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Technical Evaluation Report

DIVISION: 23 08 00 - COMMISSIONING OF HVAC

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(Subject to Renew March 1, 2022 or next code cycle)

EVALUATION SUBJECT: LENNOX PACKAGED UNITS

TER-20-30756

REPORT HOLDER:

LENNOX INDUSTRIES
2100 LAKE PARK BLVD
RICHARDSON, TX 75080, USA
1-866-953-6609 | WWW.LENNOX.COM

LENNOX)

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.

This Product Evaluation Report is being issued in accordance with the requirements of the International Building Code (2012, 2015, & 2018) and the Florida Building Code Sixth & Seventh Editions (2017 & 2020) per ASCE 7, FBC Building Ch. 16, FBC Building Section 104.11, FBC Existing Building Sections 707.1 and 707.2, FBC Residential M1202.1 and M1301.1, FMC 301.15, FS 471.025, and Broward County Administrative Provisions 107.3.4. The product noted on this report has been tested and/or evaluated as summarized herein

IN ACCORDANCE WITH THESE CODES EACH OF THESE REPORTS MUST BEAR THE ORIGINAL SIGNATURE & RAISED 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 rational analysis to qualify the following design criteria:

- · Maximum unit dimensions and weight range certified herein
- Maximum allowable lateral and uplift pressures certified herein
- Tie-down clip/strap configuration and anchor spacing
- · Anchor capacity for various substrates

Calculation summary is included in this TER and appears below. NOTE: No 33% increase in allowable stress has been used in the design of this product.

INSTALLATION:

The product(s) listed above shall be installed in strict compliance with this TER & manufacturer-provided enclosure model specifications.

The product components shall be of the material specified in the manufacturerprovided product specifications. 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.

LIMITATIONS & CONDITIONS OF USE:

Use of this product shall be in strict accordance with this TER as noted herein. Adjustment factors noted herein and the applicable codes must be considered, where applicable. Installation shall conform to the minimum standards stated in the referenced building code(s) in addition to tie-down details and limitations stated herein. See final page for complete limitations & conditions of use.

UNIT CASING MATERIALS:

Base Rails: .069" min. thick, Fy = 30 ksi galv. steel Base Pan: .047" min. thick, Fy = 22 ksi galv. steel Cabinet Panels: .034" min. thick, Fy = 30 ksi galv. steel

Unit casing components are fastened together with #10, 2100 lb min. tensile strength (ultimate) and 1400 lb min. shear strength (ultimate) SMS. See manufacturer for more information on unit construction.

TERMINOLOGY:

See list of abbreviations on the final page of this report.

Florida Building Code Sixth & Seventh Editions (2017 & 2020) International Building Code (2012, 2015 & 2018)





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

OPTIONS

This evaluation is valid for all LENNOX packaged units described herein. See page 7 for Tool-less Panel Filter Access option. Any structural changes outside of the design as described herein would void this certification.

STRUCTURAL PERFORMANCE:

Models referenced herein are subject to the following design limitations:

Maximum Rated Wind Pressures*: ± 148 psf Lateral, 117 psf Uplift

- Required design pressures shall be determined 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 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.
- Site-specific wind analysis may produce alternate limitations provided maximum rated wind pressures stated herein are not exceeded.

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October 9, 2020

Frank Bennardo, P.E., SECB ENGINEERING EXPRESS®

if Checked, Certifying Engineer and PE #

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MODEL NUMBERS, DIMENSIONS, & WEIGHTS

