



The following excerpt are pages from the [North American Product Technical Guide Volume 3: Modular Support Systems Technical Guide, Edition 1](#) .

Please refer to the publication in its entirety for complete details on this product including load values, approvals/listings, general suitability, finishes, quality, etc.

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## 3.0 MODULAR SUPPORT SYSTEM

### 3.1 MT PROFILES

#### Approvals / Listings

<b>ICC-ES (International Code Council)</b>	ESR-5019 for Cold-Formed Steel per AISI S100-16/ICC-ES AC46 ELC-5019 for Cold-Formed Steel per CSA S136-16
<b>ETA (European Technical Assessment)</b>	ETA-21/0414 for HILTI Installation Channels of MT System ETA-21/1017 for HILTI Channel Connectors of MT System ETA-21/1045 for HILTI Base Connectors of MT System ETA-21/1046 for HILTI Angle Connectors of MT System ETA-22/0194 for HILTI Saddle Nuts of MT System ETA-22/0195 for HILTI Cantilevers of MT System
<b>COLA (City of Los Angeles)</b>	2023 LABC Supplement (within ESR-5019)
<b>California Building Code</b>	2022 California Building Code (CBC) Supplement (within ESR-5019)



**Table 1 - MT Profile Material Specifications, Corrosion Protection, and Ordering Information**

Description	Material Specifications <sup>1,2</sup>	Type of Coating	Finish	Length ft (m)	Item No.
<b>MT-10</b>	EN 10346 S280GD	Indoor	Pre-Galvanized	6'-6 3/4" (2)	2268492
<b>MT-15</b>	EN 10346 S280GD	Indoor	Pre-Galvanized	6'-6 3/4" (2)	2268493
<b>MT-15 OC</b>	EN 10346 S280GD	Outdoor	Zinc Magnesium	6'-6 3/4" (2)	2268494
<b>MT-20</b>	EN 10346 S280GD	Indoor	Pre-Galvanized	6'-6 3/4" (2)	2268495
<b>MT-20 OC</b>	EN 10346 S280GD	Outdoor	Zinc Magnesium	6'-6 3/4" (2)	2268496
<b>MT-30 S</b>	EN 10346 S280GD	Indoor	Pre-Galvanized	9'-10" (3)	2268497
<b>MT-30</b>	EN 10346 S280GD	Indoor	Pre-Galvanized	19'-8 1/4" (6)	2268498
<b>MT-30 S OC</b>	EN 10346 S280GD	Outdoor	Zinc Magnesium	9'-10" (3)	2268499
<b>MT-30 OC</b>	EN 10346 S280GD	Outdoor	Zinc Magnesium	19'-8 1/4" (6)	2268500
<b>MT-50 S</b>	EN 10346 S280GD	Indoor	Pre-Galvanized	9'-10" (3)	2268509
<b>MT-50</b>	EN 10346 S280GD	Indoor	Pre-Galvanized	19'-8 1/4" (6)	2268510
<b>MT-50 S OC</b>	EN 10346 S280GD	Outdoor	Zinc Magnesium	9'-10" (3)	2268511
<b>MT-50 OC</b>	EN 10346 S280GD	Outdoor	Zinc Magnesium	19'-8 1/4" (6)	2268512
<b>MT-60 S</b>	EN 10346 S280GD	Indoor	Pre-Galvanized	9'-10" (3)	2268513
<b>MT-60</b>	EN 10346 S280GD	Indoor	Pre-Galvanized	19'-8 1/4" (6)	2268514
<b>MT-60 S OC</b>	EN 10346 S280GD	Outdoor	Zinc Magnesium	9'-10" (3)	2268515
<b>MT-60 OC</b>	EN 10346 S280GD	Outdoor	Zinc Magnesium	19'-8 1/4" (6)	2268516
<b>MT-70 S OC</b>	EN 10346 S350GD	Outdoor	Zinc Magnesium	9'-10" (3)	2268364
<b>MT-70 OC</b>	EN 10346 S350GD	Outdoor	Zinc Magnesium	19'-8 1/4" (6)	2268365
<b>MT-80 S OC</b>	EN 10346 S350GD	Outdoor	Zinc Magnesium	9'-10" (3)	2268366
<b>MT-80 OC</b>	EN 10346 S350GD	Outdoor	Zinc Magnesium	19'-8 1/4" (6)	2268367
<b>MT-90 S OC</b>	EN 10346 S350GD	Outdoor	Zinc Magnesium	9'-10" (3)	2268368
<b>MT-90 OC</b>	EN 10346 S350GD	Outdoor	Zinc Magnesium	19'-8 1/4" (6)	2268369
<b>MT-100 S OC</b>	EN 10346 S350GD	Outdoor	Zinc Magnesium	9'-10" (3)	2268490
<b>MT-100 OC</b>	EN 10346 S350GD	Outdoor	Zinc Magnesium	19'-8 1/4" (6)	2268491

