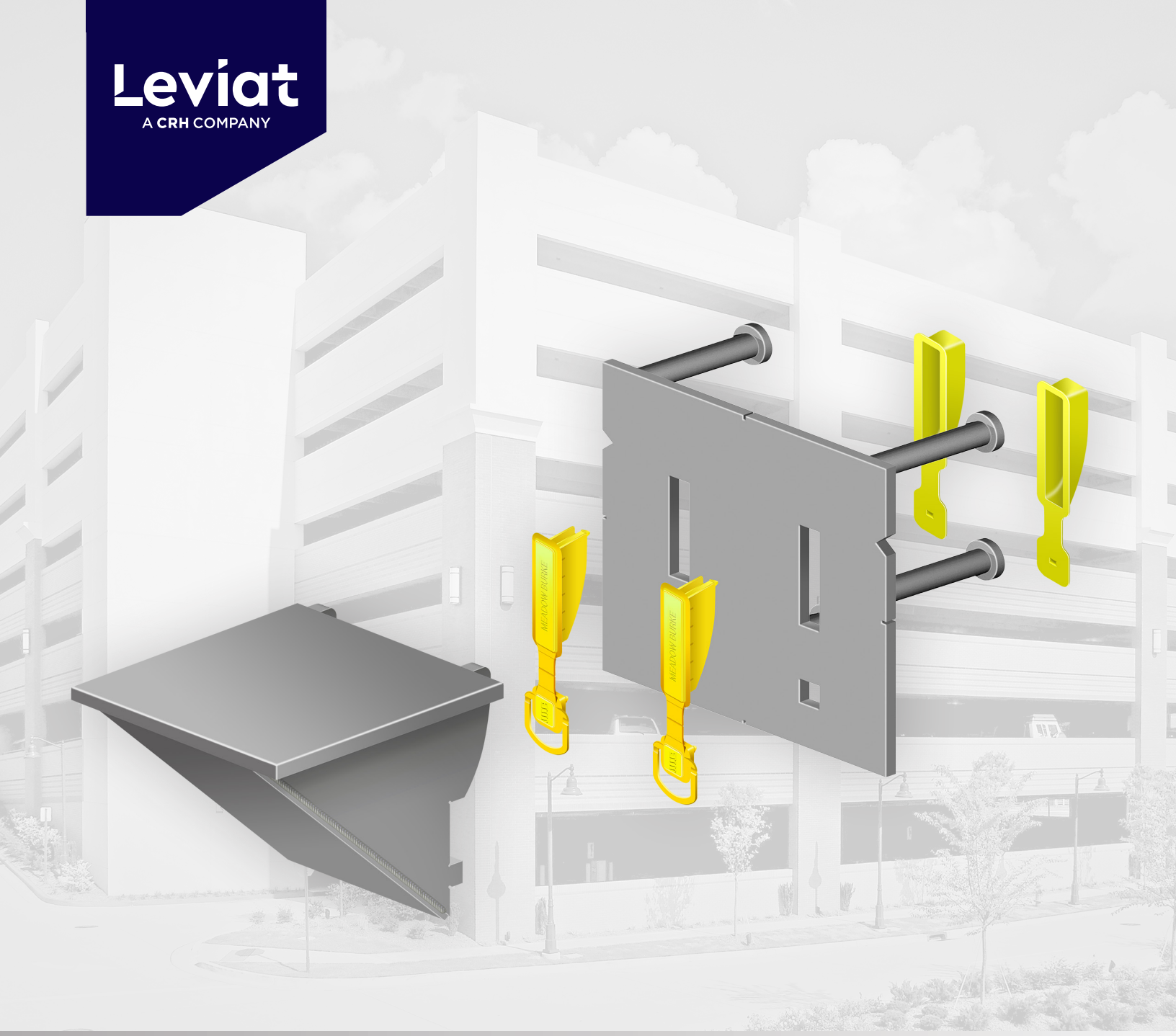
Leviat
A CRH COMPANY



MeadowBurke®

Rapid-Lok® Ultimate

The ultimate alternative to concrete corbels

US Patent No. 10,883,265

Leviat®
A CRH COMPANY

We are one team.
We are Leviat.

Leviat is the new name of CRH's construction accessories companies worldwide.