Model Number	Unit Width (in)	Unit Depth (in)	Unit Height (in)
LRP14GE24*	47.63	47.63	41.00
LRP14GE30*	47.63	47.63	41.00
LRP14GE36*	47.63	47.63	41.00
LRP14GE42*	56.13	47.63	45.00
LRP14GE48*	56.13	47.63	45.00
LRP14GE60*	56.13	47.63	45.00
LRP14GX24*	47.63	47.63	41.00
LRP14GX30*	47.63	47.63	41.00
LRP14GX36*	47.63	47.63	41.00
LRP14GX42*	56.13	47.63	45.00
LRP14GX48*	56.13	47.63	45.00
LRP14GX60*	56.13	47.63	45.00
LRP14HP24*	47.63	47.63	41.00
LRP14HP30*	47.63	47.63	41.00
LRP14HP36*	47.63	47.63	41.00
LRP14HP42*	56.13	47.63	45.00
LRP14HP48*	56.13	47.63	45.00
LRP14HP60*	56.13	47.63	45.00

		×	
Model Number	Unit Width (in)	Unit Depth (in)	Unit Height (in)
LRP14AC24*	47.63	47.63	41.00
LRP14AC30*	47.63	47.63	41.00
LRP14AC36*	47.63	47.63	41.00
LRP14AC42*	56.13	47.63	45.00
LRP14AC48*	56.13	47.63	45.00
LRP14AC60*	56.13	47.63	45.00
LRP16GE24*	47.63	47.63	41.00
LRP16GE36*	47.63	47.63	41.00
LRP16GE48*	56.13	47.63	45.00
LRP16GE60*	56.13	47.63	45.00
LRP16GX24*	47.63	47.63	41.00
LRP16GX36*	47.63	47.63	41.00
LRP16GX48*	56.13	47.63	45.00
LRP16GX60*	56.13	47.63	45.00
LRP16HP24*	47.63	47.63	41.00
LRP16HP36*	47.63	47.63	41.00
LRP16HP48*	56.13	47.63	45.00
LRP16HP60*	56.13	47.63	45.00

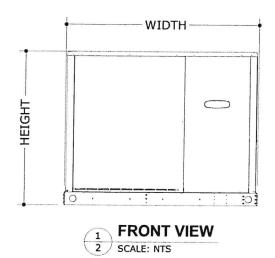
MODEL NUMBERS, DIMENSIONS, & WEIGHTS NOTES:

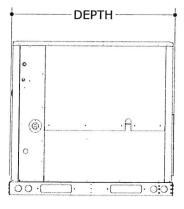
All unit net weights shall be between 280 lb and 550 lb. Model numbers, dimensions, and weights listed herein are based on information provided by the client. Please contact Report Holder and/or Manufacturer for more information. Unit height includes base rail height. Model number characters following the asterisk (*) do not pertain to this structural certification and may be any combination of numbers or characters.

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FOR A LIST OF APPROVED MODEL NUMBERS STATED IN FULL (NO ASTERISKS) OR SCAN THE QR CODE TO THE RIGHT >







SIDE VIEW - RIGHT
SCALE: NTS

Note: Unit depictions in Details 1/2 and 2/2 above are for illustrative purposes only. Actual units may differ in appearance. Louvers on panels are not shown.

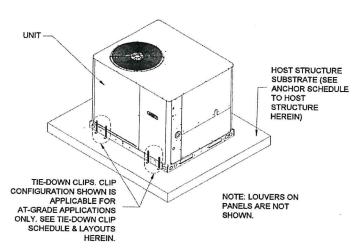
FORCES SUMMARY

	Long Side (Width x Height)			Short Side (Depth x Height)			
Wind Pressure Lateral (Uplift)	Max. Sliding Force	Max. Overturning Moment	Max. Tension per Side	Max. Sliding Force	Max. Overturning Moment	Max. Tension per Side	Max. Uplift Force
± 66 psf (53 psf)	1159.1 lb	42934.2 lb	900.1 lb	983.8 lb	41993.0 lb	747.2 lb	986.7 lb
± 90 psf (72 psf)	1580.6 lb	60853.9 lb	1275.8 lb	1341.6 lb	59981.6 lb	1067.3 lb	1340.4 lb
± 120 psf (95 psf)	2107.5 lb	82920.5 lb	1738.4 lb	1788.8 lb	82075.0 lb	1460.4 lb	1768.5 lb
± 148 psf (117 psf)	2599.3 lb	103752.8 lb	2175.1 lb	2206.1 lb	102974.5 lb	1832.3 lb	2178.1 lb