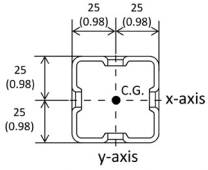
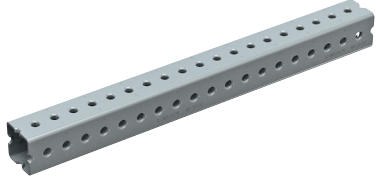
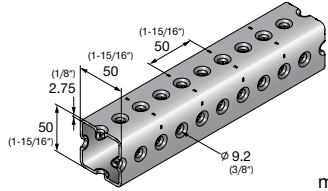
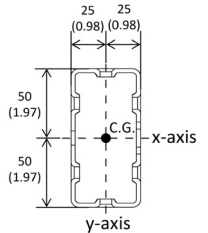
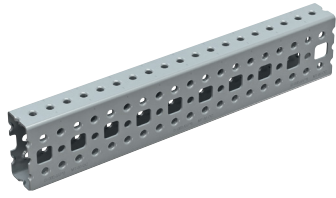
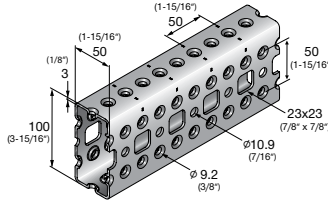
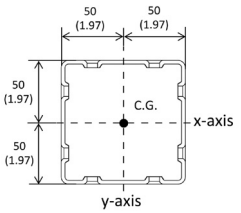
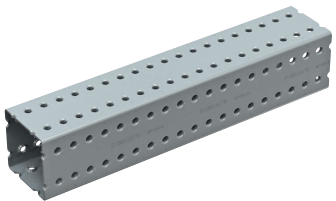
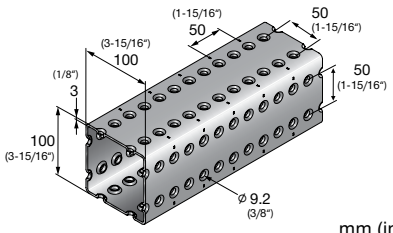
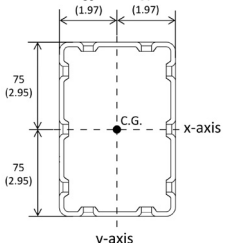
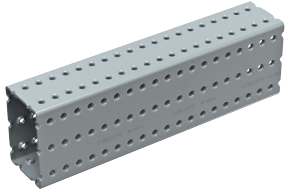
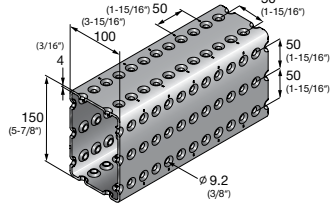
1. Mechanical properties of EN 10346 Grade S280 GD meet or exceed the mechanical properties of ASTM A653/A1046 SS Grade 37.

2. Mechanical properties of EN 10346 Grade S350 GD meet or exceed the mechanical properties of ASTM A653/A1046 SS Grade 50 Cl4.

## 3.0 MODULAR SUPPORT SYSTEM

### 3.1 MT PROFILES

**Table 3 - MT Girder Profile Dimensions**

<p><b>MT-70 S OC, MT-70 OC</b></p>  <p>mm (in)</p>		 <p>mm (in)</p>
<p><b>MT-80 S OC, MT-80 OC</b></p>  <p>mm (in)</p>		 <p>mm (in)</p>
<p><b>MT-90 S OC, MT-90 OC</b></p>  <p>mm (in)</p>		 <p>mm (in)</p>
<p><b>MT-100 S OC, MT-100 OC</b></p>  <p>mm (in)</p>		 <p>mm (in)</p>