Under the Leviat brand, we have united the expertise, skills and resources of Meadow Burke and its sister companies to create a world leader in fixing, connecting and anchoring technology.

The products you know and trust, including Meadow Burke, will remain an integral part of Leviat's comprehensive brand and product portfolio. As Leviat, we can offer you an extended range of specialist products and services, greater technical expertise, a larger and more agile supply chain and better, faster innovation.

By bringing together CRH's construction accessories family as one global organisation, we are better equipped to meet the needs of our customers, and the demands of construction projects, of any scale, anywhere in the world.

This is an exciting change. Join us on our journey.

Read more about Leviat at Leviat.com

Our product brands include:

MeadowBurke

HALFEN

thermomass®

3,000	60	25	4
employees	locations	countries	continents

Imagine. Model. Make.

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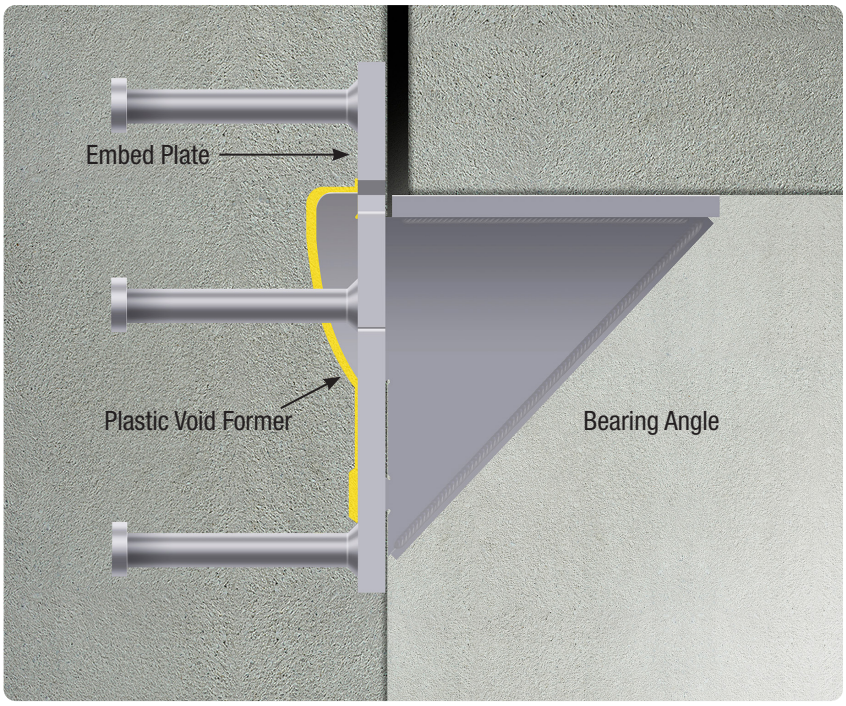
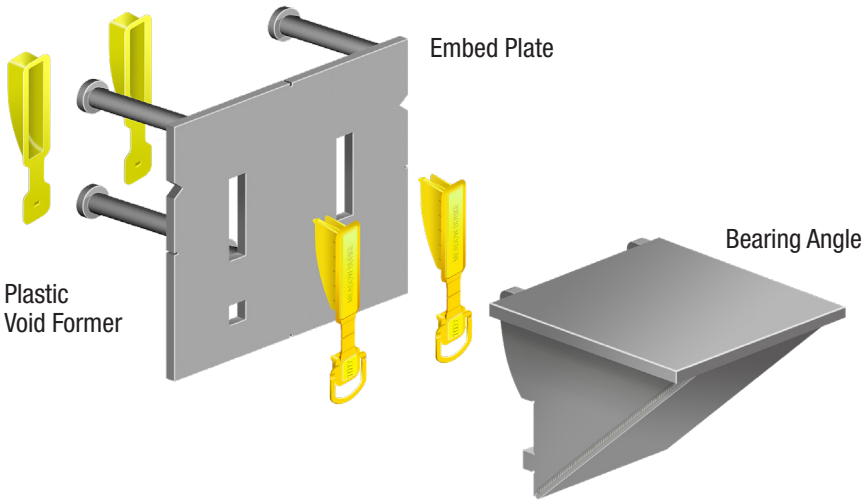
The Ultimate Solution



For more than twenty years, Meadow Burke's Rapid-Lok Gen II has been the preferred solution to replace cumbersome, concrete corbels. The Rapid-Lok system provides a safer, more efficient engineered solution to permanently hold the stems of a double tee. In response to our customers' feedback, collaboration with The Consulting Engineering Group – FL, Inc. and Kim Seeber, P.E., F.PCI., The Rapid-Lok Ultimate's new design was born.