FORCES SUMMARY NOTES:

See "Model Numbers, Dimensions, & Weights" table on page 2 for all approved unit models. Calculations were based on the information provided by the client and manufacturer-listed specifications, as well as additional worst-case scenario assumptions to cover all unit models listed herein. Forces Summary values are based on a worst-case unit, which was determined by this office to be a (56.13" W x 47.13" D x 35" H) unit. The lightest allowable net weight of 280 lb was assigned for Forces Summary calculations. All panels were assumed to have 0% porosity for Forces Summary calculations.

PRODUCT INSTALLATION





Miami Tech CUTD 1" wide and 8" tall ASTM A653 galvanized steel, 0.07" min. thick.

Fasten clip to host structure per the "Anchor Schedule to Host Structure" table and notes.

Fasten clip to unit base rail per the "Tie-Down Clip Schedule" table and notes.

Miami Tech Kit #'s: AAECUTD8KG - At-Grade Steel / Slab Mounts AAECUTD8KR - Rooftop Steel Rail Mount

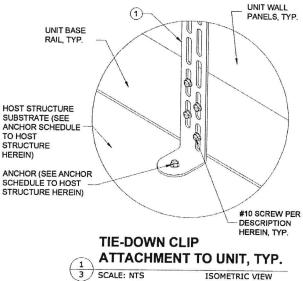


TIE-DOWN CLIP SCHEDULE:

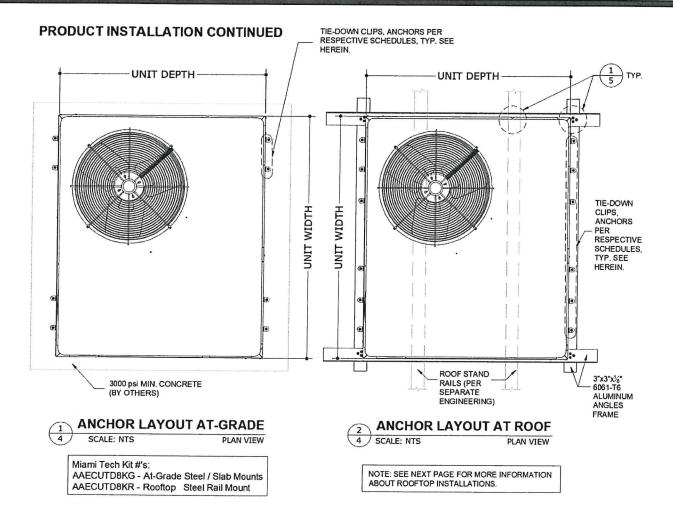
WIND PRESSURE LATERAL (UPLIFT)	# OF TIE-DOWN CLIPS REQUIRED
± 66 psf (53 psf)	8
± 90 psf (72 psf)	12
± 120 psf (95 psf)	12
± 148 psf (117 psf)	12

TIE-DOWN CLIP SCHEDULE NOTES:

Tie-down clips shall be equally distributed between each unit long side (i.e. along unit width). Provide 6" min. spacing between tie-down clips. Provide 4" min. edge distance from unit short sides. Each tie-down clip shall sit flush on host structure and flush against unit base rail. Fasten tie-down clip to base rail with (4) #10 SS316 self-drilling screws with 0.395" Ø washers, typ. Utilize the (4) bottom-most slots on each tie-down clip, (1) screw per slot, typ. (See Detail 1/3). Ensure all screws fully engage with solid sections of unit base rail (do not position tie-down clips where holes/slots in teh base rail interfere with screw connections). Fasten each tie-down clip to host structure using (1) anchor per the "Anchor Schedule to Host Structure" table on the next page.



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.