## 3.0 MODULAR SUPPORT SYSTEM

### 3.1.1 CROSS-SECTION PROPERTIES OF MT PROFILES

**Table 10 - Cross-Section Properties of MT Girder Profiles** <sup>1,3,4</sup>


Description	Symbol	Units	MT-70 S OC	MT-80 S OC	MT-90 S OC	MT-100 S OC
			MT-70 OC	MT-80 OC	MT-90 OC	MT-100 OC
Profile of cross-section	-	-				
Design thickness	t	in (mm)	0.108 (2.75)	0.118 (3)	0.118 (3)	0.157 (4)
Width	-	in (mm)	1.97 (50)	1.97 (50)	3.94 (100)	3.94 (100)
Depth	-	in (mm)	1.97 (50)	3.94 (100)	3.94 (100)	5.91 (150)
Weight	w	lbs/ft (kg/m)	2.64 (3.914)	4.43 (6.593)	6.01 (8.944)	9.99 (14.882)
Minimum specified yield strength	F <sub>y</sub>	ksi (MPa)	50.75 (350)	50.75 (350)	50.75 (350)	50.75 (350)
Modulus of elasticity	E	ksi (MPa)	29,500 (203,400)	29,500 (203,400)	29,500 (203,400)	29,500 (203,400)
<b>Gross Section Properties</b> <sup>2</sup>						
Gross cross-sectional area	A <sub>g</sub>	in <sup>2</sup> (mm <sup>2</sup> )	0.775 (500.28)	1.303 (840.82)	1.768 (1140.80)	2.937 (1894.80)
Moment of inertia of the gross section about x-axis	I <sub>x</sub>	in <sup>4</sup> (mm <sup>4</sup> )	0.4382 (182,390)	2.5576 (1,064,540)	4.2536 (1,770,469)	14.2854 (5,946,036)
Moment of inertia of the gross section about y-axis	I <sub>y</sub>	in <sup>4</sup> (mm <sup>4</sup> )	0.4382 (182,390)	0.8663 (360,568)	4.2536 (1,770,469)	7.654 (3,185,651)
Gross section-modulus about x-axis	S <sub>x</sub>	in <sup>3</sup> (mm <sup>3</sup> )	0.4452 (7,296)	1.2993 (21,291)	2.1608 (35,409)	4.838 (79,280)
Gross section-modulus about y-axis	S <sub>y</sub>	in <sup>3</sup> (mm <sup>3</sup> )	0.4452 (7,296)	0.8801 (14,423)	2.1608 (35,409)	3.888 (63,713)
Radius of gyration of the gross section about x-axis	r <sub>x</sub>	in (mm)	0.752 (19.09)	1.401 (35.58)	1.551 (39.39)	2.206 (56.02)
Radius of gyration of the gross section about y-axis	r <sub>y</sub>	in (mm)	0.752 (19.09)	0.815 (20.71)	1.551 (39.39)	1.614 (41)
<b>Effective Section Properties</b>						
Effective moment of inertia about x-axis	I <sub>x-eff</sub>	in <sup>4</sup> (mm <sup>4</sup> )	0.4382 (182,390)	2.3832 (991,957)	3.8584 (1,605,985)	12.0259 (5,005,546)
Effective moment of inertia about y-axis	I <sub>y-eff</sub>	in <sup>4</sup> (mm <sup>4</sup> )	0.4382 (182,390)	0.6451 (268,521)	3.8584 (1,605,985)	6.4751 (2,695,127)
Effective section modulus about x-axis at stress = F <sub>y</sub>	S <sub>x-eff</sub>	in <sup>3</sup> (mm <sup>3</sup> )	0.4452 (7,296)	1.2107 (19,839)	1.9601 (32,120)	4.0728 (66,741)
Effective section modulus about y-axis at stress = F <sub>y</sub>	S <sub>y-eff</sub>	in <sup>3</sup> (mm <sup>3</sup> )	0.4452 (7,296)	0.6554 (10,741)	1.9601 (32,120)	3.2893 (53,903)
Factored bending moment resistance based on local buckling about x-axis (φ <sub>b</sub> = 0.9)	φ <sub>b</sub> M <sub>nl</sub>	k-in (kN m)	22.75 (2,571)	62.76 (7,091)	92.81 (10,49)	162.03 (22,88)
Factored bending moment resistance based on local buckling about y-axis (φ <sub>b</sub> = 0.9)	φ <sub>b</sub> M <sub>nl</sub>	k-in (kN m)	22.75 (2,571)	31.58 (3,567)	92.81 (10,49)	153.16 (17,30)
Factored bending moment resistance for distortional buckling about x-axis based on Kφ = 0 (φ <sub>b</sub> = 0.9)	φ <sub>b</sub> M <sub>nd</sub>	k-in (kN m)	N.A.	N.A.	N.A.	N.A.
Factored bending moment resistance for distortional buckling about y-axis based on Kφ = 0 (φ <sub>b</sub> = 0.9)	φ <sub>b</sub> M <sub>nd</sub>	k-in (kN m)	N.A.	N.A.	N.A.	N.A.
Factored shear resistance about x-axis (φ <sub>v</sub> = 0.8)	φ <sub>v</sub> V <sub>n</sub>	lbs (N)	8,101 (36,036)	8,611 (38,304)	19,941 (88,704)	25,380 (112,896)
Factored shear resistance about y-axis (φ <sub>v</sub> = 0.8)	φ <sub>v</sub> V <sub>n</sub>	lbs (N)	8,101 (36,036)	16,285 (72,439)	19,941 (88,704)	40,488 (180,096)
<b>Torsional Section Properties</b> <sup>2</sup>						
St. Venant Torsional Constant	J	in <sup>4</sup> (mm <sup>4</sup> )	0.7146 (297,456)	2.1217 (883,107)	6.6870 (2,783,333)	15.8713 (6,606,148)
Torsional Warping Constant	C <sub>w</sub>	in <sup>6</sup> (mm <sup>6</sup> )	0.00015 (39,434)	0.1693 (45,468,000)	0.0023 (610,560)	1.2794 (343,560,000)
Distance from the centroid to the shear center along the principal x-axis	X <sub>0</sub>	in (mm)	0	0	0	0
Distance from the centroid to the shear center along the principal y-axis	Y <sub>0</sub>	in (mm)	0	0	0	0
Net polar radius of gyration about the shear center	r <sub>0</sub>	in (mm)	1.063 (27.00)	1.621 (41.17)	2.193 (55.71)	2.733 (69.42)
Coefficient for determining critical elastic lateral-torsional buckling stress	β	-	1	1	1	1

1. Tabulated values are in accordance with ICC-ES ELC-5019 and CSA S136-16, the North American Specification for the Design of Cold-Formed Steel Structural Members (using the Appendix B provisions applicable to Canada), CSA Group.

2. Tabulated gross properties, including torsional properties, are based on the full unreduced cross section of the profiles, away from the punched holes and slots.