What is Rapid-Lok Ultimate?

Rapid-Lok Ultimate creates a steel projection from a concrete structure which acts as a shelf, able to carry the weight of a double tee.



How Rapid-Lok Ultimate Works

The Embed Plate is cast into the concrete structure at the precast plant, with the faceplate flush to the wall face. Once the precast wall is on-site, the void formers attached to the face of the Embed Plate are removed to reveal recesses.

The Bearing Angle ears are then engaged into the recesses of the Embed Plate, securely engaging them in place without requiring a weld.

Benefits of Rapid-Lok Ultimate

Structural Engineers

- Capacity rating using ultimate loads aligning with current design methodology
- Consolidation of models and capacity ranges for simpler design selection
- Load tested to ACI-318's 5% fractile to meet current code requirements
- Fire rating for 3 hours and tested per ASTM-E119 and CAN/ULC-S101

Double Tee Producers

- Labor efficiencies from simplified panel forming
- Safety improvements by minimizing injuries
- Cost reductions in transportation and dunnage

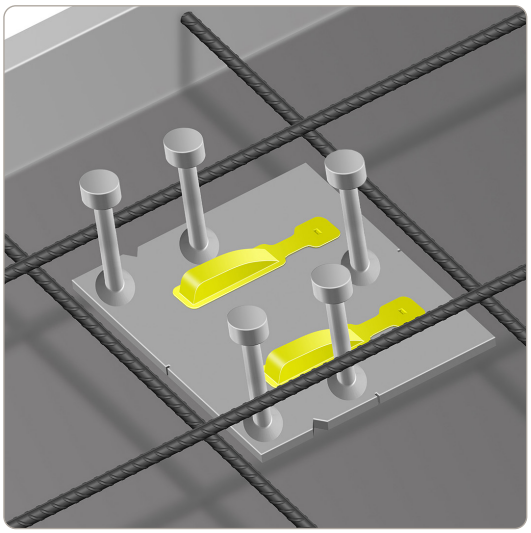
Architects and Consultants

- Fluid feature in the finished structure emulating a concrete cast corbel
- Potential cracking with traditional concrete corbels is eliminated

Erectors

- More efficient installation by avoiding obstructions from preinstalled concrete corbels

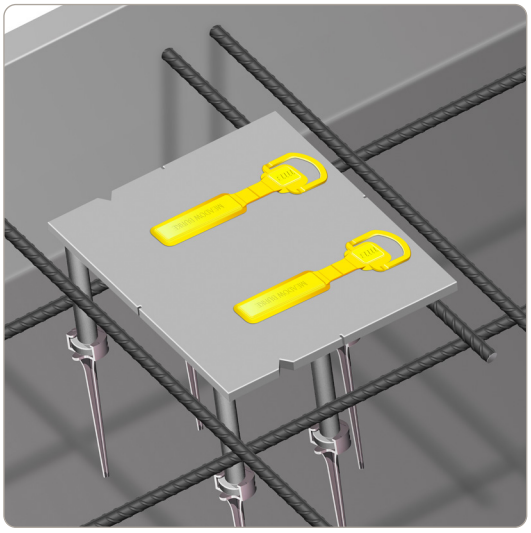
Installation Instructions for Rapid-Lok Ultimate



