

EVALUATION SUBJECT: 15-30 TON H-CABINET PACKAGE UNITS**FL # 46979.3****REPORT HOLDER:**RHEEM SALES COMPANY, INC.
800 INTERSTATE PARK DR
MONTGOMERY, AL 36109, USA
(770) 351-3000 | RHEEM.COM**SCOPE OF EVALUATION (compliance with the following codes):**

THIS IS A STRUCTURAL (WIND) PERFORMANCE EVALUATION ONLY. NO ELECTRICAL OR TEMPERATURE PERFORMANCE RATINGS OR CERTIFICATIONS ARE OFFERED OR IMPLIED HEREIN. UNDER NO CIRCUMSTANCE DOES THIS PERFORMANCE EVALUATION GUARANTEE, IMPLY, OR STATE PERFORMANCE OF THE UNIT IS MAINTAINED DURING OR AFTER A DESIGN EVENT.

This Performance Evaluation is being issued in accordance with the requirements of the **Florida Building Code Eighth Edition (2023)** per ASCE 7, FBC Building Ch. 16, FBC Building Sections 104.11 & 1522.2, FBC Existing Building Sections 707.1 & 707.2, FBC Mechanical 301.15, FBC Residential M1202.1 & M1301.1, and FS 471.025. The product noted in this performance evaluation has been tested and/or evaluated as summarized herein.

SUBSTANTIATING DATA:**• Product Evaluation Documents**

Substantiating documentation has been submitted to provide this performance evaluation and is summarized in the sections below.

• Structural Engineering Calculations

Structural engineering calculations have been prepared which evaluate the product based on comparative and/or rational analysis to qualify the following design criteria:

- Max. allowable lateral & uplift wind pressures certified herein
- Max. allowable sliding forces, uplift forces, & overturning moments (see Unit Reactions from Wind Guide on last page)
- Tie-down configuration and anchor capacity for concrete, aluminum, and steel host substrates (host by others).
- Unit panel wind pressure connection integrity

Calculation summary is included in this product evaluation and appears herein.

LIMITATIONS & CONDITIONS OF USE:

Use of the product(s) listed herein shall be in strict accordance with this product evaluation as noted herein and manufacturer-provided model specifications. Installation shall conform to the minimum standards stated in the referenced building code(s) in addition to the specifications and limitations stated herein. See herein for complete limitations & conditions of use.

OPTIONS:

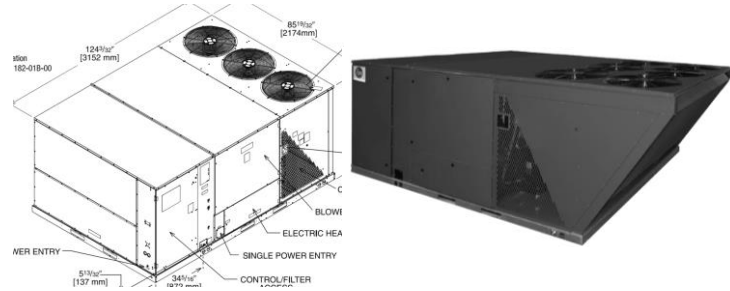
This evaluation is valid for the models described herein. The critical unit designs have been determined and used in this evaluation. Any structural changes outside of the design as described herein would void this certification.

UNIT CASING MATERIALS:

Exterior panels shall be constructed of UTS = 36 ksi min. galv. steel. Unit base shall be constructed of UTS = 45 ksi min. galv. steel. Exterior panels shall be 0.034" min. thick. Unit base shall be 0.069" min. thick. Exterior panels shall be secured with #10 (0.164") min. Ø, SAE Gr. 2 min. or SS sheet metal screws and the base rail screws with #12 min. Ø, SAE Gr. 2 min. or SS sheet metal screws. Contact Report Holder for further unit construction information.

TERMINOLOGY:

See herein for definitions of terms and abbreviations used in this evaluation.



NOTE: THE GRAPHICAL DEPICTIONS IN THIS EVALUATION ARE FOR ILLUSTRATIVE PURPOSES ONLY AND MAY DIFFER IN APPEARANCE.

STRUCTURAL PERFORMANCE:

Models referenced herein are subject to the following design limitations:

Maximum-Rated ASD Wind Pressures*:
± 140 psf Lateral, 111 psf Uplift

- Required design wind pressures shall be determined according to the guide provided in the Appendix (see last page of this document) or on a site-specific basis in accordance with ASCE 7 and applicable sections of the building code(s) being referenced in accordance with ASD methodology.
- Required design wind pressures shall be less than or equal to the maximum pressures listed herein.
- *Maximum Rated Wind Pressures indicate the maximum pressures that all units listed herein are approved for. Valid for at-grade and rooftop applications. See limitations herein.
- Valid for use inside and outside the High-Velocity Hurricane Zone (HVHZ).
- Site-specific wind analysis may produce alternate limitations provided that the maximum-rated wind pressures stated herein are not exceeded.

VISIT [ECALC.IO/RHEEM](https://ecalc.io/rheem)

FOR MORE INFORMATION AND
DEVIATIONS TO THIS EVALUATION OR
SCAN THE QR CODE TO THE RIGHT >

**Engineer Signature & Seal:**

Digitally signed by
Richard Neet
Date: 2024.12.11
15:04:23 -05'00'

November 22, 2024**Richard Neet, P.E.****ENGINEERING EXPRESS®****FL PE #86488 FLCA #9885**

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MODEL INFORMATION (Continued on Following Pages)

Model Number	Cabinet Group	Unit Dimensions (in)		
		Width	Depth	Height
(-)ACH**180*	II	152	86	57
(-)ACH**210*	II	152	86	57
(-)ACH**240*	II	152	86	57
(-)ACH**300*	II	152	86	57
(-)ACH**360*	II	152	86	57
(-)GEH**180*	II	152	86	57
(-)GEH**210*	II	152	86	57
(-)GEH**240*	II	152	86	57
(-)GEH**300*	II	152	86	57
(-)GEH**360*	II	152	86	57
(-)HPH**180*	II	152	86	57
(-)HPH**240*	II	152	86	57
(-)KNL**180*	II	152	86	57
(-)KNL**240*	II	152	86	57
(-)KNL**300*	II	152	86	57
(-)KRL**180*	I	124	86	57
(-)KRL**240*	II	152	86	57
(-)LNL**180*	II	152	86	57
(-)LNL**240*	II	152	86	57
(-)LNL**300*	II	152	86	57
(-)LRL**180*	I	124	86	57
(-)LRL**240*	II	152	86	57

MODEL INFORMATION NOTES

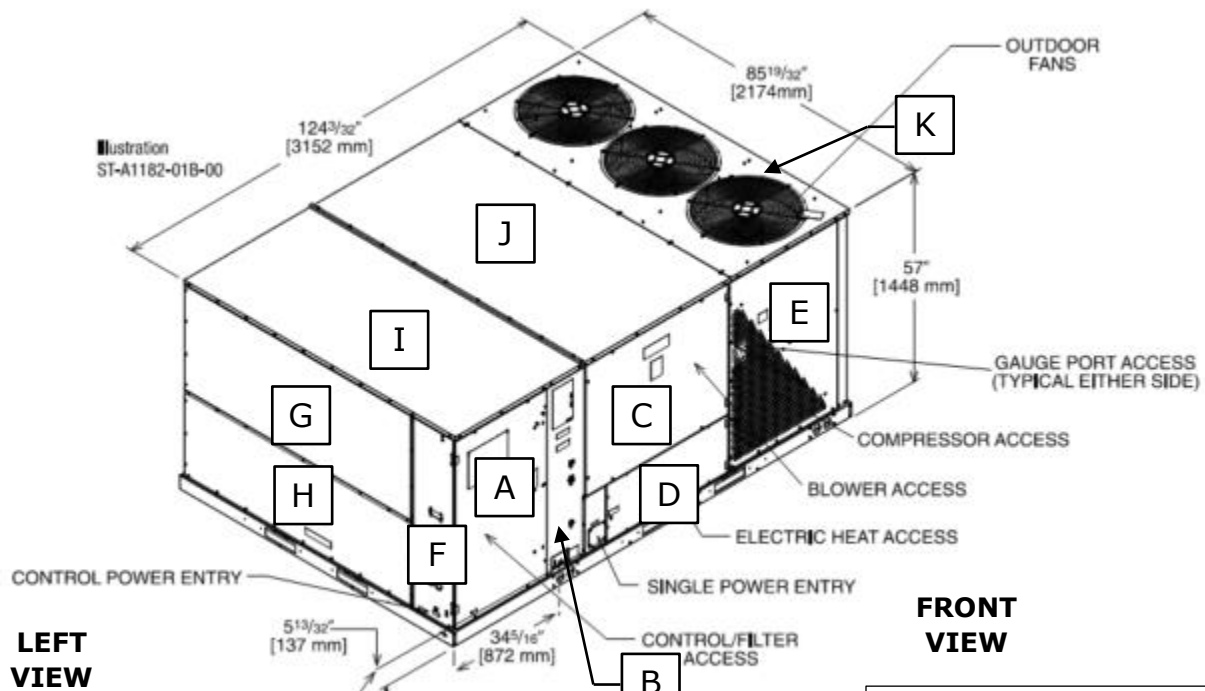
Model information listed herein is based on information provided by the Report Holder. '(-)' designates equivalent trade brands with similar cabinetry and may vary depending on the brand. Model number characters marked by an asterisk (*) do not pertain to this structural certification and may be any combination of numbers, letters, and/or symbols.

Cabinet Groups (also abbreviated herein as "Cab. Groups" or "Cab." as needed) are designated by Engineering Express based on the unit cabinet and panel layout. Unit dimensions listed above are net dimensions (as opposed to gross, packing, or shipping dimensions) and describe the main body of the unit only (not considering extra length from hoods, fan cages, etc.). Dimensions are rounded to the nearest whole number. Unit net weights shall be between 1,750 lb and 2,500 lb. typ.

See Details 1 - 6 for definitions of unit dimensions, Cabinet Groups, unit sides (front, back, left, and right) as defined in this evaluation, and panel designations (related to the Panel Integrity evaluation summarized herein). Panel layouts as designated by the boxed call-outs in Details 1 - 6 (e.g. "A", "B", etc.) apply for the respective Cabinet Group as shown. Unless noted otherwise, the remaining exterior panels and fan cages not designated herein were considered in the panel integrity evaluation and are included in this evaluation. See Panel Integrity Summary section herein for specifications. Unit appearance may vary. Please contact Report Holder for more information.

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MODEL INFORMATION (Continued on Previous/Following Pages)



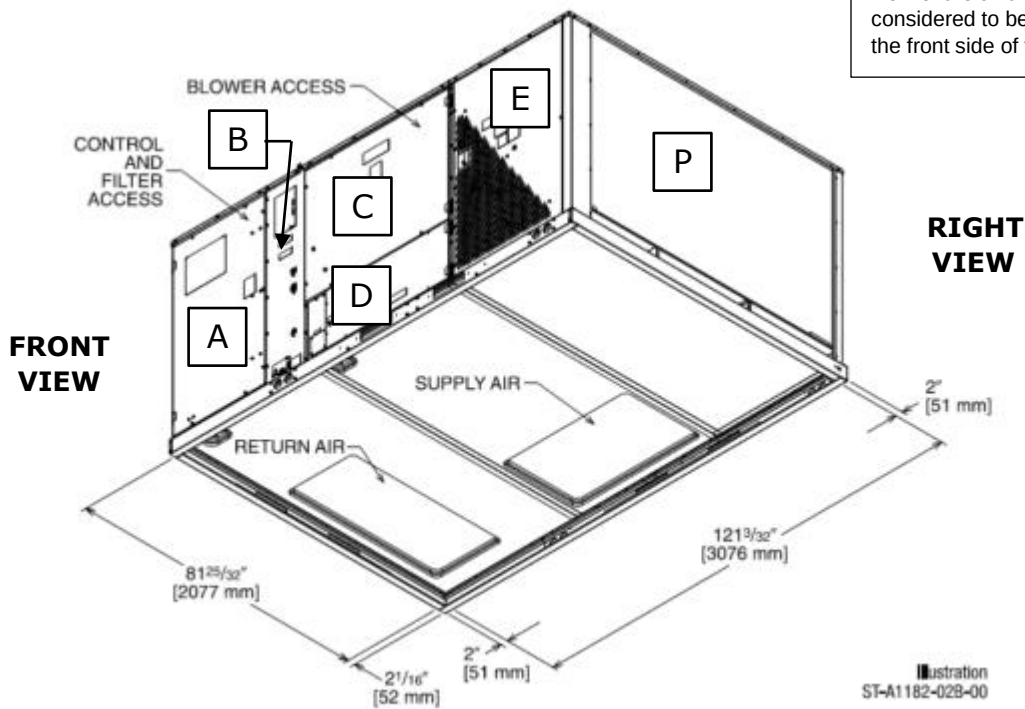
(STANDARD CONFIG.)

CABINET GROUP I

1

SCALE: NTS LEFT-FRONT ISO. VIEW

NOTE: The Cabinet Group I standard configuration is defined as the supply/return ducts running vertically into the unit through the bottom of the unit. The standard configuration back view of the unit is not depicted but is considered to be fully symmetric with the front side of the unit.



[] Designates Metric Conversions

Illustration
ST-A1182-02B-00

(STANDARD CONFIG.)

