DynaMax® Plus

Structural Aluminum
Suspension System



Technical Guide

Armstrong®
World Industries

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.





DynaMax® Plus Structural Grid Data Center Installation

Table of Contents

4	Suspension System Components
5	How the System Works
6	Notched vs. Unnotched Cross Tees
7	Ceiling Panels for DynaMax®
8	Installation & Layout Overview
9	Seismic Installation
10	Section Properties & Load Data
11-12	Loading Condition Examples
13-15	Integrated Lighting & MEP Partners



About the System

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

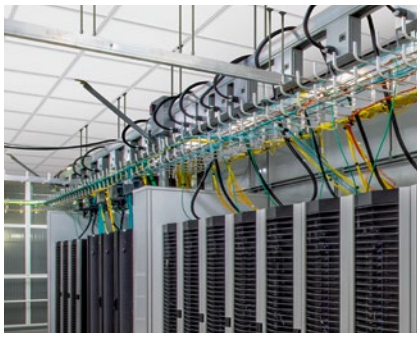
- Allows for longer spans (6' and 8') while also providing greater load-carrying capacity
- 6' spacing allows for direct attachment to steel joists or pre-cast concrete tees
- Spanning 6' or more eliminates the need for slotted strut channel at deck/roof level and creates more space for critical MEP 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
- Industrial Warehouses/ Distribution Centers
- Retail/Convenience Store



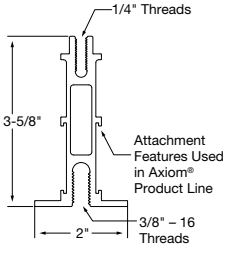
DynaMax Plus Structural Aluminum Suspension System

VISUAL SELECTION

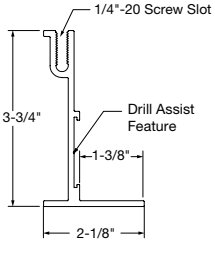
Item No.	Description	Dimensions (in.)	PACKAGING pcs./ctn.	ln. ft./ctn.
DynaMax Plus Structural Aluminum Suspension System				
☐ DM9301	Main Beam	144 × 2 × 2-3/8"	2	24
☐ DM9320	2' Cross Tee	24 × 2 × 3-5/8"	6	12
☐ DM9340	4' Cross Tee	48 × 2 × 3-5/8"	6	24
☐ DM9340NC	4' Cross Tee – No Center Notch	48 × 2 × 3-5/8"	6	24
☐ DM9360	6' Cross Tee	72 × 2 × 3-5/8"	2	12
☐ DM9380	8' Cross Tee	96 × 2 × 3-5/8"	2	16
☐ DM9800	Perimeter Molding	144 × 2-1/8 × 2-1/2"	2	24

NOTE: Contact local engineer for job specific load and/or seismic requirements For Gasketed items, add a GS after the item number (i.e. DM9301GS)

DETAILS



DynaMax Plus Main Beam



DynaMax Plus Perimeter Molding

LOAD DATA FOR DYNAMAX PLUS SUSPENSION SYSTEMS

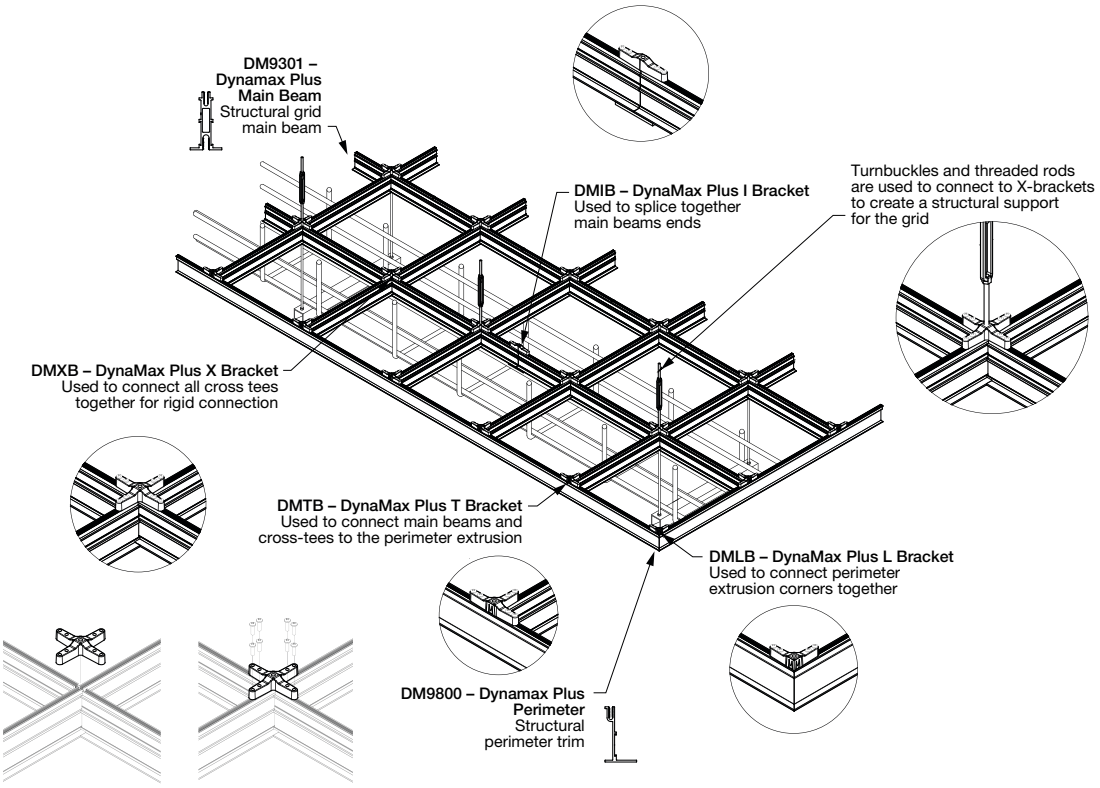
Member Span and Spacing (inches)	48"	60"	72"	96"
Maximum Allowable Uniform Area Load (lbs./sq. ft.)	113	72	50	28
Mid-Span Point Load @ L/360 Deflection (lbs.)	1,090	690	480	270
Maximum Static Point Load (lbs.)	1,800	1,800	1,800	1,800
3/8" Turnbuckle Maximum Load to Structure (lbs.)	1,200	1,200	1,200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

