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(Subject to Renew January 1, 2027 or next code cycle)

EVALUATION SUBJECT: SAMSUNG RAC (RESIDENTIAL AIR CONDITIONING) UNITS**TER-23-69459****REPORT HOLDER:**SAMSUNG HVAC
776 HENRIETTA CREEK RD, STE. 100
ROANOKE, TX 76262, USA
(888) 699-6067 | SAMSUNGHVAC.COM**SAMSUNG****SCOPE OF EVALUATION (compliance with the following codes):****THIS IS A STRUCTURAL (WIND) PERFORMANCE EVALUATION ONLY.
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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 Product Evaluation Report 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, FS 471.025, and Broward County Administrative Provisions 107.3.4. This report is also in accordance with the **International Building & Residential Codes (2012, 2015, 2018, & 2021)**. The product noted in this report has been tested and/or evaluated as summarized herein.

**IN ACCORDANCE WITH THESE CODES EACH OF THESE REPORTS
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SEAL OF THE EVALUATING ENGINEER.****SUBSTANTIATING DATA:****• Product Evaluation Documents**

Substantiating documentation has been submitted to provide this TER 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 TER and appears herein.

LIMITATIONS & CONDITIONS OF USE:

Use of the product(s) listed herein shall be in strict accordance with this TER 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:

Unit casing shall have be galv. steel, equivalent to or stronger than ASTM A653 CS Cold-Rolled steel. See panel thicknesses below.

- Unit Integrated Feet: 19 GA (1.06 mm) min. thick
- Wall Panels: 23 GA (0.8 mm) min. thick
- Top Cover: 24 GA (0.7 mm) min. thick
- Panels secured with M4 SAE 1016 SMS screws.

Knockouts provided for utility & control connections. Contact Report Holder for further unit construction information.

**NOTE: THE GRAPHICAL DEPICTIONS IN THIS REPORT 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*:
± 119 psf Lateral, 94 psf Uplift**

- Required design wind pressures shall be determined according to the guide provided in the Appendix (see last page of this report) 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 ASD Wind Pressures indicate the maximum pressures that all units listed herein are approved for. Valid for at-grade, wall-mounted, 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.

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MODEL INFORMATION (Continued on Next Page)

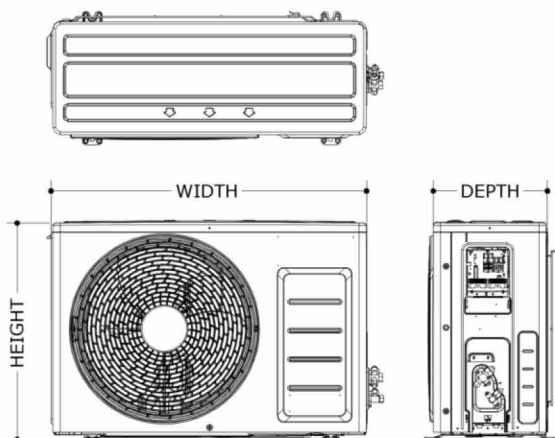
Model Number	Cabinet Group	Unit Dimensions		
		Width	Depth	Height
AR09BSFCMMWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR09CSDABWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR09CSDACWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR09CSFCMMWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR09TSFABWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR09TSFYBWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR12BSFCMMWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR12CSDABWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR12CSDACWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR12CSFCMMWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR12TSFABWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR12TSFYBWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR15CSDABWKXCV	III	34-5/8"	12-3/16"	31-7/16"
AR15CSDACWKXCV	III	34-5/8"	12-3/16"	31-7/16"
AR15CSFCMMWKXCV	II	34-5/8"	12-3/16"	25-1/8"
AR18BSFCMMWKXCV	III	34-5/8"	12-3/16"	31-7/16"
AR18CSDABWKXCV	III	34-5/8"	12-3/16"	31-7/16"
AR18CSDACWKXCV	III	34-5/8"	12-3/16"	31-7/16"
AR18CSFCMMWKXCV	II	34-5/8"	12-3/16"	25-1/8"
AR18TSFABWKXCV	III	34-5/8"	12-3/16"	31-7/16"
AR18TSFYBWKXCV	II	34-5/8"	12-3/16"	25-1/8"
AR24BSFCMMWKXCV	IV	37"	13"	39-1/4"
AR24CSDABWKXCV	IV	37"	13"	39-5/16"
AR24CSDACWKXCV	IV	37"	13"	39-5/16"
AR24CSFCMMWKXCV	III	34-5/8"	12-3/16"	31-7/16"
AR24TSFABWKXCV	IV	37"	13"	39-1/4"
AR24TSFYBWKXCV	III	34-5/8"	12-3/16"	31-3/8"
AR09DXDABWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR12DXDABWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR15DXDABWKXCV	III	34-5/8"	12-3/16"	31-7/16"
AR18DXDABWKXCV	IV	37"	13"	39-5/16"
AR24DXDABWKXCV	IV	37"	13"	39-5/16"
AR09DXFAMWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR12DXFAMWKXCV	I	31-1/8"	11-1/4"	21-9/16"
AR15DXFAMWKXCV	II	34-5/8"	12-3/16"	25-1/8"
AR18DXFAMWKXCV	III	34-5/8"	12-3/16"	31-7/16"
AR24DXFAMWKXCV	IV	37"	13"	39-5/16"
AR36DXFUMGMXCV	V	37"	13"	56-15/16"

Cabinet Group	Allowable Net Weight Range (lb)
I	60 - 100
II	75 - 115
III	100 - 140
IV	130 - 170
V	175-225

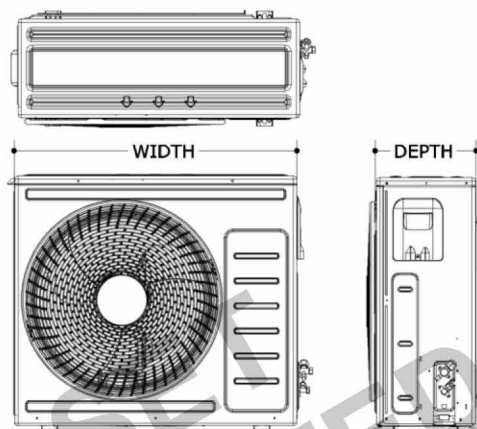
MODEL INFORMATION NOTES

Model information listed herein is based on information provided by the client. Cabinet Groups are designated by Engineering Express based on the unit cabinet and panel layout. See Details 1 – 4 herein for definitions of Cabinet Groups and unit dimensions. Details 1 – 4 do not show the valve/wire covers on the right side. Unit appearances may vary. Unit allowable weights listed above shall be the unit net/operating weights (as opposed to gross/packing/shipping weights). Please contact Report Holder for more information on unit construction.

