \frac{C'}{L}, \text{ or } \frac{C''}{L}; \quad M = \frac{C}{8}, \text{ or } \frac{C'}{8}, \text{ or } \frac{C''}{8}$$

$$C, \text{ or } C', \text{ or } C'' = WL = 8M = \frac{4}{3} f S$$

PROPERTIES OF

BETHLEHEM I BEAMS.

Section Number.	Depth of Beam, Inches.	Weight, Lbs. per Foot.	Area of Section, Square Inches.	Thick-ness of Web, Inches.	Width of Flange, Inches.	AXIS XX.		
						Moment of Inertia.	Radius of Gyration.	Section Modulus.
						I	r	S
B30	30	121.0	35.30	.540	10.500	5239.6	12.18	349.3
B28	28	106.0	30.88	.500	10.000	4014.1	11.40	286.7
B26	26	91.0	26.49	.460	9.500	2977.2	10.60	229.0
B24 b	24 $\frac{3}{32}$	104.5	30.63	.550	9.775	2967.7	9.84	246.4
	24	99.5	29.15	.525	9.750	2811.7	9.82	234.3
	23 $\frac{29}{32}$	95.5	27.79	.505	9.730	2663.1	9.79	222.8
B24 a	24	84.5	24.80	.460	9.250	2381.9	9.80	198.5
B24	24	83.0	24.59	.520	9.130	2240.9	9.55	186.7
	24	73.5	21.47	.390	9.000	2091.0	9.87	174.3
B22	22 $\frac{1}{8}$	71.5	20.88	.420	8.535	1705.2	9.04	154.2
	22 $\frac{1}{16}$	68.5	20.04	.405	8.520	1629.3	9.02	147.7
	22	65.5	19.08	.385	8.500	1549.5	9.01	140.9
B20 a	20	82.0	24.17	.570	8.890	1559.8	8.03	156.0
	20	73.0	21.37	.430	8.750	1466.5	8.28	146.7
B20	20	69.0	20.26	.520	8.145	1268.9	7.91	126.9
	20	64.5	18.86	.450	8.075	1222.1	8.05	122.2
	20	59.5	17.36	.375	8.000	1172.2	8.22	117.2

W = Safe load in pounds, uniformly distributed, including weight of beam.**L** = Span, in feet.**M** = Moment of forces, in foot pounds.**f** = Allowable Fiber Stress, in lbs. per square inch.**S** = Section Modulus about axis XX.

PROPERTIES OF

BETHLEHEM I BEAMS.

COEFFICIENTS OF STRENGTH.			Maximum Safe Shear on Web, in Pounds.	AXIS YY.			Section Number.
For Fiber Stress of 16,000 Lbs. per Sq. In. Usual Building Code Requirement.	For Fiber Stress of 12,000 Lbs. per Sq. In. For Moving Loads.	For Fiber Stress of 18,000 Lbs. per Sq. In. For Quiescent Loads.		Moment of Inertia.	Radius of Gyration.	Section Modulus.	
C	C'	C''		I'	r'	S'	
3,726,000	2,795,000	4,192,000	103,800	165.0	2.16	31.4	B30
3,058,000	2,294,000	3,441,000	89,000	131.5	2.06	26.3	B28
2,443,000	1,832,000	2,748,000	75,300	101.2	1.95	21.3	B26
2,628,000	1,971,000	2,957,000	104,300	132.9	2.08	27.2	B24 b
2,499,000	1,874,000	2,812,000	95,900	124.8	2.07	25.6	
2,376,000	1,782,000	2,673,000	89,300	117.1	2.05	24.1	
2,117,000	1,588,000	2,382,000	75,100	91.1	1.92	19.7	B24 a
1,992,000	1,494,000	2,241,000	93,100	78.0	1.78	17.1	B24
1,859,000	1,394,000	2,091,000	54,000	74.4	1.86	16.5	
1,645,000	1,233,000	1,850,000	62,500	65.8	1.78	15.4	B22
1,576,000	1,182,000	1,773,000	58,200	62.3	1.76	14.6	
1,503,000	1,127,000	1,690,000	52,600	58.8	1.76	13.8	
1,664,000	1,248,000	1,872,000	102,400	79.9	1.82	18.0	B20 a
1,564,000	1,173,000	1,760,000	64,900	75.9	1.88	17.3	
1,354,000	1,015,000	1,523,000	88,200	51.2	1.59	12.6	B20
1,304,000	977,700	1,467,000	69,400	49.8	1.62	12.3	
1,250,000	937,700	1,407,000	50,000	48.3	1.66	12.1	

C, C', and C'' = Coefficients given in the table.

$$W = \frac{C}{L}, \text{ or } \frac{C'}{L}, \text{ or } \frac{C''}{L}; \quad M = \frac{C}{8}, \text{ or } \frac{C'}{8}, \text{ or } \frac{C''}{8}$$

$$C, \text{ or } C', \text{ or } C'' = WL = 8M = \frac{3}{8} f S$$

PROPERTIES OF

BETHLEHEM I BEAMS.

Section Number.	Depth of Beam, Inches.	Weight, Lbs. per Foot.	Area of Section, Square Inches.	Thick-ness of Web, Inches.	Width of Flange, Inches.	AXIS XX.		
						Moment of Inertia.	Radius of Gyration.	Section Modulus
						I	r	S
B18 a	18 $\frac{1}{8}$	74.0	21.61	.440	8.770	1238.0	7.57	136.6
	18	69.0	20.20	.420	8.750	1142.5	7.52	126.9
	17 $\frac{7}{8}$	64.5	18.79	.400	8.730	1048.5	7.47	117.3
B18	18	59.0	17.40	.495	7.675	883.3	7.12	98.1
	18	54.5	15.87	.410	7.590	842.0	7.28	93.6
	18	52.0	15.24	.375	7.555	825.0	7.36	91.7
	18	49.0	14.25	.320	7.500	798.3	7.48	88.7
B15 b	15	71.5	20.95	.520	7.500	796.2	6.16	106.2
B15 a	15	64.0	18.81	.605	7.195	664.9	5.95	88.6
	15	54.5	15.88	.410	7.000	610.0	6.20	81.3
B15	15	46.0	13.52	.440	6.810	484.8	5.99	64.6
	15	41.0	12.02	.340	6.710	456.7	6.16	60.9
	15	38.5	11.27	.290	6.660	442.6	6.27	59.0
B12 a	12	36.5	10.61	.310	6.300	269.2	5.04	44.9
B12	12	32.0	9.44	.335	6.205	228.5	4.92	38.1
	12	28.5	8.42	.250	6.120	216.2	5.07	36.0
B10	10	28.5	8.34	.390	5.990	134.6	4.02	26.9
	10	23.5	6.94	.250	5.850	122.9	4.21	24.6
B9	9	24.0	7.04	.365	5.555	92.1	3.62	20.5
	9	20.5	6.01	.250	5.440	85.1	3.76	18.9
B8	8	19.5	5.78	.325	5.325	60.6	3.24	15.1
	8	17.5	5.18	.250	5.250	57.4	3.33	14.3

W— Safe load in pounds, uniformly distributed, including weight of beam.

L—Span, in feet.

M—Moment of forces, in foot pounds.

f—Allowable Fiber Stress, in lbs. per square inch.

S—Section Modulus about axis XX.

PROPERTIES OF

BETHLEHEM I BEAMS.