About the System

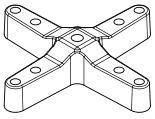
How the System Works

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



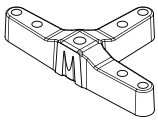
ACCESSORIES

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



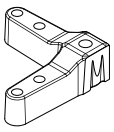
DMXB – 24 pcs.

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



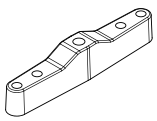
DMTB – 36 pcs.

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



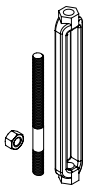
DMLB – 12 pcs.

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



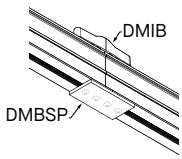
DMMBS – 24 pcs.

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.

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

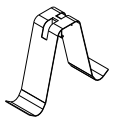


DMBSP – 24 pcs.

* 1/2" hardware kit available upon request.

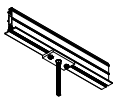
OPTIONAL ACCESSORIES

DMMDHDC – DynaMax MD Hold-Down Clip – Attaches to the suspension system to hold Lay-in panels in place



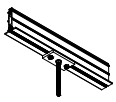
DMMDHDC – 100 pcs.

DMLAK – Load Adaptor Plate – Bottom load plate for additional direct loads



DMLAK – 24 pcs.

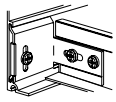
DMLAK12 – Load Adaptor Plate 1/2" Rod – Bottom load plate for 1/2" rod for additional direct loads



DMLAK12 – 24 pcs.

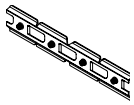
NON-STRUCTURAL CEILING ADAPTER ACCESSORIES

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

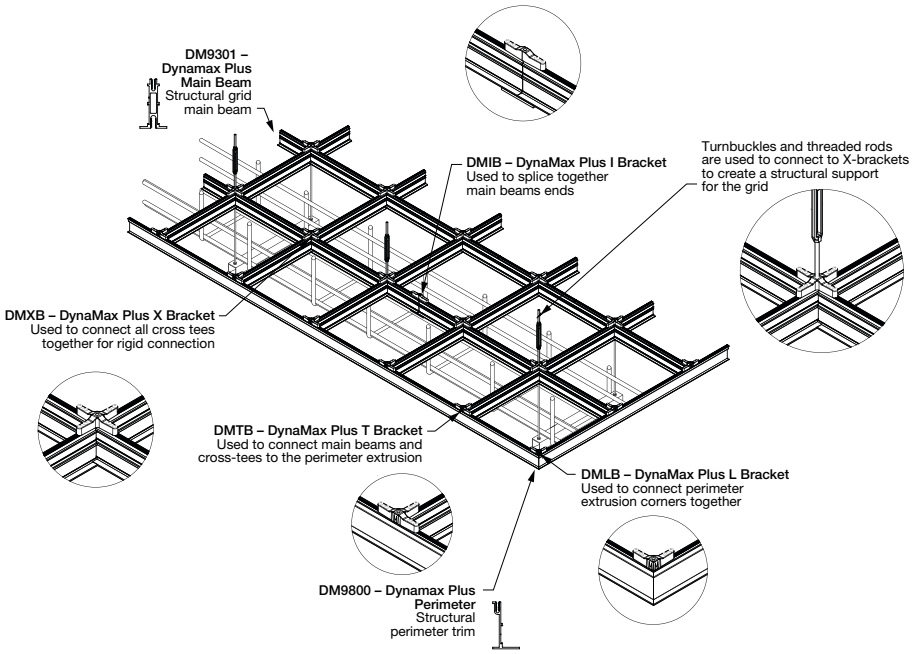


AX4SPLICEB – 1 pc.

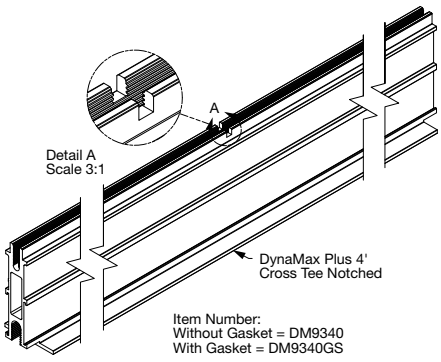
Notched vs. Unnotched Cross Tees

On 2' × 2' layouts, use a 4' cross tee that utilizes a center notch.