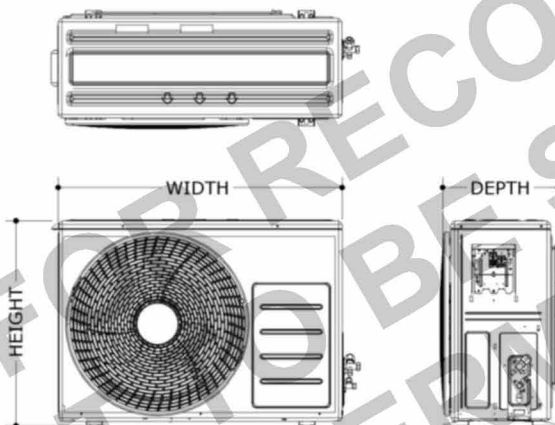
MODEL INFORMATION (Continued from Previous Page)



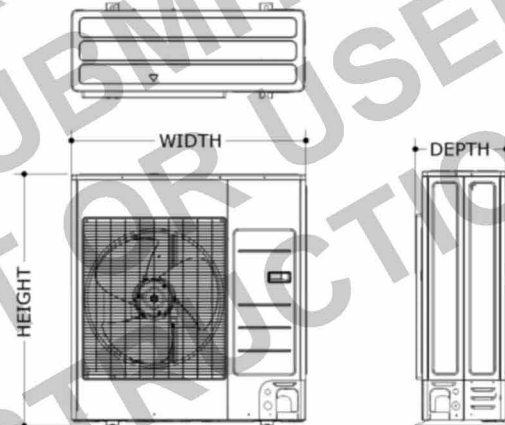
1 CABINET GROUP I
SCALE: NTS FRONT, RIGHT, TOP VIEWS



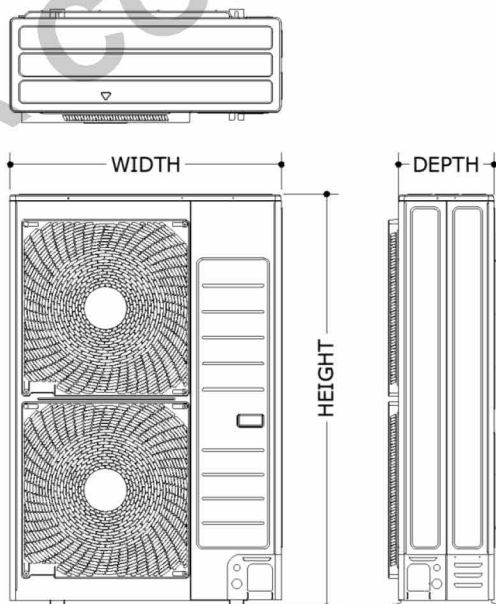
2 CABINET GROUP II
SCALE: NTS FRONT, RIGHT, TOP VIEWS



3 CABINET GROUP III
SCALE: NTS FRONT, RIGHT, TOP VIEWS

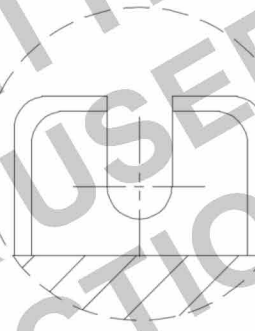
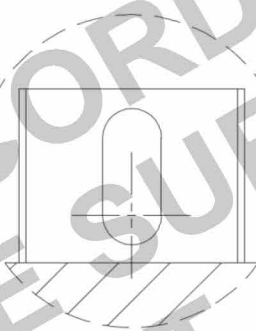
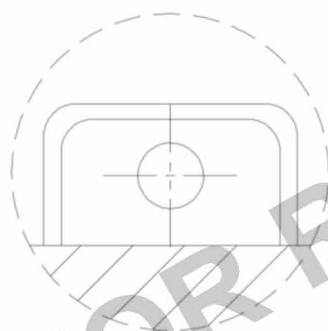
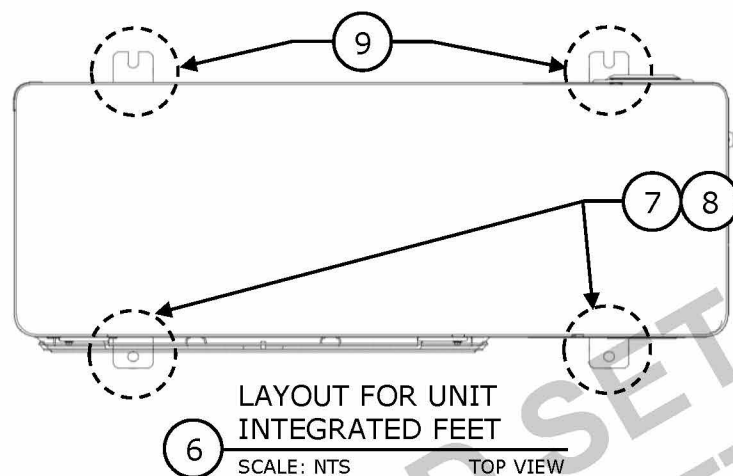


4 CABINET GROUP IV
SCALE: NTS FRONT, RIGHT, TOP VIEWS



5 CABINET GROUP V
SCALE: NTS FRONT, TOP, RIGHT VIEWS

(ALL CABINETS) UNIT INTEGRATED FEET DETAILS



UNIT INTEGRATED FEET DETAILS: NOTES

Fasten unit to host structure using anchors per the Tie-Down Schedule and Notes section herein. Position anchors at crosshairs shown in Details 7 - 9, typ. Details 6 - 9 are for illustrative purposes only. Unit and integrated feet may vary in appearance. All units were considered to have (2) unit integrated feet with open slots per Detail 9, and (2) fully enclosed feet, as shown in Details 7 & 8. A reverse configuration to that shown in Detail 5 is also permitted, with open-slotted feet at the unit front side and fully enclosed feet at the unit back side. It is also permitted for units to have (4) fully enclosed feet with no open slots, per Details 7 & 8.

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CABINET GROUPS I – IV: TIE-DOWN SCHEDULE

Installation Condition	Max. ASD Wind Pressures Lateral (Uplift)	Anchor Schedule to Host Structure By Others			# of Tie-Down Straps	Min. WLL per Strap
		f'c = 3 ksi min. Regular-Weight Concrete Host	1/8" min. thick UTS = 58 ksi min. Steel Host	1/8" min. thick 6061-T6 Aluminum Host		
At-Grade	± 58 psf (0 psf)	A	N/A	N/A	0	N/A
At-Grade, Wall-Mounted, or Rooftop	± 80 psf (64 psf)	N/A	B	B	2	700 lb
	± 100 psf (79 psf)	N/A	B	B	3	800 lb
	± 119 psf (94 psf)	N/A	B	B	3	1000 lb

CABINET GROUPS I – IV: TIE-DOWN SCHEDULE NOTES (Continued Next Page)

TIE-DOWN SCHEDULE DIRECTIVE: The Tie-Down Schedule table above is divided into maximum wind pressure tiers (each row of the table). Site-specific wind pressures up to ± 58 psf lateral & 0 psf uplift shall use, at minimum, the tie-down specifications as stated in the ± 58 psf lateral (0 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. Ensure the host structure by others meets the minimum specifications as stated in the Anchor Schedule section of the table. The Tie-Down Schedule applies 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 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 ± 58 psf (0 psf) wind pressure tier row. This row only permits anchoring to concrete host structures. If your host structure is aluminum or steel, you would need to use, at minimum, the tie-down specifications corresponding to the ± 80 psf (64 psf) wind pressure tier row.

Example 2: Say your installation is 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 ± 100 psf (79 psf) wind pressure tier row. This row permits aluminum and steel host structures only. Anchoring to a concrete host structure would not be permitted in this example.

ANCHOR SCHEDULE NOTES: In all cases, the host structure is by others. Anchor shall be selected per site-specific wind pressures and host structure substrate. Utilize (1) anchor per mounting hole/slot - (4) mounting holes/slots per unit. Refer to Details 5 – 8 for unit integrated feet anchor placement. Anchor specifications as represented in the Tie-Down Schedule are as follows:

- A: Anchors to Concrete Hosts for Unit Integrated Feet:**
 3/8" Ø HILTI Konik Bolt 3 or equivalent with 3" embedment and 3.5" min. edge distance to any edge of the concrete, typ.
 Use (1) 1" min. OD fender washer sized for 1/4" Ø anchors under each anchor head, typ.
- B: Anchors to Aluminum/Steel Hosts for Unit Integrated Feet:**
 3/8" Ø, SAE Gr. 5 min. or SS thru-bolt with 1" min. OD fender washers sized for 3/8" Ø bolts top and bottom and locking nut, typ.
 Provide 3/4" min. edge distance to any edge of the host structure, typ.