3. For deflection calculations, use the effective moment of inertia.

4. C.G. is the center of gravity of the profile cross-section.

## 3.0 MODULAR SUPPORT SYSTEM

### 3.1.2 MT BEAM AND COLUMN LOAD TABLES

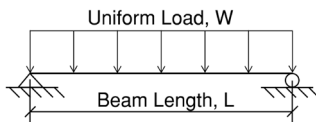
#### Beam Design Fundamentals

Hilti modular support system profiles may be used in a wide variety of beam applications. Beams are structural elements that resist applied loads perpendicular to their length.

Beams must be designed for shear, flexure (bending), torsion, and deflection. In some cases, beams may be subjected to an axial load that acts concurrently with the applied perpendicular loads, and the member must be accordingly designed for the combined effects of bending and compression. Examples of typical load, shear, and moment diagrams for beams are shown on page 31. Per AISI S100-16/CSA S136-16, cold-formed steel beams, which typically consist of highly customized profiles with very slender elements, must be designed for the effects of local buckling, distortional buckling, and for yielding and global buckling. Additionally, local buckling interacting with yielding and global buckling must be checked. The load values given in the beam tables in this technical guide represent the controlling load capacities for beams that are sufficiently laterally braced with due consideration of these limit states. A fully braced beam is restrained against twisting about the beam's longitudinal axis as well as lateral movement perpendicular to the beam's longitudinal axis. For unbraced conditions, reductions must be applied to the allowable loads per page 49.

#### Beam Loading

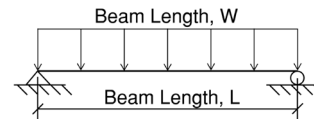
Beam load tables in this technical guide are based on a "uniformly loaded" condition unless noted otherwise. Uniform loads are distributed evenly along the length of the member.



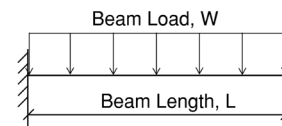
See page 32 for modification factors to be applied to allowable load values for non-uniform loading conditions.

#### Support Conditions

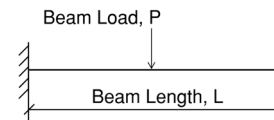
A "simply-supported" beam is a single-span beam, supported at its ends, whose supports restrain translation (lateral movement) in the 3 orthogonal directions as well as twisting about the beam's longitudinal axis, but do not restrain bending moments.



A "fixed-end" beam is a single-span beam, supported at its ends, whose supports restrain translation and rotation (bending and twisting moments) in the 3 orthogonal directions. Several Hilti MT connectors allow for moment resistance which can be used to simulate a "fixed-end" beam.



A "cantilevered" beam is a single-span beam, supported at only one end and free to translate and rotate at its other (unsupported) end. The supported end of a "cantilevered" beam is considered a "fixed-end". MT brackets are examples of "cantilevered" beams.



Note that beam load tables in this technical guide are based on a "simply-supported" beam span condition unless noted otherwise. See page 32 for modification factors to be applied to allowable load values for non-simply-supported span conditions.

#### Deflection

Beam designs can often be governed by deflection limits (serviceability). Beam deflections are computed based on the magnitude and type of applied loading, the member's length,  $L$ , elastic modulus,  $E$ , moment of inertia about the axis under consideration,  $I$ , and support conditions.

Allowable loads corresponding to deflection limits in this technical guide are based on "simply-supported" and "uniformly loaded" conditions. See page 32 for modification factors to be applied to allowable load values for other conditions.

## 3.0 MODULAR SUPPORT SYSTEM

### 3.1.2 MT BEAM AND COLUMN LOAD TABLES

#### Column Design Fundamentals

Columns are structural elements that resist applied loads primarily in axial compression along their length.

A column's capacity is based on its unbraced length (noted as "height" in load tables), support conditions, cross-sectional properties, material properties, and load location (i.e. whether applied at the column's center of gravity or at the face of the profile).

#### Column Unbraced Length

The unbraced length of a column represents the distance between braced locations. Braced locations along a column are restrained against lateral movement (perpendicular to the length of the column). The larger the unbraced height of a column, its ability to resist applied loads is decreased. The tendency for a column to buckle about an axis under consideration is highly dependent on its slenderness ratio,  $KL/r$ , where  $K$  is the effective length factor (explained to the right),  $L$  is the unbraced length of the column, and  $r$  is the radius of gyration for the cross section. The AISI S100-16/CSA S136-16 Specification recommends that such ratios not exceed 200 for compression members. Buckling must be considered in both principal directions for a column, with the smaller buckling load controlling the design. Remember that for members that are not doubly symmetric (e.g channels), the radius of gyration will be different for each principal direction.