Down-in-Form Embed Plate Installation

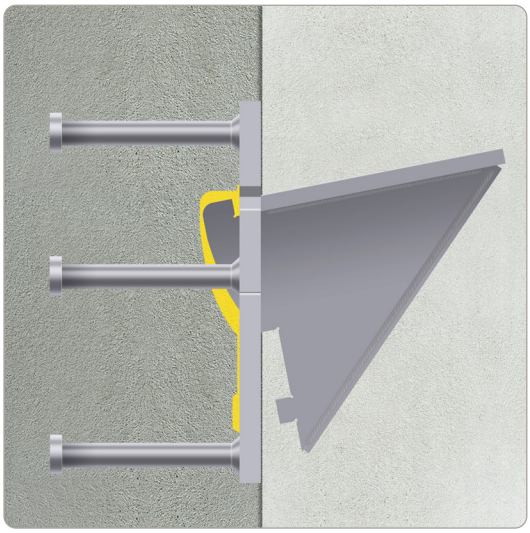
- Place the face of the Embed Plate upon the base of the casting bed, aligning the Tri-Cut to the correct bearing elevation of where the stem of the double tee will sit
- Secure Embed Plate in place
- Caulk around the base of the Embed Plate to avoid concrete leakage underneath
- The plastic void formers cause the face of the embed plate to be approximately ⅛" off the form face
- Finish prepping the panel and pour concrete

WARNING: TO AVOID DAMAGE, DO NOT PLACE REINFORCING ON TOP OF VOID FORMERS



Up-in-Form Embed Plate Installation

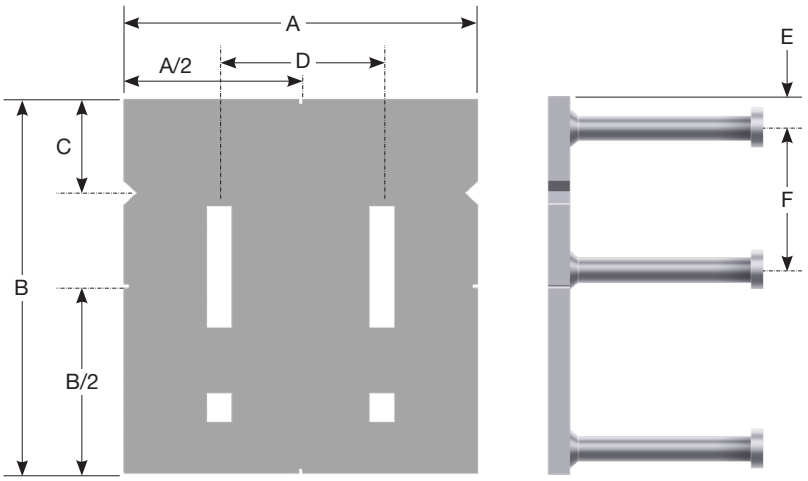
- Attach Stud Extenders to the Embed Plate Round Head Studs. If necessary, adjust the height by cutting the legs of the Stud Extender to ensure the face of the Embed Plate lies flush to the panel surface
- Place the Round Head Studs down and position in the casting bed aligning the Tri-Cut to the correct bearing elevation where the double tee will sit
- Place a cross bar underneath the bottom edge of the Embed Plate. Attach either end of the cross bar to the rebar cage
- Finish prepping the panel and pour concrete



Bearing Angle Installation

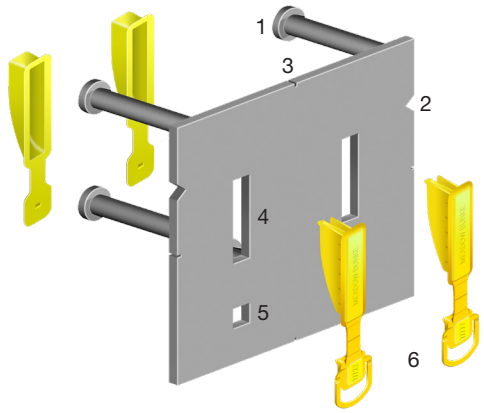
- Prior to wall erection remove the plastic void former cover by pulling the plastic tabs
- Leading with the front of the Bearing Angle Ears, using a slotting motion, engage the Ears of the Bearing Angle into the Rectangular Openings of the Embed Plate
- Seat the bottom Square Posts of the Bearing Angle into the Square Openings of the Embed Plate
- The Rapid-Lok Ultimate is now ready for the double tee to be erected and placed upon the shelf of the Bearing Angle

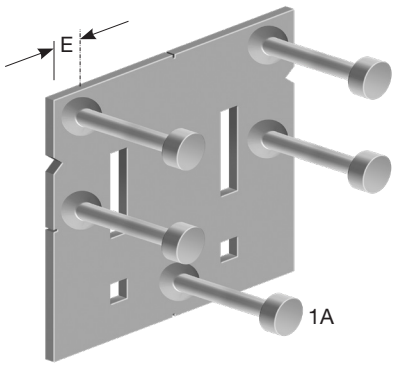
Components and Features of the Rapid-Lok Ultimate Embed Plate



The Embed Plate is manufactured from ASTM A572 grade 60, ⅝" steel and has a hot dip galvanized finish per ASTM A153. Each Embed Plate is stamped with a unique identification number for tracking purposes.