N/A: Not applicable.

TIE-DOWN STRAP NOTES: For at-grade installations to concrete host structures up to ± 58 psf lateral & 0 psf uplift wind pressures, tie-down straps are not required. Tie-down straps are required for rooftop and wall-mounted applications.

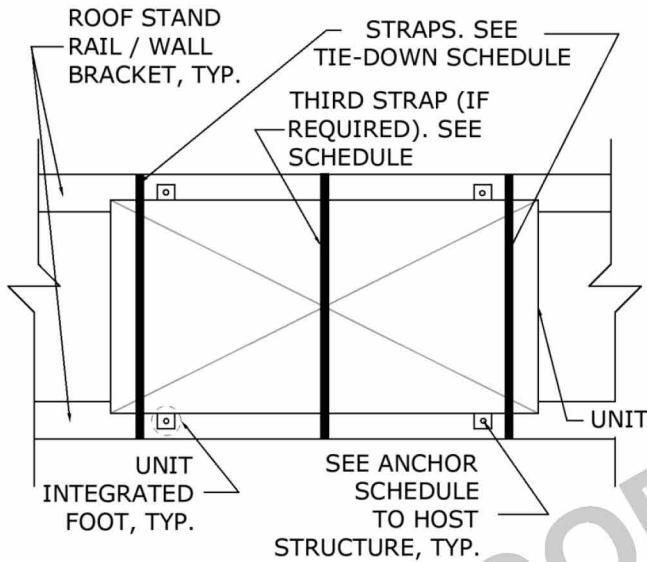
Tie-down straps shall be high-strength webbing and shall be compliant for exterior grade use if they contain plastic components, per FBC Chapter 26. Working load limit (WLL) is per the strap manufacturer, specified per strap. If the strap is rated to a capacity or breaking strength instead of WLL, the capacity/breaking strength shall be divided by the strap manufacturer's published safety factor to obtain a WLL that complies with the schedule above.

Tie-down straps shall be positioned approximately as shown in the Tie-Down Details herein. Position end tie-down straps at either end of unit long side, 3" minimum away from the unit edge, typ. (See Tie-Down Details herein). Wrap each tie-down strap over the long sides and top of the unit and attach each strap end to the aluminum or steel host structure members (i.e. wall brackets or roof stand rails). Attach each strap end to the host structure member with (2) #14, SAE Gr. 2 min. or SS SMS with 1/2" min. spacing between screws and 3/8" min. edge distance to any edge of strap and host structure member, typ. It is suggested that the straps attach to the undersides of the host structure members, but the straps are permitted to attach to any horizontal or vertical face of the host structure so long as all conditions stated herein are achieved. See the Tie-Down 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. Neoprene pads may be placed between the unit and strap to protect the unit from damage/distortion. Straps may be removed for maintenance purposes but shall be replaced per the attachment directive herein following maintenance. **Tie-down straps must be in place before any named storm or similar high-wind event.**

SEE CABINET GROUP I-IV TIE-DOWN DETAILS NEXT PAGE

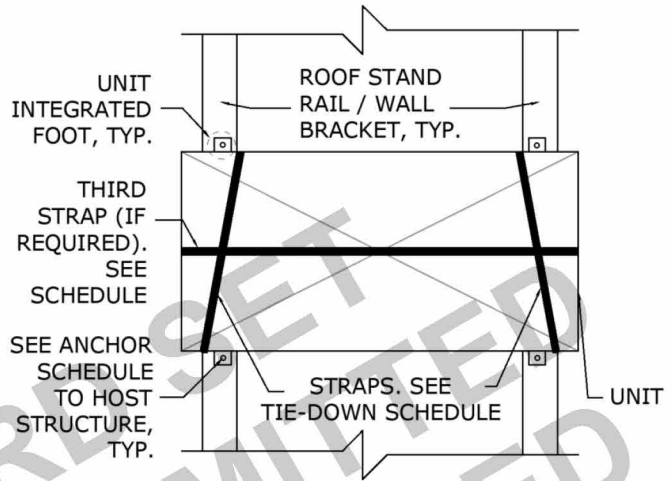
CABINET GROUPS I – IV: TIE-DOWN DETAILS



10 UNIT TIE-DOWN TO ROOF STAND / WALL BRACKET

SCALE: NTS

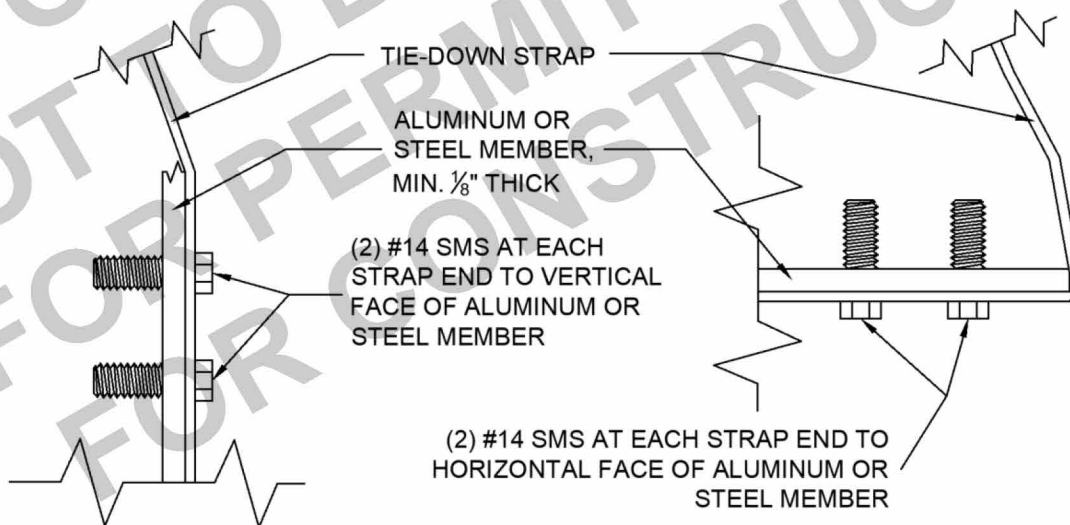
TOP VIEW, UNIT II
TO HOST SUPPORTS



11 UNIT TIE-DOWN TO ROOF STAND / WALL BRACKET

SCALE: NTS

TOP VIEW, UNIT I
TO HOST SUPPORTS



12 TIE-DOWN STRAP ATTACHMENT TO HOST

SCALE: NTS

SECTION VIEW

CABINET GROUPS I – IV: PANEL INTEGRITY SUMMARY

Max. ASD Wind Pressures Lateral (Uplift)	Panel Name	Wind Force on Panel	Additional Screws Required
± 58 psf (0 psf)	Top Panel	153.7 lb	0
	Front Panel	379.9 lb	0
	Right Panel	154.3 lb	0
± 80 psf (64 psf)	Top Panel	213.8 lb	0
	Front Panel	524.0 lb	0
	Right Panel	212.8 lb	0
± 100 psf (79 psf)	Top Panel	263.9 lb	0
	Front Panel	655.0 lb	0
	Right Panel	266.0 lb	0
± 119 psf (94 psf)	Top Panel	314.0 lb	0
	Front Panel	779.5 lb	1
	Right Panel	316.6 lb	0

CABINET GROUP I-IV: PANEL INTEGRITY SUMMARY NOTES:

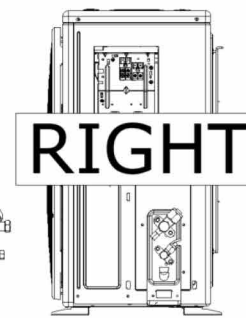
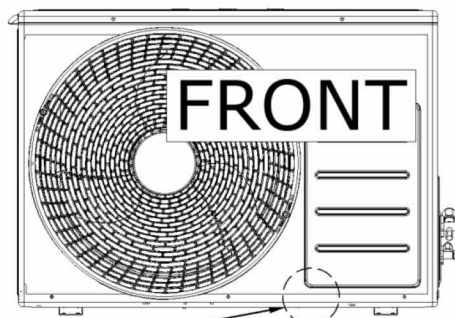
No additional screws are required for wind pressures up to ± 100 psf lateral & 79 psf uplift.