COEFFICIENTS OF STRENGTH.			Maxi- mum Safe Shear on Web, in Pounds.	AXIS YY.			Section Num- ber.
For Fiber Stress of 16,000 Lbs. per Sq. In. Usual Building Code Re- quirement.	For Fiber Stress of 12,000 Lbs. per Sq. In. For Moving Loads.	For Fiber Stress of 18,000 Lbs. per Sq. In. For Quies- cent Loads.		Mom- ent of Inertia.	Radius of Gyra- tion.	Section Modulus.	
C	C'	C''		I'	r'	S'	
1,458,000	1,093,000	1,640,000	66,100	82.9	1.96	18.9	B18a
1,354,000	1,016,000	1,523,000	60,800	75.6	1.93	17.3	
1,251,000	938,000	1,407,000	55,600	68.4	1.91	15.7	
1,047,000	785,200	1,178,000	78,000	39.1	1.50	10.2	B18
997,900	748,400	1,123,000	57,500	37.7	1.54	9.92	
977,700	733,300	1,100,000	49,200	37.1	1.56	9.82	
946,100	709,600	1,064,000	36,700	36.2	1.59	9.66	B15b
1,132,000	849,300	1,274,000	77,900	61.3	1.71	16.3	
945,600	709,200	1,064,000	90,800	41.9	1.49	11.6	
867,600	650,700	976,100	54,800	38.3	1.55	10.9	B15a
689,500	517,100	775,700	60,000	25.2	1.36	7.40	B15
649,400	487,100	730,600	39,900	24.0	1.41	7.15	
629,500	472,100	708,200	30,100	23.4	1.44	7.03	
478,600	359,000	538,400	32,200	21.3	1.42	6.77	B12a
406,200	304,700	457,000	35,800	16.0	1.30	5.14	B12
384,400	288,300	432,500	22,200	15.3	1.35	4.98	
287,100	215,300	323,000	39,000	12.1	1.21	4.05	
262,200	196,700	295,000	21,000	11.2	1.27	3.83	B10
218,300	163,700	245,600	32,900	8.8	1.12	3.17	B9
201,800	151,400	227,000	20,100	8.2	1.17	3.02	
161,600	121,200	181,800	26,000	6.7	1.08	2.51	
153,000	114,800	172,100	18,900	6.4	1.11	2.43	B8

C, C', and C'' = Coefficients given in the table.

$$W = \frac{C}{L}, \text{ or } \frac{C'}{L}, \text{ or } \frac{C''}{L}; \quad M = \frac{C}{8}, \text{ or } \frac{C'}{8}, \text{ or } \frac{C''}{8}$$

$$C, \text{ or } C', \text{ or } C'' = WL = 8M = \frac{2}{3} f S$$

DIMENSIONS AND PROPERTIES OF
BETHLEHEM 14" H COLUMNS.

Section Number.	Weight of Section, Lbs. per Foot.	DIMENSIONS, IN INCHES.							
		D	Nom-inal.	B	W	M	N	G	L
H14	84.0	13 $\frac{3}{4}$	1 $\frac{1}{16}$	13.92	.43	.620	.755	19 $\frac{5}{8}$	L is constant = 11 $\frac{1}{16}$
	92.0	13 $\frac{7}{8}$	$\frac{3}{4}$	13.96	.47	.683	.817	19 $\frac{3}{4}$	
	100.0	14	1 $\frac{3}{16}$	14.00	.51	.745	.880	19 $\frac{13}{16}$	
	107.5	14 $\frac{1}{8}$	$\frac{7}{8}$	14.04	.55	.808	.942	19 $\frac{15}{16}$	
	115.5	14 $\frac{1}{4}$	1 $\frac{1}{8}$	14.08	.59	.870	1.005	20 $\frac{1}{16}$	
	123.5	14 $\frac{3}{8}$	1	14.12	.63	.933	1.067	20 $\frac{3}{16}$	
	131.5	14 $\frac{1}{2}$	1 $\frac{1}{4}$	14.16	.67	.995	1.130	20 $\frac{1}{4}$	
	139.0	14 $\frac{5}{8}$	1 $\frac{3}{8}$	14.19	.70	1.058	1.192	20 $\frac{3}{8}$	
	147.0	14 $\frac{3}{4}$	1 $\frac{1}{2}$	14.23	.74	1.120	1.255	20 $\frac{1}{2}$	
	155.0	14 $\frac{7}{8}$	1 $\frac{3}{4}$	14.27	.78	1.183	1.317	20 $\frac{5}{8}$	
	163.0	15	1 $\frac{5}{8}$	14.31	.82	1.245	1.380	20 $\frac{3}{4}$	
	171.5	15 $\frac{1}{8}$	1 $\frac{3}{4}$	14.35	.86	1.308	1.442	20 $\frac{7}{8}$	
	179.5	15 $\frac{1}{4}$	1 $\frac{7}{8}$	14.39	.90	1.370	1.505	21	
	187.5	15 $\frac{3}{8}$	1 $\frac{1}{2}$	14.43	.94	1.433	1.567	21 $\frac{1}{8}$	
	196.0	15 $\frac{1}{2}$	1 $\frac{9}{8}$	14.47	.98	1.495	1.630	21 $\frac{1}{4}$	
	204.5	15 $\frac{5}{8}$	1 $\frac{5}{4}$	14.51	1.02	1.558	1.692	21 $\frac{3}{8}$	
	212.0	15 $\frac{3}{4}$	1 $\frac{11}{8}$	14.54	1.05	1.620	1.755	21 $\frac{7}{8}$	
	220.5	15 $\frac{7}{8}$	1 $\frac{3}{4}$	14.58	1.09	1.683	1.817	21 $\frac{9}{16}$	
	228.5	16	1 $\frac{13}{8}$	14.62	1.13	1.745	1.880	21 $\frac{11}{16}$	
	237.0	16 $\frac{1}{8}$	1 $\frac{7}{8}$	14.66	1.17	1.808	1.942	21 $\frac{13}{16}$	
	245.5	16 $\frac{1}{4}$	1 $\frac{15}{8}$	14.70	1.21	1.870	2.005	21 $\frac{15}{16}$	
	254.0	16 $\frac{3}{8}$	2	14.74	1.25	1.933	2.067	22 $\frac{1}{16}$	
	262.5	16 $\frac{1}{2}$	2 $\frac{1}{8}$	14.78	1.29	1.995	2.130	22 $\frac{3}{16}$	
	271.0	16 $\frac{5}{8}$	2 $\frac{1}{4}$	14.82	1.33	2.058	2.192	22 $\frac{5}{16}$	
	279.5	16 $\frac{3}{4}$	2 $\frac{3}{8}$	14.86	1.37	2.120	2.255	22 $\frac{7}{16}$	
	288.5	16 $\frac{7}{8}$	2 $\frac{1}{2}$	14.90	1.41	2.183	2.317	22 $\frac{9}{16}$	

DIMENSIONS AND PROPERTIES OF
BETHLEHEM 14" H COLUMNS.

