

**DRILL-TEC™ RHINO BOND® ATTACHMENT SYSTEM—ATTACHMENT TABLE**

Deck Type <sup>1</sup>	Min. Pull-out Values <sup>2</sup>	Fastener Type	Plate Type <sup>3</sup>	Min. Penetration	Fastening Pattern <sup>4</sup> (Field, Perimeter, Corner)		
					GAF Guarantee	60 psf Uplift 90 psf Uplift	105 psf Uplift 120 psf Uplift
3/4" (19mm) Plywood	525 lbf (238 kgf)	Drill-Tec™ HD #14	3" (76 mm) Drill-Tec™ RhinoBond® XHD	1" (25 mm) Thru Deck	8, 12, 16	N/A	N/A
2" (51mm) Wood Plank	800 lbf (363 kgf)	Drill-Tec™ HD #14	3" (76 mm) Drill-Tec™ RhinoBond® XHD	1" (25 mm) Into Deck	8, 12, 16	N/A	N/A
22-ga. Steel Deck (33 ksi)	450 lbf (204 kgf)	Drill-Tec™ XHD #15	3" (76 mm) Drill-Tec™ RhinoBond® XHD	3/4" (19 mm) Thru Deck	6, 9, 12	6, 10, 15	N/A
	600 lbf (272 kgf)	Drill-Tec™ SXHD #21		1" (25 mm) Thru Deck	6, 9, 12	6, 10, 15	
22-ga. Steel Deck (80 ksi)	450 lbf (204 kgf)	Drill-Tec™ XHD #15	3" (76 mm) Drill-Tec™ RhinoBond® XHD or SXHD	3/4" (19 mm) Thru Deck	6, 9, 12	N/A	8, 15, 20
	750 lbf (340 kgf)	Drill-Tec™ SXHD #21		1" (25 mm) Thru Deck	6, 9, 12		8, 15, 20
Structural Concrete <sup>5</sup> [Min. 2,500 psi (98,066 kilogram-force/cm <sup>2</sup> )]	700 lbf (317 kgf)	Drill-Tec™ HD #14	3" (76 mm) Drill-Tec™ RhinoBond® XHD	1" (25 mm) Into Deck [3/16" (4.7 mm) Pre-drilled hole required]	6, 9, 12	6, 10, 15	8, 15, 20
	900 lbf (408 kgf)	Drill-Tec™ CD-10	3" (76 mm) Drill-Tec™ RhinoBond® XHD	1" (25 mm) Into Deck [7/32" (5.5 mm) Pre-drilled hole required]	6, 9, 12	6, 10, 15	8, 15, 20
Lightweight Insulating Concrete, 22 ga. standard metal form	450 lbf (204 kgf)	Drill-Tec™ HD #15	3" (76 mm) Drill-Tec™ RhinoBond® XHD	3/4" (19 mm) Thru Form	6, 9, 12	6, 10, 15	8, 15, 20
	350 lbf (159 kgf)	Drill-Tec™ HD #14	3" (76 mm) Drill-Tec™ RhinoBond® XHD	3/4" (19 mm) Thru Form	6, 9, 12	6, 10, 15	8, 15, 20
Lightweight Insulating Concrete, 24 ga. standard metal form	350 lbf (159 kgf)	Drill-Tec™ HD #15	3" (76 mm) Drill-Tec™ RhinoBond® XHD	3/4" (19 mm) Thru Form	6, 9, 12	N/A	N/A
	350 lbf (159 kgf)	Drill-Tec™ HD #14	3" (76 mm) Drill-Tec™ RhinoBond® XHD	3/4" (19 mm) Thru Form	6, 9, 12	N/A	N/A

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- The Drill-Tec™ RhinoBond® Attachment System is not acceptable over gypsum, cementitious wood fiber, or OSB substrates, but is acceptable over structural or lightweight insulating concrete decks. However, other methods of attachment may be more appropriate, depending on the project type. Contact your local GAF Field Services Area Manager for possible alternatives.
- Pull tests should always be conducted to determine proper fastener selection.
- The Drill-Tec™ RhinoBond® Plate is used to attach rigid insulation to roof decks. The special TPO coating on the plates allows for EverGuard® TPO membrane to be welded to each plate using the RhinoBond® magnetic induction welding tool. Drill-Tec™ RhinoBond® Plates are different in type and

- color: TPO plates are a yellow/green, while the PVC plates are black in color. The appropriate plate must be used with the appropriate membrane type.
- Consult FM-Approvals, ROOFNAV listings, and FM LPDS 1-28 and 1-29 for detailed installation requirements and recommendations for FM-approved installations.
  - When installing Drill-Tec™ RhinoBond® Fasteners into lightweight insulating concrete that is poured over structural concrete, the fastener must penetrate a minimum of 1" (25 mm) into the structural concrete deck. A 7/32" (5.5 mm) pre-drilled hole is required.