Panel integrity calculations were based on information provided by the client and manufacturer-listed specifications. Panel Integrity values are based on a worst-case Top Panel, Front Panel, and Right Panel, selected from all Cabinet Groups (I-IV) as determined by this office. A comparative analysis was performed for each panel (Top, Front, Right) that considered: Panel area, fastener quantities, locations, capacities, and other features contributing to the panel's integrity (overlying/interlocking flanges, interlocking panels, etc.). Additional worst-case assumptions were incorporated to ensure the values above are valid for all Cabinet Groups. For Cabinet Group IV, the (2) front panels and (2) right panels were considered in aggregate to compare to the other Cabinet Groups adequately. See "Model Information" on page 2 for approved unit models.

Panels were assigned various porosities depending on the ratio of louver area to total panel area, for tension and shear calculation purposes. Screw sizes, quantities on panels, and panel characteristics were considered according to client-provided information. Screw quantities were checked to reinforce unit panels as needed. Additional screw(s) shall be M4 min. Ø, SAE 1016 or stronger SMS. Position additional screw(s) at the bottom of the panel in question, as noted above. Provide 1" min. spacing between neighboring screws (existing or additional).

Validate that each additional screw joins the panel in question to the 24 GA min. thick steel member. 1000 hours of ASTM B117 is required with zero red rust for each additional screw.

NOTE: THE PANEL DESIGNATIONS BELOW APPLY TO ALL CABINET GROUPS. UNIT APPEARANCE MAY VARY.



WHEN REQUIRED:
POSITION ADDITIONAL SCREW
FOR FRONT PANEL IN
APPROXIMATE LOCATION
CIRCLED, OPPOSITE THE FAN
TO JOIN BOTTOM OF PANEL TO
UNIT BASE. SEE DETAILS
HEREIN.

13 PANEL DESIGNATIONS, TYP.
SCALE: NTS FRONT, RIGHT, TOP VIEWS

CABINET GROUP V: DESIGN NOTES (Page 1 of 2)

The following notes are applicable for all Cabinet Group V at-grade (ground) and rooftop installations U.N.O.:

1. "Mechanical Unit" or "Unit" where used herein refers to a Cabinet Group V model specified herein. See the "Model Information" section prior for required specifications and approved unit sizes.
2. "Tie-Down Clip" or "Clip" where used herein: Each clip shall be 1" min. wide x 0.068" min. thick, UTS = 45 ksi min. (equivalent to ASTM A653 Gr. 33 or stronger) galv. steel, typ. Ensure clip sits flush on host structure and flush against the unit. Clip-to-unit screws shall be positioned as (1) screw per clip slot, typ. Care must be taken to avoid screw contact with internal piping and components; exercise caution with screw installation. Ensure all screws fully engage with the unit. Clip-to-host anchor shall be placed at the center of the tie-down clip leg, such that 1/2" min. edge distance is provided in all directions, typ. See herein for clip-to-unit screw and clip-to-host anchor quantities and specifications.
3. "Tie-Down Strap" or "Strap" where used herein: Each strap shall be 2" min. wide x 22 GA min. thick, UTS = 45 ksi min. (equivalent to ASTM A653 Gr. 33 or stronger) galv. steel, typ. 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. Neoprene pads may be placed between the unit and the strap to protect the unit from damage/distortion. Straps shall be positioned at 3" minimum from any unit edge. Provide 1/2" min. spacing between edges of adjacent straps, typ. Stagger strap screws as needed to achieve the required minimum spacing and edge distances. Straps may be removed for maintenance purposes but shall be replaced per the attachment directives herein following maintenance. **Tie-down straps must be in place before any named storm or similar high-wind event.**

Note: if desired, (2) 1" wide straps may be used in place of (1) 2" min. wide strap. The (2) 1" wide straps shall be 22 GA min. thick, UTS = 45 ksi min. (equivalent to ASTM A653 Gr. 33 or stronger) galv. steel, typ. The 1" wide strap ends shall be secured with half as many screws as the 2" wide strap end attachments (i.e. (2) #10 SMS per 1" wide strap end if the 2" wide strap ends are secured with (4) #10 SMS). All other strap specifications noted herein shall apply.

(This note is intended to provide installing contractors with the option to use 1" wide straps in case the 1" wide straps are easier to source. This alternate tie-down method is intended to be equivalent to the 2" wide strap method. Contact Engineering Express if additional clarity is needed).

4. "Host Concrete" where used herein: host concrete shall have $f_c = 3,000$ psi min. compressive strength and shall be regular-weight, uncracked concrete. Host concrete shall be by others.
5. "Host Members" or "Host Rails" where used herein refers to rooftop equipment stand rails or wall bracket rails. Host members shall be 12 GA (0.098") min. thick, UTS = 58 ksi min. (equivalent to ASTM A36 or stronger) galv. steel OR 0.09" min. thick, 6061-T6 aluminum, typ. Host members shall be by others, typ. Performance of the host members as structural members to support the unit assembly shall be per separate certification.
6. "Sheet Metal Screws" or "SMS" where used herein: screws shall be SAE Gr. 2 min. or SS self-drilling screws with washers, typ.
7. "Thru-Bolt" where used herein: bolt shall be SAE Gr. 5 min. with 1" min. OD fender washers and ID sized for the bolt shank diameter at the top and bottom of the connection (under the bolt head and above the locking nut), and SAE Gr. 5 min. locking nut at the underside of the connection, typ. See the thru-bolt diagram on the second-to-last page of this report.
8. For all fasteners specified herein: provide 3x diameter minimum spacing and 1.5x diameter minimum edge distance for all steel-to-steel and steel-to-aluminum connections, typ. Provide 2.5x diameter minimum spacing and 1.5x diameter minimum edge distance for all aluminum-to-aluminum connections.
9. Refer to fastener manufacturer's published data sheets and recommendations for fastener installation instructions. Fasteners shall be cadmium-plated or otherwise corrosion-resistant material and shall comply with "Specifications for Aluminum Structures" Section J.3.7.2 by the Aluminum Association Inc., and any applicable federal, state, and/or local codes.
10. Contact Engineering Express for site scenarios outside the bounds of this evaluation.
11. Alternate/equivalent anchors may be used in place of the listed anchors herein so long as all of the below conditions are satisfied and are subject to the approval of the Authority Having Jurisdiction:
 - i. The equivalent anchor is demonstrated to have allowable (ASD) tension and shear capacities equal to or greater than the listed anchor's allowable tension and shear capacities as verified by a Design Professional.
 - ii. All necessary reductions in capacity for edge distance, spacing, and other requirements as noted by the anchor manufacturer are considered in determining the equivalent anchor's tension and shear capacities.
 - iii. The alternate anchor is of equal or greater diameter than the listed anchor and is provided with the same minimum edge distance, spacing, and any other specifications as are required for the listed anchor; AND
 - iv. Anchor equivalents shall follow all requirements specified in this report in addition to the governing code(s) and allowable stress design (ASD) methodology.

Contact Engineering Express to add additional anchoring options to this report, or to certify an anchor option for special site-specific conditions needed for a particular site installation.
12. The contractor is responsible for insulating all members from dissimilar materials to prevent electrolysis.