Weight of Section, Lbs. per Foot.	Area of Section, Square Inches.	AXIS XX.				AXIS YY.			
		Moment of Inertia.	Section Modulus.	Radius of Gyration.	Bending Factor.	Moment of Inertia.	Section Modulus.	Radius of Gyration.	Bending Factor.
		I	S	r	k	I'	S'	r'	k'
84.0	24.46	884.9	128.7	6.01	.190	294.5	42.3	3.47	.578
92.0	26.76	976.8	140.8	6.04	.190	325.4	46.6	3.49	.574
100.0	29.06	1070.6	153.0	6.07	.190	356.9	51.0	3.50	.570
107.5	31.38	1166.6	165.2	6.10	.190	388.9	55.4	3.52	.566
115.5	33.70	1264.5	177.5	6.13	.190	421.3	59.9	3.54	.563
123.5	36.04	1364.6	189.9	6.16	.190	454.4	64.4	3.55	.560
131.5	38.38	1466.7	202.3	6.18	.190	487.9	68.9	3.57	.557
139.0	40.59	1568.4	214.5	6.21	.189	520.9	73.4	3.58	.553
147.0	42.95	1674.7	227.1	6.24	.189	555.4	78.1	3.60	.550
155.0	45.33	1783.3	239.8	6.27	.189	590.5	82.8	3.61	.548
163.0	47.71	1894.0	252.5	6.30	.189	626.1	87.5	3.62	.545
171.5	50.11	2007.0	265.4	6.33	.189	662.3	92.3	3.64	.543
179.5	52.51	2122.3	278.3	6.36	.189	699.0	97.2	3.65	.541
187.5	54.92	2239.8	291.4	6.39	.189	736.3	102.1	3.66	.538
196.0	57.35	2359.7	304.5	6.41	.188	774.2	107.0	3.68	.536
204.5	59.78	2481.9	317.7	6.44	.188	812.6	112.0	3.69	.534
212.0	62.07	2603.3	330.6	6.48	.188	849.8	116.9	3.70	.531
220.5	64.52	2730.2	344.0	6.51	.188	889.3	122.0	3.71	.529
228.5	66.98	2859.6	357.5	6.53	.187	929.4	127.1	3.72	.527
237.0	69.45	2991.5	371.0	6.56	.187	970.0	132.3	3.74	.525
245.5	71.94	3125.8	384.7	6.59	.187	1011.3	137.6	3.75	.523
254.0	74.43	3262.7	398.5	6.62	.187	1053.2	142.9	3.76	.521
262.5	76.93	3402.1	412.4	6.65	.187	1095.6	148.3	3.77	.519
271.0	79.44	3544.1	426.4	6.68	.186	1138.7	153.7	3.79	.517
279.5	81.97	3688.8	440.5	6.71	.186	1182.4	159.1	3.80	.515
288.5	84.50	3836.1	454.7	6.74	.186	1226.7	164.7	3.81	.513

DIMENSIONS AND PROPERTIES OF
BETHLEHEM 12" H COLUMNS.

Section Number.	Weight of Section, Lbs. per Foot.	DIMENSIONS, IN INCHES.								
		D	Nom-inal.	T	B	W	M	N	G	L
H12	65.5	11¾	⅝	11.92	.39	.567	.683	16¾		L is constant = 9⅜
	72.5	11⅞	⅞	11.96	.43	.630	.745	16⅞		
	79.0	12	¾	12.00	.47	.692	.808	17		
	85.5	12⅛	⅞	12.04	.51	.755	.870	17⅛		
	92.5	12¼	⅞	12.08	.55	.817	.933	17¼		
	99.5	12⅜	⅞	12.12	.59	.880	.995	17⅜		
	106.0	12½	1	12.16	.63	.942	1.058	17⅞		
	113.0	12⅝	1⅛	12.20	.67	1.005	1.120	17⅞		
	119.5	12¾	1⅛	12.23	.70	1.067	1.183	17⅞		
	126.5	12⅞	1⅜	12.27	.74	1.130	1.245	17⅞		
	133.5	13	1¼	12.31	.78	1.192	1.308	17⅞		
	140.5	13⅛	1⅝	12.35	.82	1.255	1.370	18		
	147.5	13¼	1⅝	12.39	.86	1.317	1.433	18⅛		
	154.5	13⅝	1⅞	12.43	.90	1.380	1.495	18¼		
	162.0	13½	1½	12.47	.94	1.442	1.558	18⅜		
	169.0	13⅝	1⅞	12.51	.98	1.505	1.620	18½		
	176.0	13¾	1⅝	12.55	1.02	1.567	1.683	18⅝		
	183.0	13⅞	1⅞	12.58	1.05	1.630	1.745	18¾		
	190.0	14	1¾	12.62	1.09	1.692	1.808	18⅞		

L is constant = 9 $\frac{3}{16}$

DIMENSIONS AND PROPERTIES OF
BETHLEHEM 12" H COLUMNS.

Weight of Section, Lbs. per Foot.	Area of Section, Square Inches.	AXIS XX.				AXIS YY.			
		Moment of Inertia, I	Section Modulus, S	Radius of Gyration, r	Bending Factor, k	Moment of Inertia, I'	Section Modulus, S'	Radius of Gyration, r'	Bending Factor, k'
65.5	19.00	499.0	84.9	5.13	.224	168.6	28.3	2.98	.672
72.5	20.96	556.6	93.7	5.15	.224	188.2	31.5	3.00	.666
79.0	22.94	615.6	102.6	5.18	.224	208.1	34.7	3.01	.661
85.5	24.92	676.1	111.5	5.21	.224	228.5	37.9	3.03	.657
92.5	26.92	738.1	120.5	5.24	.223	249.2	41.3	3.04	.652
99.5	28.92	801.7	129.6	5.27	.223	270.1	44.6	3.06	.649
106.0	30.94	866.8	138.6	5.30	.223	291.7	48.0	3.07	.645
113.0	32.96	933.4	147.9	5.33	.223	313.6	51.4	3.08	.641
119.5	34.87	1000.0	156.9	5.36	.222	335.0	54.8	3.10	.637
126.5	36.91	1069.8	166.2	5.38	.222	357.7	58.3	3.11	.633
133.5	38.97	1141.3	175.6	5.41	.222	380.7	61.9	3.13	.630
140.5	41.03	1214.5	185.0	5.44	.222	404.1	65.4	3.14	.627
147.5	43.10	1289.4	194.6	5.47	.221	428.0	69.1	3.15	.624
154.5	45.19	1366.0	204.3	5.50	.221	452.2	72.8	3.16	.621
162.0	47.28	1444.3	214.0	5.53	.221	477.0	76.5	3.18	.618
169.0	49.38	1524.4	223.8	5.56	.221	502.1	80.3	3.19	.615
176.0	51.50	1606.3	233.6	5.59	.220	527.6	84.1	3.20	.612
183.0	53.48	1687.8	243.3	5.62	.220	552.2	87.8	3.21	.609
190.0	55.62	1773.4	253.3	5.65	.220	578.6	91.7	3.23	.607

DIMENSIONS AND PROPERTIES OF
BETHLEHEM 10" H COLUMNS.