**DRILL-TEC™ RHINO BOND® ATTACHMENT TABLE – METAL ROOF RETROFIT**

Max. Purlin & Fastener Row Spacing	Uplift <sup>1</sup>	Purlin Type <sup>2</sup>	Drill-Tec™ Purlin Fastener & Drill-Tec™ RhinoBond® TPO XHD Plate Spacing (o.c.) <sup>3</sup>		
			Field	Pertimeter	Corner
5 ft. (1.52 m)	60 psf	Min. 16 ga. (50 ksi)	18" (452 mm)	10.5" (267 mm)	7" (178 mm)
	75 psf	Min. 16 ga. (50 ksi)	12" (305 mm)	7" (178 mm)	4.5" (114 mm)
		Min. 14 ga. (50 ksi) Min. 12 ga. (36 ksi)	18" (452 mm)	10.5" (267 mm)	7" (178 mm)
	90 psf	Min. 14 ga. (50 ksi) Min. 12 ga. (36 ksi)	12" (305 mm)	7" (178 mm)	4.5" (114 mm)
6 ft. (1.83 m)	135 psf	Min. 16 ga. (50 ksi)	6" (152 mm)	Additional purlins may be required	
	195 psf	Min. 14 ga. (50 ksi) Min. 12 ga. (36 ksi)	6" (152 mm)		

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1. Consult FM Approvals, ROOFNAV listings, and FM LPDS 1-28 and 1-29 for detailed installation requirements.
2. Membrane must be attached to the Drill-Tec™ RhinoBond® Plates that are installed directly into structural purlins with appropriate Drill-Tec™ Purlin Fastener. The special TPO coating on the plates allows for EverGuard® TPO membrane to be welded to each plate using the RhinoBond® magnetic induction welding tool. Drill-Tec™ RhinoBond® Plates are different in type and color: TPO plates are a yellow/green, while the PVC plates are black in color. The appropriate plate must be used with the appropriate membrane type.
3. Fastener pull-out testing must be conducted by the roof fastener manufacturer. Minimum 1" (25 mm) Drill-Tec™ Purlin Fastener embedment is required.

**DRILL-TEC™ RHINOBOND® ATTACHMENT TABLE – WOOD PURLINS**

Fastener Spacing Along Wood Joist	Wood Joist Spacing <sup>1</sup>	Plate <sup>2</sup>	Contributory Area Per Fastener	Fastener	Fastener Embedment <sup>3</sup>	Uplift	Membranes Qualified
12 in. (305 mm)	96 in. (2.44 m)	Drill-Tec™ RhinoBond® TPO XHD	8 ft <sup>2</sup> (.743 m <sup>2</sup> )	Drill-Tec™ #14	1.0 in. (25 mm) into 2 x 8 in. (51 x 203 mm) support [1.5 in. (38 mm) through plywood decking joint and into lumber]	60 psf	EverGuard® TPO, EverGuard Extreme® TPO
24 in. (610 mm)	48 in. (1.22 m)	Drill-Tec™ RhinoBond® TPO XHD	8 ft <sup>2</sup> (.743 m <sup>2</sup> )	Drill-Tec™ #14	1.0 in. (25 mm) into 2 x 8 in. (51 x 203 mm) support [1.5 in. (38 mm) through plywood decking joint and into lumber]	75 psf	EverGuard® TPO, EverGuard Extreme® TPO
36 in. (914 mm)	24 in. (610 mm)	Drill-Tec™ RhinoBond® TPO XHD	6 ft <sup>2</sup> (.557 m <sup>2</sup> )	Drill-Tec™ #14	0.75 in. (19 mm) into 2 x 8 in. (51 x 203 mm) support [1.25 in. (32 mm) through plywood decking joint and into lumber]	105 psf	EverGuard® TPO, EverGuard Extreme® TPO
24 in. (610 mm)	24 in. (610 mm)	Drill-Tec™ RhinoBond® TPO XHD	4 ft <sup>2</sup> (.372 m <sup>2</sup> )	Drill-Tec™ #14	0.75 in. (19 mm) into 2 x 8 in. (51 x 203 mm) support [1.25 in. (32 mm) through plywood decking joint and into lumber]	150 psf	EverGuard® TPO, EverGuard Extreme® TPO
18 in. (452 mm)	24 in. (610 mm)	Drill-Tec™ RhinoBond® PVC XHD	3 ft <sup>2</sup> (.279 m <sup>2</sup> )	Drill-Tec™ #14	0.75 in. (19 mm) into 2 x 8 in. (51 x 203 mm) support [1.25 in. (32 mm) through plywood decking joint and into lumber]	165 psf	EverGuard® PVC Smooth, EverGuard® PVC XK, EverGuard® TPO, EverGuard Extreme® TPO

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1. Drill-Tec™ RhinoBond® test results with fasteners driven into 2 x 8 in. (51 x 203 mm) wood joists over <sup>15</sup>/<sub>32</sub>" (11.9 mm) plywood.
2. Membrane must be attached to the Drill-Tec™ RhinoBond® Plates that are installed directly into structural wood joists with Drill-Tec™ #14 Fasteners. The special TPO coating on the plates allows for EverGuard® TPO membrane to be welded to each plate using the RhinoBond® magnetic induction welding tool. Drill-Tec™ RhinoBond® Plates are different in type and color: TPO plates are a yellow/green, while the PVC plates are black in color. The appropriate plate must be used with the appropriate membrane type.
3. Fastener pull-out testing must be conducted by the roof fastener manufacturer.