Armstrong®
World Industries

Technical Guide

DynaMax® Plus

Structural Aluminum Suspension System

Hang Tough(er)

Introducing Dynamax® Plus

Like the DynaMax® structural grid system, DynaMax® Plus is a structural aluminum suspension system that serves as both a ceiling system and structural component by providing a suspension or attachment platform for cable trays, equipment, partitions, and containment barriers while eliminating penetrations in the ceiling system.

Previously, the typical construction method for data centers was to have a structural system, like slotted strut, to suspend heavy items, then an acoustical ceiling to contain air flow and protect the equipment from debris. We have combined these two needs into one with DynaMax grid, and now, the DynaMax Plus suspension system. DynaMax Plus grid provides the accessibility and flexibility of the existing DynaMax system but with enhanced load-carrying capacity for 6-ft. and 8-ft. rod drops.

Code Compliance You Can Trust

Meets:

- ASTM C635
- ASTM C636
- ASTM E580
- ICC-ES AC156

Seismic D, E, F configurations available

DynaMax® Plus Structural Grid Data Center Installation

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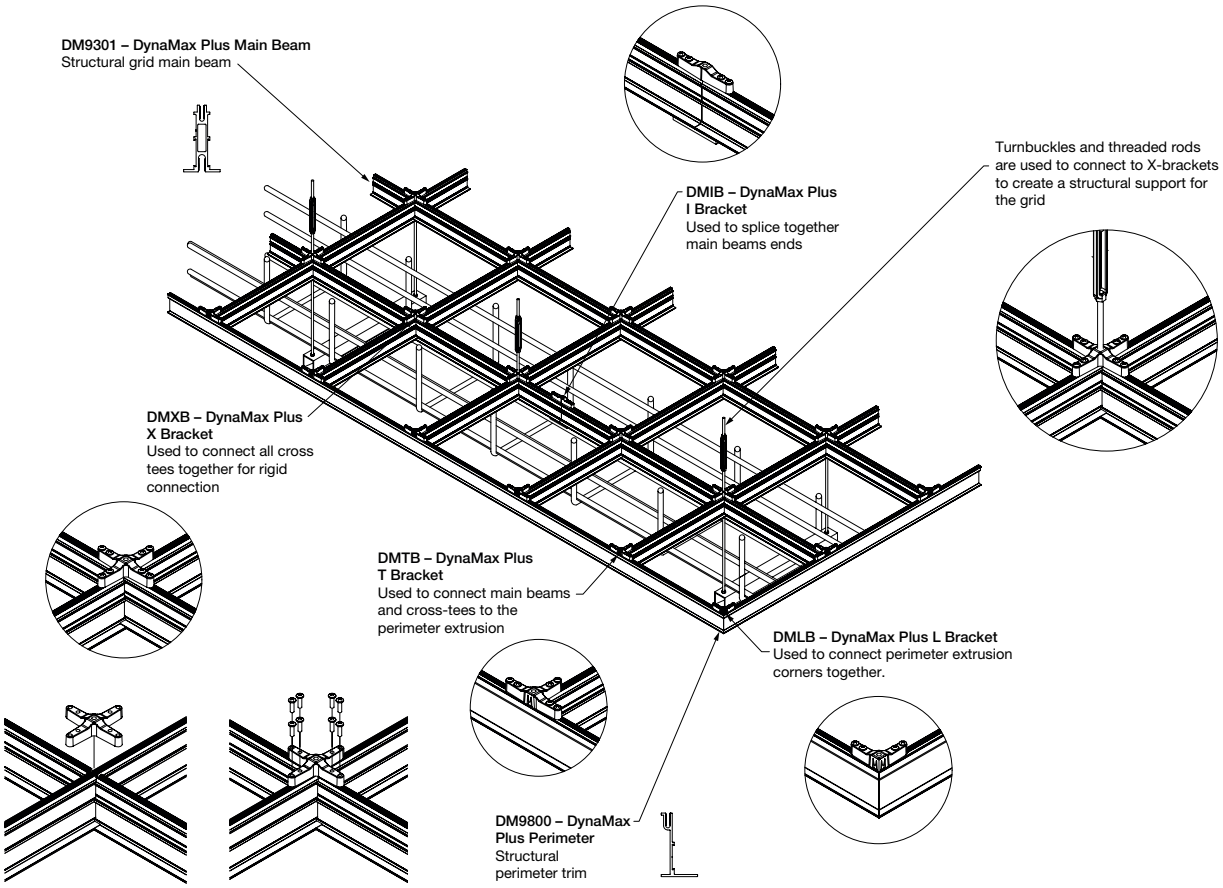
How the System Works

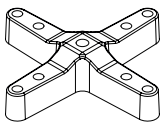
For additional information and technical guidelines, contact TechLine at 877 276-7876 and select prompts 1-2-3.



ACCESSORIES

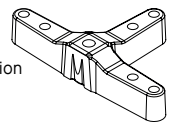
DMXB – X-Bracket
Used to connect all cross tees together for rigid connection

DMXB – 24 PCS



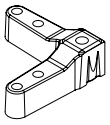
DMTB – T-Bracket –
Used to connect main beams and cross tees to the perimeter extrusion

DMTB – 36 PCS



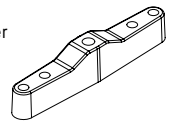
DMLB – L-Bracket –
Used to connect perimeter extrusion corners together

DMLB – 12 PCS



DMIB – I-Bracket –
Used to splice together main beam ends

DMIB – 24 PCS



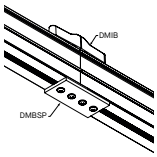
DMHWK – Hardware Kit –
Turnbuckles and threaded rods are used to connect the X-brackets to the threaded rod to create a structural support for the grid.*

DMHWK – 12 PCS

*1/2" hardware kit available upon request)

DMBSP – DynaMax Main Beam Splice Plate – Used with DMIB I-Bracket to splice together main beams that butt up against one another

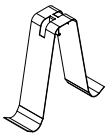
DMBSP – 24 PCS



OPTIONAL ACCESSORIES

DMPHDC – Hold-down Clip for DynaMax Plus – Attaches to the suspension system to hold Lay-in panels in place