Section Number.	Weight of Section, Lbs. per Foot.	DIMENSIONS, IN INCHES.						
		D	T	B	W	M	N	L
H10	49.5	9 $\frac{7}{8}$	$\frac{9}{16}$	9.97	.36	.514	.611	14 $\frac{1}{16}$
	55.0	10	$\frac{5}{8}$	10.00	.39	.577	.673	14 $\frac{3}{16}$
	60.5	10 $\frac{1}{8}$	$\frac{11}{16}$	10.04	.43	.639	.736	14 $\frac{5}{16}$
	66.0	10 $\frac{1}{4}$	$\frac{3}{4}$	10.08	.47	.702	.798	14 $\frac{3}{8}$
	72.0	10 $\frac{3}{8}$	$\frac{13}{16}$	10.12	.51	.764	.861	14 $\frac{1}{2}$
	77.5	10 $\frac{1}{2}$	$\frac{7}{8}$	10.16	.55	.827	.923	14 $\frac{5}{8}$
	83.5	10 $\frac{5}{8}$	$\frac{15}{16}$	10.20	.59	.889	.986	14 $\frac{3}{4}$
	89.0	10 $\frac{3}{4}$	1	10.24	.63	.952	1.048	14 $\frac{7}{8}$
	95.0	10 $\frac{7}{8}$	1 $\frac{1}{16}$	10.28	.67	1.014	1.111	15
	100.5	11	1 $\frac{1}{8}$	10.31	.70	1.077	1.173	15 $\frac{1}{8}$
	106.5	11 $\frac{1}{8}$	1 $\frac{3}{16}$	10.35	.74	1.139	1.236	15 $\frac{1}{16}$
	112.0	11 $\frac{1}{4}$	1 $\frac{1}{4}$	10.39	.78	1.202	1.298	15 $\frac{5}{16}$
	118.0	11 $\frac{3}{8}$	1 $\frac{5}{16}$	10.43	.82	1.264	1.361	15 $\frac{7}{16}$
	124.0	11 $\frac{1}{2}$	1 $\frac{3}{8}$	10.47	.86	1.327	1.423	15 $\frac{9}{16}$
	130.0	11 $\frac{5}{8}$	1 $\frac{7}{16}$	10.51	.90	1.389	1.486	15 $\frac{11}{16}$
	136.5	11 $\frac{3}{4}$	1 $\frac{1}{2}$	10.55	.94	1.452	1.548	15 $\frac{13}{16}$

L is constant = 7 $\frac{11}{16}$

DIMENSIONS AND PROPERTIES OF
BETHLEHEM 10" H COLUMNS.

Weight of Section, Lbs. per Foot.	Area of Section, Square Inches.	AXIS XX.				AXIS YY.			
		Moment of Inertia.	Section Modulus.	Radius of Gyration.	Bending Factor.	Moment of Inertia.	Section Modulus.	Radius of Gyration.	Bending Factor.
		I	S	r	k	I'	S'	r'	k'
49.5	14.37	263.5	53.4	4.28	.269	89.1	17.9	2.49	.804
55.0	15.91	296.8	59.4	4.32	.268	100.4	20.1	2.51	.792
60.5	17.57	331.9	65.6	4.35	.268	112.2	22.3	2.53	.786
66.0	19.23	368.0	71.8	4.37	.268	124.2	24.6	2.54	.780
72.0	20.91	405.2	78.1	4.40	.268	136.5	27.0	2.56	.775
77.5	22.59	443.6	84.5	4.43	.267	149.1	29.4	2.57	.770
83.5	24.29	483.0	90.9	4.46	.267	162.0	31.8	2.58	.765
89.0	25.99	523.5	97.4	4.49	.267	175.1	34.2	2.60	.760
95.0	27.71	565.2	103.9	4.52	.267	188.6	36.7	2.61	.755
100.5	29.32	607.0	110.4	4.55	.266	201.7	39.1	2.62	.749
106.5	31.06	651.0	117.0	4.58	.265	215.6	41.7	2.64	.746
112.0	32.80	696.2	123.8	4.61	.265	229.9	44.3	2.65	.741
118.0	34.55	742.7	130.6	4.64	.265	244.4	46.9	2.66	.737
124.0	36.32	790.4	137.5	4.67	.264	259.3	49.5	2.67	.733
130.0	38.09	839.4	144.4	4.69	.264	274.5	52.2	2.68	.729
136.5	39.88	889.7	151.4	4.72	.263	289.9	55.0	2.70	.726

DIMENSIONS AND PROPERTIES OF
BETHLEHEM 8" H COLUMNS.

Section Number.	Weight of Section, Lbs. per Foot.	DIMENSIONS, IN INCHES.							
		D	T	B	W	M	N	G	L
H8	32.0	$7\frac{7}{8}$	$\frac{7}{16}$	8.00	.31	.399	.476	$11\frac{1}{4}$	L is constant = $6\frac{1}{8}$
	35.0	8	$\frac{1}{2}$	8.00	.31	.462	.538	$11\frac{3}{8}$	
	39.5	$8\frac{1}{8}$	$\frac{9}{16}$	8.04	.35	.524	.601	$11\frac{7}{16}$	
	44.0	$8\frac{1}{4}$	$\frac{5}{8}$	8.08	.39	.587	.663	$11\frac{9}{16}$	
	48.5	$8\frac{3}{8}$	$\frac{11}{16}$	8.12	.43	.649	.726	$11\frac{11}{16}$	
	53.0	$8\frac{1}{2}$	$\frac{3}{4}$	8.16	.47	.712	.788	$11\frac{13}{16}$	
	58.0	$8\frac{5}{8}$	$\frac{13}{16}$	8.20	.51	.774	.851	12	
	62.5	$8\frac{3}{4}$	$\frac{7}{8}$	8.24	.55	.837	.913	$12\frac{1}{16}$	
	67.5	$8\frac{7}{8}$	$\frac{15}{16}$	8.28	.59	.899	.976	$12\frac{1}{8}$	
	72.0	9	1	8.32	.63	.962	1.038	$12\frac{1}{4}$	
	77.0	$9\frac{1}{8}$	$1\frac{1}{16}$	8.36	.67	1.024	1.101	$12\frac{3}{8}$	
	81.5	$9\frac{1}{4}$	$1\frac{1}{8}$	8.39	.70	1.087	1.163	$12\frac{1}{2}$	
	86.0	$9\frac{3}{8}$	$1\frac{3}{16}$	8.43	.74	1.149	1.226	$12\frac{5}{8}$	
	91.0	$9\frac{1}{2}$	$1\frac{1}{4}$	8.47	.78	1.212	1.288	$12\frac{3}{4}$	

DIMENSIONS AND PROPERTIES OF
BETHLEHEM 8" H COLUMNS.

Weight of Section, Lbs. per Foot.	Area of Section, Square Inches.	AXIS XX.				AXIS YY.			
		Moment of Inertia. I	Section Modulus. S	Radius of Gyration. r	Bending Factor. k	Moment of Inertia. I'	Section Modulus. S'	Radius of Gyration. r'	Bending Factor. k'
32.0	9.17	105.7	26.9	3.40	.342	35.8	8.9	1.98	1.025
35.0	10.17	121.5	30.4	3.46	.335	41.1	10.3	2.01	.990
39.5	11.50	139.5	34.3	3.48	.335	47.2	11.7	2.03	.979
44.0	12.83	158.3	38.4	3.51	.334	53.4	13.2	2.04	.971
48.5	14.18	177.7	42.4	3.54	.334	59.8	14.7	2.05	.963
53.0	15.53	197.8	46.5	3.57	.334	66.3	16.3	2.07	.956
58.0	16.90	218.6	50.7	3.60	.333	73.1	17.8	2.08	.948
62.5	18.27	240.2	54.9	3.63	.333	80.0	19.4	2.09	.941
67.5	19.66	262.5	59.2	3.65	.332	87.1	21.0	2.11	.934
72.0	21.05	285.6	63.5	3.68	.332	94.4	22.7	2.12	.928
77.0	22.46	309.5	67.8	3.71	.331	101.9	24.4	2.13	.921
81.5	23.78	333.5	72.1	3.75	.330	109.2	26.0	2.14	.914
86.0	25.20	359.0	76.6	3.77	.329	117.1	27.8	2.16	.907
91.0	26.64	385.3	81.1	3.80	.328	125.1	29.6	2.17	.902