2' × 2' DynaMax Plus Module Layout

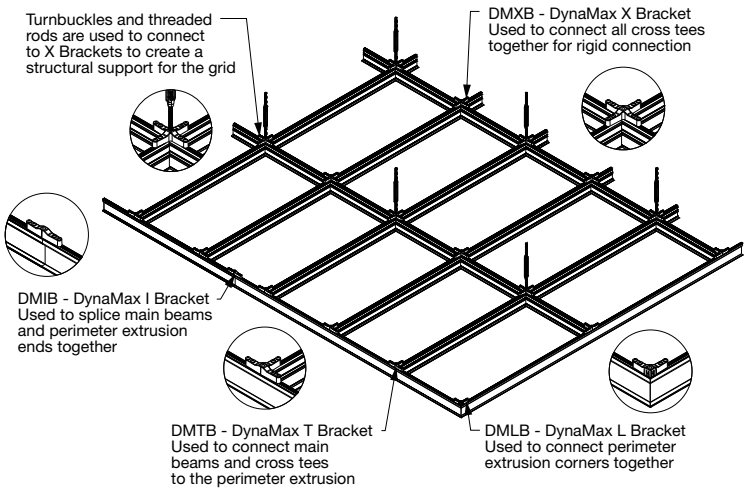


4' DynaMax Plus Cross Tee: DM9340

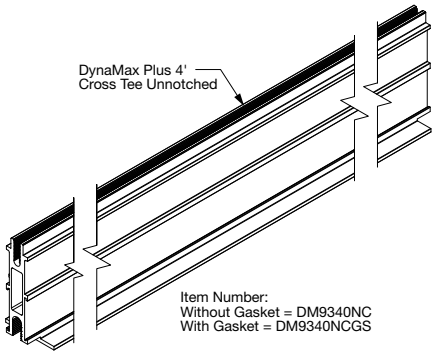


On 2' × 4' layouts, use a 4’ cross tee that **DOES NOT** have a center notch, since it’s not needed.

2' × 4' DynaMax Plus Module Layout



4' DynaMax Plus Cross Tee: DM9340NC



For 2' × 4' and 4' × 4' layouts, do not utilize center notch cross tees. We recommend a 4’ tee with the “NC” suffix.

Ceiling Panels for DynaMax®

Square Lay-In

Ceiling panels for DynaMax® are specifically designed for performance, reliability, and sustainability in data center and critical application environments.



DataZone™ panels with DynaMax® suspension system

KEY SELECTION ATTRIBUTES

DataZone™, Ultima® Templok®, and Ultima® AirAssure® for DynaMax®

- DataZone panels are part of the Sustain® portfolio, and meet the most stringent industry sustainability compliance standards today
- Get total noise control and floor plan versatility with Total Acoustics® ceiling panels: NRC + CAC = Total Acoustics performance
- Smooth, clean, durable finish – Washable, Impact-resistant, scratch-resistant, and soil-resistant
- Mold- and mildew-resistant surface
- 30-Year Limited System Warranty against visible sag, mold, and mildew
- Made in the U.S.A. of domestic and global content
- Build America, Buy America (BABA) Act compliant

Ultima® AirAssure® for DynaMax®

- Factory gasketed Ultima® AirAssure® panels for DynaMax®, DynaMax® LT, and DynaMax® Plus grid reduces air leakage and contributes to annual energy savings

Ultima® Templok® for DynaMax®

- Saves up to 15% energy*
- Provides 50 BTUs/SF of passive cooling*

Save 40% or 50% in Tax Credits

Templok® ceilings may qualify for Investment Tax Credits (ITC) under Inflation Reduction Act of 2022, Section 48E

Learn more at armstrong.com/saveontemplok

MetalWorks™ for DynaMax®

- CleanAssure™ family of products – includes disinfectable panels, suspension systems, and trim
- Perforated panel option available to enhance acoustical performance and design aesthetics
- Outstanding NRC with acoustical fleece or infill panel (0.70 – 0.85)
- Provides additional options when bidding data centers and structural applications
- Factory-fit ceiling panels eliminate the need to field modify panels in all standard suspension layouts

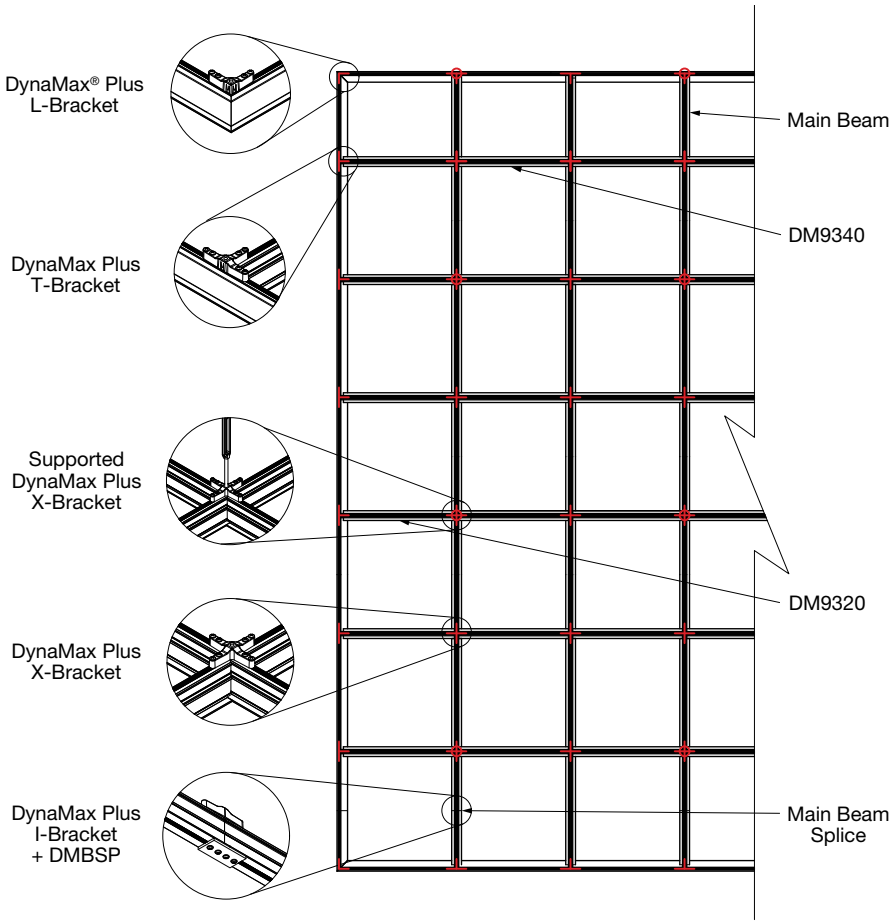
For more information about recommended ceiling panels, please visit **armstrong.com/structuralgrid**

Ceiling panels are specially sized and engineered for the DynaMax® suspension systems and must be used with these systems. These panels do not fit in other suspension systems.