DMHDC – 100 PCS



DM3FGSKT – Main Beam and Cross Tee Field Gasket for DynaMax Plus – Field Gasket option for DynaMax Plus Main Beams and Cross Tees

DM3FGSKT – 108 LF/roll

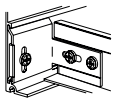
DM8FGSKT – Perimeter Molding Field Gasket for DynaMax Plus – Field Gasket option for DynaMax Plus Perimeter Molding

DM8FGSKT – 10LF/roll

NON-STRUCTURAL CEILING ADAPTER ACCESSORIES

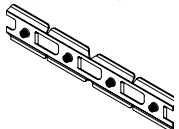
AXTBC – Axiom® T-Bar Connector Clip – Provides positive mechanical lock with factory-installed screw. Screw-fastened connection to suspension members that intersect the trim channel

AXTBC – 1 PC



AX4SPLICEB – Axiom Splice Plate with Set Screws – Join straight sections of light cove together

AX4SPLICEB – 1 PC



Suspension System Components

This system provides the accessibility and flexibility of DynaMax® grid but with enhanced load-carrying capacity for 6' and 8' rod drops.

Key Selection Attributes

- Allows for longer spans (6' and 8') while also providing greater load-carrying capacity
- 6' spacing allows for direct attachment to steel joists or pre-cast concrete tees
- new Spanning 6' or more eliminates the need for slotted strut channel at deck/roof level and creates more space for critical MEP components
- Eliminate up to 1/2 of threaded rods/accessories utilized today for typical 48" hanging spans
- Ideal combination of a finished ceiling system with a structural solution
- Easy integration into a conventional grid system using AXTBC clip and DynaMax® Plus boss channels
- Can integrate seamlessly with select Armstrong® ceiling panels for a complete ceiling system solution
- Suspension system has continuous threaded boss channel, allowing 3/8"–16 threaded rod to be installed to the suspension system at any location
- Available in 24" × 24", 24" × 48", and 48" × 48" suspension system layouts
- Allows for 96" × 96" (or similar) structural pods/bays with acoustical grid infill using AXTBC clips
- Fully accessible system allows for future expansion and upgrades
- Non-progressive installation gives the ability to remove or replace a section of the system without the need to dismantle those components around it
- Cross tees not bearing any load are removable for plenum access without compromising the structural integrity of the system
- 10-Year Limited Suspension System Warranty; 30-Year Limited Ceiling System Warranty
- For custom layout information and technical guidelines, contact TechLine customer support at 877 276-7876

For Data Center Applications

- Provides a suspension platform or attachment for data center cable trays, equipment, partitions, and hot and cold aisle containment barriers from building structure to below the ceiling plane
- Finished ceiling system offers a containment barrier to protect servers from debris
- Controls airflow by eliminating penetrations
- Grid provides increased temperature and pressure management, reduced leakage, and enables the best hot and cold air containment at the ceiling plane when compared to other ceiling types
- Available with Ultima® AirAssure® panels with factory-gasketed edges to provide even greater temperature and pressure management
- Lighting, diffuser, and containment options are available from our Data Center lighting and MEP partners

Typical Applications

- Data Centers
- Laboratories
- Hospitals
- Industrial Warehouses/Distribution Centers
- Retail/Convenience Store

DynaMax Plus Structural Aluminum Suspension System

VISUAL SELECTION

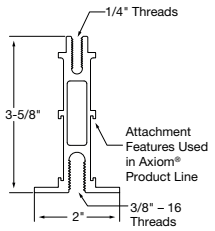
	Item No.	Description	Dimensions (Inches)
DynaMax Plus Structural Aluminum Suspension System	DM9301	Main Beam	144 × 2 × 3-5/8"
	DM9320	2' Cross Tee	24 × 2 × 3-5/8"
	DM9340	4' Cross Tee	48 × 2 × 3-5/8"
	DM9360	6' Cross Tee	72 × 2 × 3-5/8"
	DM9380	8' Cross Tee	96 × 2 × 3-5/8"
	DM9800	Perimeter Molding	144 × 2-1/8 × 3-3/4"

PACKAGING

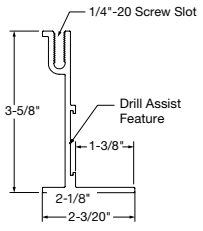
PCS/CTN	LF/CTN
2	24
6	12
6	24
2	12
2	16
2	24

NOTE: Contact local engineer for job specific load and/or seismic requirements

DETAILS



DynaMax Plus Main Beam



Perimeter Molding (DM9800)

LOAD DATA FOR DYNAMAX PLUS SUSPENSION SYSTEMS

Member Span and Spacing (inches)	48"	60"	72"	96"
Maximum Allowable Uniform Area Load (LBS/SF)	113	72	50	28
Mid-Span Point Load @ L/360 Deflection (LBS)	1,090	690	480	270
Maximum Static Point Load (LBS)	1,800	1,800	1,800	1,800
3/8" Turnbuckle Maximum Load to Structure (LBS)	1,200	1,200	1,200	1,200
1/2" Turnbuckle Maximum Load to Structure (LBS)	2,200	2,200	2,200	2,200

NOTE: The above values are based on use with 1/2" threaded rod

Recommended Ceiling Panels

VISUAL SELECTION | PERFORMANCE SELECTION Dots represent high level of performance