**DIMENSIONS AND PROPERTIES OF
BETHLEHEM COLUMNS.
14" AND 12"
SUPPLEMENTARY SECTIONS.**

Section Number.	Weight of Section, Lbs. per Foot.	DIMENSIONS, IN INCHES.							
		Nom-inal D	Nom-inal T	B	W	M	N	G	L
$H \frac{14}{8}$	43.0	$13\frac{3}{8}$	$\frac{1}{2}$	8.00	.31	.491	.567	$15\frac{9}{16}$	$11\frac{1}{16}$
	48.0	$13\frac{1}{2}$	$\frac{9}{16}$	8.04	.35	.553	.630	$15\frac{11}{16}$	$11\frac{1}{16}$
	53.5	$13\frac{5}{8}$	$\frac{5}{8}$	8.08	.39	.616	.692	$15\frac{13}{16}$	$11\frac{1}{16}$
	58.5	$13\frac{3}{4}$	$\frac{11}{16}$	8.12	.43	.678	.755	16	$11\frac{1}{16}$
$H \frac{14}{10}$	55.0	$13\frac{1}{2}$	$\frac{9}{16}$	10.00	.35	.533	.630	$16\frac{13}{16}$	$11\frac{1}{16}$
	61.5	$13\frac{5}{8}$	$\frac{5}{8}$	10.04	.39	.596	.692	$16\frac{15}{16}$	$11\frac{1}{16}$
	67.5	$13\frac{3}{4}$	$\frac{11}{16}$	10.08	.43	.658	.755	$17\frac{1}{16}$	$11\frac{1}{16}$
	73.5	$13\frac{7}{8}$	$\frac{3}{4}$	10.12	.47	.721	.817	$17\frac{3}{16}$	$11\frac{1}{16}$
$H \frac{14}{12}$	69.0	$13\frac{5}{8}$	$\frac{5}{8}$	12.00	.39	.576	.692	$18\frac{1}{8}$	$11\frac{1}{16}$
	76.0	$13\frac{3}{4}$	$\frac{11}{16}$	12.04	.43	.639	.755	$18\frac{1}{4}$	$11\frac{1}{16}$
	83.0	$13\frac{7}{8}$	$\frac{3}{4}$	12.08	.47	.701	.817	$18\frac{3}{8}$	$11\frac{1}{16}$
	90.0	14	$\frac{13}{16}$	12.12	.51	.764	.880	$18\frac{1}{2}$	$11\frac{1}{16}$
$H \frac{12}{8}$	40.5	$11\frac{1}{2}$	$\frac{1}{2}$	8.00	.31	.481	.558	14	$9\frac{3}{16}$
	45.5	$11\frac{5}{8}$	$\frac{9}{16}$	8.04	.35	.543	.620	$14\frac{1}{8}$	$9\frac{3}{16}$
	50.5	$11\frac{3}{4}$	$\frac{5}{8}$	8.08	.39	.606	.683	$14\frac{1}{4}$	$9\frac{3}{16}$
	55.0	$11\frac{7}{8}$	$\frac{11}{16}$	8.12	.43	.668	.745	$14\frac{3}{8}$	$9\frac{3}{16}$
$H \frac{12}{10}$	52.5	$11\frac{5}{8}$	$\frac{9}{16}$	10.00	.35	.524	.620	$15\frac{5}{16}$	$9\frac{3}{16}$
	58.0	$11\frac{3}{4}$	$\frac{5}{8}$	10.04	.39	.586	.683	$15\frac{7}{16}$	$9\frac{3}{16}$
	64.0	$11\frac{7}{8}$	$\frac{11}{16}$	10.08	.43	.649	.745	$15\frac{9}{16}$	$9\frac{3}{16}$
	70.0	12	$\frac{3}{4}$	10.12	.47	.711	.808	$15\frac{11}{16}$	$9\frac{3}{16}$

DIMENSIONS AND PROPERTIES OF
BETHLEHEM COLUMNS.
 14" AND 12"
 SUPPLEMENTARY SECTIONS.

Weight of Section, Lbs. per Foot.	Area of Section, Square Inches.	Axis XX.				Axis YY.			
		Moment of Inertia, I	Section Modulus, S	Radius of Gyration, Inches, r	Bending Factor, k	Moment of Inertia, I'	Section Modulus, S'	Radius of Gyration, Inches, r'	Bending Factor, k'
43.0	12.28	397.6	59.5	5.69	.207	43.6	10.9	1.88	1.127
48.0	13.82	450.9	66.8	5.71	.207	49.7	12.4	1.90	1.118
53.5	15.37	505.6	74.2	5.74	.207	56.0	13.9	1.91	1.110
58.5	16.93	561.6	81.7	5.76	.207	62.4	15.4	1.92	1.102
55.0	15.95	540.4	80.1	5.82	.199	93.1	18.6	2.42	.857
61.5	17.75	606.3	89.0	5.84	.199	104.8	20.9	2.43	.850
67.5	19.55	673.7	98.0	5.87	.200	116.8	23.2	2.44	.844
73.5	21.37	742.7	107.1	5.90	.200	129.0	25.5	2.46	.838
69.0	20.04	704.0	103.3	5.93	.194	174.7	29.1	2.95	.689
76.0	22.00	782.9	113.9	5.95	.194	194.7	32.3	2.97	.683
83.0	24.15	863.6	124.5	5.98	.194	215.0	35.6	2.98	.678
90.0	26.22	946.1	135.2	6.01	.194	235.8	38.9	3.00	.674
40.5	11.55	280.1	48.7	4.92	.237	42.8	10.7	1.92	1.081
45.5	13.02	318.8	54.8	4.95	.237	48.8	12.1	1.94	1.071
50.5	14.49	358.5	61.0	4.97	.237	55.1	13.6	1.95	1.063
55.0	15.98	399.3	67.3	5.00	.238	61.5	15.2	1.96	1.055
52.5	15.11	383.2	65.9	5.04	.229	91.5	18.3	2.46	.826
58.0	16.83	431.3	73.4	5.06	.229	103.2	20.5	2.48	.819
64.0	18.56	480.6	80.9	5.09	.229	115.1	22.8	2.49	.813
70.0	20.30	531.3	88.5	5.12	.229	127.3	25.2	2.50	.807