* Data measured in lab tests, building energy modeling software, and field installations. Results may vary.

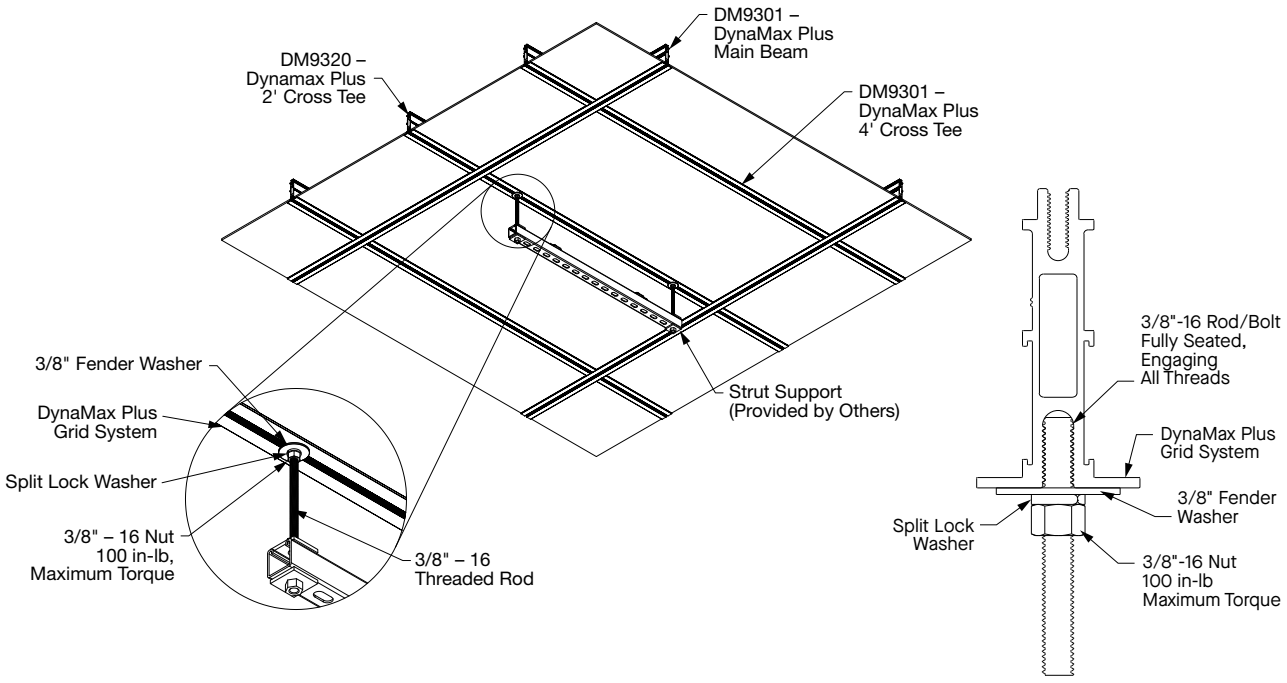
Installation & Layout Overview

Installation



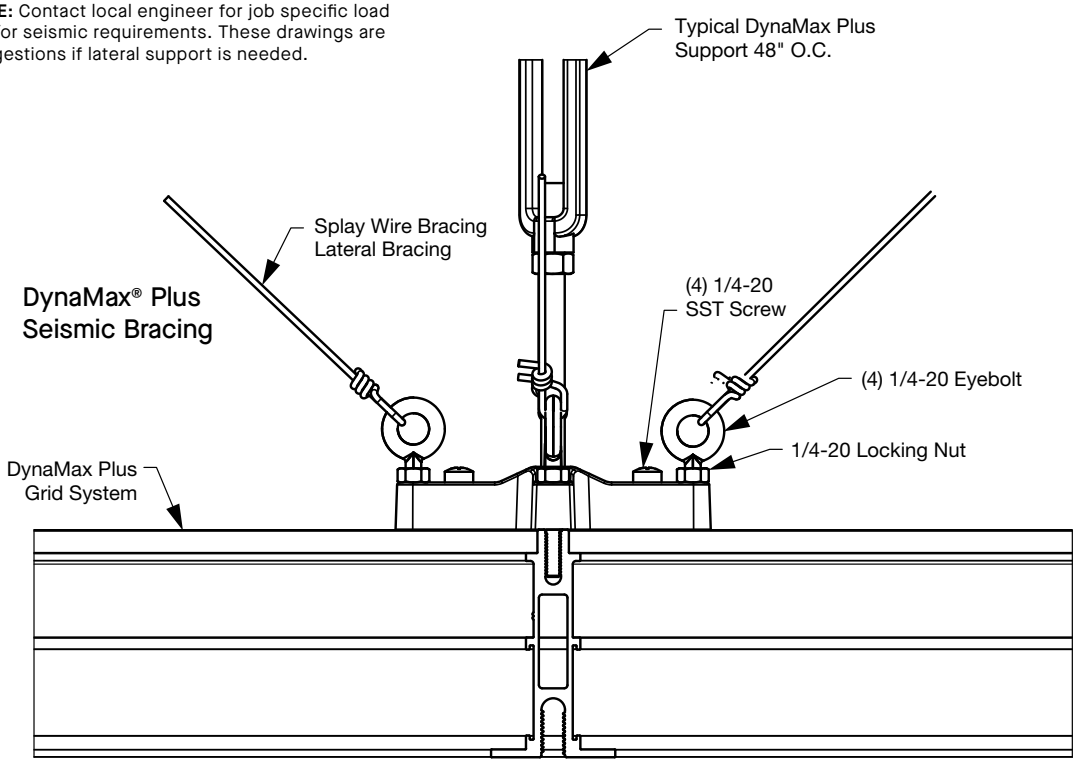
NOTE: DynaMax Plus threaded rod drops can be spaced at increased spans of 5', 6' or 8' due to the system's greater load-carrying capability.