Edge Profile	Item No.	Dimensions (Inches)	Sound Absorption (NRC)	+	Sound Blocking (CAC)	=	Total Acoustics1 (NRC + CAC)	Articulation Class (AC)	Fire Performance	Light Reflect	Bio-Block Mold & Mildew Protection	Humi-Guard+ Sag Resistant	Certified Low VOC Emissions	Durability	Recycled Content	Recycle Program	30-Yr Warranty
FINE FISSURED™ for DynaMax® Plus	**4126**	23-1/4 × 23-1/4 × 5/8"	0.55		35		N/A	N/A	Class A	0.82	•	•	•	Std	Std	•	•
Square Lay-in	**4126BL (Black)**	23-1/4 × 23-1/4 × 5/8"	0.55		35		N/A	N/A	Class A	N/A	•	•	•	Std	Std	•	•
	4127	23-1/4 × 47-1/4 × 5/8"	0.55		35		N/A	N/A	Class A	0.82	•	•	•	Std	Std	•	•
	4127BL (Black)	23-1/4 × 47-1/4 × 5/8"	0.55		35		N/A	N/A	Class A	N/A	•	•	•	Std	•	•	•
CALLA® for DynaMax® Plus	**2896**	23-1/4 × 23-1/4 × 1"	0.85		35		**BEST**	170 •	Class A	0.85	•	•	•	•	•	•	•
Square Lay-in	**2896BK (Black)**	23-1/4 × 23-1/4 × 1"	0.85		35		**BEST**	170 •	Class A	N/A	•	•	•	•	•	•	•
	2897	23-1/4 × 47-1/4 × 1"	0.85		35		**BEST**	170 •	Class A	0.85	•	•	•	•	•	•	•
	2897BK (Black)	23-1/4 × 47-1/4 × 1"	0.85		35		**BEST**	170 •	Class A	N/A	•	•	•	•	•	•	•
DUNE® for DynaMax® Plus	**4270**	23-1/4 × 23-1/4 × 5/8"	0.50		35		**N/A**	N/A	Class A	0.81	•	•	•	•	•	•	•
Square Lay-in	**4271**	23-1/4 × 47-1/4 × 5/8"	0.50		35		**N/A**	N/A	Class A	0.81	•	•	•	•	•	•	•
ULTIMA® for DynaMax® Plus	**1807**	23-1/4 × 23-1/4 × 3/4"	0.75		35		**BETTER**	170 •	Class A	0.88	•	•	•	•	•	•	•
Square Lay-in	**1808**	23-1/4 × 47-1/4 × 3/4"	0.75		35		**BETTER**	170 •	Class A	0.88	•	•	•	•	•	•	•
ULTIMA® AirAssure® for DynaMax® Plus	**1599**	23-1/4 × 23-1/4 × 3/4"	0.75		35		**BETTER**	N/A	Class A	0.88	•	•	•	•	•	•	•
Square Lay-in	**1638**	23-1/4 × 47-1/4 × 3/4"	0.75		35		**BETTER**	N/A	Class A	0.88	•	•	•	•	•	•	•
OPTIMA® PB for DynaMax® Plus	**3210PB**	47-5/16 × 47-5/16 × 1"	0.95		N/A		**N/A**	190 •	Class A	0.88	•	•	•	•	•	•	•
Square Lay-in																	

NOTE: These panels are specially sized and engineered for the DynaMax Plus suspension system and must be used with the system. These panels do not fit in other suspension systems.

[1] Total Acoustics® ceiling panels have an ideal combination of noise reduction and sound-blocking performance in one product.

MetalWorks™ Lay-in for DynaMax® Plus

VISUAL SELECTION

PERFORMANCE SELECTION
Dots represent high level of performance

Edge Profile	Perforation	Item No.	Dimensions (Inches)	Sound Absorption NRC	Sound Absorption* (with infill panel) NRC	Fire Performance	Light Reflect	Bio-Block Mold & Mildew Protection	Certified Low VOC Emissions	Durability	Recycled Content
METALWORKS™ for DynaMax® Plus Square Lay-in	M1 (Unperforated) new	6345W24L48M1WHA	23" x 47"	N/A	N/A	Class A	0.75	•	•	•	•
	new	6345W48L48M1WHA	47" x 47"	N/A	N/A	Class A	0.75	•	•	•	•
	M19 new	6345W24L48M19WHA	23" x 47"	0.70 •	0.85 •	Class A	0.75	•	•	•	•
	new	6345W48L48M19WHA	47" x 47"	0.70 •	0.85 •	Class A	0.75	•	•	•	•

NOTE: Ceiling panels are specially sized and engineered for the DynaMax Plus suspension system and must be used with the system. These panels do not fit in other suspension systems.
* NRC achieved with acoustical infill (Item 8200T10).

COLORS
Due to printing limitations, shade may vary from actual product.

Painted

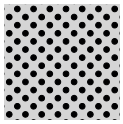
Whitelume (WHA)


Custom Colors Available

For custom options contact ASQuote, ASQuote@armstrongceilings.com

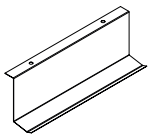
PERFORMANCE OPTIONS
(1:2 SCALE SHOWN)

M1 (Unperforated)


M19 (Microperforated)

ACCESSORIES FOR METALWORKS LAY-IN CEILING PANELS

6483H35 – MetalWorks Lay-In Perimeter Hold-down Clip for DynaMax Plus – Screw attaches to perimeter molding to hold the perimeter cut metalworks panels in place. 2 clips required per cup panel.



6483H35 – 10 PCS

8200T10 – 1" Fiberglass Infill Bag –
24 × 24 × 1"
Color – Black (gloss)

8200T10 – 12 PCS

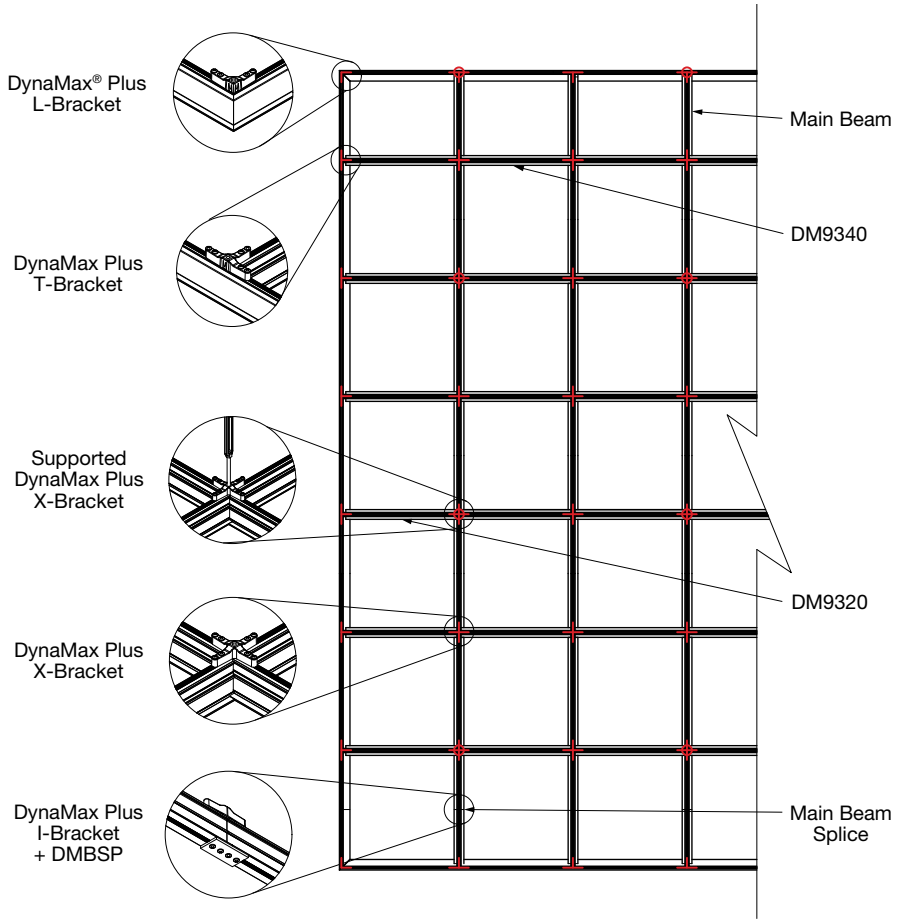
PHYSICAL DATA FOR METALWORKS LAY-IN CEILING PANELS