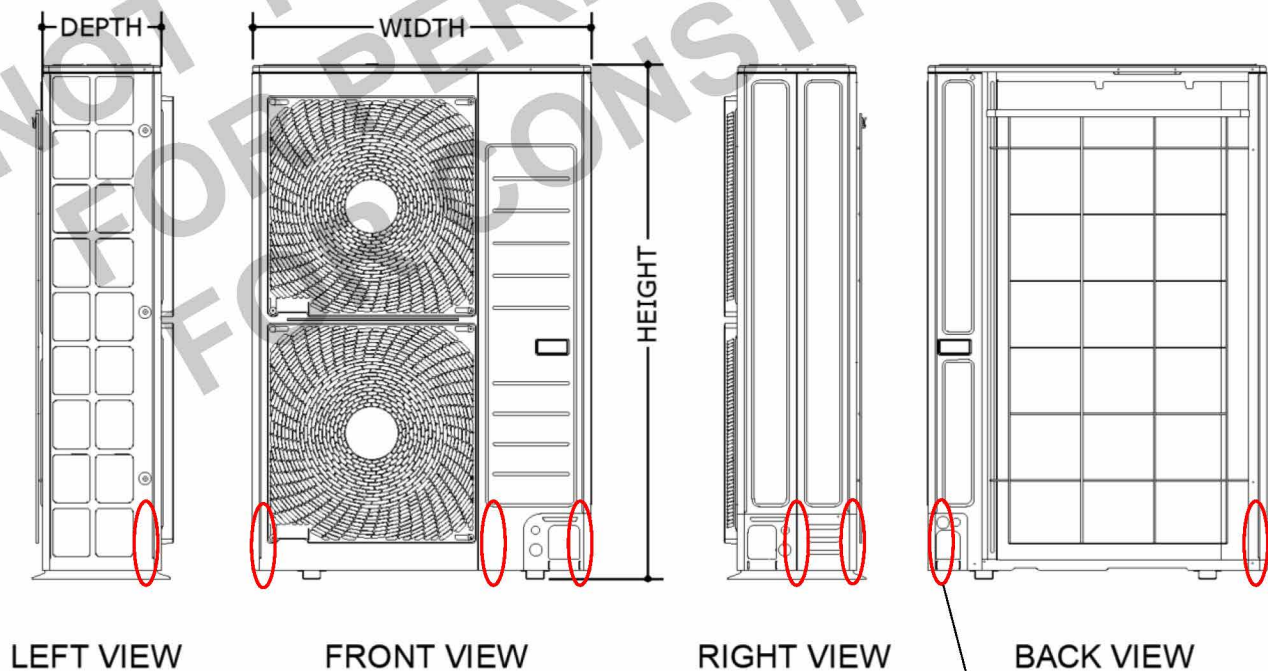
CABINET GROUP V: DESIGN NOTES (Page 2 of 2)

13. Water-tightness of the existing host substrate/structure shall be the full responsibility of the installing contractor. Contractor shall ensure that any removed or altered waterproofing membrane is restored after fabrication and installation of the structure evaluated herein. This engineer shall not be responsible for any waterproofing or leakage issues which may occur as water-tightness shall be the full responsibility of the installing contractor.
14. Large and small missile impact are not covered in this certification and shall be approved through a separate submittal if required. Interior mechanisms and/or electrical circuitry are outside the scope of this performance evaluation. Electrical ground, when required, to be designed & installed by others. All mechanical specifications (clear space, tonnage, etc.) shall be as per manufacturer recommendations and are the express responsibility of the contractor.
15. Alterations, additions, or other markings to this document are not permitted and invalidate this certification. Dimensions are shown to illustrate design forces and other design criteria. They may vary slightly but must remain within the limitations specified herein. Work shall be field-verified by others.
16. Engineering Express shall be notified and given an opportunity to reevaluate our work upon discovery of any inaccurate information prior to modification of existing field conditions and fabrication and installation of materials.
17. The products and/or systems detailed herein are generic and do not provide information for a specific site. For site conditions different from the conditions listed herein, a licensed engineer or registered architect shall provide site-specific documents for use in conjunction with this evaluation report.
18. Engineer seal affixed hereto validates the structural design as shown only. Use of this specification by contractor, et. al. indemnifies and saves harmless this engineer for all costs and damages including legal fees and appellate fees resulting from material fabrication, system erection, and construction practices beyond that which is called for by local, state, and federal codes and from deviations of this plan.

CABINET GROUP V: PANEL INTEGRITY SUMMARY

No additional screws are required for ASD wind pressures up to ± 119 psf lateral & 94 psf uplift.

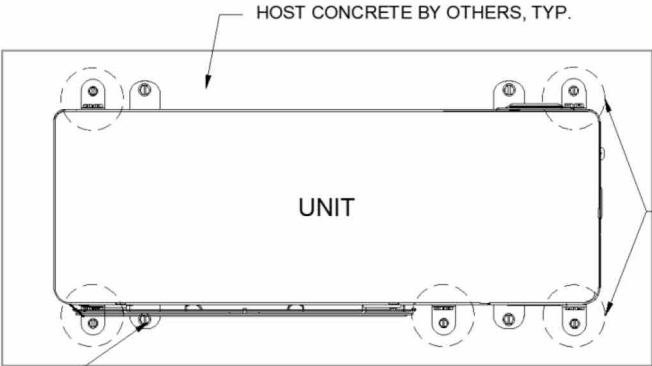
Panel integrity calculations were based on information provided by the client and manufacturer-listed specifications. Calculations are valid for all unit models listed herein, and specifications herein apply to all unit models listed herein (see "Model Information" section). All exterior panels were 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.



14 **CABINET GROUP V**
SCALE: NTS FRONT, TOP, RIGHT VIEWS

POSSIBLE TIE-DOWN
CLIP LOCATION, TYP.
SEE INSTALLATION
DETAILS HEREIN.

CABINET GROUP V: AT-GRADE TIE-DOWN (UP TO ± 54 PSF LATERAL ASD WIND PRESSURE)



(1) ANCHOR PER UNIT INTEGRATED FOOT, (4) TOTAL. ATTACH FOOT TO CONCRETE HOST WITH (1) 1/4" Ø ITW TAPCON OR EQUIVALENT WITH 1-3/4" MIN. EMBEDMENT, 3" MIN. EDGE DISTANCE TO ANY EDGE OF CONCRETE, AND 2-3/4" MIN. SPACING FROM NEIGHBORING CONCRETE ANCHORS, TYP. PROVIDE (1) 1" MIN. OD x 0.065" MIN. THICK FENDER WASHER SIZED FOR 1/4" Ø ANCHORS UNDER EACH ANCHOR HEAD, TYP.

PROVIDE TIE-DOWN CLIPS AT LONG SIDES OF UNIT PER THE AT-GRADE TIE-DOWN CLIP SCHEDULE TABLE. DISTRIBUTE TIE-DOWN CLIP QUANTITY EVENLY BETWEEN THE UNIT LONG SIDES AS SHOWN, TYP. POSITION CLIPS 1" MIN. AWAY FROM UNIT EDGE, TYP.

NOTE: A LONG SIDE TIE-DOWN CLIP MAY BE PLACED AT THE SHORT SIDE INSTEAD, SO LONG AS THE CLIP IS POSITION TOWARDS THE CORNER (i.e. WITHIN 4" FROM THE NEAREST LONG SIDE EDGE); ENSURE FLUSH, SOLID CONNECTION WITH UNIT AND CLIP AND THAT ALL SPECIFICATIONS HEREIN ARE MET.