3/8" DynaMax® Plus Threaded Channel Connection

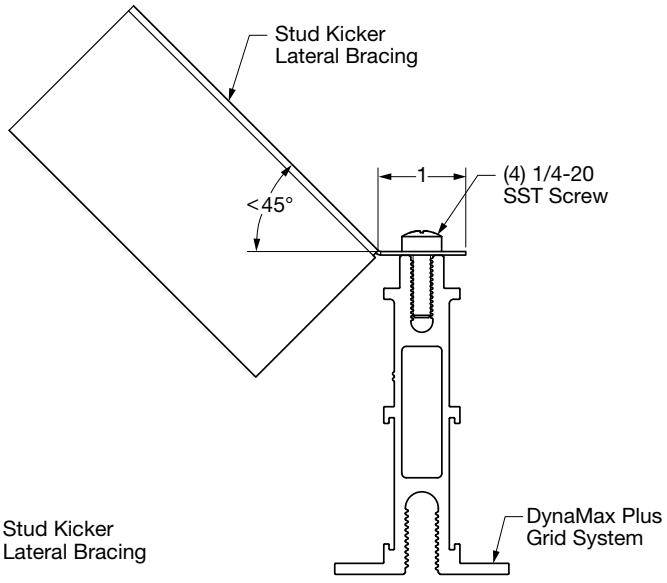


Seismic Installation

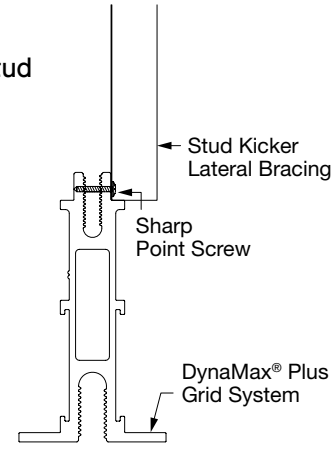
NOTE: Contact local engineer for job specific load and/or seismic requirements. These drawings are suggestions if lateral support is needed.



DynaMax® Plus
Seismic Bracing



DynaMax Plus
Seismic Bracing



DynaMax Plus Side Stud
Seismic Bracing

Design Guide

Section Properties

Find the full installation instructions here.

DynaMax® Plus Section Properties

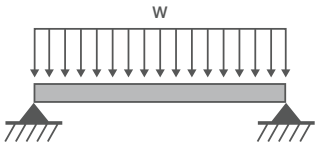
Area	Weight	Yield Strength	Modulus of Elasticity	Moment of Inertia	Radius of Gyration	Moment of Inertia	Radius of Gyration	Section Modulus	Maximum Bending Moment
Ab	Wb	Fy	E	Ix	Rx	Iy	Ry	Scx	[M]
($in.^2$)	(lbs./ft.)	(ksi)	($lbs./in.^2$)	($in.^4$)	(in.)	($in.^4$)	(in.)	($in.^3$)	(ft.-lb.)
1.315	1.547	35.0	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

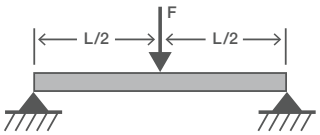


$\Delta_{max} = 5\ W\ L^3 / (384\ E\ I)$

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

Uniform Load

Span (in)	Load at Yield	Uniform Load, W (lbs./ft.) Max. Allowable Load	Load at Deflection Limit L/180	L/240	L/360
48	1300	778	—	650	430
60	830	497	440	330	220
72	570	341	250	190	120
96	320	192	100	80	50



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

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

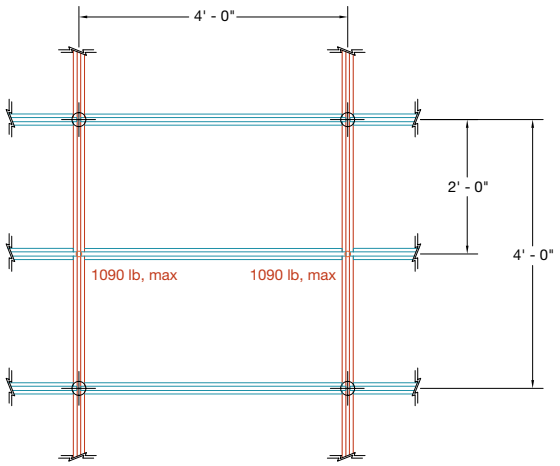
Mid-Span Point Load

Span (in.)	Load at Yield	Mid-Span Point Load, F (lbs.) Max. Allowable Load	Load at Deflection Limit L180	L/240	L/360
48	2,600	1,557	—	—	1,090
60	2,080	1,246	—	1,040	690
72	1,730	1,036	960	720	480
96	1,300	778	540	400	270