Design Considerations
MetalWorks panels and DynaMax and DynaMax Plus grid are manufactured at separate facilities that use different paint systems. Colors i.e. White and Whitelume will coordinate but are not exact color matches.

Material
All MetalWorks panels: Aluminum – 0.064"

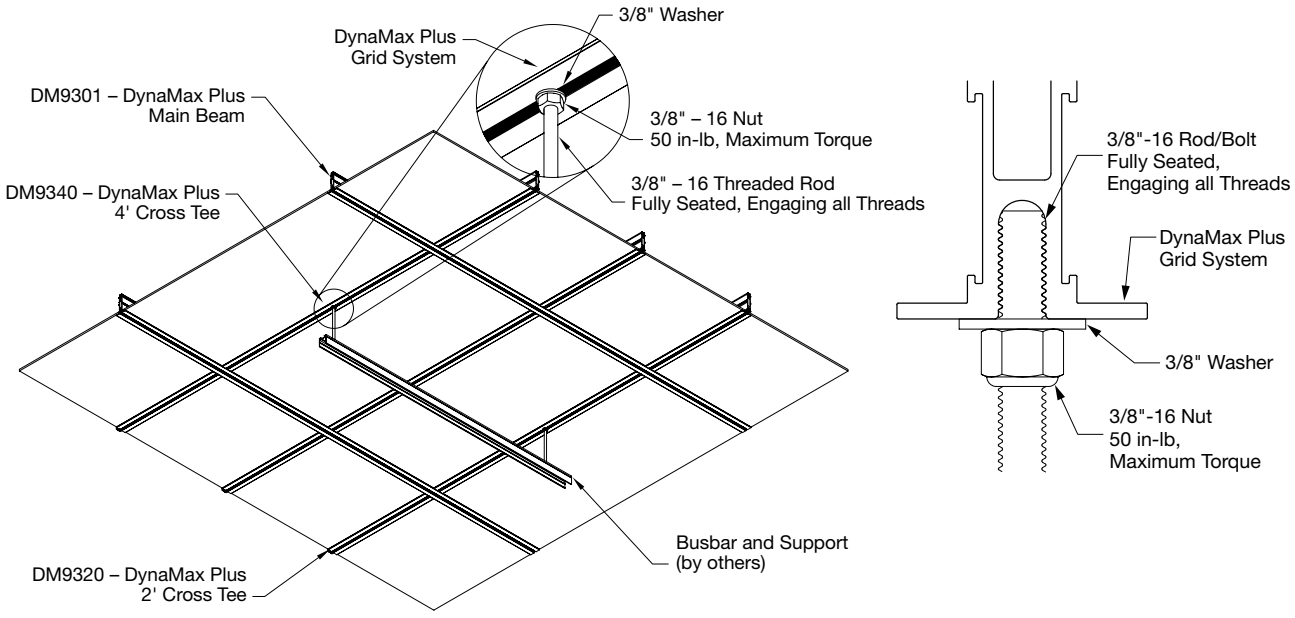
Warranty
One (1) year limited warranty for MetalWorks items. Details at armstrongceilings.com/warranty.

Installation



NOTE: DynaMax Plus threaded rod drops can be spaced at increased spans of 5', 6' or 8' due to the system's greater load-carrying capability.

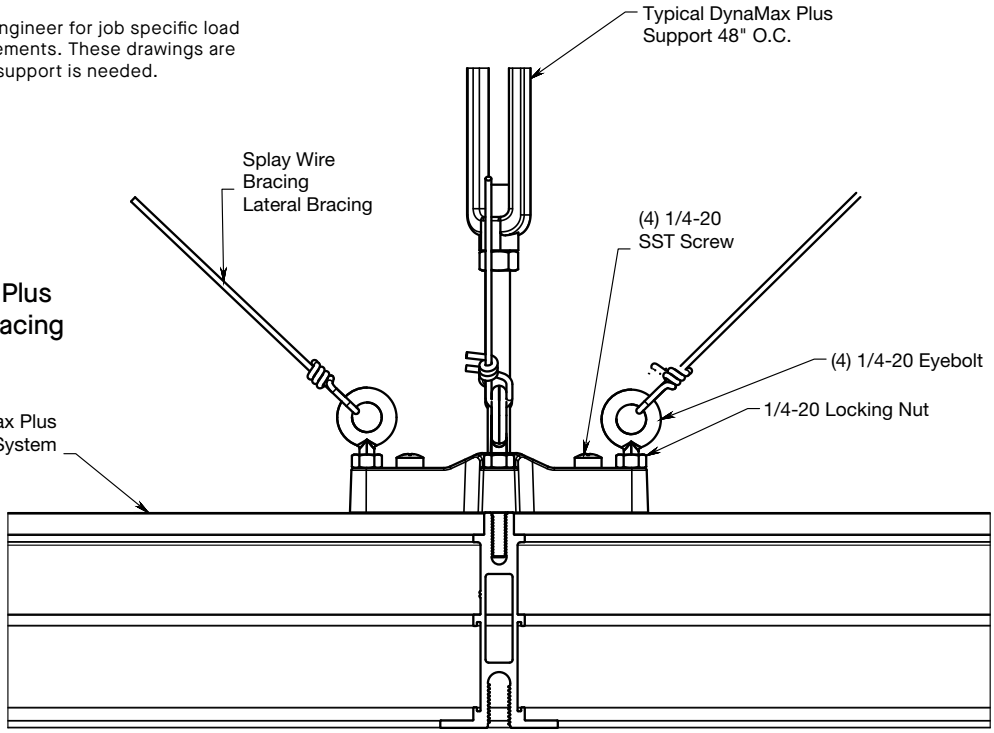
3/8" DynaMax® Plus Threaded Channel Connection