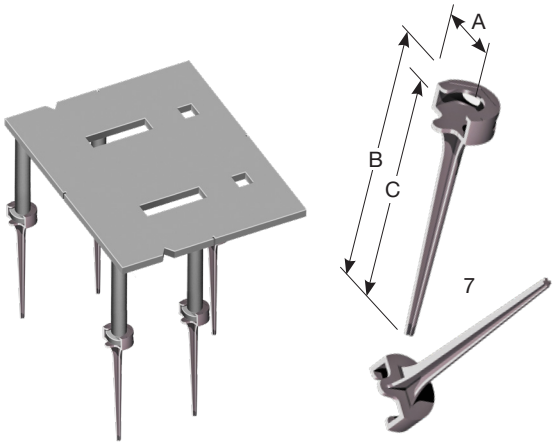
EMBED PLATE									
Item #	A	B	C	D	E	F	# of Studs	Stud Size	Weight
MBRLUP8G	11"	12"	3"	5"	1"	4.5"	5	0.75"x 6.125"	26 lbs.





1. **Round Head Studs**
   Five Round Head Studs are located on the back of the Embed Plate, used to anchor it into the concrete member. The bottom stud (1A) is tack-welded. This non-structural stud adds increased stability during installation.
2. **Tri-Cuts**
   Two Tri-Cuts are edged on the sides of the Embed Plate, used to align the Embed Plate to the bearing elevation of the double tee and bearing pad.
3. **Notches**
   Four Notches are positioned on each side of the Embed Plate to be used as the center line of the embed plate.
4. **Rectangular Openings**
   Two Rectangular Openings located at the top half of the face of the Embed Plate receive the Ears of the Bearing Angle.
5. **Square Openings**
   Two Square Openings located at the bottom half of the face of the Embed Plate receive the square posts of the Bearing Angle.
6. **Plastic Void Formers**
   Two Plastic Void Formers fit into the Rectangular and Square Openings to prevent concrete from filling the openings that receive the Bearing Angle.
7. **Stud Extenders for Up-in-Face application**
   Four MB Stud Extenders can be placed onto the Round Head Studs to adjust height and ensure the Embed Plate face is flush to the panel surface when installed.

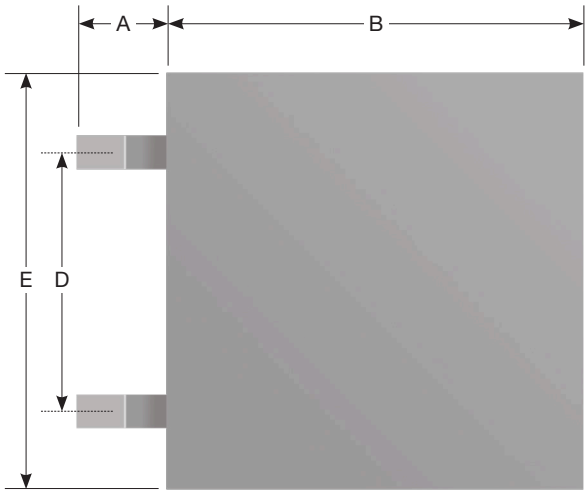
Components and Features of the Rapid-Lok Ultimate Bearing Angle



STUD EXTENDER				
Item #	A	B	C	Weight
MB291833*	¾" (1¼" Head)	1 ⅝"	1"	0.192 oz.
MB291834†	¾" (1¼" Head)	3 ⅝"	3"	0.240 oz.
MB291830‡	¾" (1¼" Head)	5 ⅞"	5 ¼"	0.275 oz.