**DIMENSIONS AND PROPERTIES OF
BETHLEHEM COLUMNS.
10", 8" AND 6"
SUPPLEMENTARY SECTIONS.**

Section Number.	Weight of Section, Lbs. per Foot.	DIMENSIONS, IN INCHES.							
		Nominal D	Nominal T	B	W	M	N	G	L
H ¹⁰ / ₈	33.5	9 ⁵ / ₈	⁷ / ₁₆	8.00	.28	.408	.486	12 ¹ / ₂	7 ¹¹ / ₁₆
	38.0	9 ³ / ₄	¹ / ₂	8.03	.31	.471	.548	12 ⁵ / ₈	7 ¹¹ / ₁₆
	42.5	9 ⁷ / ₈	⁹ / ₁₆	8.07	.35	.533	.611	12 ³ / ₄	7 ¹¹ / ₁₆
	47.5	10	⁵ / ₈	8.11	.39	.596	.673	12 ⁷ / ₈	7 ¹¹ / ₁₆
H ⁸ / _{6.5}	23.5	7 ³ / ₄	³ / ₈	6.50	.25	.351	.413	10 ¹ / ₈	6 ¹ / ₈
	27.0	7 ⁷ / ₈	⁷ / ₁₆	6.53	.28	.413	.476	10 ¹ / ₄	6 ¹ / ₈
	30.5	8	¹ / ₂	6.56	.31	.476	.538	10 ³ / ₈	6 ¹ / ₈
	34.5	8 ¹ / ₈	⁹ / ₁₆	6.60	.35	.538	.601	10 ¹ / ₂	6 ¹ / ₈
H6	20.0	6	³ / ₈	6.00	.25	.346	.404	8 ¹ / ₂	4 ⁵ / ₈
	23.0	6 ¹ / ₈	⁷ / ₁₆	6.02	.27	.409	.466	8 ⁹ / ₁₆	4 ⁵ / ₈
	26.5	6 ¹ / ₄	¹ / ₂	6.06	.31	.471	.529	8 ¹¹ / ₁₆	4 ⁵ / ₈
	30.0	6 ³ / ₈	⁹ / ₁₆	6.10	.35	.534	.591	8 ¹³ / ₁₆	4 ⁵ / ₈
	33.5	6 ¹ / ₂	⁵ / ₈	6.14	.39	.596	.654	8 ¹⁵ / ₁₆	4 ⁵ / ₈
	37.0	6 ⁵ / ₈	¹¹ / ₁₆	6.18	.43	.659	.716	9 ¹ / ₁₆	4 ⁵ / ₈
	40.5	6 ³ / ₄	³ / ₄	6.22	.47	.721	.779	9 ³ / ₁₆	4 ⁵ / ₈

DIMENSIONS AND PROPERTIES OF
BETHLEHEM COLUMNS.
 10", 8" AND 6"
 SUPPLEMENTARY SECTIONS.

Weight of Section, Lbs. per Foot.	Area of Section, Square Inches.	Axis XX.				Axis YY.			
		Moment of Inertia.	Section Modulus.	Radius of Gyration, Inches.	Bending Factor.	Moment of Inertia.	Section Modulus.	Radius of Gyration, Inches.	Bending Factor.
		I	S	r	k	I'	S'	r'	k'
33.5	9.60	166.2	34.5	4.16	.278	36.6	9.14	1.95	1.050
38.0	10.89	192.0	39.4	4.20	.276	42.4	10.56	1.97	1.031
42.5	12.29	219.4	44.4	4.23	.277	48.5	12.02	1.99	1.022
47.5	13.70	247.6	49.5	4.25	.277	54.8	13.52	2.00	1.013
23.5	6.72	74.6	19.2	3.33	.349	16.8	5.17	1.58	1.298
27.0	7.76	88.2	22.4	3.37	.347	20.0	6.11	1.60	1.270
30.5	8.82	102.3	25.6	3.41	.345	23.2	7.07	1.62	1.248
34.5	9.97	117.4	28.9	3.43	.345	26.6	8.07	1.63	1.236
20.0	5.81	38.7	12.9	2.58	.451	13.0	4.34	1.50	1.340
23.0	6.69	45.9	15.0	2.62	.446	15.4	5.12	1.52	1.305
26.5	7.69	53.9	17.3	2.65	.445	18.1	5.96	1.53	1.290
30.0	8.70	62.4	19.6	2.68	.445	20.8	6.82	1.55	1.277
33.5	9.72	71.2	21.9	2.71	.444	23.6	7.69	1.56	1.264
37.0	10.76	80.4	24.3	2.73	.443	26.6	8.59	1.57	1.251
40.5	11.80	90.1	26.7	2.76	.442	29.6	9.52	1.58	1.240

REINFORCED 14" H COLUMNS AND SPECIAL COMPOUND COLUMNS.

When columns are required of greater sectional area than the regular sections of H columns, it is necessary to reinforce the latter to obtain the desired area. This may be the case in the columns for the lower stories of a high building.

Additional area may be secured by riveting plates to the flanges of the regular H columns. In general this is the simplest and most economical method of reinforcement. Dimensions and properties of such reinforced 14" H columns are given on pages 32 and 33 in the table of Reinforced 14" H Columns.

If it is desired to avoid drilling the thick metal of the flanges of the heavy H columns, for attaching the cover plates, the Bethlehem 14" Special H Section, H14 b, shown below, may be used. Dimensions and properties of this special section are given on the opposite page. This special section is produced by the same rolls and has the same inner contour as the regular series of 14" H columns on page 18, which can be spliced to this special section in the usual way. This section permits the addition of plates, or other shapes, for increasing the area to the desired extent, in the manner indicated by Figs. 1-3 on the opposite page, avoiding the drilling of thick metal in the flanges. Dimensions and properties of heavy columns, made of this Bethlehem 14" Special H Section with cover plates, are given on pages 34 and 35 in the table of Special Compound Columns.

DIMENSIONS AND PROPERTIES OF

BETHLEHEM 14" SPECIAL H SECTION. **DIMENSIONS.**

Section Number.	Weight of Section, Lbs. per Foot.	DIMENSIONS, IN INCHES.							
		D	T	B	W	M	N	G	L
H14 b	149.0	14 $\frac{1}{8}$	$\frac{7}{8}$	14.90	1.41	.808	.942	20 $\frac{7}{8}$	11 $\frac{1}{16}$

PROPERTIES.

Section Number.	Weight of Section, Lbs. per Foot.	Area of Section, Square Inches.	AXIS XX.			AXIS YY.		
			Moment of Inertia. I	Section Modulus. S	Radius of Gyration. r	Moment of Inertia. I'	Section Modulus. S'	Radius of Gyration. r'
H14 b	149.0	43.52	1368.5	193.8	5.61	468.6	62.9	3.28

SUGGESTIONS FOR USING THE BETHLEHEM 14" SPECIAL H SECTION IN BUILDING UP COLUMNS OF LARGE SECTIONAL AREA.

Fig. 1 **Fig. 2** **Fig. 3**

DIMENSIONS AND PROPERTIES OF REINFORCED 14" H COLUMNS.

BETHLEHEM
14" H COLUMNS

REINFORCED
WITH COVER PLATES.