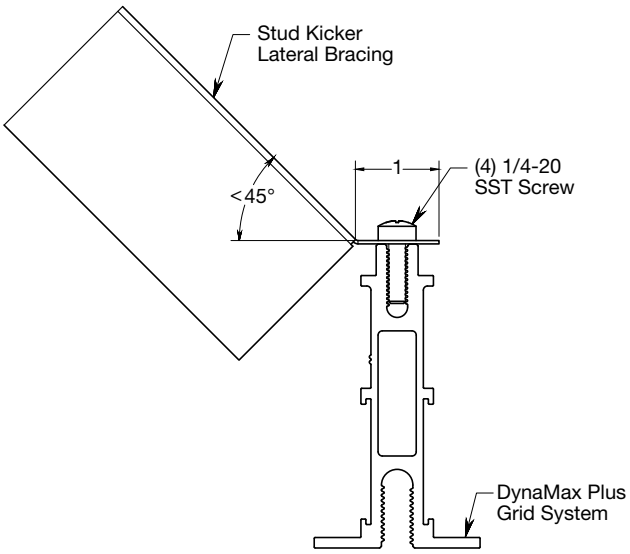
Seismic Installation

NOTE: Contact local engineer for job specific load and/or seismic requirements. These drawings are suggestions if lateral support is needed.

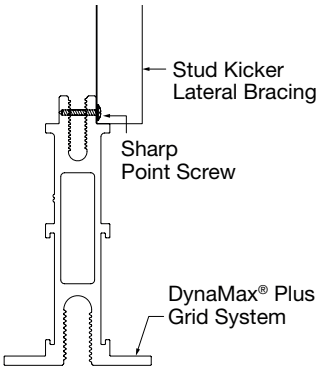
DynaMax® Plus Seismic Bracing



DynaMax Plus Seismic Bracing



DynaMax Plus Side Stud Seismic Bracing



Section Properties

Find the full installation instructions **HERE**.

DynaMax® Plus Section Properties

Area	Weight	Yield Strength	Modulus of Elasticity	Moment of Inertia	Radius of Gyration	Moment of Inertia	Radius of Gyration	Section Modulus	Maximum Bending Moment
Ab	Wb	Fy	E	Ix	Rx	Iy	Ry	Scx	[M]
(IN^2)	(LBS/FT)	(ksi)	(LBS/IN^2)	(IN^4)	(IN)	(IN^4)	(IN)	(IN^3)	(FT/LB)
1.315	1.547	35.0	1.00E+07	1.8837	1.1967	0.1487	0.3362	0.9386	2,737

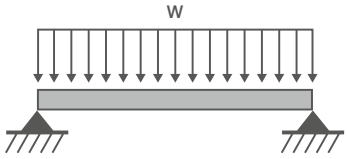
General Notes:

1. The data contained in this technical guide is intended to be used as a general guideline only and does not replace the design of a qualified engineer.
2. The load tables in this technical guide are calculated conservatively as single span (simple) beams supported at the ends.
3. The "Load at Yield" is calculated as the maximum bending moment for each loading condition. The "Allowable Load" is calculated by dividing the maximum bending moment by a safety factor of 1.67.
4. It is recommended that the DynaMax Plus system is designed to limit the deflection of loaded members to L/360 of the span.
5. Load supported by DynaMax Plus support brackets must not exceed the allowable load of 1,800 lbs when utilizing 1/2" threaded rod.

DynaMax® Plus Structural Aluminum Suspension System supports maximum static point loads of up to 1,800 lbs. This system is also capable of supporting a point load of 1,800 lbs. with L/360 deflection.

Load Data

Uniform Load

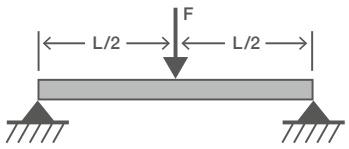


$\Delta_{max} = 5\ W\ L^3 / (384\ E\ I)$

$M_{max} = W\ L^2 / 8$

Span (IN)	Uniform Load, W (LB/FT)				
	Load at Deflection Limit			Max. Allowable Load	Load at Yield
	L/180	L/240	L/360		
48	—	650	430	778	1,300
60	440	330	220	497	830
72	250	190	120	341	570
96	100	80	50	192	320

Mid-span Point Load



$\Delta_{max} = F L^3 / (48\ E\ I)$

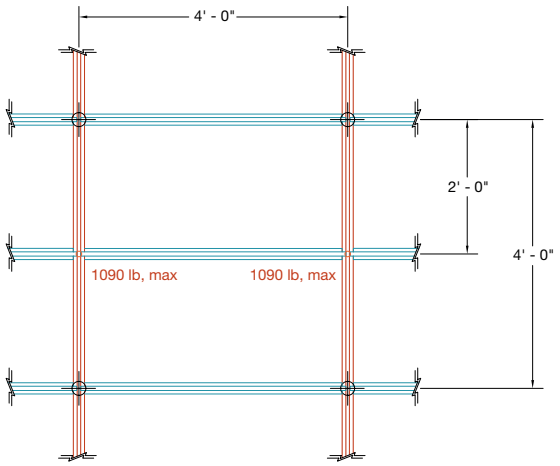
$M_{max} = F\ L / 4$

Span (IN)	Mid-Span Point Load, F (LB)				
	Load at Deflection Limit			Max. Allowable Load	Load at Yield
	L/180	L/240	L/360		
4	—	—	1,090	1,557	2,600
5	—	1,040	690	1,246	2,080
6	960	720	480	1,036	1,730
8	540	400	270	778	1,300