ANCHOR SCHEDULE TO HOST STRUCTURE

Wind Pressure Lateral (Uplift)	3000 psi min. Concrete	1/8" min. thick Fy = 36 ksi min. Steel	1/8" min. thick 6061-T6 Aluminum	1/8" min. thick Fy = 36 ksi min. Steel Curb	18 GA (.051") min. thick Fy = 36 ksi min. Steel Curb
± 66 psf (53 psf)	Α	В	В	С	D
± 90 psf (72 psf)	N/A	В	В	С	E
± 120 psf (95 psf)	N/A	В	В	С	E
± 148 psf (117 psf)	N/A	В	В	С	E

ANCHOR SCHEDULE TO HOST STRUCTURE NOTES:

All host structures described in the anchor schedule are by others.

Anchors shall be selected per site-specific wind pressures and host structure. Wind pressures up to ± 66 psf lateral (53 psf uplift) and below shall use the anchor specified in the ± 66 psf lateral (53 psf uplift) tier. Site-specific wind pressures that fall in-between pressure tiers shall use the anchor specified by the higher pressure tier.

Anchor Schedule to Host Structure Key:

A: 1/4" Ø DeWalt UltraCon+ or equivalent with 1" min. OD washer, 1.75" embedment, and 3" min. edge distance from any edge of concrete, typ.

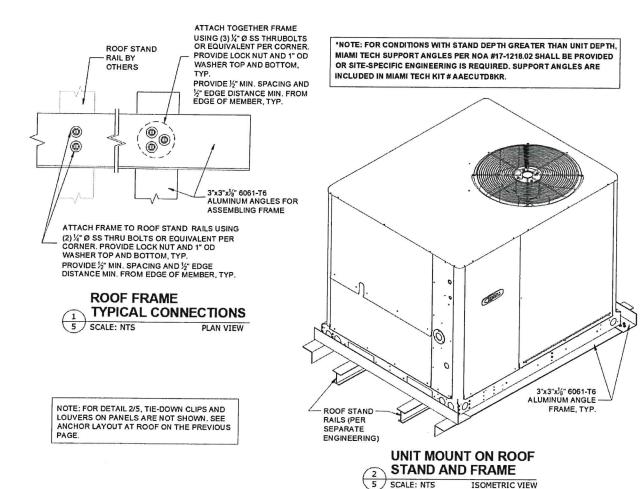
B: 1/4" Ø SAE GR. 5 or SS Thru Bolt with 5/8" min. OD washers top and bottom, typ. Provide 1/2" min. edge distance between Thru Bolt and any edge of substrate, typ.

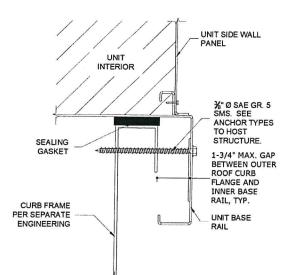
C: 3/8" SAE Gr. 5 SMS at 10" o.c. max. and 5" max. from ends, all sides. Ensure threaded portion engages steel curb material beyond flange (see Detail 3/5). Ensure (5) pitches min. past the thread plane, typ.

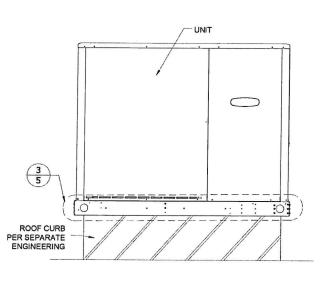
D: 3/8" SAE Gr. 5 SMS at 8" o.c. max. and 5" max. from ends, all sides. Ensure threaded portion engages steel curb material beyond flange (see Detail 3/5). Ensure (5) pitches min. past the thread plane, typ.

E: 3/8" SAE Gr. 5 SMS at 6" o.c. max. and 5" max. from ends, all sides. Ensure threaded portion engages steel curb material beyond flange (see Detail 3/5). Ensure (5) pitches min. past the thread plane, typ.