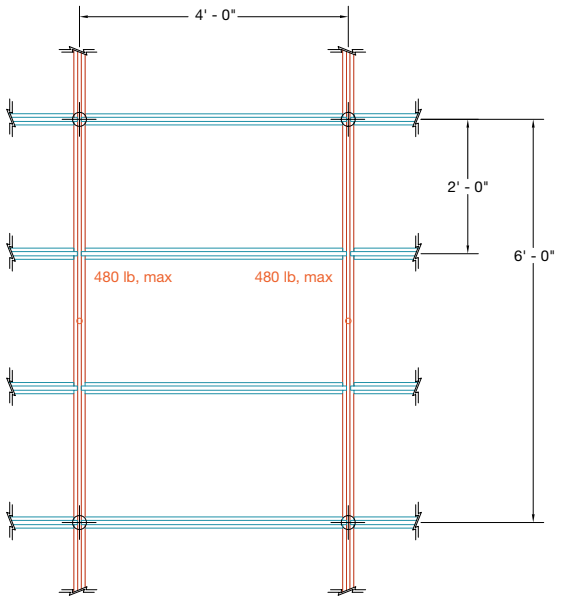
Main Beam Spacing (in.)	Span (in.)	Area (sq. ft.)	Uniform Area Load (lbs./sq. ft.) Load at Yield	Max. Allowable Load	L/180	L/240	L/360
48	48	16	162.5	97.3	—	—	68.1
	72	24	72.0	43.1	40.0	30.0	20.0
	96	32	40.6	24.3	16.8	12.5	8.4
60	60	25	83.2	49.8	—	41.6	27.6
72	72	36	48.0	28.7	26.6	20.0	13.3
96	96	64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

Loading Condition Examples

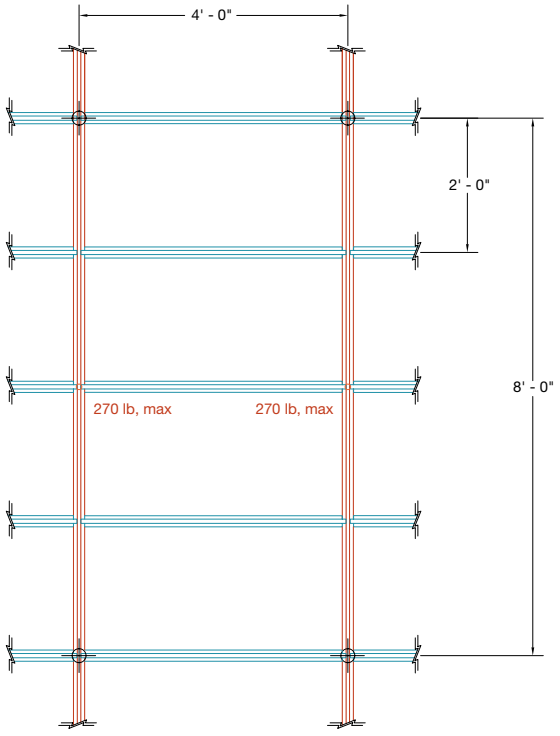
NOTE: Loading condition examples are shown with L/360 deflection



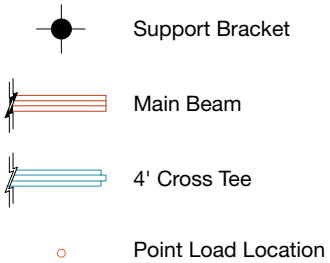
4' × 4' Support Spacing
Main Beam Mid-span Loading