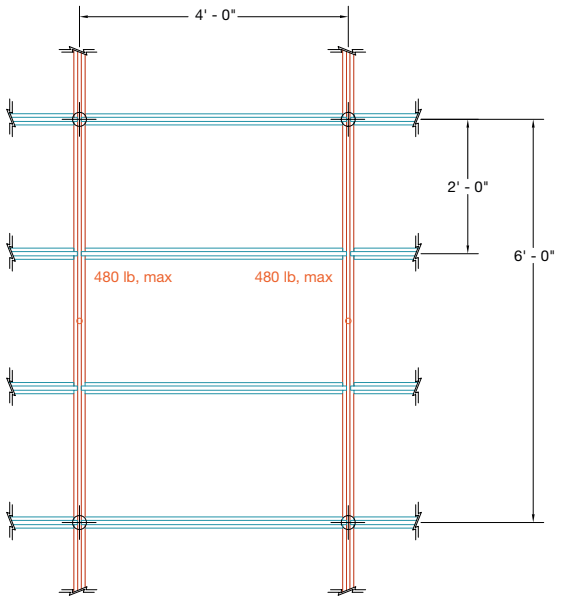
Main Beam Spacing (IN)	Span (IN)	Area (SF)	Uniform Area Load (LB/SF)				
			L/180	L/240	L/360	Max. Allowable Load	Load at Yield
48	48	16	—	—	68.1	97.3	162.5
	72	24	40.0	30.0	20.0	43.1	72.0
	96	32	16.8	12.5	8.4	24.3	40.6
60	60	25	—	41.6	27.6	49.8	83.2
72	72	36	26.6	20.0	13.3	28.7	48.0
96	96	64	8.4	6.2	4.2	12.1	20.3

Loading Condition Examples

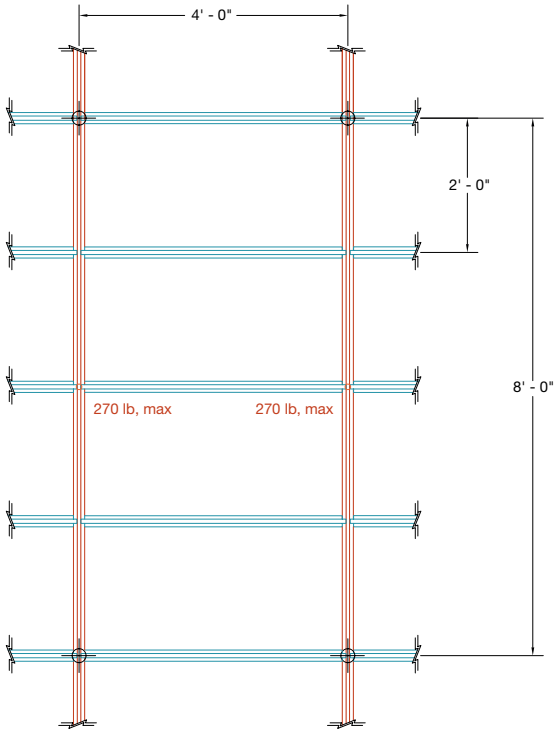
NOTE: Loading condition examples are shown with L/360 deflection



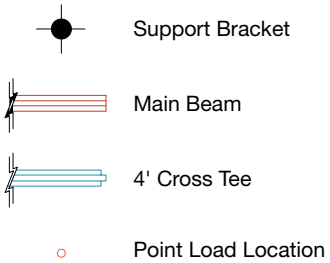
4' × 4' Support Spacing
Main Beam Mid-span Loading



4' × 6' Support Spacing
Main Beam Mid-span Loading

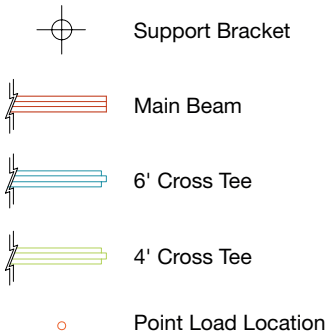


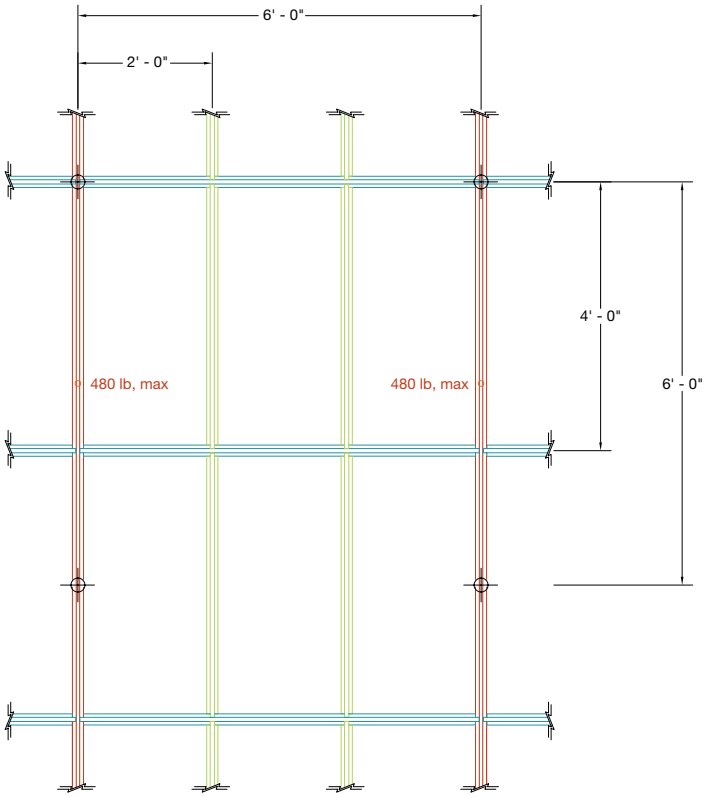
4' × 8' Support Spacing
Main Beam Mid-span Loading