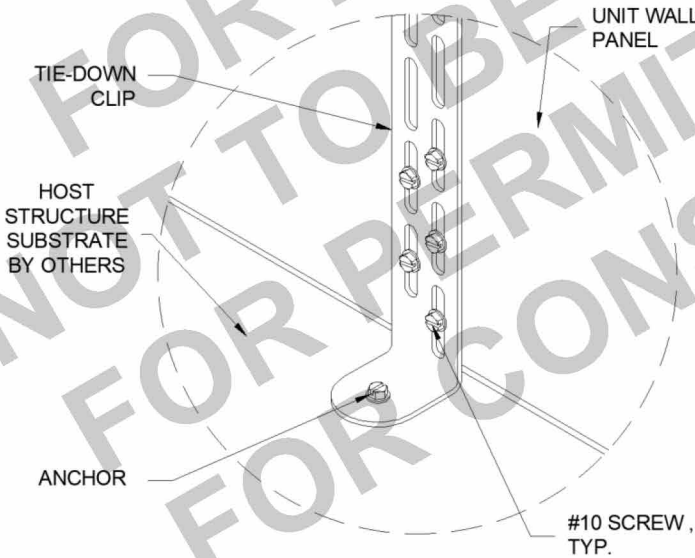
ATTACH CLIP TO UNIT WITH (5) #10 SMS, TYP.

ATTACH CLIP TO CONCRETE HOST WITH (1) 1/4" Ø ITW TAPCON OR EQUIVALENT WITH STD SAE WASHER AND 1-3/4" MIN. EMBEDMENT, 3" MIN. EDGE DISTANCE TO ANY EDGE OF CONCRETE, AND 2-3/4" MIN. SPACING FROM NEIGHBORING CONCRETE ANCHORS, TYP.

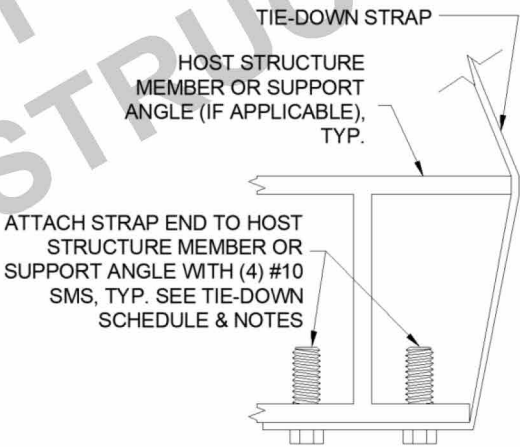
SUGGESTED TIE-DOWN CLIP LOCATIONS ARE CIRCLED; ENSURE THE 2-3/4" MIN. SPACING IS PROVIDED BETWEEN TIE-DOWN CLIP AND UNIT-INTEGRATED FOOT ANCHORS.

At-Grade Tie-Down Clip Schedule	
Max. ASD Wind Pressures Lateral (Uplift)	# of Tie-Down Clips
± 34 psf (0 psf)	0
± 45 psf (0 psf)	2
± 54 psf (0 psf)	4

15 CABINET GROUP V: AT-GRADE TIE-DOWN DIRECTIVE
SCALE: NTS PLAN VIEW



16 TIE-DOWN CLIP ATTACHMENT, TYP.
SCALE: NTS ISOMETRIC VIEW



17 TIE-DOWN STRAP ATTACHMENT, TYP.
SCALE: NTS SECTION VIEW

TIE-DOWN DETAILS, 15 - 17 NOTES

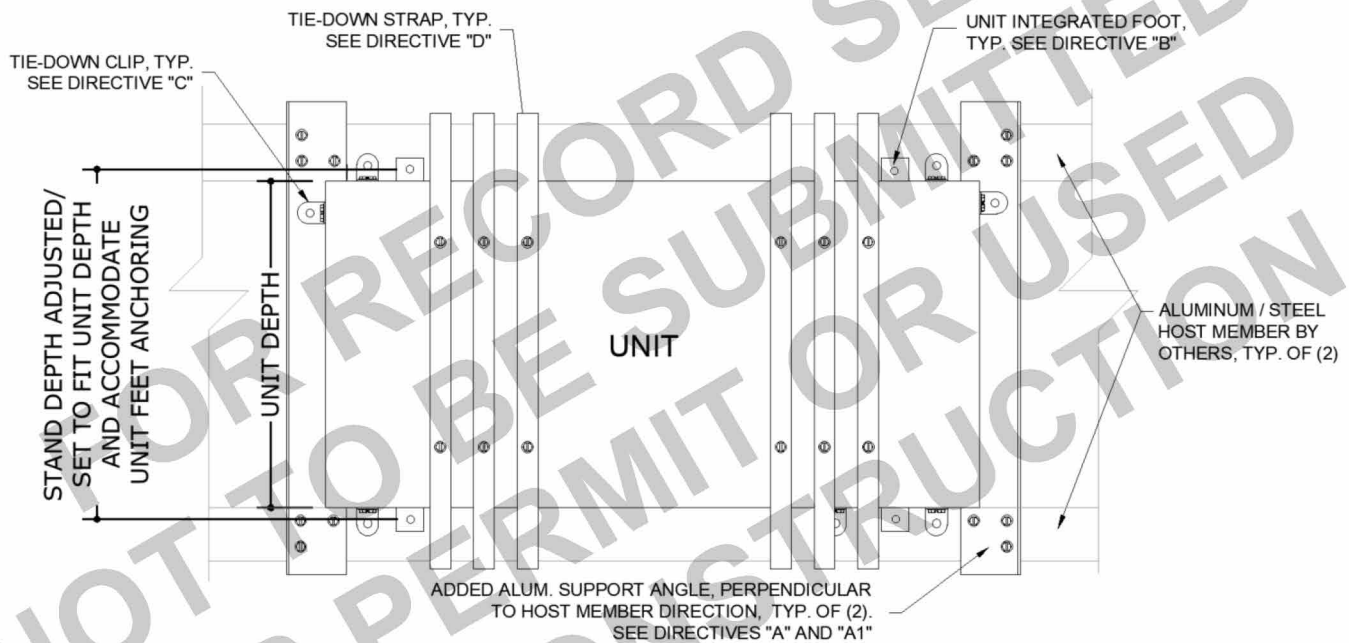
The units depicted in the Details on this page are for illustrative purposes only. Units may vary in appearance. Tie-down system may not be depicted in full. The sample tie-down layouts shown herein are for illustrative purposes only. Tie-down locations may vary per the specifications herein. Host structure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

Note: Detail 17 is applicable for rooftop mount directives on the following pages.

CABINET GROUP V: WALL-MOUNTED OR ROOFTOP TIE-DOWN (Page 1 of 3)
TIE-DOWN DIRECTIVE: UNIT ORIENTED PARALLEL TO HOST MEMBER DIRECTION,
STAND DEPTH \approx UNIT DEPTH. PLAN VIEW, NOT TO SCALE

Tie-Down Schedule: Unit Oriented Parallel to Host Member Direction		
Max. ASD Wind Pressures Lateral (Uplift)	# of Tie-Down Clips and Clip Location on Unit (i.e. Side of Unit)	# of Tie-Down Straps
± 65 psf (52 psf)	(2) Total: (1) at Front, (1) at Back	(2)
± 90 psf (72 psf)	(4) Total: (2) at Front, (2) at Back	(4)
± 119 psf (94 psf)	(5) Total: (2) at Front, (2) at Back, & (1) at Left or Right Side	(6)

Note: Directive detail shown is for illustrative purposes. Units may vary in appearance. Tie-down location may vary per the specifications herein.



A: To facilitate tie-down clip placement on the unit short sides (if applicable – only needed for ASD wind pressures greater than 90 psf lateral and 72 psf uplift), support angles shall be added as depicted in the detail above. Provide (2) support angles with 3" min. wide legs x 1/8" min. thick, 6061-T6 aluminum angles as shown.