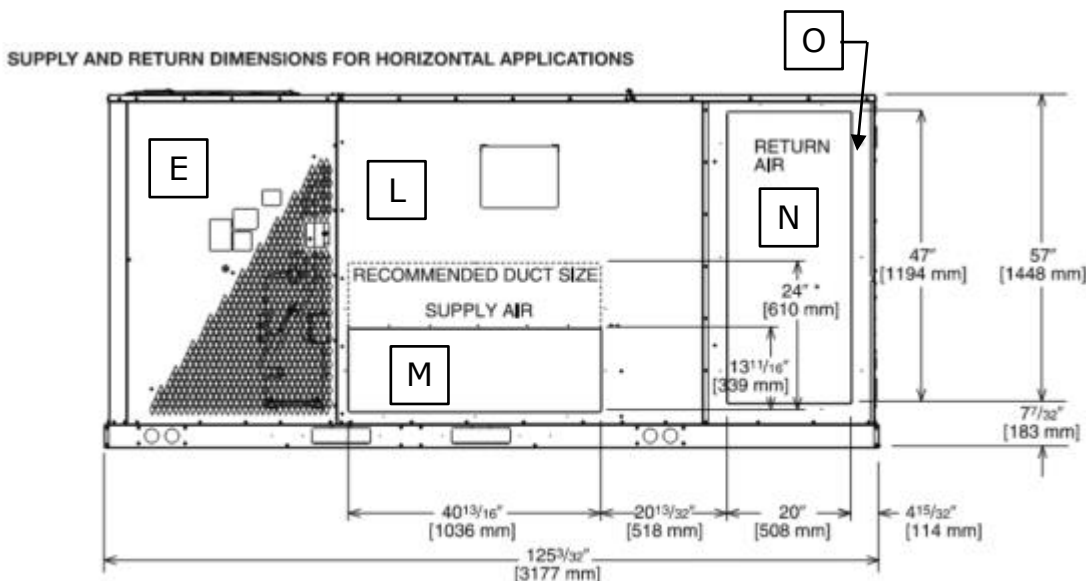
CABINET GROUP I

2

SCALE: NTS FRONT-RIGHT ISO. VIEW

MODEL INFORMATION (Continued on Previous/Following Pages)

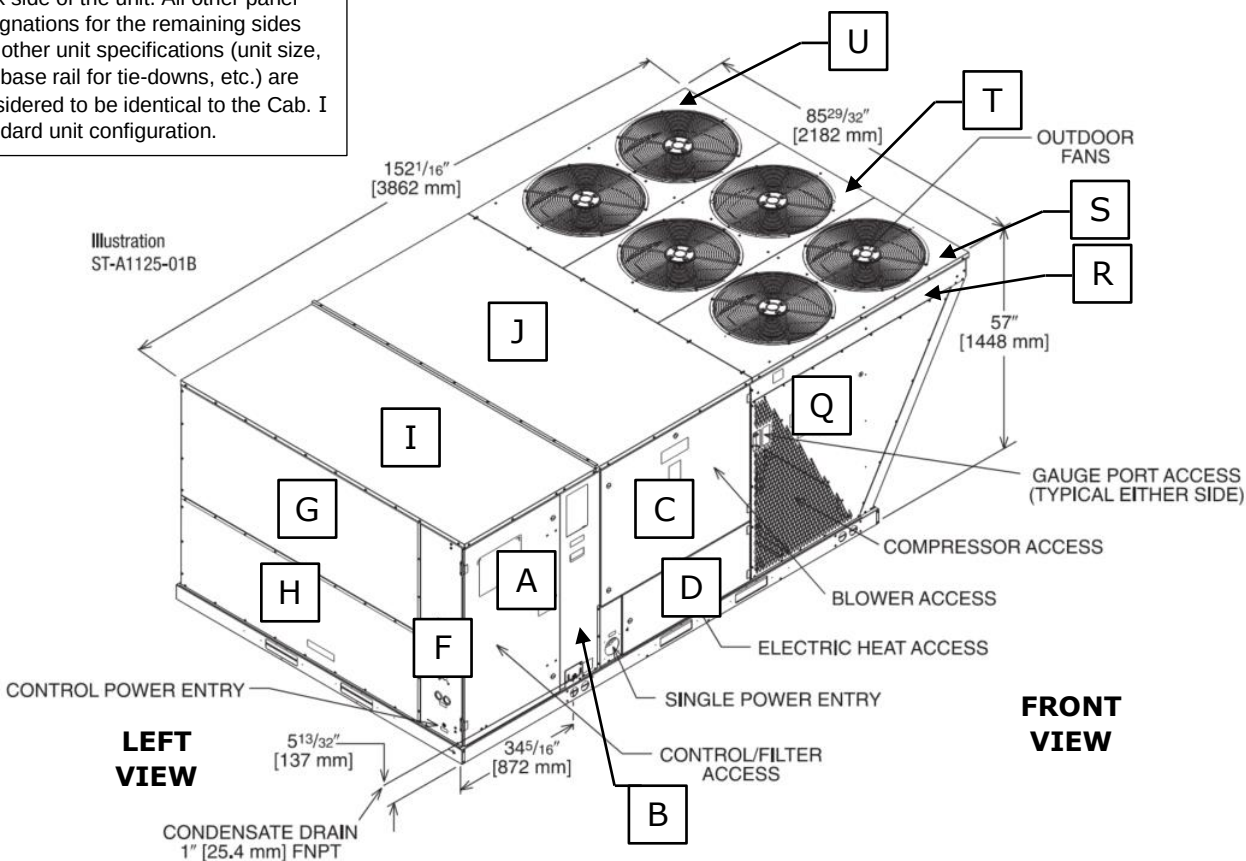
SUPPLY AND RETURN DIMENSIONS FOR HORIZONTAL APPLICATIONS

Illustration
ST-A1182-08B-00(ALT. CONFIGURATION)
CABINET GROUP I

SCALE: NTS ALT. BACK SIDE VIEW

* RECOMMENDED DUCT SIZE

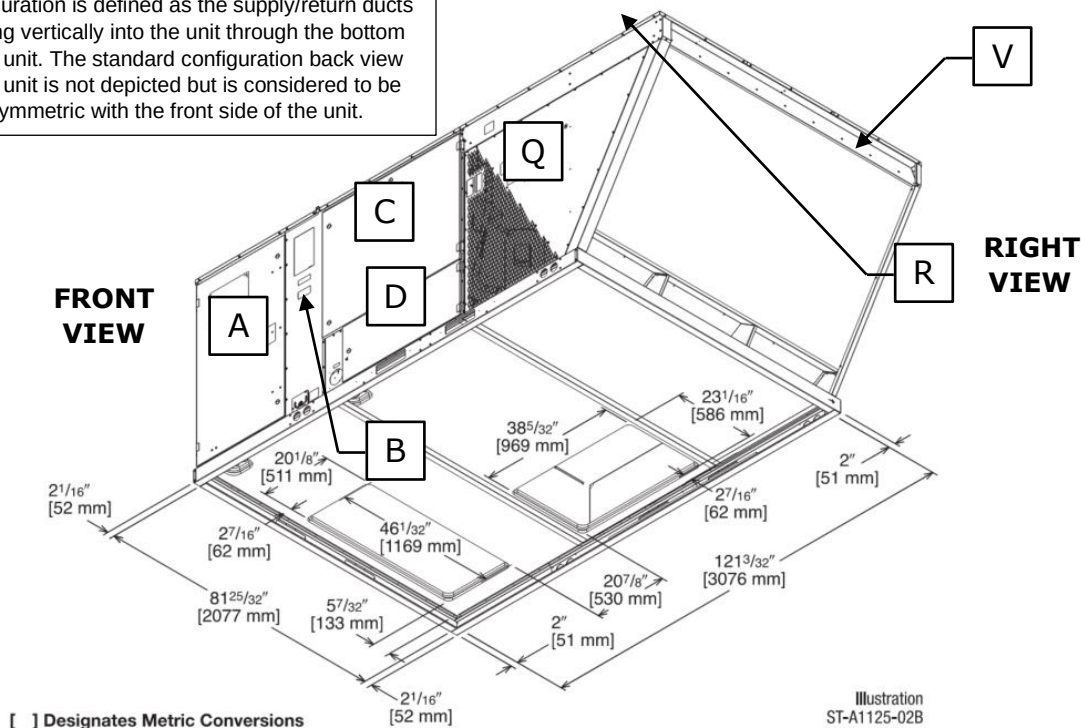
NOTE: The Cabinet Group I alternate (alt.) configuration is defined as the supply/return ducts running horizontally into the unit through the back side of the unit. All other panel designations for the remaining sides and other unit specifications (unit size, unit base rail for tie-downs, etc.) are considered to be identical to the Cab. I standard unit configuration.

Illustration
ST-A1125-01B(STANDARD CONFIG.)
CABINET GROUP II

SCALE: NTS LEFT-FRONT ISO. VIEW

MODEL INFORMATION (Continued on Previous Pages)

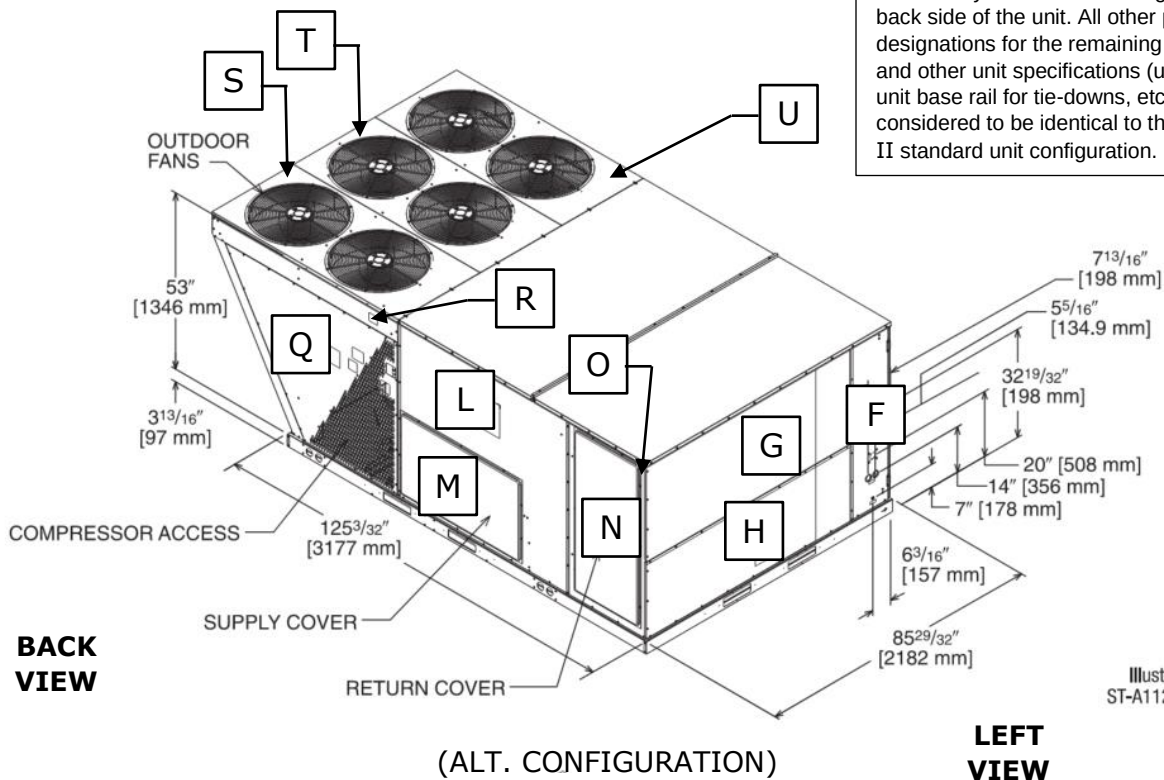
NOTE: The Cabinet Group II standard configuration is defined as the supply/return ducts running vertically into the unit through the bottom of the unit. The standard configuration back view of the unit is not depicted but is considered to be fully symmetric with the front side of the unit.



(STANDARD CONFIG.)
CABINET GROUP II

5 SCALE: NTS FRONT-RIGHT ISO. VIEW

NOTE: The Cabinet Group II alternate (alt.) configuration is defined as the supply/return ducts running horizontally into the unit through the back side of the unit. All other panel designations for the remaining sides and other unit specifications (unit size, unit base rail for tie-downs, etc.) are considered to be identical to the Cab. II standard unit configuration.



(ALT. CONFIGURATION)
CABINET GROUP II

6 SCALE: NTS ALT. BACK-LEFT VIEW

UNIT MOUNT TO HOST CONCRETE SCHEDULE (AT GRADE ONLY)

Cabinet Group	Max. ASD Wind Pressures Lateral (Uplift)	Quantity of Tie-Down Clips		
		# of Clips per Unit Long Side (L.S.)	# of Clips per Unit Short Side (S.S.)	# of Clips in Total per Unit
I	± 54 psf (0 psf)	4	0	8
II	± 54 psf (0 psf)	5	0	10

UNIT MOUNT TO HOST CONCRETE SCHEDULE NOTES**INTRODUCTION:**

This Schedule provides the option of a unit direct mount to a concrete host structure by others for at-grade applications only. See herein for additional mounting options.

SCHEDULE DIRECTIVE:

The Schedule table above is divided by Cabinet Group (each row of the table). The host concrete structures by others shall be regular-weight concrete with 3000 psi minimum compressive strength. **In all cases, the host structure is by others.** Follow the tie-down provisions for the respective unit Cabinet Group that matches the unit model being installed. This Schedule is applicable for all units described in this evaluation. See tie-down specifications and Details herein. Contact Engineering Express for site scenarios outside the bounds of this evaluation.

TIE-DOWN CLIP NOTES:

Tie-down clips shall be 1" min. wide, 6"-12" tall, 0.068" min. thick, UTS = 45 ksi min. (equiv. to ASTM A653 Gr. 33 or stronger) galv. steel. Fasten clip to host structure with (1) anchor per tie-down clip per the following:

- 1/4" Ø ITW Tapcon or equivalent with 1-3/4" embedment, 3" min. edge distance to the edge of the concrete, and 4-1/4" min. spacing from neighboring concrete anchors, typ. See "Tie-Down Clip Notes" below for additional specifications.

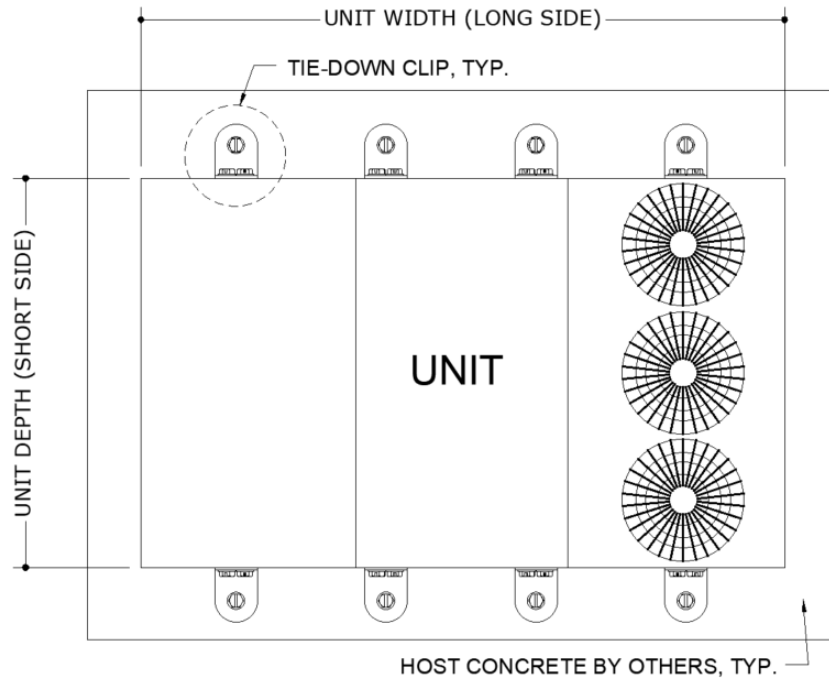
Ensure anchor is placed at the center of the tie-down clip leg to provide 1/2" min. edge distance, typ. Fasten tie-down clip to the unit base rail with (6) #10, SAE Gr. 2 min. or SS self-drilling screws with 1/2" min. OD washers, typ. Utilize (6) slots that have flush, solid contact with the unit, (1) screw per slot, typ. Ensure all screws fully engage with the unit. Tie-down clips shall sit flush on the host concrete and flush against the unit. See tie-down clip details herein.