#### Column Loading - Concentric

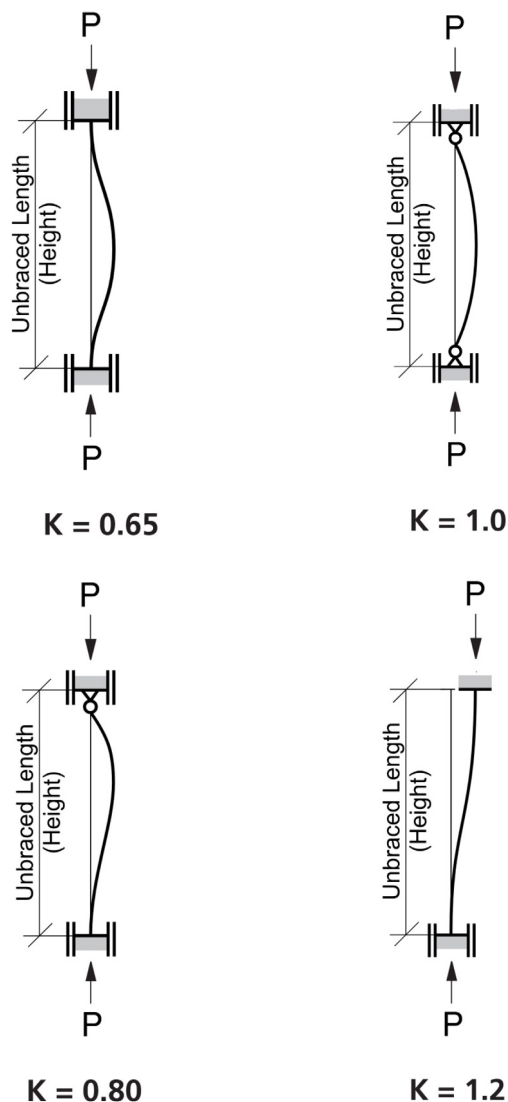
A load applied at the center of gravity, C.G., of a column cross section is considered concentric. Such a load does not induce a bending moment in the column at the point of load application.

#### Column Loading - Eccentric

A load applied away from the center of gravity, C.G., of a column cross section is considered eccentric (e.g. a load at the slotted face of an MT channel). Such a load induces a bending moment in the column at the point of load application and, consequently, results in a lower allowable column load compared to a concentrically loaded condition. Columns with higher slenderness ratios are particularly sensitive to eccentrically applied axial loads.

#### Column Support Conditions

A column's allowable load capacity depends considerably on its support (end) conditions. Variations in support conditions for a column are addressed via an Effective Length Factor,  $K$ , which modifies a non-pinned-end column's unbraced height to represent that of an equivalent pinned-end column. Accordingly, the  $K$  value for a pinned-end column is 1.0. See the figure below for applicable  $K$  values to be used for certain column support conditions.



## 3.0 MODULAR SUPPORT SYSTEM

### 3.1.2 MT BEAM AND COLUMN LOAD TABLES

**Table 11 - Beam Load, Shear, and Moment Diagrams**
**Simply-Supported Beams**

	$R_L = \frac{WL}{2}$ $R_R = \frac{WL}{2}$ $V_{max} = \frac{WL}{2}$ $M_{max} = \frac{WL^2}{8}$ $\Delta_{max} = \frac{5WL^4}{384EI}$		$R_L = \frac{P}{2}$ $R_R = \frac{P}{2}$ $V_{max} = \frac{P}{2}$ $M_{max} = \frac{PL}{4}$ $\Delta_{max} = \frac{PL^3}{48EI}$		$R_L = \frac{WL}{2}$ $R_R = \frac{WL}{2}$ $V_{max} = \frac{WL}{2}$ $M_{max} = \frac{WL^2}{8}$ $\Delta_{max} = \frac{Pab(a+2b)\sqrt{3a(a+2b)}}{27EI}$
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**Cantilever Beams**

	$R_L = WL$ $V_{max} = WL$ $M_{max} = \frac{WL^2}{2}$ $\Delta_{max} = \frac{WL^4}{8EI}$		$R_L = P$ $V_{max} = P$ $M_{max} = PL$ $\Delta_{max} = \frac{PL^3}{3EI}$		$R_L = P$ $V_{max} = P$ $M_{max} = Pb$ $\Delta_{max} = \frac{Pb^2}{6EI}(3L - b)$
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**Beams Fixed at One End and Supported at the Other**

	$R_L = \frac{5WL}{8}$ $R_R = \frac{3WL}{8}$ $V_{max} = \frac{5WL}{8}$ $M_{max} = \frac{WL^2}{8}$ $\Delta_{max} = \frac{WL^4}{184EI}$		$R_L = \frac{11P}{16}$ $R_R = \frac{5P}{16}$ $V_{max} = \frac{11P}{16}$ $M_{max} = \frac{3PL}{16}$ $\Delta_{max} = 0.00932 \frac{PL^3}{EI}$		$R_L = \frac{Pa}{2L^3}(3L^2 - a^2)$ $R_R = \frac{Pb^2}{2L^3}(a + 2L)$ $M_L = \frac{Pab}{2L^2}(a + L)$ $\Delta_{max} = \frac{Pb^2}{6EI}(3L - b)$
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**Beams Fixed at Both Ends**