ROOFTOP INSTALLATION DETAILS







UNIT ATTACHMENT TO ROOFTOP CURB

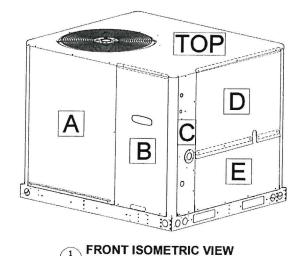
SCALE: NTS

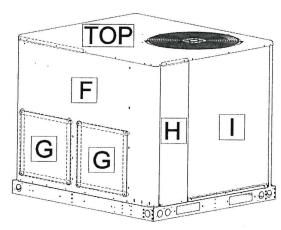
NOTE: WOOD NAILER (IF APPLICABLE) NOT SHOWN IN ABOVE DETAIL.

NOTE: SEE ANCHOR SCHEDULE FOR CURB THICKNESS OPTIONS

UNIT MOUNT TO ROOFTOP CURB SCALE: NTS SECTION VIEW

PANEL DESIGNATIONS





BACK ISOMETRIC VIEW

SCALE: NTS

Note: Unit depictions in Details 1/6 and 2/6 are for illustrative purposes only. Actual units may vary slightly in appearance. Louvers on Panel A and Panel I are not shown. Circled regions on panel illustrate additional screw locations per the Additional Screw Directives below.

PANEL INTEGRITY SUMMARY

Up to ± 66 psf Lateral & 53 psf Uplift Wind Pressures				
Panel Designation	Additional Screws Required	Additional Screws Directive		
Top Panel	0*	*No additional screws required beyond the additional screws specified herein for joining individual wall panels to the Top Panel. See othe panel directives.		
Panel A	0	No additional screws required for Panel A.		
Panel B	0	No additional screws required for Panel B.		
Panel C	0	No additional screws required for Panel C.		
Panel D	2	Install (2) screws at bottom of panel to join with Panel E.		
Panel E	0*	*No additional screws required beyond the (2) screws at top of Panel E as specified in the Panel I directive.		
Panel F	0	No additional screws required for Panel F.		
Panel G	0	No additional screws required for Panel G.		
Panel H	0	No additional screws required for Panel H.		
Panel I	0	No additional screws required for Panel I.		
•	(2) Addition	nal Screws Required in Total		

Panel Designation	Additional Screws Required	Additional Screws Directive		
Top Panel	0*	*No additional screws required beyond the additional screws specified herein for joining individual wall panels to the Top Panel. See othe panel directives.		
Panel A	0	No additional screws required for Panel C.		
Panel B	4	Install (1) screw into base rail at bottom of pane on-center between existing screws. Install (3) screws at top to join with Top Panel.		
Panel C	0	No additional screws required for Panel C.		
Panel D	12	Install (3) screws at top to join with Top Panel Install (9) screws at bottom of panel to join with Panel E.		
Panel E	0*	*No additional screws required beyond the (9) screws at top of Panel E as specified in the Panel directive.		
Panel F	4	Install (4) screws at top-left half of panel to join with Top Panel.		
Panel G	4	Install (4) screws along outer edges of the panel t join with Panel F.		
Panel H	1	Install (1) screws at top to join with Top Panel.		
Panel I	0	No additional screws required for Panel I.		

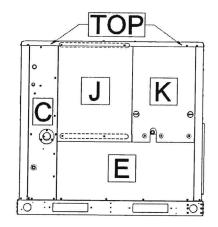
Panel Integrity Summary Notes:

No additional screws are required for wind pressures up to ± 54 psf lateral & 43 psf uplift.

Calculations were performed according to the information provided by the client for a worst-case unit (which was determined by this office to be a (47.63" Wx 56.13" Dx 45" H unit). Panels were assigned various porosities depending on the ratio of louver area to total panel area, for tension and shear calculation purposes. Screw quantities were checked to reinforce unit panels as needed. Additional screws shall be #10 min. diameter 2100 lb min. tensile strength (ultimate) and 1400 lb min. shear strength (ultimate) SMS. They shall be positioned according to the "Additional Screws Directives" in the tables above and Details 1/6 and 2/6. Provide 1" min. spacing between neighboring screws (existing or additional). Distirbute additional screws evenly between left and right sides of the panel U.N.O.