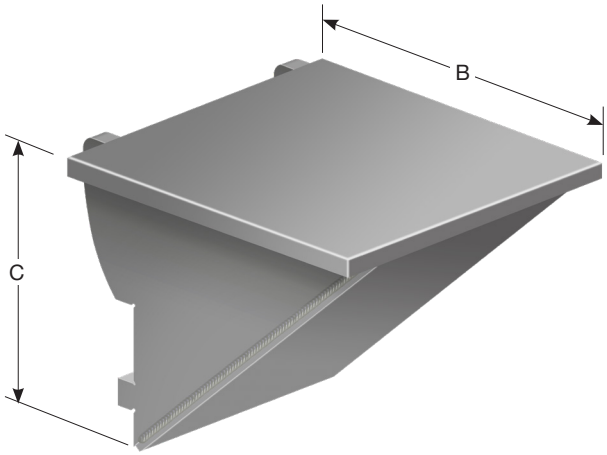
*Suitable for 8" panels thickness
†Suitable for 10" panels thickness
‡Cut to fit panel thickness

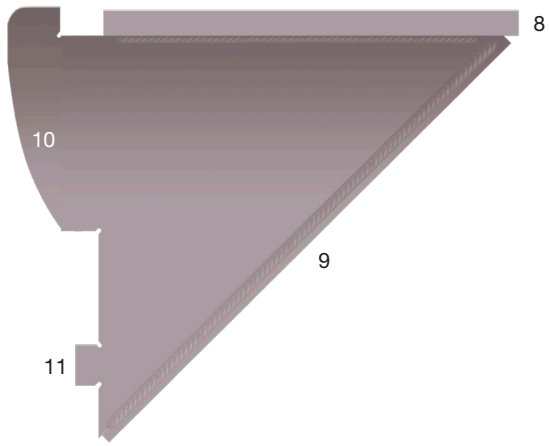
The Bearing Angle is manufactured from ASTM A572 grade 60 steel and ASTM A36. It has a hot dip galvanized finish per ASTM A153. Each Bearing Angle is stamped with a unique identification number for tracking purposes.



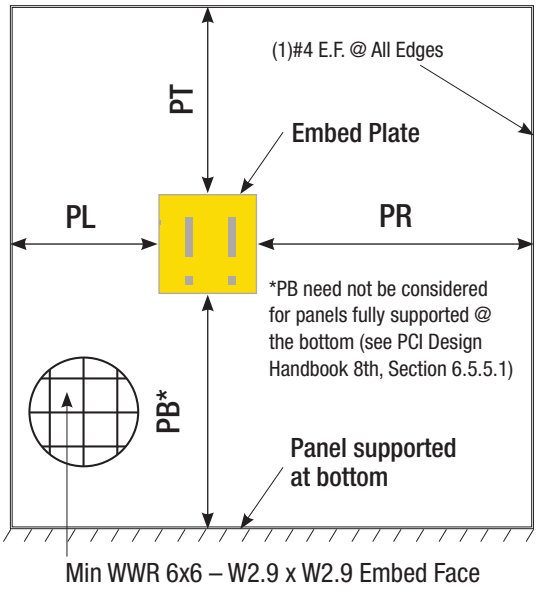
BEARING ANGLE						
Item #	A	B	C	D	E	Weight
MBRLUP8G	1.81"	8"	8.40"	5"	8"	25 lbs.

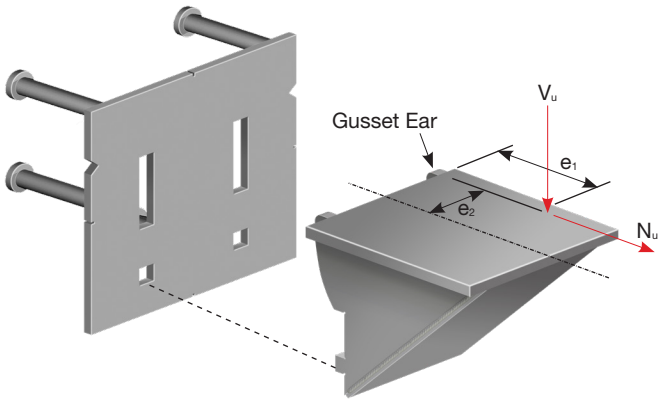
8. **Shelf**
   Located on the top of the Bearing Angle, the Shelf supports the stem of the double tee or other member.
9. **Front Angle**
   The 45-degree angle front provides a seamless finish in the completed structure.
10. **Ears**
    Ears on each side of the Bearing Angle engage with the Embed Plate.
11. **Square Posts**
    Square Posts at the bottom of the Bearing Angle fit into Square Openings of the Embed Plate