Miami-Tech "CAB" aluminum support angles may also be used and attached per details 1A & 1B of the current edition of Miami-Dade NOA # 21-1013.03 (see Miami-Dade website for the latest edition of the NOA file).

A1: The (2) support angles perpendicular to the host member direction shall attach to the host members with (3) 1/4" ϕ thru-bolts per crossing, (6) total per perpendicular support angle, typ. Position angles to allow for clip positioning on the unit short sides.

B: Attach unit feet to host member with (1) 3/8" ϕ thru-bolt per unit foot, (4) total.

C: Provide the required quantity of tie-down clips per the schedule table. Attach tie-down clips to unit with (6) #10 SMS per clip, typ. Attach tie-down clips to support angles with (1) 1/4" ϕ thru-bolt.

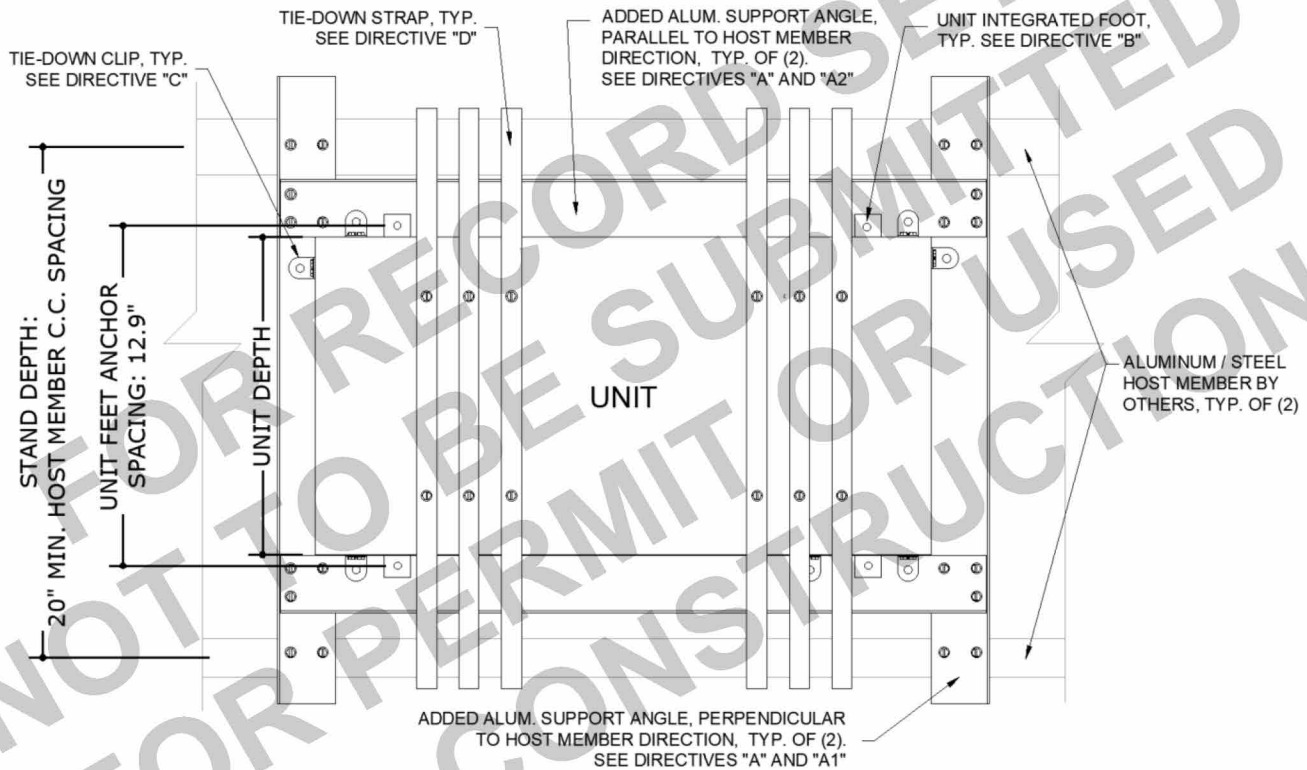
D: Provide the required quantity of tie-down straps per the schedule table. Wrap straps over the unit and attach to the host members with (4) #10 SMS per strap end, (8) total per strap, typ. To prevent straps from slipping, also attach each strap to the roof of the unit with (2) #10 SMS with 3" min. end distance from ends of roof and positioned O.C. of strap, (1) each side as depicted, typ.

CABINET GROUP V: WALL-MOUNTED OR ROOFTOP TIE-DOWN (Page 2 of 3)

**TIE-DOWN DIRECTIVE: UNIT ORIENTED PARALLEL TO HOST MEMBER DIRECTION,
STAND DEPTH (MIN. 20") ≥ UNIT DEPTH. PLAN VIEW, NOT TO SCALE**

Tie-Down Schedule: Unit Oriented Parallel to Host Member Direction		
Max. ASD Wind Pressures Lateral (Uplift)	# of Tie-Down Clips and Clip Location on Unit (i.e. Side of Unit)	# of Tie-Down Straps
± 65 psf (52 psf)	(2) Total: (1) at Front, (1) at Back	(2)
± 90 psf (72 psf)	(4) Total: (2) at Front, (2) at Back	(4)
± 119 psf (94 psf)	(5) Total: (2) at Front, (2) at Back, & (1) at Left or Right Side	(6)

Note: Directive detail shown is for illustrative purposes. Units may vary in appearance. Tie-down location may vary per the specifications herein.



- A:** To facilitate tie-down clip placement, support angles shall be added as depicted in the detail above. When host member spacing (i.e. wall bracket or roof stand rails) exceeds the unit feet anchor spacing as shown, provide (4) support angles with 3" min. wide legs x 1/8" min. thick, 6061-T6 aluminum angles as shown.

Miami-Tech "CAB" aluminum support angles may also be used and attached per details 1A & 1B of the current edition of Miami-Dade NOA # 21-1013.03 (see Miami-Dade website for latest edition of the NOA file).

- A1:** The (2) support angles perpendicular to the host member direction shall attach to the host members with (2) 1/4" ϕ thru-bolts per crossing, (4) total per perpendicular support angle, typ. Position angles to allow for clip positioning on the unit short sides and for attachment of the other support angles.
- A2:** The (2) support angles parallel to the host member direction shall be positioned underneath the unit feet and with clearance for tie-down clip positioning against the unit. Attach support angles to the perpendicular support angles with (3) 1/4" ϕ thru-bolts per crossing, (6) total per parallel support angle, typ.

- B:** Attach unit feet to support angles with (1) 3/8" ϕ thru-bolts per unit foot, (4) total.