Distribute the specified tie-down clip quantity evenly between the unit long sides as described in the Schedule table. For each unit long side, position tie-down clips evenly spaced along the unit side as much as is feasible. Position tie-down clips 3" minimum away from either end of the unit. Ensure adequate anchor spacing and flush contact are achieved when positioning tie-down clips. See tie-down clip details herein.

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SEE NEXT PAGE FOR UNIT MOUNT TO HOST CONCRETE TIE-DOWN DETAILS

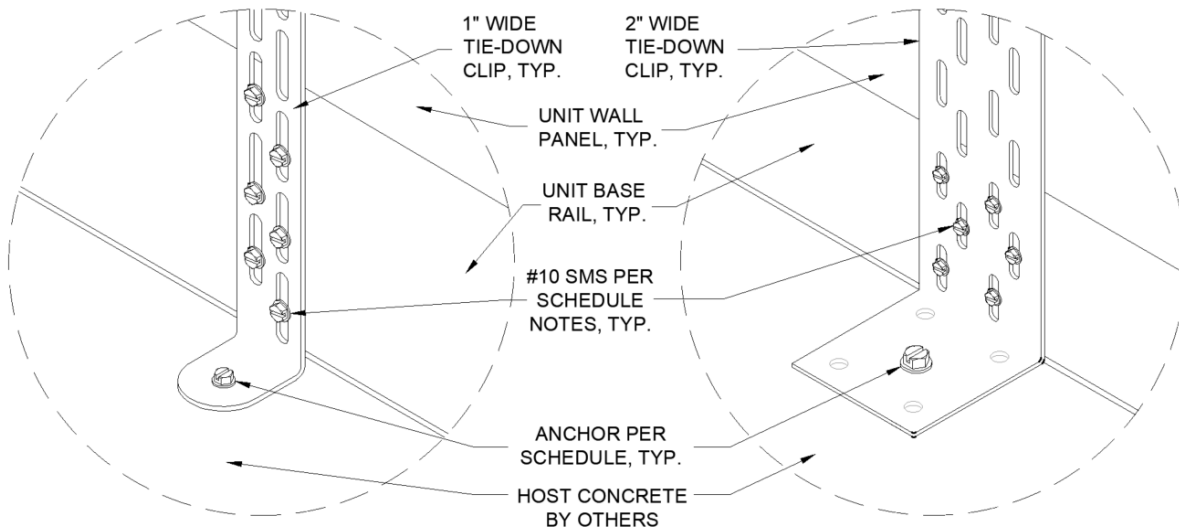
UNIT MOUNT TO HOST CONCRETE, TIE-DOWN DETAILS 7 – 9



7 SAMPLE TIE-DOWN LAYOUT TO CONCRETE, TYP.

SCALE: NTS

PLAN VIEW



8 1" WIDE TIE-DOWN CLIP ATTACHMENT, TYP.

SCALE: NTS

ISOMETRIC VIEW

9 2" WIDE TIE-DOWN CLIP ATTACHMENT, TYP.

SCALE: NTS

ISOMETRIC VIEW

TIE-DOWN DETAILS 7 – 9 NOTES

For each Detail in this section, consult the Schedule and Notes herein for all tie-down components & specifications required.

The units depicted in the Details on this page are for illustrative purposes only. Units may vary in appearance. Tie-down system may not be depicted in full. The sample tie-down layouts shown herein are for illustrative purposes only. Tie-down locations may vary per the specifications of the Schedule and Notes herein. Host structure shape may vary.

For Details 6 and 7: two common tie-down clip options are shown (1" wide and 2" wide tie-down clips) as examples. Any tie-down clip may be used so long as it complies with the Schedule and Notes specifications.

UNIT MOUNT TO HOST STAND SCHEDULE (AT GRADE & ROOFTOP APPLICATIONS)

Cabinet Group	Installation Condition	Max. ASD Wind Pressures Lateral (Uplift)	Qty. of Tie-Down Clips		Qty. of Tie-Down Straps	
			# of Clips per Unit S.S.	# of Clips in Total per Unit	# of Straps per Unit L.S.	# of Straps in Total per Unit
I	At Grade Only	± 54 psf (0 psf)	4	8	3	6
	At-Grade or Rooftop	± 80 psf (64 psf)	5	10	8	16
		± 110 psf (87 psf)	7	14	11	22
		± 140 psf (111 psf)	9	18	14	28
II	At-Grade	± 54 psf (0 psf)	4	8	3	6
	At-Grade or Rooftop	± 80 psf (64 psf)	6	12	9	18
		± 110 psf (87 psf)	8	16	13	26
		± 140 psf (111 psf)	10	20	16	32

UNIT MOUNT TO HOST STAND SCHEDULE NOTES (Continued on Following Page)

INTRODUCTION: This Schedule provides the option of a unit mount to a steel stand host structure by others for at-grade and rooftop applications. See herein for additional mounting options.

SCHEDULE DIRECTIVE: The Schedule table above is divided into maximum wind pressure tiers for each Cabinet Group (each row of the table). The host stand rails shall be 1/8" min. thick, UTS = 58 ksi min. (equiv. to ASTM A36) galvanized steel. Site-specific wind pressures up to ± 54 psf lateral and 0 psf uplift shall use, at minimum, the tie-down specifications as stated in the ± 54 psf lateral (0 psf uplift) pressure tier row for the respective Cabinet Group. Site-specific wind pressures that fall in-between pressure tiers shall use, at minimum, the tie-down specifications as specified by the higher pressure tier. This Schedule is applicable to all units described in this evaluation. See tie-down specifications and Details herein. Contact Engineering Express for site scenarios outside the bounds of this evaluation.

Example 1: Say your installation is a Cab. II unit model being installed at grade, with site-specific wind pressures of ± 45 psf lateral and 0 psf uplift. In this case, you would need to follow, at minimum, the tie-down specifications corresponding to the ± 54 psf (0 psf) wind pressure tier row for Cab. II. This requires (4) clips per short side, (8) total, and (3) straps per long side, (6) total. See specifications herein.

Example 2: Say your installation is a Cab. I unit model being installed on a rooftop, with site-specific wind pressures of ± 96 psf lateral and 76 psf uplift. In this case, you would need to follow, at minimum, the tie-down specifications corresponding to the ± 110 psf (87 psf) wind pressure tier row for Cab. I. This requires (7) clips per short side, (14) total, and (11) straps per long side, (22) total. See specs.

TIE-DOWN CLIP NOTES: Tie-down clips shall be 1" min. wide, 4"-12" tall, 0.068" min. thick, UTS = 45 ksi min. (equiv. to ASTM A653 Gr. 33 or stronger) galv. steel. Fasten clip to host structure with (1) anchor per tie-down clip per the following:

- 1/4" Ø, SAE Gr. 5 or stronger thru-bolt with 1" min. OD fender washers sized for 1/4" Ø bolts top and bottom and locking nut, typ. Provide 1/2" min. edge distance to any edge of host structure and 1" min. spacing from neighboring thru-bolts, typ. See "Tie-Down Clip Notes" below for additional specifications.

Ensure anchor is placed at the center of the tie-down clip leg to provide 1/2" min. edge distance, typ. Fasten tie-down clip to the unit base rail with (4) #10, SAE Gr. 2 min. or SS self-drilling screws with 1/2" min. OD washers, typ. Utilize (4) slots that have flush, solid contact with the unit, (1) screw per slot, typ. Ensure all screws fully engage with the unit. Tie-down clips shall sit flush on the host rail and flush against the unit. See the associated tie-down clip details herein.

Distribute the specified number of tie-down clips along each unit short side (S.S.) as follows: position (2) end clips 3" min. and 6" max away from the unit long side, (1) clip each end. Position the interior clips as evenly spaced between the end clips as is feasible. Ensure adequate anchor spacing and flush contact are achieved when positioning tie-down clips. See the associated tie-down clip details herein.

To accommodate tie-down clip placement on the unit short sides, provide (2) aluminum support angles. Support angles shall be L-angles with the following specifications: 3" min. wide legs x 1/8" min. thick, 6061-T6 aluminum. Support angle length may vary so long as the support angle attachment conditions are achieved. Attach each support angle to the host stand rails per the following:

- Up to ± 80 psf lateral & 64 psf uplift wind pressures:
Provide (2) 1/4" Ø, SAE Gr. 5 or stronger Thru-Bolt at each end of the support angle, (4) total per angle.
- Up to ± 140 psf lateral & 110 psf uplift wind pressures:
Provide (3) 1/4" Ø, SAE Gr. 5 or stronger Thru-Bolt at each end of the support angle, (6) total per angle.

Provide 1" min. OD fender washers sized for 1/4" Ø bolts top and bottom and locking nut for all thru-bolts, typ. Provide 1/2" min. edge distance to any edge of members in contact (support angle and host structure member).

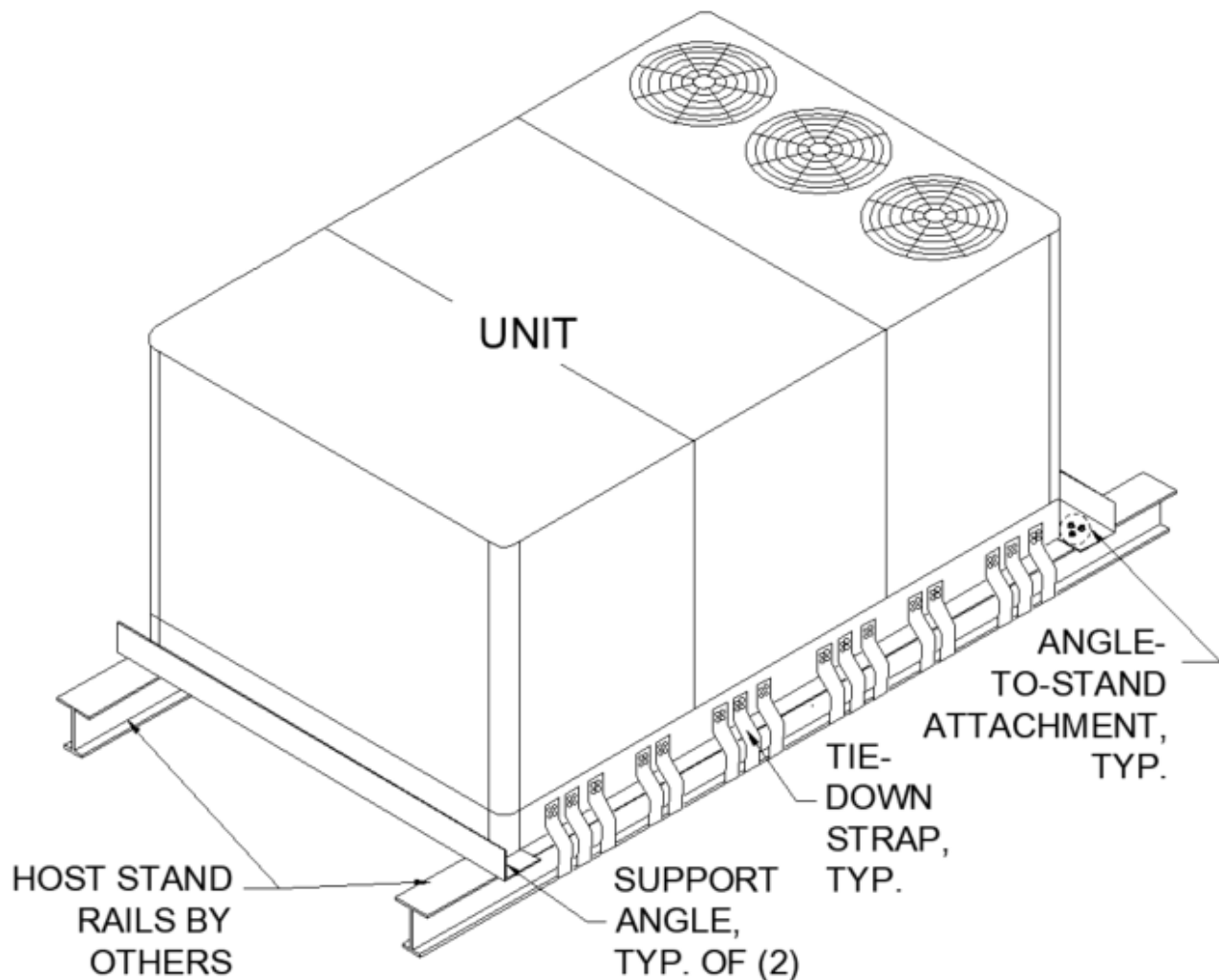
UNIT MOUNT TO HOST STAND SCHEDULE NOTES (Continued from Previous Page)

TIE-DOWN STRAP NOTES: Tie-down straps shall be 1" min. wide x 22 GA (.030") min. thick, UTS = 45 ksi min. (equiv. to ASTM A653 Gr. 33 or stronger) galv. steel.

Distribute the specified number of tie-down straps along each unit long side (L.S.) as follows: position (2) end straps 3" min. away from the unit short side, (1) strap per end. Position the interior straps as evenly spaced between the end straps as is feasible. Provide 1" min. spacing between the edges of adjacent straps.

Attach one end of the strap to the unit base rail with (4) #10 SAE Gr. 2 min. or SS SMS with 1/2" min. spacing between screws and 1/4" min. edge distance to any edge of the strap and the unit base rail, typ. Attach the other end of the strap to the host rail with (4) #10 SAE Gr. 2 min. or SS SMS with 1/2" min. spacing between screws and 1/4" min. edge distance to any edge of the strap and the host rail, typ. It is suggested that the straps attach to the undersides of the host rail, but the straps are permitted to attach to any horizontal or vertical face of the host rail so long as all conditions stated herein are achieved. See the associated Details herein.