Panel Fully Supported at Bottom – Wall, Lite Wall, Column





Condition – Bottom Edge Supported (BES)

Bottom Condition

Rapid-Lok Ultimate Capacities

Table values are based on physical tests using ACI's 5% Fractile analysis

Minimum member thickness = 8"

Φ = 0.70 if a higher Φ is to be used, it must be determined by Engineer[D]

V_u and N_u Loads are simultaneous[D]

TABLE NOTES:
1. The tabulated capacities must be coordinated with the applicable support conditions.
2. The ASTM E119 Fire Duration for all assemblies is 3 hours with $V_{service}$ = 30 kips.
3. Tables are to be used only by qualified structural engineers that understand and apply all applicable codes.
4. Table values apply to fully factored ultimate loads (V_u and N_u).

All Units in Inches

$e_1 \le 6$" and $e_2 \le 2$"

	#	Plate to Edge Conditions	PL	PR	PT	PB	ΦV_{nf} kips [A, B, C]	ΦN_{nf} kips [A, B, C, D]	Governing Material
BES	1	Not near a free edge	≥27	≥27	≥9	n/a	42.1	5.26	Steel
BES	2	Free edge on one side	≥9.5	≥30	≥9	n/a	42.1	5.26	Steel
BES	3	Free edge on one side	≥2	≥30	≥9	n/a	37.8	4.73	Concrete
BES	4	Free edge on two sides	≥6.5	≥6.5	≥9	n/a	42.1	5.26	Steel
BES	5	Top edge	≥27	≥27	≥3	n/a	28.6	3.58	Concrete

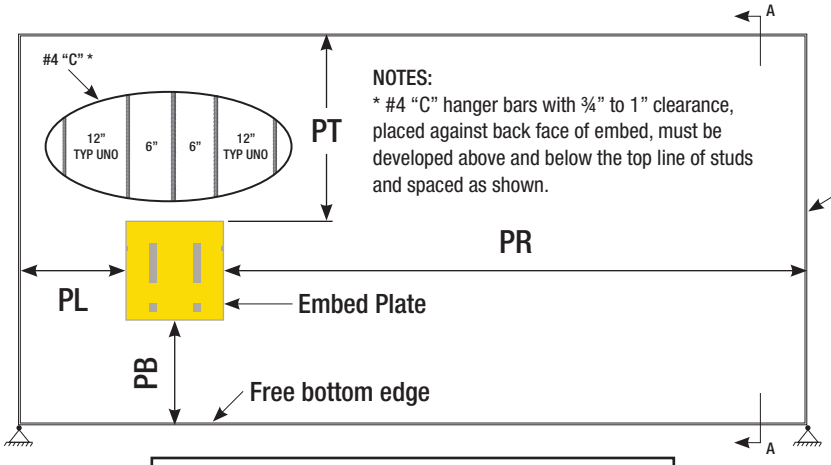
A. Capacity values table BES use a Φ-factor = 0.70
If the structural engineer determines a Φ = 0.75 may be used, then the table values may be multplied by a factor = (0.75/0.70) = 1.071
Typical ACI 318 Φ-factors are: (Reference ACI 318-14 Section 17.3.3)
Φ-factor = 0.70 for members without confinement reinforcing
Φ-factor = 0.75 for members with adequate confinement reinforcing

B. All values apply to fc' = 5000 psi. Concrete capacity values may be modified by (fc'/5000)1/2, but ΦV_n must not exceed the bearing angle's steel capacity of 42.1 kips. Steel capacity includes Φ = 0.90

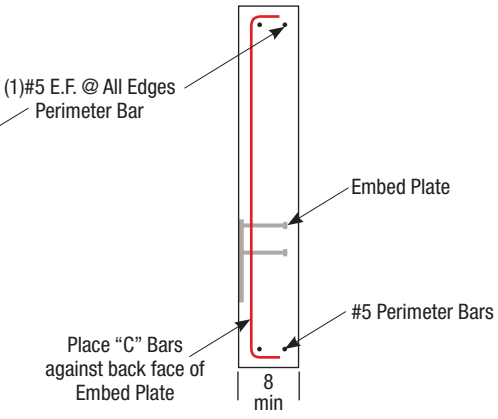
C. Capacity values for concrete failures may be increased by adding additional reinforcing, (Reference ACI 318-14 Section 17.4.2.9 and 17.5.2.9), but ΦV_n must not exceed the bracket's steel capacity of 42.1 kips.