	$R_L = \frac{WL}{2}$ $R_R = \frac{WL}{2}$ $V_{max} = \frac{5WL}{8}$ $M_{max} = \frac{WL^2}{12}$ $\Delta_{max} = \frac{WL^4}{384EI}$		$R_L = \frac{P}{2}$ $R_R = \frac{P}{2}$ $V_{max} = \frac{P}{2}$ $M_{max} = \frac{PL}{8}$ $\Delta_{max} = \frac{PL^3}{192EI}$		$R_L = \frac{Pb^3}{L^3}(3a + b)$ $R_R = \frac{Pa^3}{L^3}(a + 3b)$ $M_{at P} = \frac{2Pa^2b^2}{L^3}$ $M_{max} = \frac{Pa^2b}{L^2}$ $\Delta_{max} = \frac{2Pa^3b^2}{3EI(3a + b)^2}$
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*W*: Uniformly Distributed Load  
*L*: Beam Span Length  
 $R_L$ : Reaction at Left End  
 $R_R$ : Reaction at Right End

*V*: Shear  
 $V_{max}$ : Maximum Shear  
*M*: Moment  
 $M_{max}$ : Maximum Moment

*P*: Concentrated (Point) Load  
*E*: Modulus of Elasticity  
*I*: Moment of Inertia  
 $\Delta_{max}$ : Maximum Deflection of Beam

## 3.0 MODULAR SUPPORT SYSTEM

### 3.1.2 MT BEAM AND COLUMN LOAD TABLES

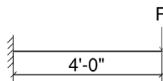
**Table 12 - Load and Deflection Factors for Beams**

Span and Loading Condition		Load Factor	Deflection Factor
Simple Beam - Uniform Load		1.00	1.00
Simple Beam - Concentrated Load at Mid-span		0.50	0.80
Simple Beam - Two Equal Concentrated Loads at 1/4 Points		1.00	1.10
Beam Fixed at Both Ends - Uniform Load		1.50	0.30
Beam Fixed at Both Ends - Concentrated Load at Mid-span		1.00	0.40
Cantilever Beam - Uniform Load		0.25	2.40
Cantilever Beam - Concentrated Load at End		0.12	3.20
Continuous Beam - Two Equal Spans, Uniform Load on One Span		1.3	0.92
Continuous Beam - Two Equal Spans, Uniform Load on Both Spans		1.00	0.42
Continuous Beam - Two Equal Spans, Concentrated Load at Center of One Span		0.62	0.71
Continuous Beam - Two Equal Spans, Concentrated Load at Center of Both Spans		0.67	0.48

The allowable beam load tables in this technical guide are for single-span supported beams with uniform loading. Common arrangements of other load and support conditions are shown in the above table. Loads and deflections for these conditions can be determined by multiplying the load value from the tables by the given load and deflection factors. Additional reduction factors for unbraced beam lengths may apply per the tables on page 49.

**EXAMPLE 1)**

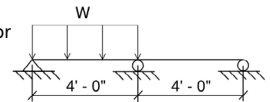
Determine the maximum allowable load and deflection for an MT-50 fully braced cantilever beam with a concentrated load at the unsupported end.


**SOLUTION:**

- Allowable load and deflection for an MT-50 with a 48" span from Table 19 on Page 35 is 1,000 lbs and 0.24".
- Multiply by factors from above table:  
 Load = (1,000 lbs - 1.97 x 4) x 0.12 = 119 lbs  
 Deflection = 0.24" x 3.20 = 0.77"

**EXAMPLE 2)**

Determine the maximum allowable load and deflection for a two-span MT-70 fully braced continuous beam that is uniformly loaded on one span.

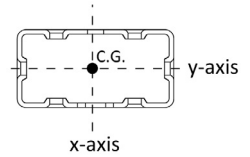
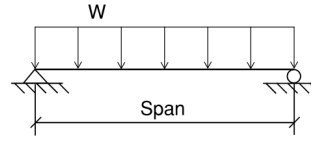
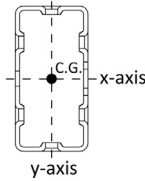
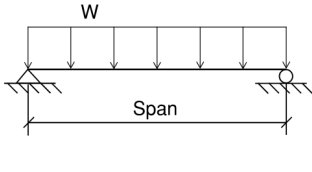

**SOLUTION:**

- Allowable load and deflection for an MT-70 with a 48" span from Table 25 on Page 37 is 2,520 lbs and 0.28".
- Multiply by factors from above table:  
 Load = (2,520 lbs - 2.64 x 4) x 1.3 = 3,260 lbs  
 Deflection = 0.28" x 0.92 = 0.26"