Tie-down strap lengths shall be determined by the installing contractor. Ensure strap lengths are such that the strap is neither excessively taut nor excessively slack once installed. A secure fit should be achieved.

UNIT MOUNT TO HOST STAND, TIE-DOWN DETAIL # 10

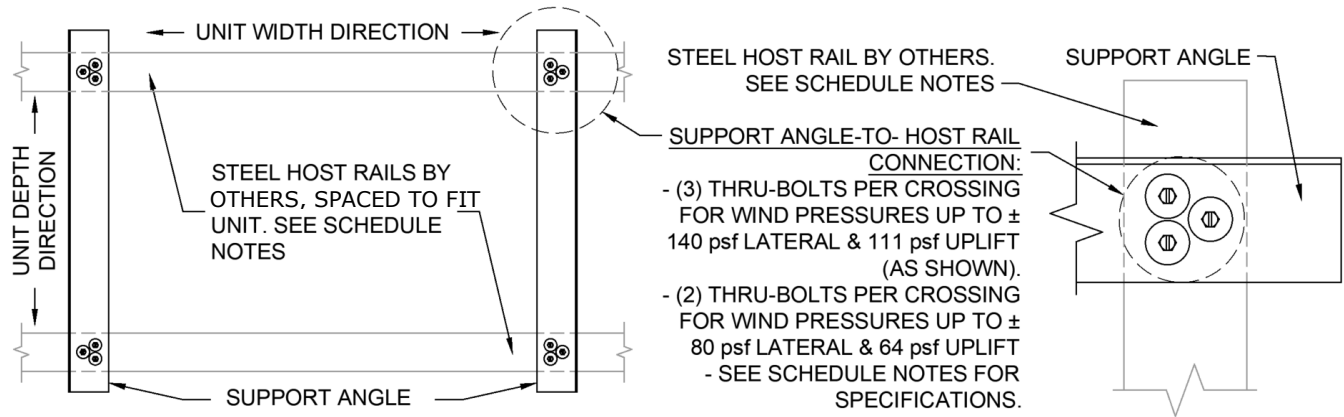
10 UNIT POSITIONING ON STAND RAILS WITH SUPPORT ANGLES
SCALE: NTS LEFT-FRONT ISOMETRIC VIEW

TIE-DOWN DETAIL 10 NOTES

For this Detail, consult the Schedule and Notes herein for all tie-down components & specifications required.

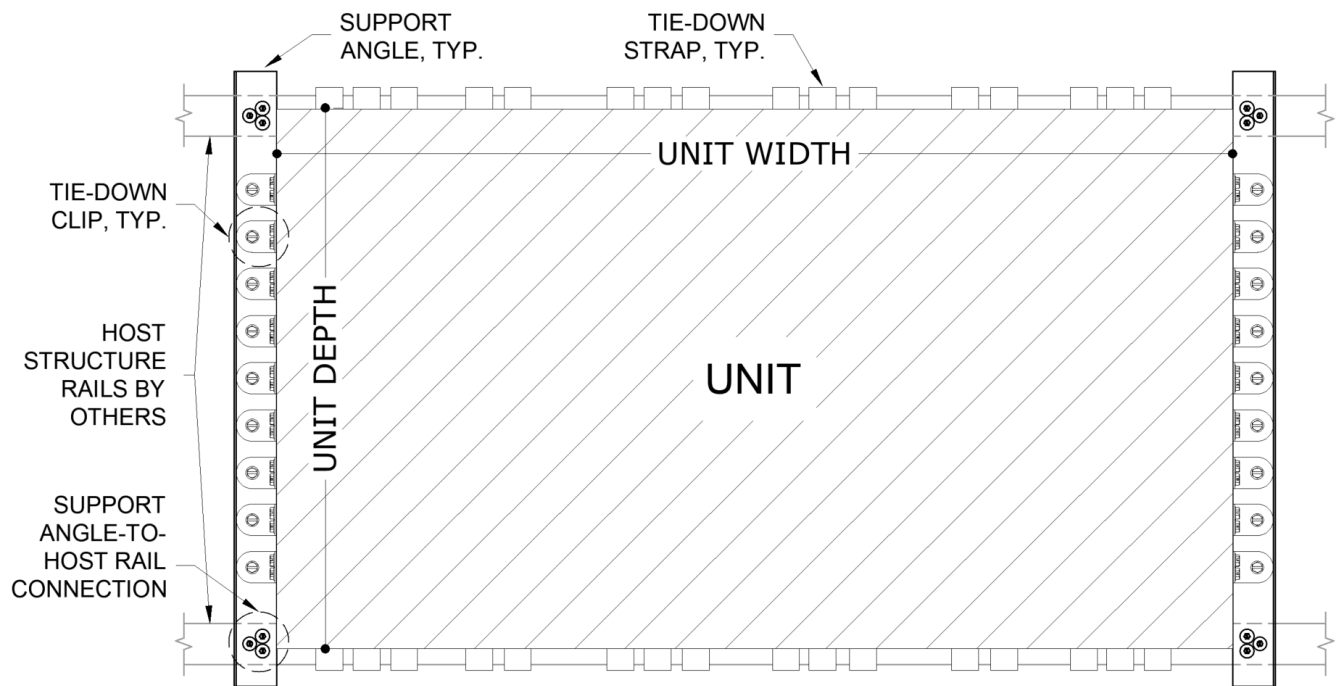
The units depicted in the Details on this page are for illustrative purposes only. Units may vary in appearance. Tie-down system may not be depicted in full. The sample tie-down layouts shown herein are for illustrative purposes only. Tie-down locations may vary per the specifications of the Schedule and Notes herein. Host structure shape may vary.

UNIT MOUNT TO HOST STAND, TIE-DOWN DETAILS 11 - 15



11 SUPPORT ANGLE PLACEMENT ON STAND RAILS BY OTHERS
SCALE: NTS PLAN VIEW

12 SUPPORT ANGLE CONNECTIONS TO STAND, TYP.
SCALE: NTS PLAN VIEW



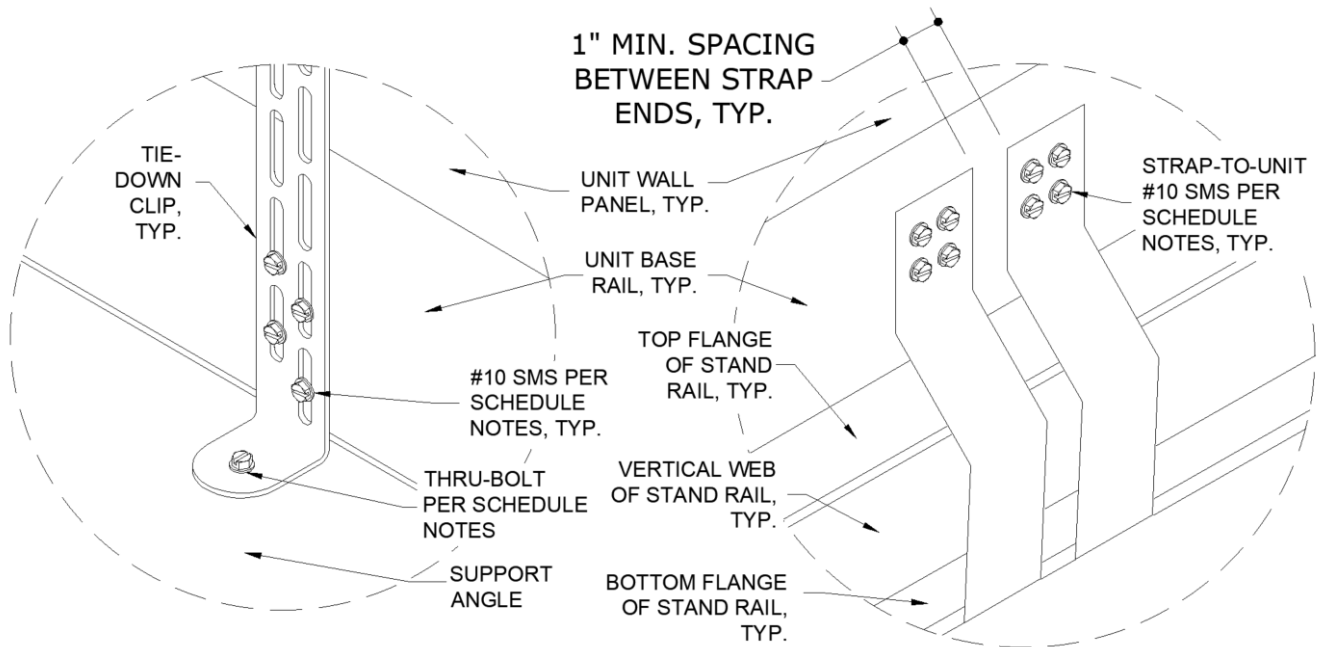
13 STAND MOUNT: SAMPLE TIE-DOWN LAYOUT
SCALE: NTS PLAN VIEW

TIE-DOWN DETAILS 11 - 13 NOTES

For this Detail, consult the Schedule and Notes herein for all tie-down components & specifications required.

The units depicted in the Details on this page are for illustrative purposes only. Units may vary in appearance. Tie-down system may not be depicted in full. The sample tie-down layouts shown herein are for illustrative purposes only. Tie-down locations may vary per the specifications of the Schedule and Notes herein. Host structure shape may vary.

UNIT MOUNT TO HOST STAND, TIE-DOWN DETAILS 14 - 16



14 TIE-DOWN CLIP ATTACHMENT TO UNIT & SUPPORT ANGLE, TYP.

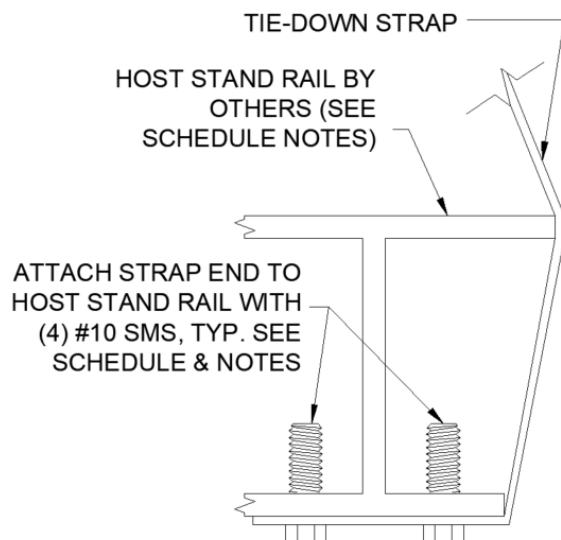
SCALE: NTS

ISOMETRIC VIEW

15 TIE-DOWN STRAP ATTACHMENT TO UNIT, TYP.

SCALE: NTS

ISOMETRIC VIEW



16 TIE-DOWN STRAP ATTACHMENT TO STAND, TYP.

SCALE: NTS

SECTION VIEW

TIE-DOWN DETAILS 14 - 16 NOTES

For this Detail, consult the Schedule and Notes herein for all tie-down components & specifications required.

The units depicted in the Details on this page are for illustrative purposes only. Units may vary in appearance. Tie-down system may not be depicted in full. The sample tie-down layouts shown herein are for illustrative purposes only. Tie-down locations may vary per the specifications of the Schedule and Notes herein. Host structure shape may vary. Details 15 and 16 consider the host stand rails to be an I-beam shape.

UNIT MOUNT TO HOST CURB SCHEDULE: DIRECT MOUNT OPTION (ROOFTOP APPLICATIONS ONLY)

Cabinet Group	Max. ASD Wind Pressures Lateral (Uplift)	Quantity of Anchoring Screws			# of Tie-Down Straps Required
		# per Unit S.S.	# per Unit L.S.	Total # per Unit	
I	± 80 psf (64 psf)	5	7	24	2
	± 110 psf (87 psf)	8	7	30	4
	± 140 psf (111 psf)	9	8	34	6
II	± 80 psf (64 psf)	8	8	32	2
	± 110 psf (87 psf)	9	10	38	4
	± 140 psf (111 psf)	10	9	38	8

UNIT MOUNT TO HOST CURB SCHEDULE: DIRECT MOUNT OPTION NOTES (Continued on Following Page)**INTRODUCTION:**

This Schedule provides the option of a unit direct mount to a steel curb host structure by others for rooftop applications only. See herein for additional mounting options.

SCHEDULE DIRECTIVE:

The Schedule table above is divided into maximum wind pressure tiers for each Cabinet Group (each row of the table). The host curb shall be 16 GA (.060") min. thick, UTS = 58 ksi min. (equiv. to ASTM A36) galvanized steel. Site-specific wind pressures up to ± 80 psf lateral and 64 psf uplift shall use, at minimum, the tie-down specifications as stated in the ± 80 psf lateral (64 psf uplift) pressure tier row for the respective Cabinet Group. Site-specific wind pressures that fall in-between pressure tiers shall use, at minimum, the tie-down specifications as specified by the higher pressure tier for the respective Cabinet Group. This Schedule is applicable to all units described in this evaluation. See tie-down specifications and Details herein. Contact Engineering Express for site scenarios outside the bounds of this evaluation.

Example 1: Say your installation is a Cab. II unit model, with site-specific wind pressures of ± 60 psf lateral and 48 psf uplift. In this case, you would need to follow, at minimum, the tie-down specifications corresponding to the ± 80 psf (64 psf) wind pressure tier row for Cab II. This requires (8) anchoring screws per short side, (8) anchoring screws per unit long side (equating to (32) anchoring screws in total), and (2) straps wrapped over the unit long side. See specifications herein.

Example 2: Say your installation is a Cab. I unit model, with site-specific wind pressures of ± 96 psf lateral and 76 psf uplift. In this case, you would need to follow, at minimum, the tie-down specifications corresponding to the ± 110 psf (87 psf) wind pressure tier row for Cab. I. This requires (8) anchoring screws per short side, (7) anchoring screws per unit long side (equating to (30) anchoring screws in total), and (4) straps wrapped over the unit long side. See specifications herein.