D. Tested values Nu are based on 12.5% of V_u. The test loads were applied simultaneously

Panel with Free Edge at Bottom – Spandrel, Wall Opening Below



Condition – Bottom Edge Free (BEF)



Section A-A

CONDITION 1 – Unreinforced

Rapid-Lok Ultimate Capacities
without #4 "C" Hanger Bars

Table values are based on physical tests using ACI's 5% Fractile analysis

Minimum member thickness = 8"

Φ = 0.70 if a higher Φ is to be used, it must be determined by Engineer[A] V_u and N_u Loads are simultaneous[E]

TABLE NOTES:
1. The tabulated capacities must be coordinated with the applicable support conditions.
2. The ASTM E119 Fire Duration for all assemblies is 3 hours with $V_{service}$ = 30 kips.
3. Tables are to be used only by qualified structural engineers that understand and apply all applicable codes.
4. Table values apply to fully factored ultimate loads (V_u and N_u).

Bottom Condition	#	Plate to Edge Conditions	All Units in Inches PL	PR	PT	PB	$e_1 \le 6$" and $e_2 \le 2$" ΦV_{nf} kips[A, C, D]	ΦN_{nf} kips[A, B, D, E]	Governing Material
BEF	6	Bottom edge	≥22.5	≥22.5	≥9	≥4.5	17.6	2.20	Concrete
BEF	7	Side Edge - Bottom Edge	≥6	≥27	≥9	≥4.5	14.8	1.85	Concrete

CONDITION 2 – Reinforced

Rapid-Lok Ultimate Capacities
with #4 "C" Hanger Bars

Table values are based on physical tests using ACI's 5% Fractile analysis

Minimum member thickness = 8"

Φ = 0.75 if a higher Φ is to be used, it must be determined by Engineer[A] V_u and N_u Loads are simultaneous[E]

TABLE NOTES:
1. The tabulated capacities must be coordinated with the applicable support conditions.
2. The ASTM E119 Fire Duration for all assemblies is 3 hours with $V_{service}$ = 30 kips.
3. Tables are to be used only by qualified structural engineers that understand and apply all applicable codes.
4. Table values apply to fully factored ultimate loads (V_u and N_u).

Bottom Condition	#	Plate to Edge Conditions	All Units in Inches PL	PR	PT	PB	$e_1 \le 6$" and $e_2 \le 2$" ΦV_{nf} kips[B, C, D]	ΦN_{nf} kips[B, C, D, E]	Governing Material
BEF	8	Bottom edge	≥22.5	≥22.5	≥9	≥4.5	41.1	5.14	Concrete
BEF	9	Side Edge - Bottom Edge	≥12.5	≥22.5	≥9	≥4.5	40.8	5.10	Concrete
BEF	10	Bottom Edge	≥22.5	≥22.5	≥9	≥3	30.0	3.70	Concrete

A. Capacity values Condition 1 use a Φ-factor = 0.70
If the structural engineer determines a Φ= 0.75 may be used, then the table values may be multplied by a factor = (0.75/0.70) = 1.071
Typical ACI 318 Φ-factors are: (Reference ACI 318-14 Section 17.3.3)
Φ-factor = 0.70 for members without confinement reinforcing
Φ-factor = 0.75 for members with adequate confinement reinforcing

B. Capacity values Condition 2 use a Φ-factor = 0.75 due to use of confinement reinforcement

C. All values apply to fc' = 5000 psi. Concrete capacity values may be modified by $(fc'/5000)^{½}$, but ΦV_n must not exceed the bearing angle's steel capacity of 42.1 kips. Steel capacity includes Φ = 0.90

D. Capacity values for concrete failures may be increased by adding additional reinforcing, (Reference ACI 318-14 Section 17.4.2.9 and 17.5.2.9), but ΦV_n must not exceed the bracket's steel capacity of 42.1 kips.

E. Tested values N_u are based on 12.5% of V_u. The test loads were applied simultaneously

Notes

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