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

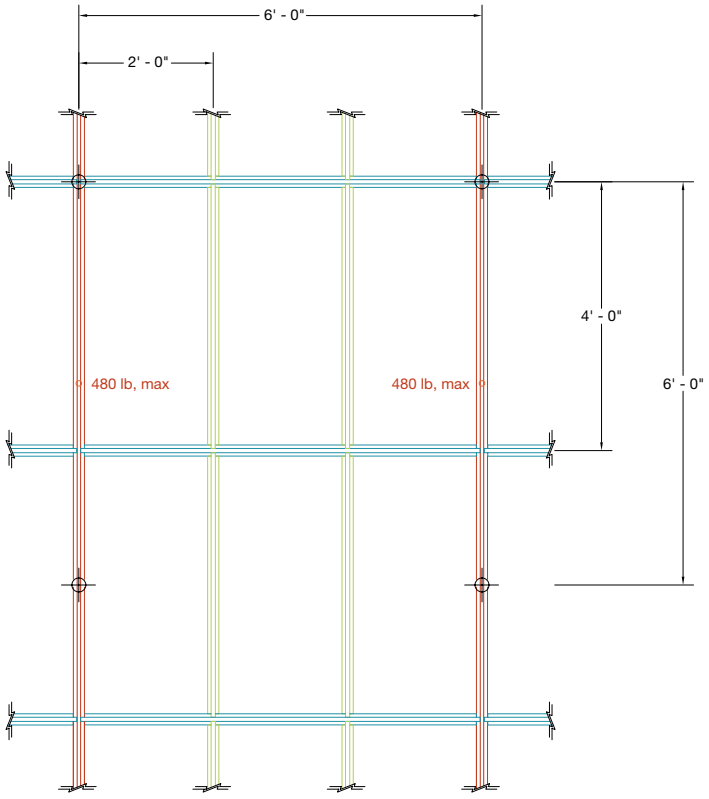


4' × 8' Support Spacing
Main Beam Mid-span Loading



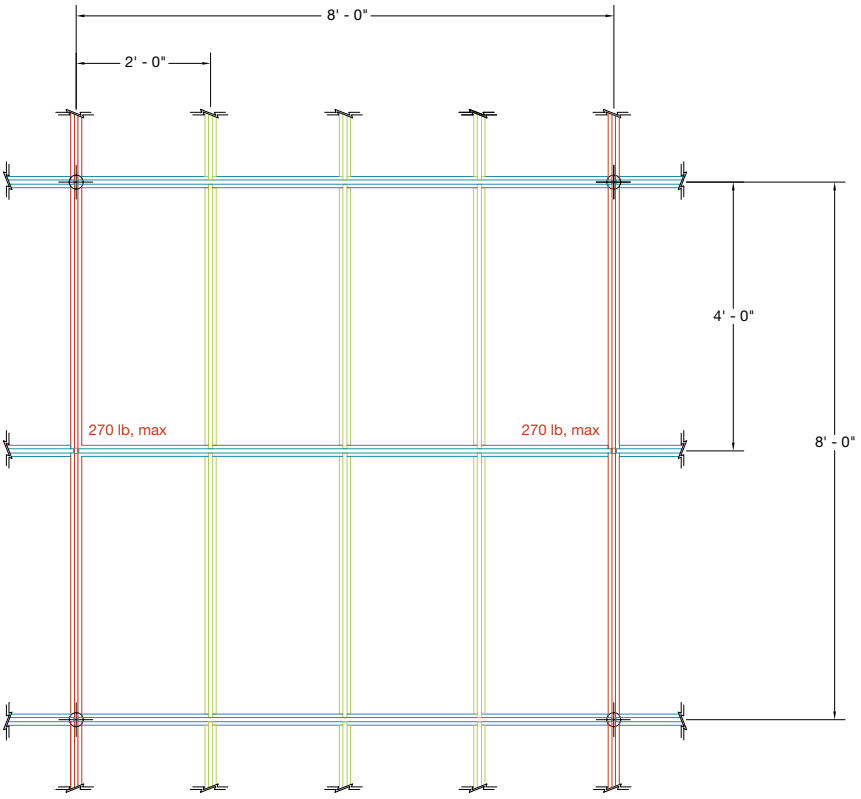
Loading Condition Examples

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



Support Bracket
Main Beam
6' Cross Tee
4' Cross Tee
Point Load Location

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



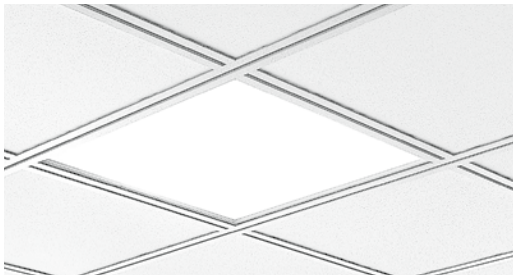
Support Bracket
Main Beam
8' Cross Tee
4' Cross Tee
Point Load Location

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

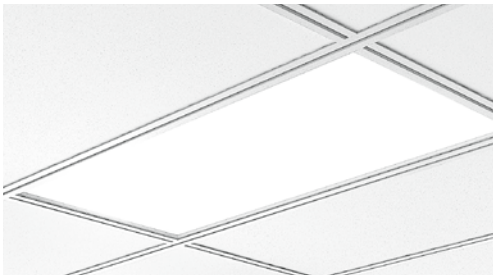
Partner Solutions for DynaMax® Plus

Integrated Lighting Partners

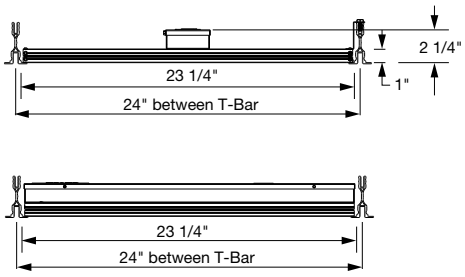
Lighting and diffuser solutions are available through partner companies.

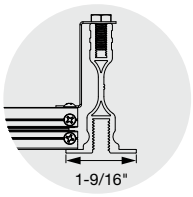


TRAYFIT™ 2' × 2'

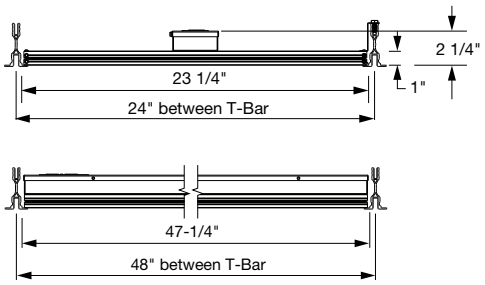


TRAYFIT™ 2' × 4'





Detail View

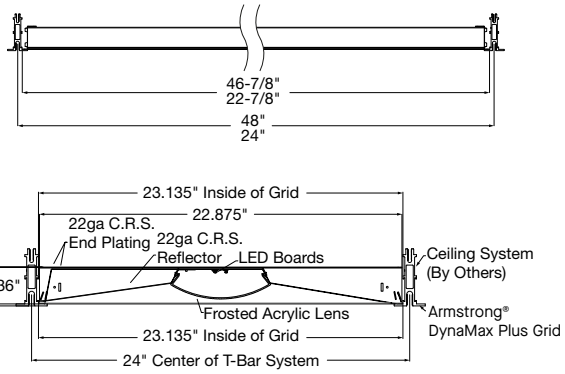


NOTE: Details above show DynaMax MD; however, Axis TRAYFIT 2' × 2' and 2' × 4' are also compatible with DynaMax Plus.