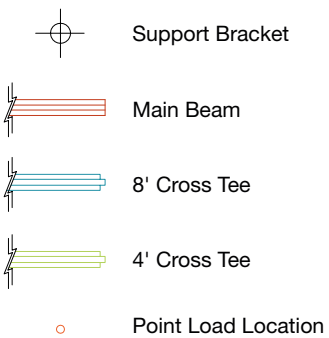
Loading Condition Examples

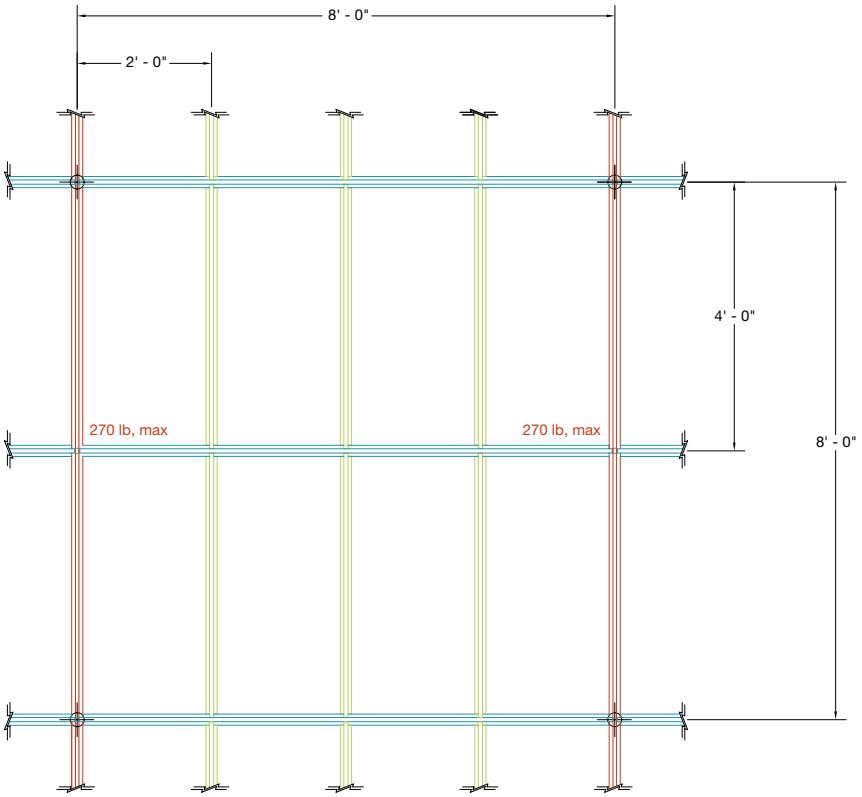
NOTE: Loading condition examples are shown with L/360 deflection





6' × 6' Support Spacing
Main Beam Mid-span Loading

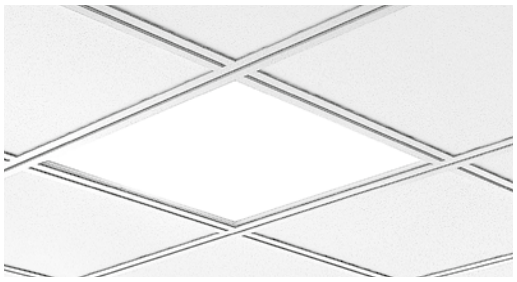




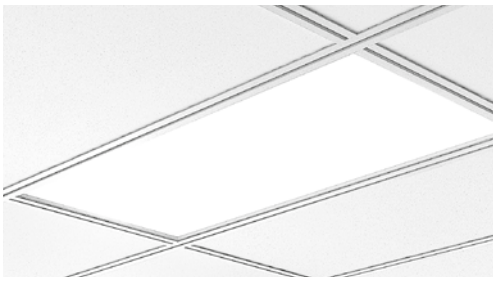
8' × 8' Support Spacing
Main Beam Mid-span Loading

Integrated Lighting Partners

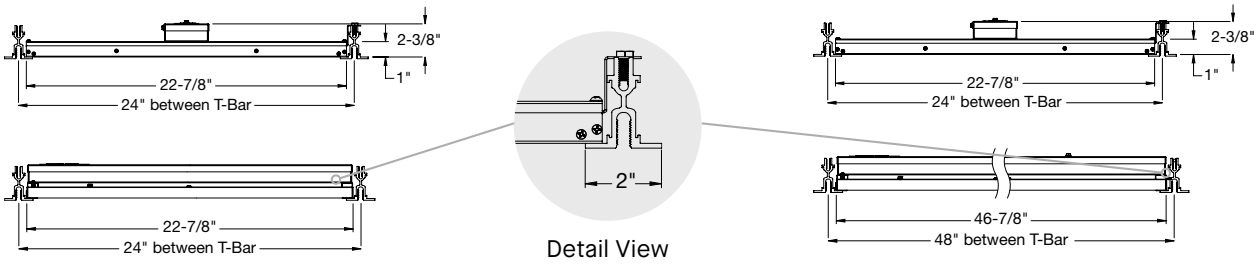
Lighting and diffuser solutions are available through partner companies.



TRAYFIT™ 2' × 2'



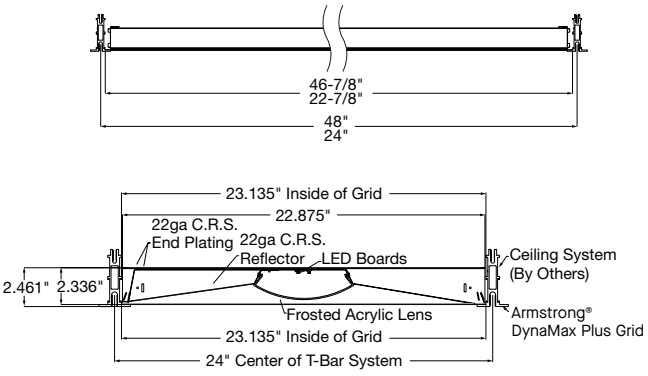
TRAYFIT™ 2' × 4'



Detail View

NOTE: Details in this section show standard DynaMax; however, Axis TRAYFIT 2' × 2' and 2' × 4' are also compatible with DynaMax Plus. For compatible lighting details, visit axislighting.com.