ANCHORING SCREW ("ANCHOR") NOTES:

Fasten the unit to the host curb by others with anchoring screws per the Schedule above and per the following:

Anchoring screws shall be 3/8" Ø, SAE Gr. 5 or stronger UNC screws/bolts. Install the anchoring screws into the unit base rail and steel curb, full perimeter around the unit (front, back, left, and right sides) per the quantities listed in the Schedule. "Unit long sides" are along the unit width and "unit short sides" are along the unit depth, as defined in this report. Ensure the threaded portion of the anchoring screw engages the steel curb (5) pitches minimum past the thread plane, typ. See the associated Details herein.

For each unit side: position (2) of the specified anchor quantity between 6" and 12" from the end of the base rail, (1) per end, typ. Distribute the remaining screw quantity in between the (2) end screws as evenly spaced as is feasible. Provide 3/4" min. edge distance to any edges/openings of unit base rail and 1-1/4" min. spacing from neighboring screws, typ. Also provide 3/4" min. edge distance to any edges of the steel curb. See the associated Details herein.

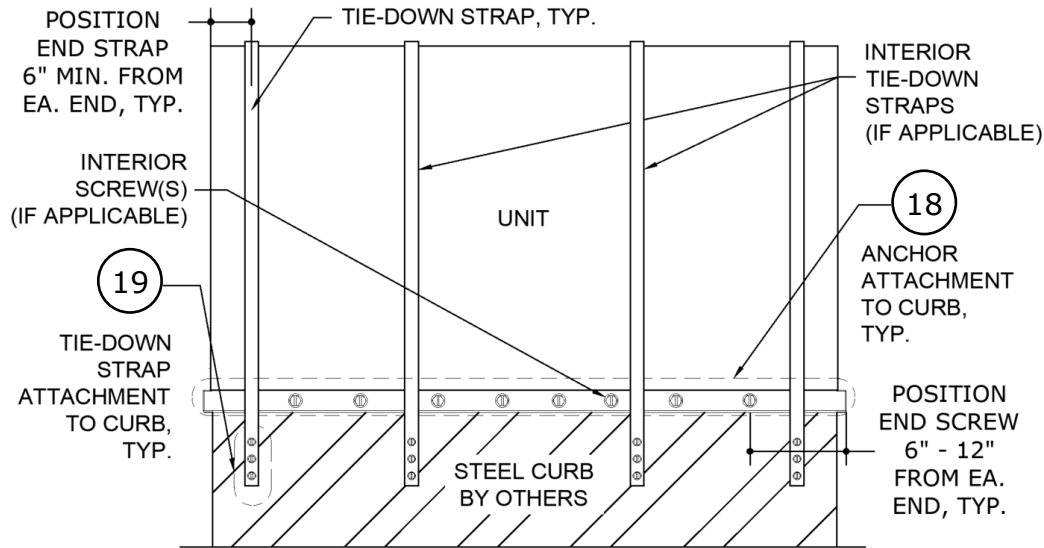
Ensure that there is no more than a 3/4" gap between the faces of the outer curb flange and inner unit base rail for each screw connection, typ. See Detail 18.

TIE-DOWN STRAP NOTES:

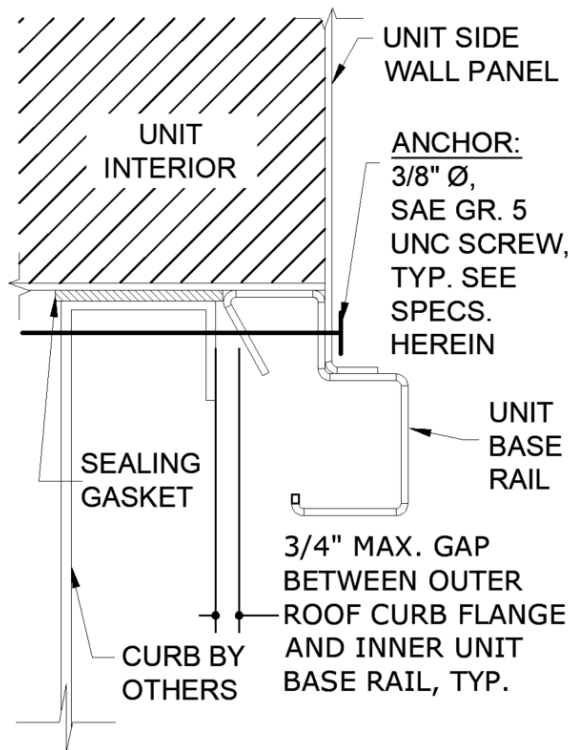
Tie-down straps shall be 1" min. wide x 22 GA (.030") min. thick, UTS = 45 ksi min. (equiv. to ASTM A653 Gr. 33 or stronger) galv. steel. Position (2) tie-down straps at either end of the unit long sides, (1) each end, 6" minimum away from the unit short side edge, typ. For scenarios in which additional tie-down straps are required beyond (2) straps, position the additional straps in-between the (2) end straps evenly spaced as much as is feasible. See the associated Details herein.

Wrap each tie-down strap over the long sides and top of the unit and attach each strap end to the vertical face of the steel curb. Attach each strap end to the curb with (3) #14 (1/4" Ø), SAE Gr. 2 min. or SS SMS with 3/4" min. spacing between screws and 3/8" min. edge distance to any edge of the strap and vertical face of the curb, typ. See the associated Details herein.

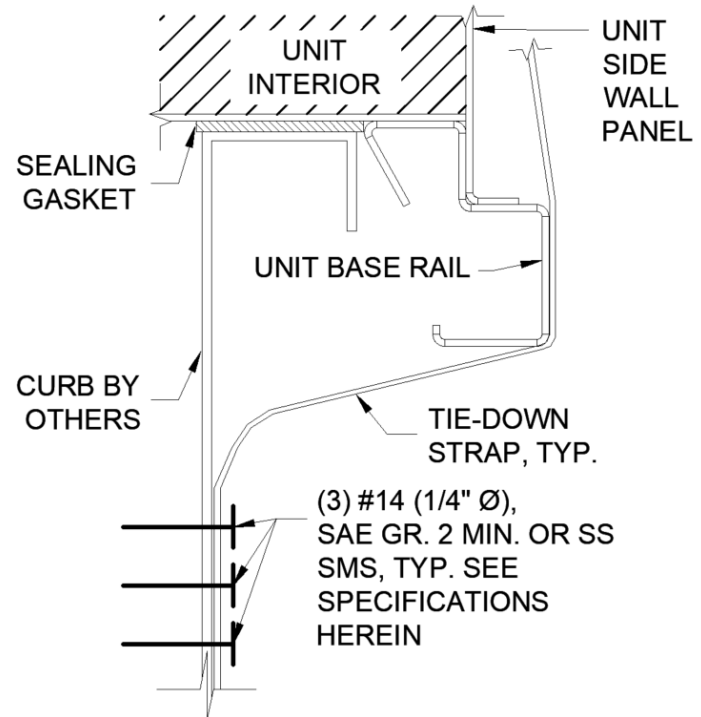
UNIT MOUNT TO HOST CURB (DIRECT MOUNT OPTION), TIE-DOWN DETAILS 17 - 19



17 SAMPLE TIE-DOWN LAYOUT TO CURB, TYP.
SCALE: NTS SIDE (ELEVATION) VIEW



18 UNIT ANCHORING TO CURB, TYP.
SCALE: NTS SECTION VIEW



19 TIE-DOWN STRAP ATTACHMENT TO CURB, TYP.
SCALE: NTS SECTION VIEW

TIE-DOWN DETAILS, 17 - 19 NOTES

For each Detail in this section, consult the Schedule and Notes herein for all tie-down components & specifications required.

The units depicted in the Details on this page are for illustrative purposes only. Units may vary in appearance. The tie-down system may not be depicted in full. The sample tie-down layouts shown herein are for illustrative purposes only. Tie-down locations may vary per the specifications of the Tie-Down Schedule and Notes herein. Host curb and unit base rail shapes may vary. Tie-down specifications shown in Details 18 and 19 shall be implemented in tandem as part of the tie-down system; they are shown separately in each Detail for clarity.

UNIT MOUNT TO HOST CURB SCHEDULE: CURB CLIP MOUNT OPTION (ROOFTOP APPLICATIONS ONLY)

Cabinet Group	Max. ASD Wind Pressures Lateral (Uplift)	Quantity of Curb Clips		
		# per Unit S.S.	# per Unit L.S.	Total # per Unit
I & II	± 80 psf (64 psf)	3	4	14
	± 110 psf (87 psf)	4	5	18
	± 140 psf (111 psf)	4	6	20

UNIT MOUNT TO HOST CURB SCHEDULE: CURB CLIP MOUNT OPTION NOTES (Continued on Following Page)**INTRODUCTION:**

This Schedule provides the option of a unit mount via curb clips to a steel curb host structure by others for rooftop applications only. See herein for additional mounting options.

SCHEDULE DIRECTIVE:

The Schedule table above is divided into maximum wind pressure tiers (each row of the table). The host curb shall be 16 GA (.060") min. thick, UTS = 58 ksi min. (equiv. to ASTM A36) galvanized steel. Site-specific wind pressures up to ± 80 psf lateral and 64 psf uplift shall use, at minimum, the tie-down specifications as stated in the ± 80 psf lateral (64 psf uplift) pressure tier row. Site-specific wind pressures that fall in-between pressure tiers shall use, at minimum, the tie-down specifications as specified by the higher pressure tier. This Schedule is applicable to all units and Cabinet Groups described in this evaluation. See tie-down specifications and Details herein. Contact Engineering Express for site scenarios outside the bounds of this evaluation.

Example 1: Say your installation is a unit model with site-specific wind pressures of ± 60 psf lateral and 48 psf uplift. In this case, you would need to follow, at minimum, the tie-down specifications corresponding to the ± 80 psf (64 psf) wind pressure tier row. This requires (3) curb clips per unit short side and (4) curb clips per unit long side, (14) curb clips in total. See specifications herein.

Example 2: Say your installation is a unit model with site-specific wind pressures of ± 96 psf lateral and 76 psf uplift. In this case, you would need to follow, at minimum, the tie-down specifications corresponding to the ± 110 psf (87 psf) wind pressure tier row. This requires (4) curb clips per unit short side and (5) curb clips per unit long side, (18) curb clips in total. See specifications herein.

CURB CLIP NOTES:

Fasten the unit to the host curb by others with curb clips per the Schedule above and per the following:

Curb clips may also be referred to as "curb brackets" or curb "hold-down brackets". Curb clips shall be 14 GA (0.072") min. thick, UTS = 45 ksi min. (equiv. to ASTM A653 Gr. 33 or stronger) galv. steel. Attach the curb clips to the unit base rail and steel curb, full perimeter around the unit (front, back, left, and right sides) per the quantities listed in the Schedule. "Unit long sides" are along the unit width and "unit short sides" are along the unit depth, as defined in this report. Fasten curb clips to the curb prior to unit placement on the curb and curb clip attachment to the unit.

For each unit side: position (2) of the specified curb clip quantity between 6" and 12" from the end of the base rail, (1) per end, typ. Distribute the remaining curb clip quantity in between the (2) end curb clips as evenly spaced as is feasible.

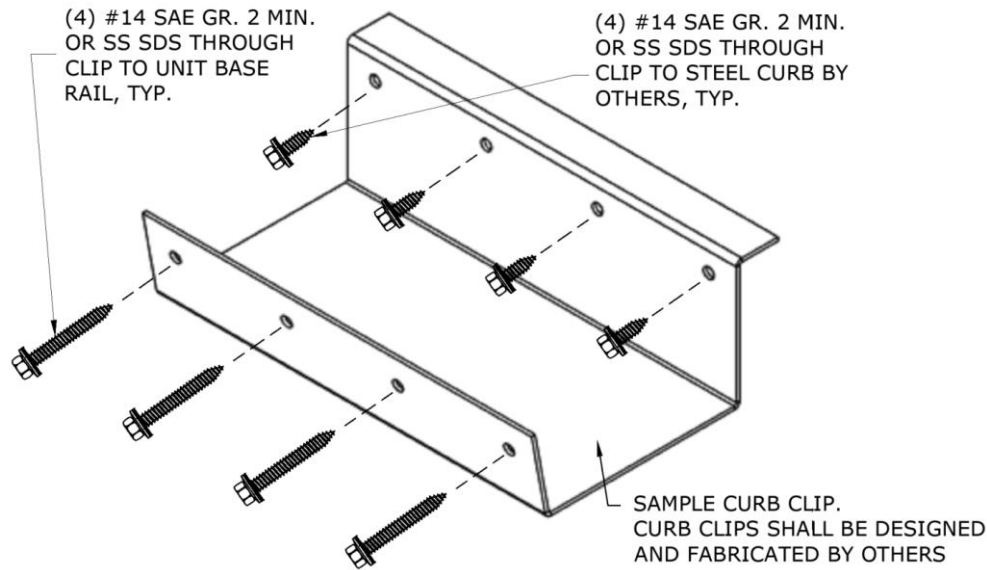
Fasten each curb clip to the curb with (4) #14 (1/4" Ø), SAE Gr. 2 min. or SS self-drilling screws with 1" min. spacing between screws, typ. Provide 3/8" min. edge distance to any edge of the curb clip and the steel curb, typ. See the associated Details herein.

Once the unit is positioned on the curb and the unit base rail is resting on the curb clips: Fasten the curb clip to the unit base rail with (4) #14 (1/4" Ø), SAE Gr. 2 min. or SS self-drilling screws with 1" min. spacing between screws, typ. Provide 3/8" min. edge distance to any clip edge and to any edges/openings in the unit base rail, typ. See the associated Details herein.

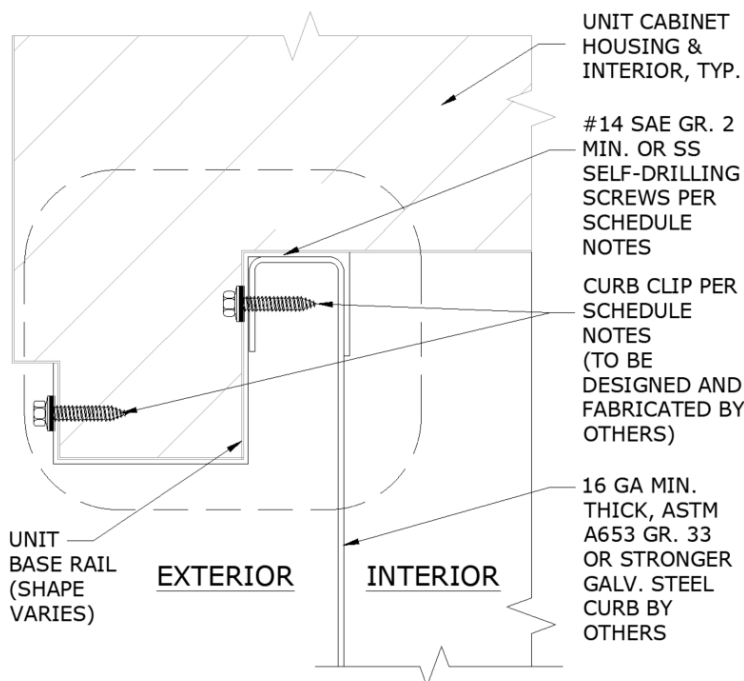
Ensure all screws fully engage with both members in contact.