## 3.0 MODULAR SUPPORT SYSTEM

### 3.1.2 MT BEAM AND COLUMN LOAD TABLES


**Table 49 - MT-80 Maximum Factored Beam Loads: X-axis Bending<sup>1,2,3,4,5</sup>**


Span in (cm)	Max Factored Uniform Load lbs (N)	Defl. At Max Uniform Load in (cm)	Uniform Loading at Deflection		
			Span/180 lbs (N)	Span/240 lbs (N)	Span/360 lbs (N)
24 (61.0)	20,935 (93,120)	0.05 (0.14)	20,935 (93,120)	20,935 (93,120)	20,935 (93,120)
36 (91.4)	13,955 (62,070)	0.12 (0.31)	13,955 (62,070)	13,955 (62,070)	11,570 (51,465)
48 (121.9)	10,465 (46,550)	0.21 (0.54)	10,465 (46,550)	9,760 (43,410)	6,505 (28,935)
60 (152.4)	8,370 (37,230)	0.33 (0.85)	8,330 (37,050)	6,245 (27,775)	4,165 (18,525)
72 (182.9)	6,975 (31,025)	0.48 (1.22)	5,785 (25,730)	4,335 (19,280)	2,890 (12,855)
84 (213.4)	5,980 (26,600)	0.66 (1.67)	4,250 (18,900)	3,185 (14,165)	2,125 (9,450)
96 (243.8)	5,230 (23,260)	0.86 (2.18)	3,250 (14,455)	2,440 (10,850)	1,625 (7,225)
108 (274.3)	4,650 (20,680)	1.08 (2.76)	2,570 (11,430)	1,925 (8,560)	1,285 (5,715)
120 (304.8)	4,185 (18,615)	1.34 (3.40)	2,080 (9,250)	1,560 (6,935)	1,040 (4,625)
144 (365.8)	3,485 (15,500)	1.93 (4.90)	1,445 (6,425)	1,080 (4,800)	720 (3,200)
168 (426.7)	2,990 (13,300)	2.63 (6.67)	1,060 (4,715)	795 (3,535)	530 (2,355)
192 (487.7)	2,615 (11,630)	3.43 (8.71)	810 (3,600)	610 (2,710)	405 (1,800)
216 (548.6)	2,325 (10,340)	4.34 (11.02)	640 (2,845)	480 (2,135)	320 (1,420)
240 (609.6)	2,090 (9,295)	5.35 (13.59)	520 (2,310)	390 (1,730)	260 (1,155)

**Table 50 - MT-80 Maximum Factored Beam Loads: Y-axis Bending<sup>1,2,3,4,5</sup>**

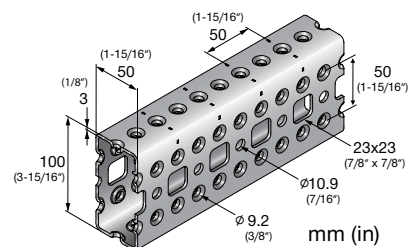

Span in (cm)	Max Factored Uniform Load lbs (N)	Defl. At Max Uniform Load in (cm)	Uniform Loading at Deflection		
			Span/180 lbs (N)	Span/240 lbs (N)	Span/360 lbs (N)
24 (61.0)	10,535 (46,860)	0.03 (0.07)	10,535 (46,860)	10,535 (46,860)	7,045 (31,335)
36 (91.4)	7,025 (31,245)	0.06 (0.15)	6,265 (27,865)	4,695 (20,880)	3,130 (13,920)
48 (121.9)	5,265 (23,415)	0.11 (0.27)	3,520 (15,655)	2,640 (11,740)	1,760 (7,825)
60 (152.4)	4,215 (18,745)	0.17 (0.43)	2,255 (10,030)	1,690 (7,515)	1,125 (5,000)
72 (182.9)	3,510 (15,610)	0.24 (0.62)	1,565 (6,960)	1,170 (5,200)	780 (3,465)
84 (213.4)	3,010 (13,385)	0.33 (0.84)	1,150 (5,115)	860 (3,825)	575 (2,555)
96 (243.8)	2,630 (11,695)	0.43 (1.09)	880 (3,910)	660 (2,935)	440 (1,955)
108 (274.3)	2,340 (10,405)	0.55 (1.39)	695 (3,090)	520 (2,310)	345 (1,530)
120 (304.8)	2,105 (9,360)	0.67 (1.71)	560 (2,490)	420 (1,865)	280 (1,245)
144 (365.8)	1,755 (7,805)	0.97 (2.47)	390 (1,730)	290 (1,285)	195 (865)
168 (426.7)	1,505 (6,690)	1.32 (3.36)	285 (1,265)	215 (955)	140 (620)
192 (487.7)	1,315 (5,845)	1.72 (4.38)	220 (975)	165 (730)	110 (485)
216 (548.6)	1,170 (5,200)	2.18 (5.55)	170 (755)	130 (575)	85 (375)
240 (609.6)	1,050 (4,670)	2.69 (6.83)	140 (620)	105 (465)	70 (310)

**Table 51 - MT-80 Maximum Factored Column Loads<sup>1,2,6,7,8</sup>**


Unbraced Height in (cm)	Max Factored Load at Girder Face lbs (N)	Maximum Column Load Applied at C.G.			
		K = 0.65 lbs (N)	K = 0.80 lbs (N)	K = 1.0 lbs (N)	K = 1.2 lbs (N)
24 (61.0)	17,020 (75,710)	42,875 (190,725)	42,875 (190,725)	42,875 (190,725)	42,875 (190,725)
36 (91.4)	16,615 (73,920)	42,875 (190,725)	42,875 (190,725)	42,875 (190,725)	42,045 (187,035)
48 (121.9)	16,070 (71,485)	42,875 (190,725)	42,875 (190,725)	39,835 (177,200)	34,205 (152,160)
60 (152.4)	15,015 (66,805)	42,875 (190,725)	39,835 (177,200)	32,960 (146,615)	26,760 (119,040)
72 (182.9)	12,365 (55,025)	40,405 (179,735)	34,205 (152,160)	26,760 (119,040)	19,785 (88,010)
84 (213.4)	11,185 (49,770)	35,755 (159,045)	29,220 (130,000)	20,920 (93,070)	14,535 (64,660)
96 (243.8)	10,020 (44,580)	31,715 (141,080)	24,360 (108,375)	16,025 (71,290)	11,130 (49,510)
108 (274.3)	8,870 (39,460)	27,675 (123,110)	19,785 (88,010)	12,660 (56,335)	8,790 (39,105)
120 (304.8)	7,830 (34,845)	23,770 (105,750)	16,025 (71,290)	10,250 (45,605)	7,120 (31,675)
144 (365.8)	6,190 (27,540)	16,860 (75,005)	11,130 (49,510)	7,120 (31,675)	**