For compatible lighting details, visit **axislighting.com**



PTDC – Shallow Plenum LED Troffer for DynaMax® Plus System

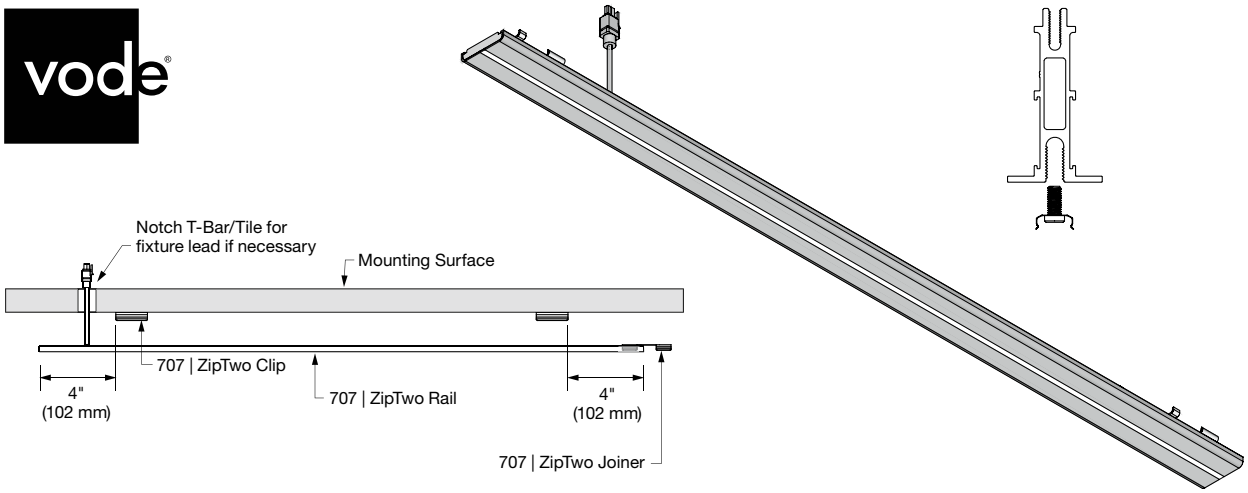


For compatible lighting details, visit **hew.com/products/PTDC**

Partner Solutions for DynaMax® Plus

Integrated Lighting Partners

Lighting and diffuser solutions are available through partner companies.

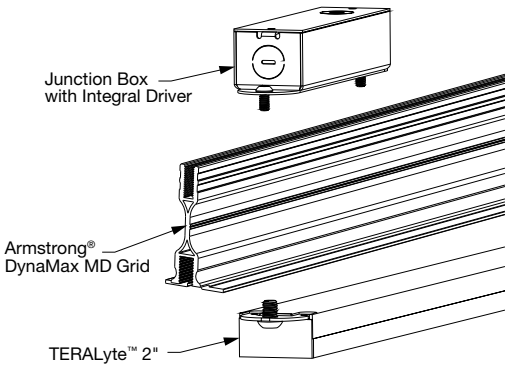


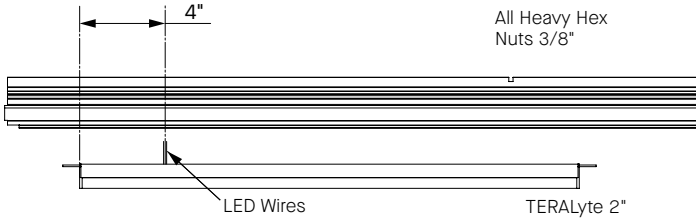
ZipTwo® Data Center Solutions

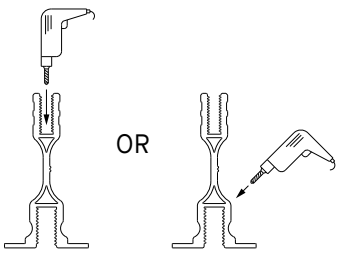
For compatible lighting details, visit **vode.com/dynamax**



TERALyte™ 2" for the DynaMax Plus grid system.





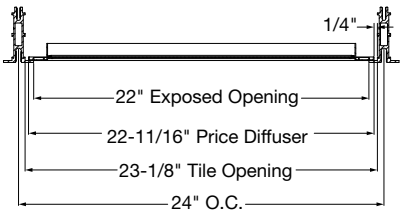


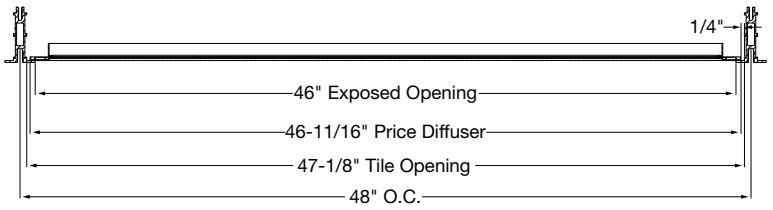
NOTE: Details in the above section show DynaMax MD grid; however, this TERALyte lighting system is compatible with DynaMax® Plus grid.

For compatible lighting details, visit **jlc-tech.com**

Partner Solutions for DynaMax® Plus

MEP Partners



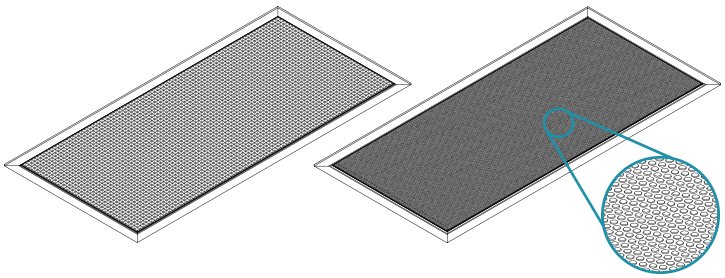




Eggcrate Air Device –
Price Model 80



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**

The Next Step

877 276-7876

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