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SEE NEXT PAGE FOR UNIT MOUNT TO HOST CURB (CURB CLIP MOUNT) TIE-DOWN DETAILS

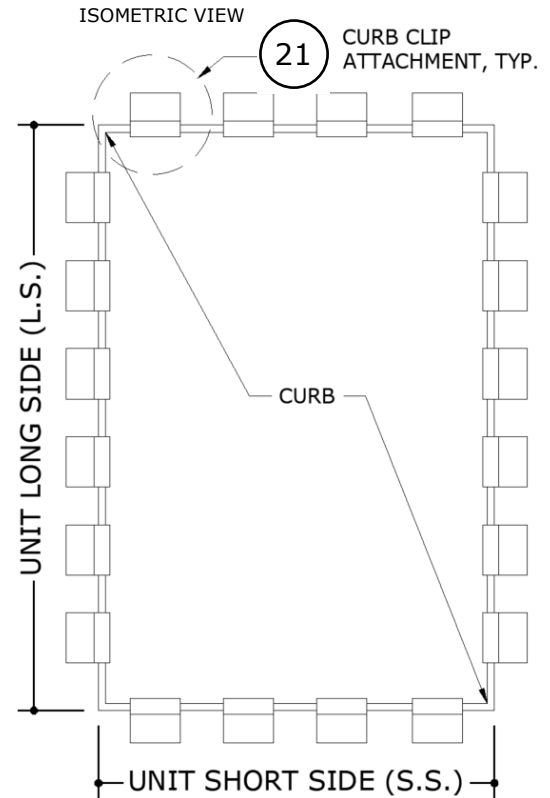
UNIT MOUNT TO HOST CURB (CURB CLIP MOUNT OPTION), TIE-DOWN DETAILS 20 - 22

20 SAMPLE CURB CLIP SCREW ATTACHMENT, TYP.
SCALE: NTS



21 UNIT ATTACHMENT TO CURB WITH CURB CLIP, TYP.
SCALE: NTS

SECTION VIEW



22 SAMPLE CURB CLIP LAYOUT, TYP.
SCALE: NTS

TOP VIEW

TIE-DOWN DETAILS, 20 - 22 NOTES

For each Detail in this section, consult the Schedule and Notes herein for all tie-down components & specifications required.

The units, curb, curb clip, and screws depicted in the Details on this page are for illustrative purposes only and may vary in quantity and/or appearance. The tie-down system may not be depicted in full. The sample tie-down layouts shown herein are for illustrative purposes only.

Curb clip and screw locations may vary per the specifications of the Schedule and Notes herein. Host curb, curb clip, and unit base rail shapes may vary. For the curb clip screws fastening to the curb shown in Detail 21: the screws are permitted to be oriented in the opposite horizontal direction, such that the screw head is located in the curb interior and faces outward. (Vertical orientation of the screws is not permitted). Screw orientation depends on the curb clip design by others.

PANEL INTEGRITY SUMMARY: NOTES

The following notes apply to all Cabinet Groups described herein:

Panel integrity calculations were based on information provided by the client and manufacturer-listed specifications. Calculations are valid for all Cabinet Group unit models listed and defined herein. Specifications herein apply to the respective Cabinet Group unit models. See "Model Information" section on page 2 for Cabinet Group designations. All exterior panels were considered in the calculations and are covered by this certification. Panels were assigned various porosities depending on the ratio of louver/aperture area to total panel area, for the purposes of calculating the acting wind force on each panel. Screw sizes, quantities on panels, and panel characteristics were considered based on client-provided information and additional conservative assumptions. Screw quantities were checked to reinforce unit panels as needed.

"Additional screws" are screws that are required to be installed **in addition to** the existing screws present as part of the original unit design(s) submitted to this office, unless noted otherwise (U.N.O.). It is the installing contractor's responsibility to ensure additional screws are installed on the unit as applicable. The purpose of additional screws is to ensure panel connection integrity, referred to herein as "panel integrity", is sufficiently validated, such that the panel in question can withstand a high-speed wind gust and not detach or otherwise become flying debris.

Additional screw(s) shall be #14 (1/4" min. Ø), SAE Gr. 2 min. or SS SMS. 1000 hours of ASTM B117 with zero red rust is required for all additional screws. Position additional screw(s) as directed by the respective "Additional Screws Directive" specifications for the panel in question. Provide 1" min. spacing between neighboring screws (existing or additional). Validate that each additional screw joins the panel in question to the other specified member (as specified in the "Additional Screws Directive" where applicable). See diamond "◇" regions in the following Panel Integrity Details for approximate screw locations.

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SEE THE FOLLOWING PAGES PAGE FOR PANEL INTEGRITY SUMMARIES

PANEL INTEGRITY SUMMARY: CABINET GROUP I (PAGE 1 OF 3)

No additional screws are required for ASD wind pressures up to ± 32 psf lateral & 0 psf uplift.

For site-specific ASD pressures greater than ± 32 psf lateral & 0 psf uplift, follow the directives and specifications as noted in the Panel Integrity Summary Tables and Notes herein:

Cabinet Group I Up to ± 54 psf Lateral & 0 psf Uplift Wind Pressures		
Panel Designations	Addtl. Screws Required	Additional Screws Directive
Panel C Blower Access Door	4	Install (4) addtl. screw(s) along either: (i) the top of the panel to join with the top intermediate bracket (C-channel) between Panels C and J, or (ii) the left and right sides of the panel to join with the main body of the unit, (2) screws each side.
(4) Additional Screw Required in Total per Unit. Addtl. screws shall be #14 min. Ø, SAE Gr. 2 min. or SS SMS. See notes below for further specifications.		

NOTE: The individual Panel Integrity additional screw counts and directives shown are valid for both standard and alternate configurations, but the screw totals shown at the bottom of each table are the sums for alternate configurations only. Standard configurations have two of each of the following panels: "A", "B", "C", "D", "E" (one set of each at the front and back sides) and have zero of the following panels: "L", "M", "N", "O". Recalculate total screw counts for standard configurations accordingly. Contact Engineering Express if additional clarification is needed.

Cabinet Group I Up to ± 80 psf Lateral & 64 psf Uplift Wind Pressures		
Panel Designations	Addtl. Screws Required	Additional Screws Directive
Panel A Control Box Door	2	Install (1) addtl. screw(s) at bottom of panel to join with the unit base. Install (1) addtl. screw(s) at top of panel to join with the roof Panel I.
Panel C Blower Access Door	8	Install (6) addtl. screw(s) at the top of the door to join with the top intermediate bracket (C-channel) between Panels C and J. Install (2) addtl. screws along the left and right ends of the panel, (1) per side, joining the panel to the main body of the unit.
Panel D Heat Access Door	1	Install (1) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel H Left Lower Panel	1	Install (1) addtl. screw(s) at bottom of panel to join with the unit base.
Panel J Middle Roof Panel	6	Install (3) addtl. screw(s) at the front side of the unit to join with the top intermediate bracket (C-channel) between Panels C and J. Install (3) addtl. screw(s) at the back side of the unit to join with Panel L.
(18) Additional Screw Required in Total per Unit. Addtl. screws shall be #14 min. Ø, SAE Gr. 2 min. or SS SMS. See notes below for further specifications.		

NOTE: Wind pressures listed in the tables are ASD wind pressures. See the next page for additional Panel Integrity Summary Tables.

PANEL INTEGRITY SUMMARY: CABINET GROUP I (PAGE 2 OF 3)

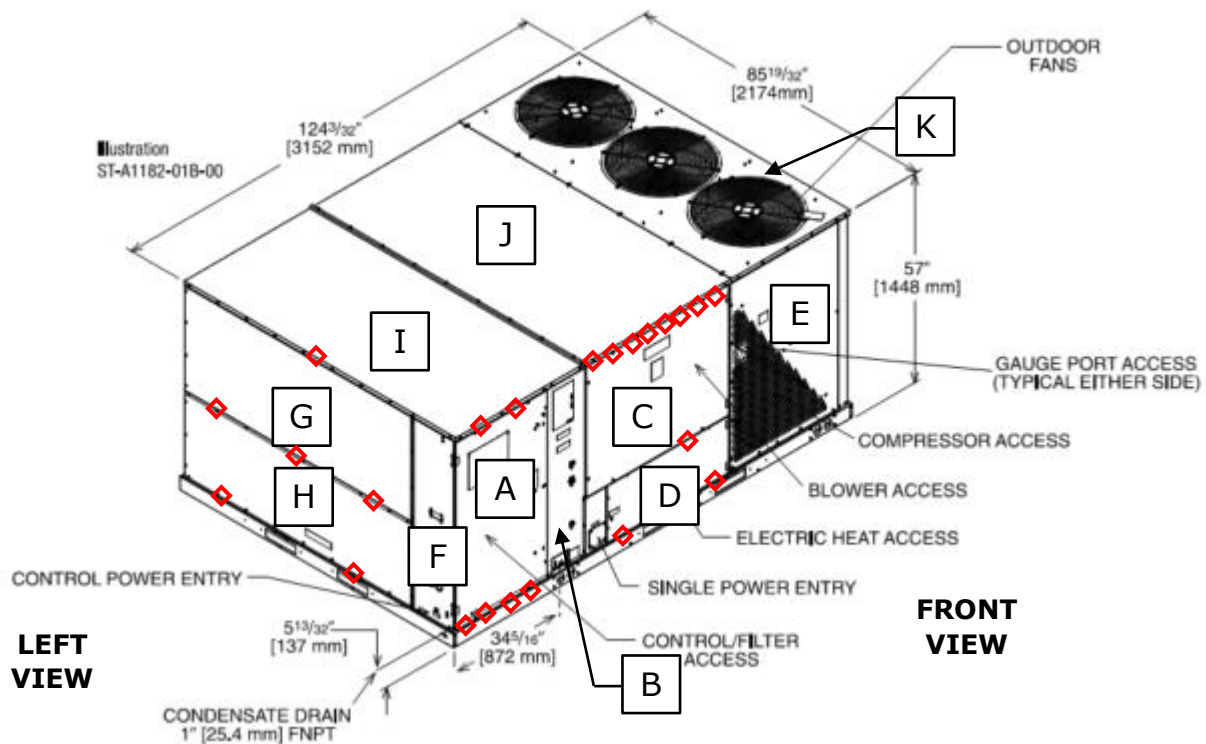
Cabinet Group I Up to ± 110 psf Lateral & 87 psf Uplift Wind Pressures		
Panel Designations	Addtl. Screws Required	Additional Screws Directive
Panel A Control Box Door	4	Install (2) addtl. screw(s) at bottom of panel to join with the unit base. Install (2) addtl. screw(s) at top of panel to join with the roof Panel I.
Panel C Blower Access Door	12	Install (10) addtl. screw(s) at the top of the door to join Install (2) addtl. screws along the left and right ends of the panel, (1) per side, joining the panel to the main body of the unit.
Panel D Heat Access Door	2	Install (1) addtl. screw(s) at bottom of panel to join with the unit base. Install (1) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel H Left Lower Panel	3	Install (2) addtl. screw(s) at bottom of panel to join with the unit base. Install (1) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel J Middle Roof Panel	10	Install (5) addtl. screw(s) at the front side of the unit to join with the top intermediate bracket (C-channel) between Panels C and J. Install (5) addtl. screw(s) at the back side of the unit to join with Panel L.
Panel M Supply Cover Panel	2	Install (1) addtl. screw(s) at bottom of panel and (1) addtl. screw(s) at top of panel to join with the main body of the unit.
(33) Additional Screw Required in Total per Unit. Addtl. screws shall be #14 min. Ø, SAE Gr. 2 min. or SS SMS. See notes below for further specifications.		

NOTE: The individual Panel Integrity additional screw counts and directives shown are valid for both standard and alternate configurations, but the screw totals shown at the bottom of each table are the sums for alternate configurations only. Standard configurations have two of each of the following panels: "A", "B", "C", "D", "E" (one set of each at the front and back sides) and have zero of the following panels: "L", "M", "N", "O". Recalculate total screw counts for standard configurations accordingly. Contact Engineering Express if additional clarification is needed.