PTDC – Shallow Plenum LED Troffer for DynaMax® Plus System

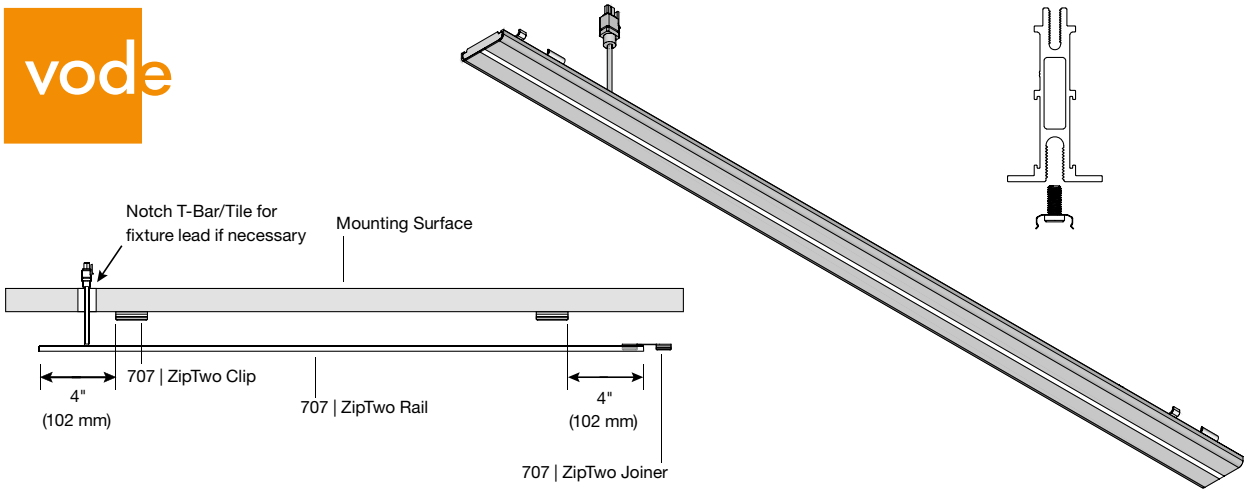


For compatible lighting details, visit hew.com/products/PTDC

Partner Solutions for DynaMax® Plus

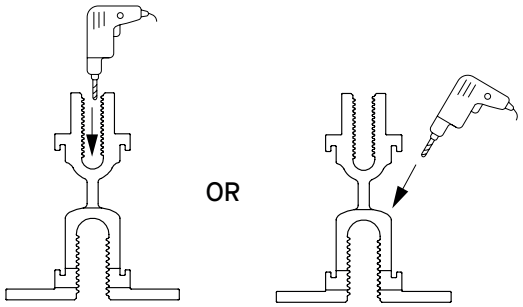
Integrated Lighting Partners

Lighting and diffuser solutions are available through partner companies.

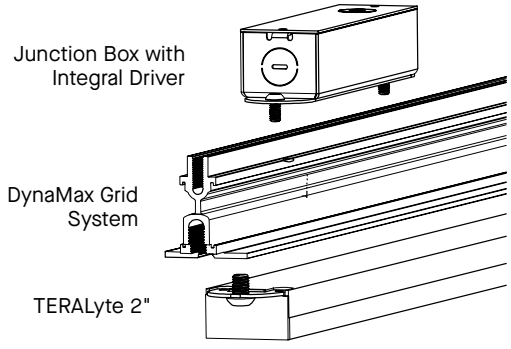


ZipTwo® Data Center Solutions

For compatible lighting details, visit vode.com/dynamax

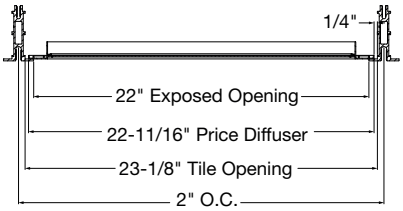


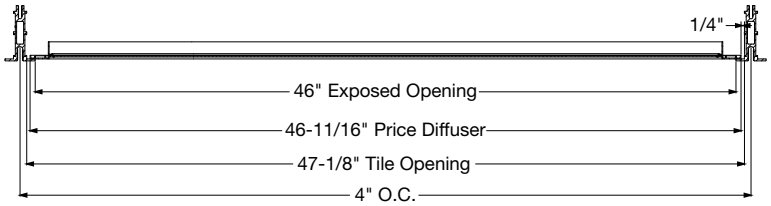
TERALyte™ 2" for the DynaMax Plus grid system.



NOTE: Details in this section show standard DynaMax grid; however, this TERALyte lighting system is compatible with DynaMax® Plus grid.
For compatible lighting details, visit jlc-tech.com

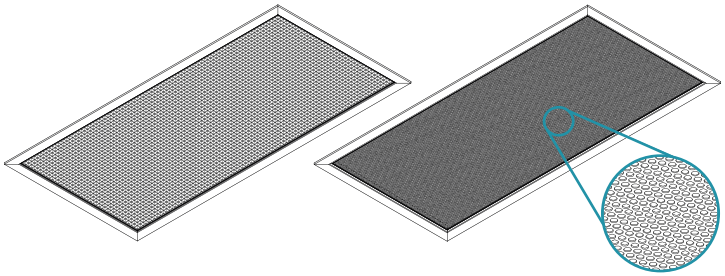
MEP Partners





Eggcrate Air Device – Price Model 80

Perforated Air Device – Price Model 10



Eggcrate Air Device – Price Model 80

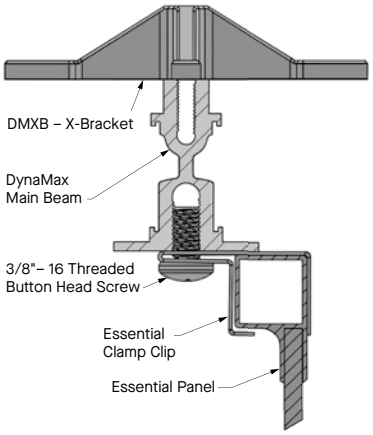
Perforated Air Device – Price Model 10

For compatible diffuser details, visit priceindustries.com/diffusers

Air Containment Partner

The Subzero Engineering and Armstrong World Industries partnership is the latest development in the portfolio expansion of data center products and services, seamlessly combining structural ceiling solutions with high-performing and energy-efficient air containment systems.

The Subzero Essential Clamp Clip (shown right) was designed specifically for integrating Subzero Essential Series Wall Panels with DynaMax® Plus main beams. This provides easier attachment and improved installation efficiency.



NOTE: Detail in this section shows standard DynaMax grid, however, the Subzero Essential Clamp Clip is compatible with DynaMax Plus grid.
For more data center containment details, visit subzeroeng.com

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