H Column Selected for Reinforcing.	Weight, Entire Section, Lbs. per Foot.	DIMENSIONS, IN INCHES.				
		COVER PLATES.		Depth of Column. A	Diagonal Diam- eter. G	Dimensions of H Column.
		Width. C	Thick- ness. P			
H 14 254.0 Lbs. per foot.	294.8	16	$\frac{3}{8}$	$17\frac{1}{8}$	$23\frac{7}{16}$	D = $16\frac{3}{8}$
	301.6	16	$\frac{7}{16}$	$17\frac{1}{4}$	$23\frac{1}{2}$	T = 2
	308.4	16	$\frac{1}{2}$	$17\frac{3}{8}$	$23\frac{5}{8}$	B = 14.74
	315.2	16	$\frac{9}{16}$	$17\frac{1}{2}$	$23\frac{11}{16}$	W = 1.25
	322.0	16	$\frac{5}{8}$	$17\frac{5}{8}$	$23\frac{13}{16}$	M = 1.933
	328.8	16	$\frac{11}{16}$	$17\frac{3}{4}$	$23\frac{7}{8}$	N = 2.067
	335.6	16	$\frac{3}{4}$	$17\frac{7}{8}$	24	L = $11\frac{1}{16}$
	342.4	16	$\frac{13}{16}$	18	$24\frac{1}{16}$	
	349.2	16	$\frac{7}{8}$	$18\frac{1}{8}$	$24\frac{3}{16}$	
	356.0	16	$\frac{15}{16}$	$18\frac{1}{4}$	$24\frac{1}{4}$	
H 14 288.5 Lbs. per foot.	360.8	17	$\frac{5}{8}$	$18\frac{1}{8}$	$24\frac{7}{8}$	D = $16\frac{7}{8}$
	368.0	17	$\frac{11}{16}$	$18\frac{1}{4}$	$24\frac{15}{16}$	T = $2\frac{1}{4}$
	375.2	17	$\frac{3}{4}$	$18\frac{3}{8}$	$25\frac{1}{16}$	B = 14.90
	382.4	17	$\frac{13}{16}$	$18\frac{1}{2}$	$25\frac{1}{8}$	W = 1.41
	389.7	17	$\frac{7}{8}$	$18\frac{5}{8}$	$25\frac{1}{4}$	M = 2.183
	396.9	17	$\frac{15}{16}$	$18\frac{3}{4}$	$25\frac{5}{16}$	N = 2.317
	404.1	17	1	$18\frac{7}{8}$	$25\frac{3}{8}$	L = $11\frac{1}{8}$
	411.3	17	$1\frac{1}{16}$	19	$25\frac{1}{2}$	
	418.6	17	$1\frac{1}{8}$	$19\frac{1}{8}$	$25\frac{9}{16}$	
	426.2	18	$1\frac{1}{8}$	$19\frac{1}{8}$	$26\frac{1}{4}$	
	433.9	18	$1\frac{3}{16}$	$19\frac{1}{4}$	$26\frac{3}{8}$	
	441.5	18	$1\frac{1}{4}$	$19\frac{3}{8}$	$26\frac{7}{16}$	
	449.2	18	$1\frac{5}{16}$	$19\frac{1}{2}$	$26\frac{9}{16}$	
	456.8	18	$1\frac{3}{8}$	$19\frac{5}{8}$	$26\frac{5}{8}$	
	464.5	18	$1\frac{7}{16}$	$19\frac{3}{4}$	$26\frac{3}{4}$	
H 14 288.5 Lbs. per foot.	472.1	18	$1\frac{1}{2}$	$19\frac{7}{8}$	$26\frac{13}{16}$	
	479.8	18	$1\frac{9}{16}$	20	$26\frac{15}{16}$	
	487.4	18	$1\frac{5}{8}$	$20\frac{1}{8}$	27	
	495.1	18	$1\frac{11}{16}$	$20\frac{1}{4}$	$27\frac{1}{8}$	
	502.7	18	$1\frac{3}{4}$	$20\frac{3}{8}$	$27\frac{1}{16}$	

DIMENSIONS AND PROPERTIES OF
REINFORCED 14" H COLUMNS.

**BETHLEHEM
 14" H COLUMNS**

**REINFORCED
 WITH COVER PLATES.**

Weight, Entire Section, Lbs. per Foot.	Area, Entire Section, Square Inches.	AXIS XX.				AXIS YY.			
		Mom- ent of Inertia.	Section Modu- lus.	Radius of Gyra- tion.	Bend- ing Factor.	Mom- ent of Inertia.	Section Modu- lus.	Radius of Gyra- tion.	Bend- ing Factor.
		I	S	r	k	I'	S'	r'	k'
294.8	86.43	4104.5	479.4	6.89	.180	1309.2	163.6	3.89	.528
301.6	88.43	4252.2	493.0	6.93	.179	1351.8	169.0	3.91	.523
308.4	90.43	4402.1	506.7	6.98	.178	1394.5	174.3	3.93	.519
315.2	92.43	4554.1	520.5	7.02	.178	1437.2	179.6	3.94	.515
322.0	94.43	4708.3	534.3	7.06	.177	1479.8	185.0	3.96	.510
328.8	96.43	4864.8	548.1	7.10	.176	1522.5	190.3	3.97	.507
335.6	98.43	5023.4	562.1	7.14	.175	1565.2	195.6	3.99	.503
342.4	100.43	5184.3	576.0	7.18	.174	1607.8	201.0	4.00	.500
349.2	102.43	5347.4	590.1	7.23	.174	1650.5	206.3	4.01	.496
356.0	104.43	5512.8	604.1	7.27	.173	1693.2	211.6	4.03	.493
360.8	105.75	5463.7	602.9	7.19	.175	1738.5	204.5	4.06	.517
368.0	107.87	5639.4	618.0	7.23	.175	1789.6	210.5	4.07	.512
375.2	110.00	5817.6	633.2	7.27	.174	1840.8	216.6	4.09	.508
382.4	112.12	5998.2	648.5	7.31	.173	1892.0	222.6	4.11	.504
389.7	114.25	6181.2	663.8	7.36	.172	1943.2	228.6	4.12	.500
396.9	116.37	6366.8	679.1	7.40	.171	1994.3	234.6	4.14	.496
404.1	118.50	6554.8	694.5	7.44	.171	2045.5	240.6	4.15	.492
411.3	120.62	6745.3	710.0	7.48	.170	2096.7	246.7	4.17	.489
418.6	122.75	6938.3	725.6	7.52	.169	2147.9	252.7	4.18	.486
426.2	125.00	7120.8	744.7	7.55	.168	2320.2	257.8	4.31	.485
433.9	127.25	7327.9	761.3	7.59	.167	2380.9	264.5	4.33	.481
441.5	129.50	7537.7	778.1	7.63	.166	2441.7	271.3	4.34	.477
449.2	131.75	7750.2	794.9	7.67	.166	2502.4	278.0	4.36	.474
456.8	134.00	7965.5	811.8	7.71	.165	2563.2	284.8	4.37	.471
464.5	136.25	8183.5	828.7	7.75	.164	2623.9	291.5	4.39	.467
472.1	138.50	8404.3	845.7	7.79	.164	2684.7	298.3	4.40	.464
479.8	140.75	8627.9	862.8	7.83	.163	2745.4	305.0	4.42	.461
487.4	143.00	8854.3	879.9	7.87	.163	2806.2	311.8	4.43	.459
495.1	145.25	9083.6	897.1	7.91	.162	2866.9	318.5	4.44	.456
502.7	147.50	9315.7	914.4	7.95	.161	2927.7	325.3	4.46	.453

DIMENSIONS AND PROPERTIES OF SPECIAL COMPOUND COLUMNS.