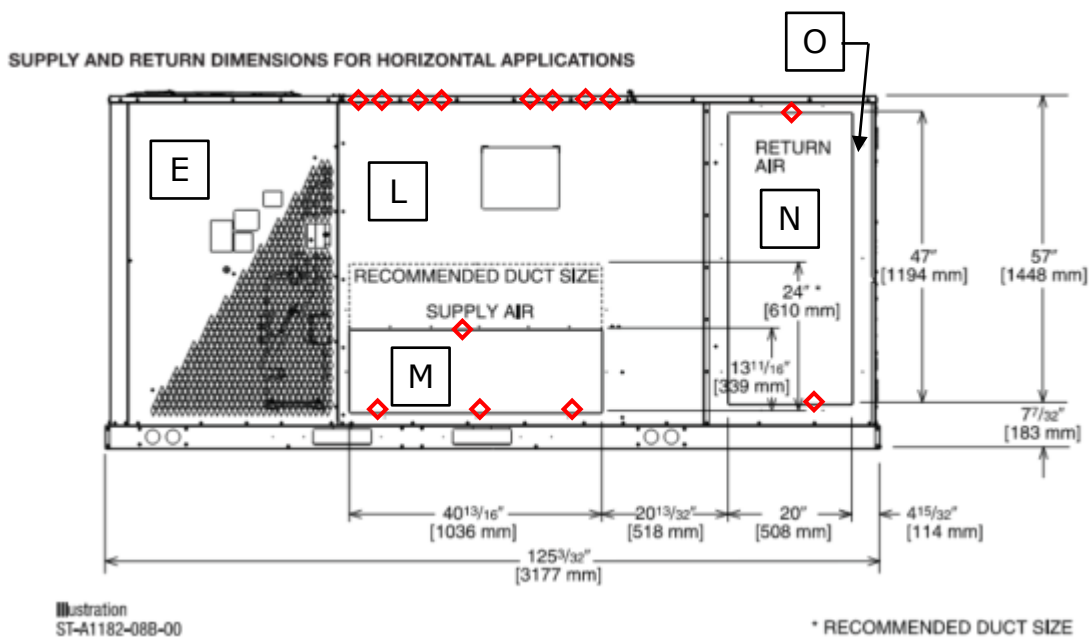
Cabinet Group I Up to ± 140 psf Lateral & 111 psf Uplift Wind Pressures		
Panel Designations	Addtl. Screws Required	Additional Screws Directive
Panel A Control Box Door	6	Install (4) addtl. screw(s) at bottom of panel to join with the unit base. Install (2) addtl. screw(s) at top of panel to join with the roof Panel I.
Panel C Blower Access Door	17	Install (17) addtl. screw(s) at the top of the door to join with the top intermediate bracket (C-channel) between Panels C and J.
Panel D Heat Access Door	3	Install (2) addtl. screw(s) at bottom of panel to join with the unit base. Install (1) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel H Left Lower Panel	5	Install (2) addtl. screw(s) at bottom of panel to join with the unit base. Install (3) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel I Left Top Panel	1	Install (1) addtl. screw(s) at left side of panel to join with Panel G.
Panel J Middle Roof Panel	16	Install (8) addtl. screw(s) at the front side of the unit to join with the top intermediate bracket (C-channel) between Panels C and J. Install (8) addtl. screw(s) at the back side of the unit to join with Panel L.
Panel M Supply Cover Panel	4	Install (3) addtl. screw(s) at bottom of panel and (1) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel N Return Cover Panel	2	Install (1) addtl. screw(s) at bottom of panel and (1) addtl. screw(s) at top of panel to join with the main body of the unit.
(54) Additional Screw Required in Total per Unit. Addtl. screws shall be #14 min. Ø, SAE Gr. 2 min. or SS SMS. See notes below for further specifications.		

NOTE: Wind pressures listed in the tables are ASD wind pressures.

PANEL INTEGRITY SUMMARY: CABINET GROUP I (PAGE 3 OF 3)



23 SAMPLE ADDTL. SCREW LOCATIONS
SCALE: NTS LEFT-FRONT ISOMETRIC VIEW



24 SAMPLE ADDTL. SCREW LOCATIONS
SCALE: NTS ALT. BACK SIDE VIEW

PANEL INTEGRITY SUMMARY: CABINET GROUP II (PAGE 1 OF 3)

No additional screws are required for ASD wind pressures up to ± 26 psf lateral & 0 psf uplift.

For site-specific ASD pressures greater than ± 26 psf lateral & 0 psf uplift, follow the directives and specifications as noted in the Panel Integrity Summary Tables and Notes herein:

Cabinet Group II Up to ± 54 psf Lateral & 0 psf Uplift Wind Pressures		
Panel Designations	Addtl. Screws Required	Additional Screws Directive
Panel C Blower Access Door	6	Install (6) addtl. screw(s) along either: (i) the top of the panel to join with the top intermediate bracket (C-channel) between Panels C and J, or (ii) the left and right sides of the panel to join with the main body of the unit, (3) screws each side.
(6) Additional Screw Required in Total per Unit. Addtl. screws shall be #14 min. Ø, SAE Gr. 2 min. or SS SMS. See notes below for further specifications.		

NOTE: The individual Panel Integrity additional screw counts and directives shown are valid for both standard and alternate configurations, but the screw totals shown at the bottom of each table are the sums for alternate configurations only. Standard configurations have two of each of the following panels: "A", "B", "C", "D", "Q", "R" (one set of each at the front and back sides) and have zero of the following panels: "L", "M", "N", "O". Recalculate total screw counts for standard configurations accordingly. Contact Engineering Express if additional clarification is needed.

Cabinet Group II Up to ± 80 psf Lateral & 64 psf Uplift Wind Pressures		
Panel Designations	Addtl. Screws Required	Additional Screws Directive
Panel A Control Box Door	2	Install (1) addtl. screw(s) at bottom of panel to join with the unit base. Install (1) addtl. screw(s) at top of panel to join with the roof Panel I.
Panel C Blower Access Door	10	Install (8) addtl. screw(s) at top of panel to join with the top intermediate bracket (C-channel) between Panels C and J. Install (2) addtl. screws along the left and right ends of the panel, (1) per side, joining the panel to the main body of the unit.
Panel D Heat Access Door	1	Install (1) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel H Left Lower Panel	1	Install (1) addtl. screw(s) at bottom of panel to join with the unit base.
Panel J Middle Roof Panel	8	Install (4) addtl. screw(s) at the front side of the unit to join with the top intermediate bracket (C-channel) between Panels C and J. Install (4) addtl. screw(s) at the back side of the unit to join with Panel L.
Panel T Outdoor Top-Middle Panel	2	Install (2) addtl. screw(s) at the right side of the unit to join with the underneath panel.
(24) Additional Screw Required in Total per Unit. Addtl. screws shall be #14 min. Ø, SAE Gr. 2 min. or SS SMS. See notes below for further specifications.		

NOTE: Wind pressures listed in the tables are ASD wind pressures. See the next page for additional Panel Integrity Summary Tables.

PANEL INTEGRITY SUMMARY:
CABINET GROUP II (PAGE 2 OF 3)

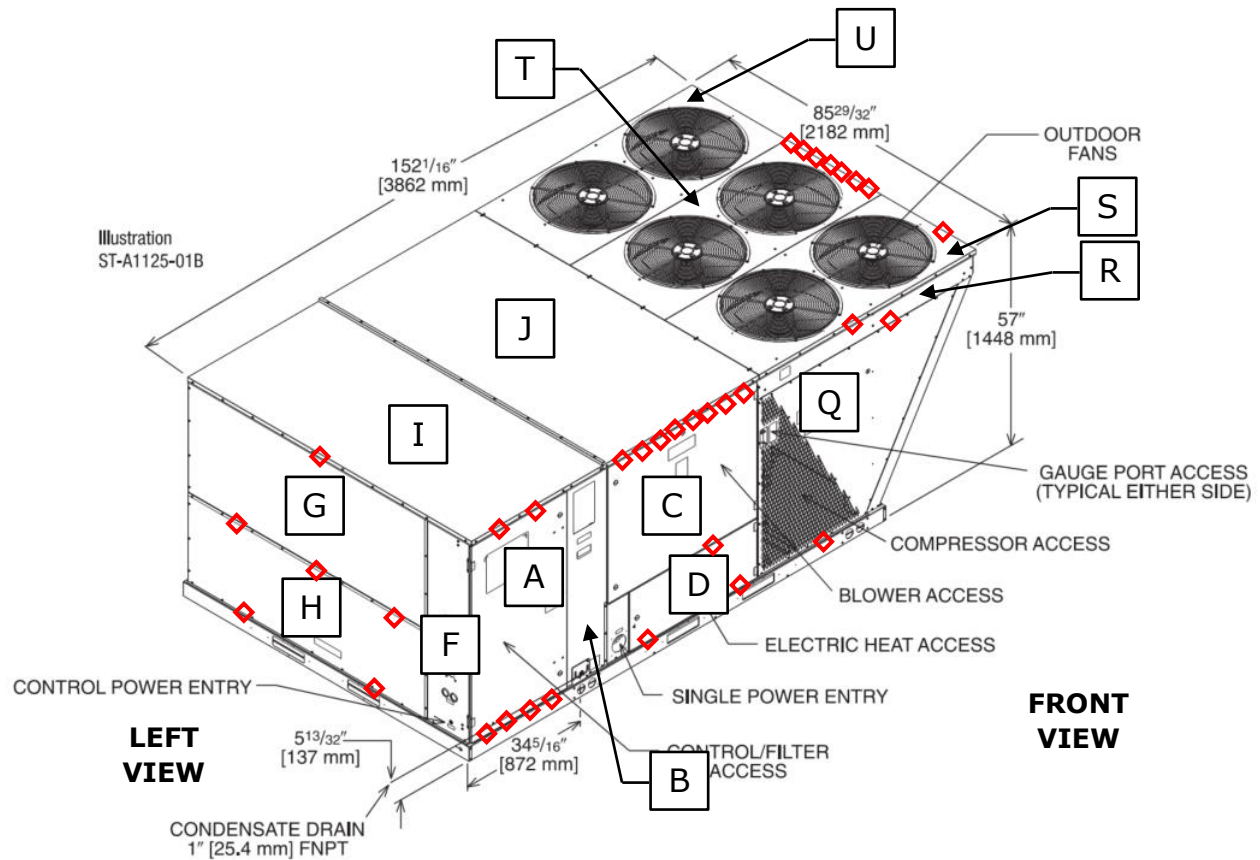
Cabinet Group II Up to ± 110 psf Lateral & 87 psf Uplift Wind Pressures		
Panel Designations	Addtl. Screws Required	Additional Screws Directive
Panel A Control Box Door	4	Install (2) addtl. screw(s) at bottom of panel to join with the unit base. Install (2) addtl. screw(s) at top of panel to join with the roof Panel I.
Panel C Blower Access Door	16	Install (14) addtl. screw(s) at top of panel to join with the top intermediate bracket (C-channel) between Panels C and J. Install (2) addtl. screws along the left and right ends of the panel, (1) per side, joining the panel to the main body of the unit.
Panel D Heat Access Door	2	Install (1) addtl. screw(s) at bottom of panel to join with the unit base. Install (1) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel H Left Lower Panel	3	Install (2) addtl. screw(s) at bottom of panel to join with the unit base. Install (1) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel J Middle Roof Panel	14	Install (7) addtl. screw(s) at the front side of the unit to join with the top intermediate bracket (C-channel) between Panels C and J. Install (7) addtl. screw(s) at the back side of the unit to join with Panel L.
Panel M Supply Cover Panel	2	Install (1) addtl. screw(s) at bottom of panel and (1) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel T Outdoor Top-Middle Panel	4	Install (4) addtl. screw(s) at the right side of the unit to join with the underneath panel.
(45) Additional Screw Required in Total per Unit. Addtl. screws shall be #14 min. Ø, SAE Gr. 2 min. or SS SMS. See notes below for further specifications.		

NOTE: The individual Panel Integrity additional screw counts and directives shown are valid for both standard and alt. configurations, but the screw totals shown at the bottom of each table are the sums for alternate configurations only. Standard configurations have two of each of the following panels: "A", "B", "C", "D", "Q", "R" (one set of each at the front and back sides) and have zero of the following panels: "L", "M", "N", "O". Recalculate total screw counts for standard configurations accordingly. Contact Engineering Express if additional clarification is needed.

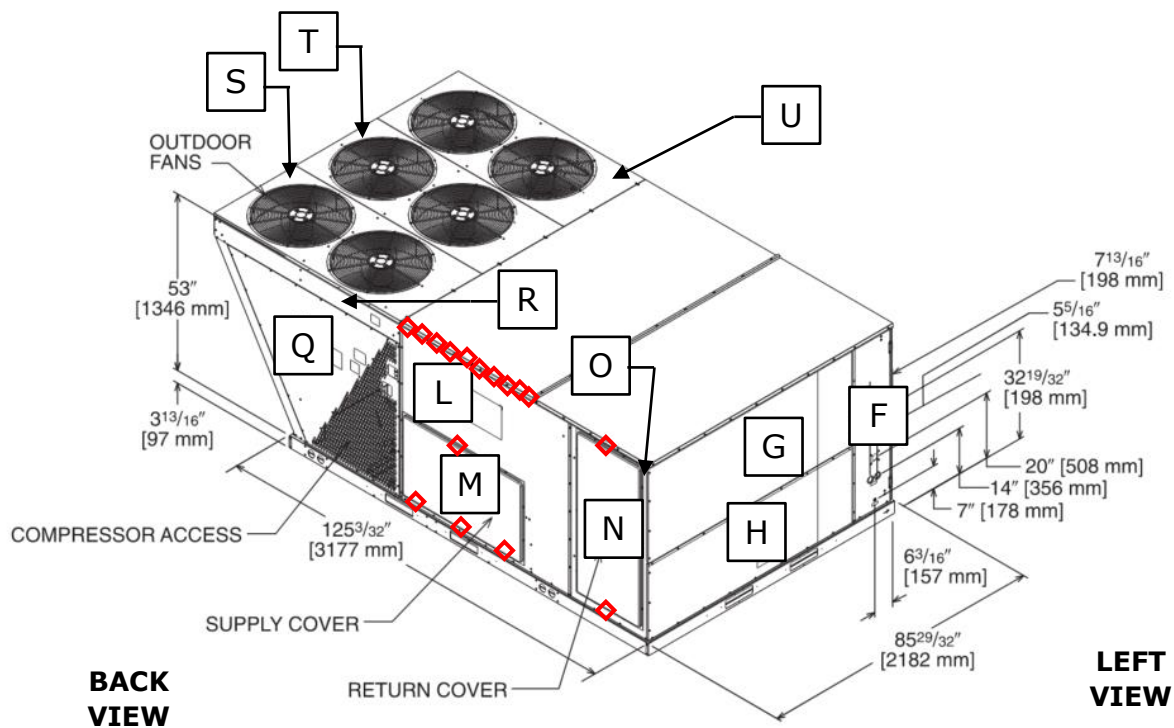
Cabinet Group II Up to ± 140 psf Lateral & 111 psf Uplift Wind Pressures		
Panel Designations	Addtl. Screws Required	Additional Screws Directive
Panel A Control Box Door	6	Install (4) addtl. screw(s) at bottom of panel to join with the unit base. Install (2) addtl. screw(s) at top of panel to join with the roof Panel I.
Panel C Blower Access Door	21	Install (21) addtl. screw(s) at the top of the door to join with the top intermediate bracket (C-channel) between Panels C and J.
Panel D Heat Access Door	3	Install (2) addtl. screw(s) at bottom of panel to join with the unit base. Install (1) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel H Left Lower Panel	5	Install (2) addtl. screw(s) at bottom of panel to join with the unit base. Install (3) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel I Left Top Panel	1	Install (1) addtl. screw(s) at left side of panel to join with Panel G.
Panel J Middle Roof Panel	20	Install (10) addtl. screw(s) at the front side of the unit to join with the top intermediate bracket (C-channel) between Panels C and J. Install (10) addtl. screw(s) at the back side of the unit to join with Panel L.
Panel M Supply Cover Panel	4	Install (3) addtl. screw(s) at bottom of panel and (1) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel N Return Cover Panel	2	Install (1) addtl. screw(s) at bottom of panel and (1) addtl. screw(s) at top of panel to join with the main body of the unit.
Panel Q Condenser Access Panel	2	Install (1) addtl. screw at bottom of panel to join with the unit base. Install (1) addtl. screw at top of panel to join with above Panel R.
Panel S Outdoor Top-Front Panel	2	Install (1) addtl. screw at the front side of the unit to join with the front Panel Q. Install (1) addtl. screw at the right side of the unit to join with the underneath panel.
Panel T Outdoor Top-Middle Panel	7	Install (7) addtl. screw(s) at the right side of the unit to join with the underneath panel.
(73) Additional Screw Required in Total per Unit. Addtl. screws shall be #14 min. Ø, SAE Gr. 2 min. or SS SMS. See notes below for further specifications.		