**Notes:**

1. Loads are based on ICC-ES ELC-5019 and CSA S136-16, the North American Specification for the Design of Cold-Formed Steel Structural Members (using the Appendix B provisions applicable to Canada), CSA Group.
2. Resistance factors for flexure and compression are 0.90 and 0.80, respectively.
3. Maximum factored beam loads in table are given in total uniform load (W \* Span) and based on a uniformly loaded condition with simply supported ends. For other loading and support conditions, see page 32 for applicable load and deflection modification factors.
4. Beams spans in table are assumed to be sufficiently laterally braced. Unbraced spans may reduce beam load carrying capacity. See page 49 for reduction factors for unbraced conditions.
5. Profile weight, 4.43 lbs/ft (64.67 N/m), must be deducted from maximum factored beam load values.
6. C.G. is the 'Center of Gravity' of the cross section.
7. \*\* indicates KL/r for compression exceeds 200.
8. Maximum factored load at girder face assumes K value of 0.8.



## 3.0 MODULAR SUPPORT SYSTEM

### 3.1.2 MT BEAM AND COLUMN LOAD TABLES

**Table 57 - MT Beam Load Reduction Factors for Laterally Unbraced Channels<sup>1,2,3,4</sup>**

Span in (cm)	MT-20		MT-30		MT-50		MT-60	
	x-axis	y-axis	x-axis	y-axis	x-axis	y-axis	x-axis	y-axis
12 (30.5)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24 (51.0)	1.00	1.00	1.00	1.00	0.93	1.00	0.91	1.00
36 (91.4)	0.98	1.00	0.86	0.90	0.79	0.95	0.89	1.00
48 (121.9)	0.90	1.00	0.86	0.81	0.75	0.90	0.76	1.00
60 (152.4)	0.83	1.00	0.83	0.71	0.70	0.69	0.64	1.00
72 (182.9)	0.77	0.95	0.81	0.62	0.66	0.69	0.54	1.00
84 (213.3)	-	-	0.78	0.53	0.63	0.69	0.46	0.99
96 (243.8)	-	-	0.76	0.45	0.59	0.69	0.41	0.97
108 (274.3)	-	-	0.74	0.40	0.57	0.69	0.37	0.94
120 (304.8)	-	-	0.72	0.35	0.54	0.67	0.35	0.92
144 (365.8)	-	-	0.69	0.29	0.49	0.60	0.31	0.86
168 (426.7)	-	-	0.65	0.25	0.44	0.53	0.28	0.79
192 (487.7)	-	-	0.61	0.22	0.41	0.46	0.26	0.73
216 (548.6)	-	-	0.58	0.19	0.38	0.41	0.24	0.68
240 (609.6)	-	-	0.54	0.17	0.35	0.36	0.23	0.62

1. Linear interpolation is not permitted.
2. Reduction factors in table are based on loading through the shear center of the cross section. The impact of torsion is not accounted for in these values.
3. Reduction factors are to be applied to the tabulated beam load values for fully braced spans. Additional modification factors based on loading and support conditions may apply per Table 12 on page 32.
4. Tabulated values conservatively assume a value for the lateral torsional-buckling modification factor,  $C_b$ , of 1.0.

**Table 58 - MT Beam Load Reduction Factors for Laterally Unbraced Girders<sup>1,2</sup>**

Span in (cm)	MT-70	MT-80	MT-90	MT-100
	x- and y-axis	x- and y-axis	x- and y-axis	x- and y-axis
24 (51.0)	1.00	1.00	1.00	1.00
36 (91.4)	1.00	1.00	1.00	1.00
48 (121.9)	1.00	1.00	1.00	1.00
60 (152.4)	1.00	1.00	1.00	1.00
72 (182.9)	1.00	1.00	1.00	1.00
84 (213.3)	1.00	1.00	1.00	1.00
96 (243.8)	1.00	1.00	1.00	1.00
108 (274.3)	1.00	1.00	1.00	1.00
120 (304.8)	1.00	1.00	1.00	1.00
144 (365.8)	1.00	1.00	1.00	1.00
168 (426.7)	1.00	1.00	1.00	1.00
192 (487.7)	1.00	1.00	1.00	1.00
216 (548.6)	1.00	1.00	1.00	1.00
240 (609.6)	1.00	1.00	1.00	1.00

1. No reductions to the published allowable MT beam load capacities herein are required for unbraced girder spans up to 240 inches.
2. Additional modification factors based on loading and support conditions may apply per Table 12 on page 32.