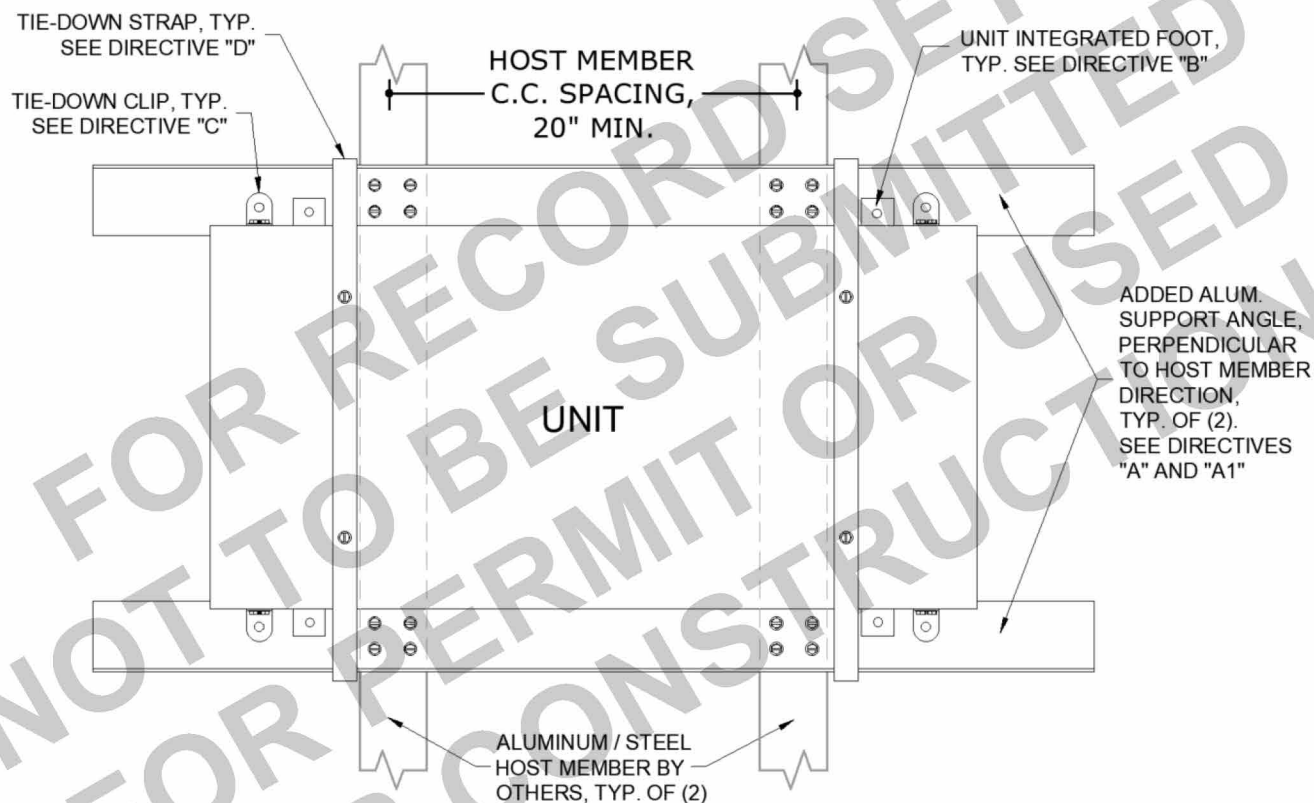
- C:** Provide the required quantity of tie-down clips per the schedule table. Attach tie-down clips to unit with (6) #10 SMS per clip, typ. Attach tie-down clips to support angles with (1) 1/4" ϕ thru-bolt.

- D:** Provide the required quantity of tie-down straps per the schedule table. Wrap straps over the unit and attach to the host members with (4) #10 SMS per strap end, (8) total per strap, typ. To prevent straps from slipping, also attach each strap to the roof of the unit with (2) #10 SMS with 3" min. end distance from ends of roof and positioned O.C. of strap, (1) each side as depicted, typ.

CABINET GROUP V: WALL-MOUNTED OR ROOFTOP TIE-DOWN (Page 3 of 3)**TIE-DOWN DIRECTIVE: UNIT ORIENTED PERPENDICULARLY TO HOST MEMBER DIRECTION****PLAN VIEW, NOT TO SCALE.**

Tie-Down Schedule: Unit Oriented Perpendicularly to Host Member Direction		
Max. ASD Wind Pressures Lateral (Uplift)	# of Tie-Down Clips and Clip Location on Unit (i.e. Side of Unit)	# of Tie-Down Straps
± 65 psf (52 psf)	(2) Total: (1) at Front, (1) at Back	(2)
± 90 psf (72 psf)	NOT PERMITTED	NOT PERMITTED
± 119 psf (94 psf)	NOT PERMITTED	NOT PERMITTED

Note: Directive detail shown is for illustrative purposes. Units may vary in appearance. Tie-down location may vary per the specifications herein.



- A:** To facilitate tie-down clip placement on the unit long sides, support angles shall be added as depicted in the detail above. Provide (2) support angles with 3" min. wide legs x 1/8" min. thick, 6061-T6 aluminum angles as shown.

Miami-Tech "CAB" aluminum support angles may also be used and attached per details 1A & 1B of the current edition of Miami-Dade NOA # 21-1013.03 (see Miami-Dade website for the latest edition of the NOA file).

- A1:** The (2) support angles perpendicular to the host member direction shall attach to the host members with (4) 1/4" Ø thru-bolts per crossing, (8) total per perpendicular support angle, typ. Position angles to allow for clip positioning on the unit long sides.

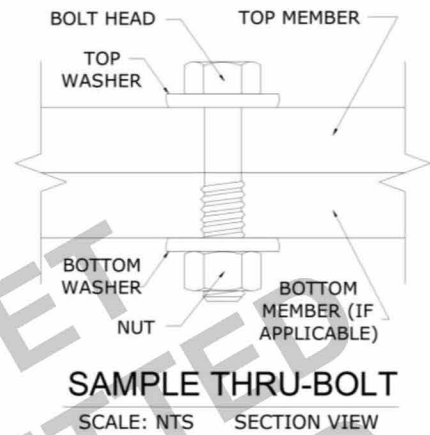
- B:** Attach unit feet to host member with (1) 3/8" Ø thru-bolt per unit foot, (4) total.

- C:** Provide the required quantity of tie-down clips per the schedule table. Attach tie-down clips to unit with (6) #10 SMS per clip, typ. Attach tie-down clips to support angles with (1) 1/4" Ø thru-bolt.

- D:** Provide the required quantity of tie-down straps per the schedule table. Wrap straps over the unit and attach to the host members with (4) #10 SMS per strap end, (8) total per strap, typ. To prevent straps from slipping, also attach each strap to the roof of the unit with (2) #10 SMS with 3" min. end distance from ends of roof and positioned O.C. of strap, (1) each side as depicted, typ.

TERMINOLOGY

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 TER 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 that 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.

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: Evaluation reports are 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
20-30110	Initial Issue	EPR	RWN	10/23/20	23-69459	2023 FBC Update	MRT	ER/RN	01/19/24
20-30110	Model #'s Added	EPR	RWN	01/27/22	23-69459	Add models + CAB V Analysis	MARH	EPR	03/17/25
20-30110	Add Models	EPR	EPR	03/15/23					

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:

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

Rooftop (>15 ft MRH) Required Design Pressures:

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

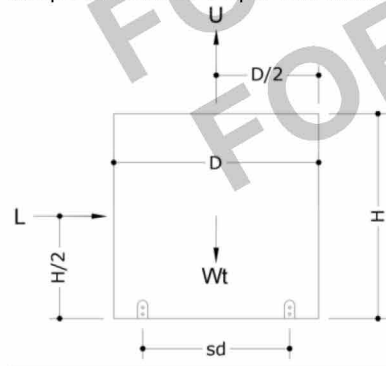
VISIT [ECALC.IO/FORCES](https://ecalc.io/forces)

FOR DESIGN AID CALCULATORS AND RESOURCES RELATED TO THIS TER & 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 report. 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):

- Sliding Force, L = P_{lat} x W x H
= (120 psf) x (48 in) x (42 in) x (1 in² / 144 ft²) = **1680 lb**
- Uplift Force, U = P_{up} x W x D
= (95 psf) x (48 in) x (36 in) x (1 in² / 144 ft²) = **1140 lb**
- 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):

- Sliding Force, L = P_{lat} x D x H
= (120 psf) x (36 in) x (42 in) x (1 in² / 144 ft²) = **1260 lb**
- Uplift Force, U = P_{up} x W x D
= (95 psf) x (48 in) x (36 in) x (1 in² / 144 ft²) = **1140 lb**
- 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.

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