NOTE: Wind pressures listed in the tables are ASD wind pressures.

PANEL INTEGRITY SUMMARY: CABINET GROUP II (PAGE 3 OF 3)



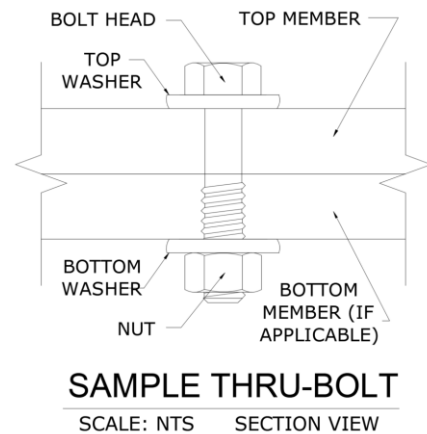
(25) **SAMPLE ADDTL. SCREW LOCATIONS**
SCALE: NTS FRONT-LEFT ISOMETRIC VIEW



(26) **SAMPLE ADDTL. SCREW LOCATIONS**
SCALE: NTS ALT. BACK-LEFT ISOMETRIC VIEW

TERMINOLOGY, CONTINUED

The following abbreviations may appear in this report: "Addtl." for "additional", "AHJ" for "Authority Having Jurisdiction", "alum" for "aluminum", "ASCE" for "American Society of Civil Engineers", "ASD" for "Allowable Stress Design", "ASTM" for "American Society for Testing and Materials", "EA." for "each", "E.D." for "edge distance", "EDDS" for "extra deep drawing steel", "e.g." for "exempli gratia" or "for example", "equiv." for "equivalent", "FBC" for "Florida Building Code", "FEA" for "Finite Element Analysis", "FLCA" for "Florida Certificate of Authorization", "FS" for "Florida Statutes", "Fu" for "ultimate tensile strength" or "ultimate tensile stress", "Fy" for "yield strength" or "yield stress", "GA" for "gauge", "GR." or "Gr." for "grade", "HVAC" for "heating, ventilation, and air conditioning", "HVHZ" for "High-Velocity Hurricane Zone", "i.e." for "id est" or "in other words", "in" for "inch", "lb" for "pound (force)", "max." for "maximum", "min." for "minimum", "mm" for "millimeter", "NTS" for "not to scale", "O.C." for "on center", "OD" for "outer diameter", "pcf" for "pounds (force) per cubic foot", "PE" for "Professional Engineer", "qty" for "quantity", "SAE" for "Society of Automotive Engineering", "SMS" for "sheet metal screws", "SS" for "stainless steel", "TER" for "Technical Evaluation Report", "typ." for "typical", "ult" for "ultimate loads", "U.N.O." for "unless noted otherwise", "UTS" for "ultimate tensile strength" or "ultimate tensile stress", "WLL" for "working load limit", "w/o" for "without", "YS" for "yield strength" or "yield stress", "#" for "number", "&" for "and", and "Ø" for "diameter". Please visit ecalx.io/glossary for additional abbreviation clarifications.



Note: The term "Thru-Bolt" or through bolt, if used herein, refers to a bolt passing through the member(s) in contact and is fastened by a nut at the end opposite the screw head. Nut shall be equivalent to or exceed the strength of the bolt U.N.O. Nut shall be sized to accommodate the same nominal diameter as the bolt U.N.O. See diagram above-right for a sample thru-bolt configuration.

Note: For instances herein which list material specifications as "[material type] or stronger".

U.N.O. herein, the term "stronger" refers to a material with a UTS value equal to or greater than the UTS value of the stated material type. Consult appropriate literature for established material UTS values.

Note: Equivalent steel gauge thicknesses as used in this evaluation, U.N.O., are as follows:
22 GA (.030"), 20 GA (.036"), 18 GA (.048"), 16 GA (.060"), 14 GA (.075"), 12 GA (.098").

LIMITATIONS & CONDITIONS OF USE, CONTINUED

Use of this product shall be in strict accordance with this product evaluation as noted herein. The supporting host structure shall be designed to resist all superimposed loads as determined by others on a site-specific basis as may be required by the authority having jurisdiction. Host structure conditions which are not accounted for in this product's respective anchor schedule shall be designed for on a site-specific basis by a registered Professional Engineer. No evaluation is offered for the host supporting structure by use of this document. Adjustment factors noted herein and the applicable building codes must be considered, where applicable. Product components shall be of the material(s) specified in the manufacturer-provided product specifications. All supporting components which are permanently installed shall be protected against corrosion, contamination, and other such damage at all times. All fasteners and anchors shall be installed in accordance with the applicable provisions specified herein in addition to the anchor/fastener manufacturers' published installation instructions. Fasteners must penetrate the supporting members such that the full length of the threaded portion is embedded within the main member. This evaluation does not offer any evaluation to meet large missile impact debris requirements under any circumstances.

All of the wind-resisting exterior panels (with accompanying retrofits) individually meet or exceed their capacity to resist the design wind loads as stated in the calculations as required by the codes and standards stated herein. Due to the indeterminate nature of these units, distortion, deflection, and material deformation cannot be accurately evaluated, but with the diaphragm action of external components and internal stiffeners, the base unit (with accompanying retrofits stated herein as applicable) has the capacity to withstand the design wind loads without detaching from the unit and becoming flying debris.

Survivability: This performance evaluation is valid for a newly installed unit and do not include certification of the product beyond a design event or if impacted by any debris. Inspections shall be implemented annually by the end user and after every named storm. All fasteners and cabinet components are to be verified, and all damaged, loose, corroded and/or broken fasteners and cabinet components shall be replaced to ensure structural integrity against hurricane wind forces. Contact this office for any reevaluation needs or as designated by the Authority Having Jurisdiction.

Durability: Components or component assemblies shall not deteriorate, crack, fail, or lose functionality due to galvanic corrosion or weathering. All supporting components which are permanently installed shall be protected against corrosion, contamination, and other such damage at all times. Each component or component assembly shall be supported and oriented in its intended installation position. All exposed plastic components shall be certified to resist sunlight exposure as specified by ASTM B117, or ASTM G155 in Broward or Miami Dade counties.

Extent of Certification: Certification pertains to the overall structural integrity of the unit components listed within the evaluation as required by code, subject to the limitations and criteria stated herein. Operability during or after a design event is not included in this certification. Water infiltration is outside the bounds of this certification. No other certifications are intended other than as described herein. This evaluation alone does not offer any evaluation for large missile impact debris or cyclic wind requirements unless specifically stated herein.

Proj. #	Remarks	By	Checked	Date	Proj. #	Remarks	By	Checked	Date
24-76223	Initial Issue	MARH	EPR	07/11/24					
24-76223	Add models	MARH	EPR	11/25/24					

APPENDIX A: DESIGN WIND PRESSURE GUIDE

Max. Ult. Wind Speed (V_{ult})	Max. MRH (Roof Height)	Exposure Category	Required Design Wind Pressures (ASD)	
			Lateral Pressure	Uplift Pressure
140 mph	At-Grade (0 ft)	C	± 26 psf	0* psf
		D	± 31 psf	0* psf
	100 ft	C	± 63 psf	50 psf
		D	± 71 psf	56 psf
	200 ft	C	± 72 psf	57 psf
		D	± 80 psf	63 psf
175 mph	At-Grade (0 ft)	C	± 40 psf	0* psf
		D	± 49 psf	0* psf
	100 ft	C	± 98 psf	77 psf
		D	± 111 psf	87 psf
	200 ft	C	± 113 psf	89 psf
		D	± 124 psf	98 psf
186 mph	At-Grade (0 ft)	C	± 46 psf	0* psf
		D	± 54 psf	0* psf
	100 ft	C	± 111 psf	87 psf
		D	± 125 psf	99 psf
	200 ft	C	± 127 psf	100 psf
		D	± 140 psf	111 psf

100 psf

Note: Any table values with the format shown left, if present, indicate design wind pressures and site conditions that are **not approved for use** by this evaluation. Seek additional engineering or contact this firm for design solutions.

DIRECTIVE: This design pressure guide is for reference only and shall be approved for use by the Authority Having Jurisdiction (AHJ). If the design pressures listed in this guide are not used, required design pressures shall be calculated separately. For site-specific scenarios classified as Exposure Category B, the required design pressures stated for Exposure Category C in the above guide shall be used or design pressures shall be calculated separately. For heights and parameters beyond the parameters listed in this guide, visit our Online Calculator via the website link (<https://ecalc.io/forces>) or QR Code below, or obtain calculations separately by others.

The required ASD design pressures listed in this guide were calculated per the table's listed corresponding site conditions. The project design professional or permitting contractor shall verify that the site-specific conditions are equal to or less than the approved design parameters listed in the guide. Per the note below table: any values shown as "XX psf", indicate wind pressures and corresponding site conditions that are **not valid for use** with this evaluation (exceeds the max. rated pressures).

*Note: Per the codes and standards referenced herein, uplift is not required for mechanical equipment at-grade. If uplift at-grade is required by the AHJ, contact this firm for a site-specific evaluation.

At-Grade (0 ft MRH) Required Design Pressures:

- o ASCE 7 "Design Wind Loads: Other Structures"
- o Structure Shape = Square, flat terrain
- o Height of structure (unit + stand or curb, if used) = 6 ft max.
- o Width of unit = 1 ft min., Depth of unit = 11 in min.

Rooftop (>15 ft MRH) Required Design Pressures:

- o ASCE 7 "Design Wind Loads: Other Structures: Rooftop Structures and Equipment for Buildings"
- o Structure Shape = Square, flat terrain
- o z = up to 7 ft, where z = height of stand or curb + ½ unit height
- o Lateral GC_f = 1.90; Uplift GC_f = 1.50

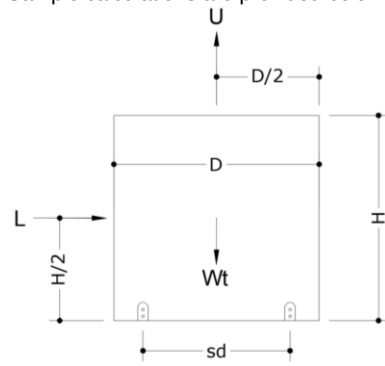
VISIT [ECALC.IO/FORCES](https://ecalc.io/forces)

FOR DESIGN AID CALCULATORS AND RESOURCES RELATED TO THIS EVALUATION & GUIDES HEREIN, OR SCAN THE QR CODE RIGHT >



UNIT REACTIONS FROM WIND GUIDE

DIRECTIVE: This guide is intended for use by a design professional. Design parameters shall abide all specifications and limitations stated in this evaluation. Design professional shall consider all forces, including seismic and snow loads, per the governing building code. Unit reactions obtained from this guide shall be verified by a registered Professional Engineer. Reactions are applicable for unit-to-host connections only. Sample calculations are provided below.

**Design Parameters:**

- Lateral Wind Pressure, P_{lat}
- Unit Height, H
- Unit Width, W
- Support Spacing across Depth, sd
- Uplift Wind Pressure, P_{up}
- Unit Depth, D
- Unit Weight, Wt
- Support Spacing across Width, sw

Unit Reaction Equations:**Long Side (Width x Height):**

- Sliding Force, L = P_{lat} x W x H
- Uplift Force, U = P_{up} x W x D
- Total Tension per Long Side = (L x H/2 + U x sd/2 - Wt x 0.6 x sd/2) / sd

Short Side (Depth x Height):

- Sliding Force, L = P_{lat} x D x H
- Uplift Force, U = P_{up} x W x D
- Total Tension per Short Side = (L x H/2 + U x sw/2 - Wt x 0.6 x sw/2) / sw

Example: A (48" W x 36" D x 42" H), 250 lb net weight unit at wind pressures of 120 psf lateral and 95 psf uplift, on a 24" wide roof stand, shall have the following unit reactions:

Long Side (Width x Height):

1. Sliding Force, L = P_{lat} x W x H
= (120 psf) x (48 in) x (42 in) x (1 in² / 144 ft²) = **1680 lb**
2. Uplift Force, U = P_{up} x W x D
= (95 psf) x (48 in) x (36 in) x (1 in² / 144 ft²) = **1140 lb**
3. Total Tension per Long Side =
= (L x H/2 + U x sd/2 - Wt x 0.6 x sd/2) / sd
= ((1680 lb x 42/2 in) + (1140 lb x 24/2 in) - (250 lb x 0.6 x 24/2 in)) / 24 in = **1965 lb**

Short Side (Depth x Height):

1. Sliding Force, L = P_{lat} x D x H
= (120 psf) x (36 in) x (42 in) x (1 in² / 144 ft²) = **1260 lb**
2. Uplift Force, U = P_{up} x W x D
= (95 psf) x (48 in) x (36 in) x (1 in² / 144 ft²) = **1140 lb**
3. Total Tension per Short Side =
= (L x H/2 + U x sw/2 - Wt x 0.6 x sw/2) / sw
= ((1260 lb x 42/2 in) + (1140 lb x 48/2 in) - (250 lb x 0.6 x 48/2 in)) / 48 in = **1046 lb**

IN ALL CONDITIONS IT IS THE RESPONSIBILITY OF THE PERMIT HOLDER TO ENSURE THE HOST STRUCTURE IS CAPABLE OF WITHSTANDING THE RATED GRAVITY, LATERAL, AND UPLIFT FORCES BY SITE-SPECIFIC DESIGN. NO WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED, IS OFFERED BY ENGINEERING EXPRESS AS TO THE INTEGRITY OF THE HOST STRUCTURE TO CARRY DESIGN FORCE LOADS INCURRED BY THIS UNIT.