BETHLEHEM
14 $\frac{1}{8}$ " x 149 Lbs.
SPECIAL H SECTION

**REINFORCED
WITH
COVER PLATES.**

Column Section.	Weight of Column, Lbs. per Foot.	DIMENSIONS, IN INCHES.				
		COVER PLATES.		Depth of Column. A	Diagonal Diameter. G	Dimensions of 14" Special H Section.
		Width. C	Thick- ness. P			
Columns composed of a 14 $\frac{1}{8}$ " x 149 Lb. Special H Section, (Section H 14b), reinforced with cover plates of width and thickness given in table. The total thickness, P, may be made of two or more plates, each of punchable thickness.	285.0	16	1 $\frac{1}{4}$	16 $\frac{5}{8}$	23 $\frac{1}{16}$	D 14 $\frac{1}{8}$
	291.8	16	1 $\frac{5}{16}$	16 $\frac{3}{4}$	23 $\frac{3}{16}$	
	298.6	16	1 $\frac{3}{8}$	16 $\frac{7}{8}$	23 $\frac{1}{4}$	
	305.4	16	1 $\frac{7}{16}$	17	23 $\frac{3}{8}$	
	312.2	16	1 $\frac{1}{2}$	17 $\frac{1}{8}$	23 $\frac{7}{16}$	T $\frac{7}{8}$
	319.0	16	1 $\frac{9}{16}$	17 $\frac{1}{4}$	23 $\frac{1}{2}$	
	325.8	16	1 $\frac{5}{8}$	17 $\frac{3}{8}$	23 $\frac{5}{8}$	
	332.6	16	1 $\frac{11}{16}$	17 $\frac{1}{2}$	23 $\frac{11}{16}$	
	339.4	16	1 $\frac{3}{4}$	17 $\frac{5}{8}$	23 $\frac{13}{16}$	B 14.90
	346.2	16	1 $\frac{13}{16}$	17 $\frac{3}{4}$	23 $\frac{7}{8}$	
	351.3	17	1 $\frac{3}{4}$	17 $\frac{5}{8}$	24 $\frac{1}{2}$	
	358.5	17	1 $\frac{13}{16}$	17 $\frac{3}{4}$	24 $\frac{9}{16}$	
	365.7	17	1 $\frac{7}{8}$	17 $\frac{7}{8}$	24 $\frac{11}{16}$	W 1.41
	373.0	17	1 $\frac{15}{16}$	18	24 $\frac{3}{4}$	
	380.2	17	2	18 $\frac{1}{8}$	24 $\frac{7}{8}$	
	387.4	17	2 $\frac{1}{16}$	18 $\frac{1}{4}$	24 $\frac{15}{16}$	
	394.6	17	2 $\frac{1}{8}$	18 $\frac{3}{8}$	25 $\frac{1}{16}$	M 0.808
	401.9	17	2 $\frac{3}{16}$	18 $\frac{1}{2}$	25 $\frac{1}{8}$	
	409.1	17	2 $\frac{1}{4}$	18 $\frac{5}{8}$	25 $\frac{3}{16}$	
	416.3	17	2 $\frac{5}{16}$	18 $\frac{3}{4}$	25 $\frac{5}{16}$	
	424.4	18	2 $\frac{1}{4}$	18 $\frac{5}{8}$	25 $\frac{7}{8}$	N 0.942
	432.0	18	2 $\frac{5}{16}$	18 $\frac{3}{4}$	26	
	439.7	18	2 $\frac{3}{8}$	18 $\frac{7}{8}$	26 $\frac{1}{16}$	
	447.3	18	2 $\frac{7}{16}$	19	26 $\frac{3}{16}$	
	455.0	18	2 $\frac{1}{2}$	19 $\frac{1}{8}$	26 $\frac{1}{4}$	L 11 $\frac{1}{16}$
	462.6	18	2 $\frac{9}{16}$	19 $\frac{1}{4}$	26 $\frac{3}{8}$	
	470.3	18	2 $\frac{5}{8}$	19 $\frac{3}{8}$	26 $\frac{7}{16}$	
	477.9	18	2 $\frac{11}{16}$	19 $\frac{1}{2}$	26 $\frac{9}{16}$	
	485.6	18	2 $\frac{3}{4}$	19 $\frac{5}{8}$	26 $\frac{5}{8}$	
	493.2	18	2 $\frac{13}{16}$	19 $\frac{3}{4}$	26 $\frac{3}{4}$	
	500.9	18	2 $\frac{7}{8}$	19 $\frac{7}{8}$	26 $\frac{13}{16}$	

DIMENSIONS AND PROPERTIES OF
SPECIAL COMPOUND COLUMNS.

BETHLEHEM
14 $\frac{1}{8}$ " x 149 Lbs.
SPECIAL H SECTION

**REINFORCED
WITH
COVER PLATES.**

Weight of Column Lbs. per Foot.	Area of Column Square Inches.	AXIS XX.				AXIS YY.			
		Moment of Inertia.	Section Modu- lus.	Radius of Gyra- tion.	Bend- ing Factor.	Moment of Inertia.	Section Modu- lus.	Radius of Gyra- tion.	Bend- ing Factor.
		I	S	r	k	I'	S'	r'	k'
285.0	83.52	3737.6	449.6	6.69	.186	1322.0	165.2	3.98	.505
291.8	85.52	3876.9	462.9	6.73	.185	1364.6	170.6	3.99	.501
298.6	87.52	4018.2	476.2	6.78	.184	1407.3	175.9	4.01	.498
305.4	89.52	4161.7	489.6	6.82	.183	1450.0	181.2	4.02	.494
312.2	91.52	4307.2	503.0	6.86	.182	1492.6	186.6	4.04	.491
319.0	93.52	4454.9	516.5	6.90	.181	1535.3	191.9	4.05	.487
325.8	95.52	4604.8	530.0	6.94	.180	1578.0	197.2	4.06	.484
332.6	97.52	4756.8	543.6	6.98	.179	1620.6	202.6	4.08	.481
339.4	99.52	4911.0	557.3	7.02	.179	1663.3	207.9	4.09	.479
346.2	101.52	5067.5	571.0	7.07	.178	1706.0	213.2	4.10	.476
351.3	103.02	5132.5	582.4	7.06	.177	1901.6	223.7	4.30	.460
358.5	105.15	5298.7	597.0	7.10	.176	1952.8	229.7	4.31	.458
365.7	107.27	5467.2	611.7	7.14	.175	2003.9	235.8	4.32	.455
373.0	109.40	5638.1	626.5	7.18	.175	2055.1	241.8	4.33	.452
380.2	111.52	5811.5	641.3	7.22	.174	2106.3	247.8	4.35	.450
387.4	113.65	5987.2	656.1	7.26	.173	2157.5	253.8	4.36	.448
394.6	115.77	6165.4	671.1	7.30	.173	2208.6	259.8	4.37	.446
401.9	117.90	6345.9	686.0	7.34	.172	2259.8	265.9	4.38	.443
409.1	120.02	6529.0	701.1	7.38	.171	2311.0	271.9	4.39	.441
416.3	122.15	6714.5	716.2	7.41	.171	2362.2	277.9	4.40	.440
424.4	124.52	6832.6	733.7	7.41	.170	2655.6	295.1	4.62	.422
432.0	126.77	7029.0	749.8	7.45	.169	2716.4	301.8	4.63	.420
439.7	129.02	7228.1	765.9	7.48	.169	2777.1	308.6	4.64	.418
447.3	131.27	7429.8	782.1	7.52	.168	2837.9	315.3	4.65	.416
455.0	133.52	7634.2	798.3	7.56	.167	2898.6	322.1	4.66	.415
462.6	135.77	7841.3	814.7	7.60	.167	2959.4	328.8	4.67	.413
470.3	138.02	8051.1	831.1	7.64	.166	3020.1	335.6	4.68	.411
477.9	140.27	8263.6	847.6	7.68	.166	3080.9	342.3	4.69	.410
485.6	142.52	8478.9	864.1	7.71	.165	3141.6	349.1	4.70	.408
493.2	144.77	8696.9	880.7	7.75	.164	3202.4	355.8	4.70	.407
500.9	147.02	8917.7	897.4	7.79	.164	3263.1	362.6	4.71	.406

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BETHLEHEM, PA.

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