Validate that each additional screw joins the panel to the 0.034" min. thick steel member. Screw sizes, quantities on panels, and panel characteristics are according to client's description. 1000 hours of ASTM B117 are required with zero red rust for all additional screws.

TOOL-LESS PANEL FILTER ACCESS OPTION - PANEL INTEGRITY SUMMARY



SIDE VIEW - RIGHT

SCALE: NTS

Note: Unit depiction in Detail 1/7 is for illustrative purposes only. Actual units may vary slightly in appearance. Circled regions on panels illustrate additional screw locaations per the "Additional Screw Directives" shown right and on page 6.

Tool-less Panel Filter Access Option - Panel Integrity Summary Notes:

Panel Designation	Additional Screws Required	Additional Screws Directive
Panel J	1	Install (1) screw at bottom of panel to join with Panel E.
Panel K	0	No additional screws required for Panel K.
Panel E	0*	*No additional screws required beyond the (1) screw at top of Panel E as specified in the Panel J directive.

Panel Additional Screws Required		Additional Screws Directive
Panel J	8	Install (3) screws at top to join with Top Panel. Install (5) screws at bottom of panel to join with Panel E.
Panel K	0	No additional screws required for Panel K.
Panel E	0*	*No additional screws required beyond the (5) screws at top of Panel E as specified in the Panel J directive.

This option may be implemented in lieu of Panel D as shown on the previous page. The additional screws required and directives for Panels J and K replace those required for Panel D on the previous page. Similarly, the additional screws required and directive for Panel E on this page replaces those required for Panel E on the previous page. Updated additional screws required totals are listed above. For Panel K, the (2) SOUTHCO zinc alloy latches, part # E5-2-125-051, were rated according to the stated maximum working load of 74.1 lb (330 N) each, per the information provided by the client. For this option, no additional screws are required for wind pressures up to ± 43 psf lateral & 34 psf uplift.

All Panel Integrity Summary Notes stated on page 6 apply for this option U.N.O.

TERMINOLOGY (CONTINUED):

The following abbreviations may appear in this report: "ASCE" for "American Society of Civil Engineers", "ASD" for "Allowable Stress Design", "FBC" for "Florida Building Code", "FLCA" for "Florida Certificate of Authorization", "FMC" for "Florida Mechanical Code", "HVAC" for "heating, ventilation, and air conditioning", "in" for "inch", "Ib" for "pound (force) "max." for "maximum", "min." for "minimum", "NTS" for "not to scale", "OD" for "outer diameter", "PE" for "Professional Engineer", "SAE" for "Society of Automotive Engineering", "SECB" for "Structural Engineering Certification Board", "SMS" for "sheet metal screws", "SS" for "stainless steel", "TER" for "Technical Evaluation Report", "typ." for "typical", "U.N.O." for "unless noted otherwise", "w/o" for "without", "#" for "number", and "Ø" for "diameter". For additional abbreviation/terminology clarifications, please contact this office.

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 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. All supporting components which are permanently installed shall be protected against corrosion, contamination, and other such damage at all times. 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 circumstance.

All of the wind resisting exterior panels individually meet or exceed their capacity to resist the design wind loads as stated in the calculations as required by the FBC. Due to the indeterminate nature of these units, distortion and deflection cannot be accurately evaluated, but with diaphragm action of external components and internal stiffeners, the base unit has the capacity to withstand these forces with individual

external parts being contained. Inspections shall be implemented during annual equipment maintenance or after a 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 as designated by the Authority Having Jurisdiction.

Remarks	Drawn	Checked	Date
Initial Issue (20-29015 Master Project)	EPR	RWN	9/30/20