

CODES:

FLORIDA BUILDING CODE 2014, 5TH EDITION
 ASCE STANDARD 7-2010
 MIAMI DADE WIND SPEED = 186 MPH

WIND DESIGN REQUIREMENTS:

ULTIMATE DESIGN WIND SPEED, Vult (3 sec. gust) 186 mph
 NOMINAL DESIGN WIND SPEED, Vasd 144 mph

RISK CATEGORY IV
 HEIGHT TO CENTROID 77 FT
 EXPOSURE CATEGORY D
 ENCLOSURE CATEGORY N/A
 EFFECTIVE WIND AREA N/A

INTERNAL PRESSURE COEFFICIENT GCPI N/A
 DIRECTIONALITY FACTOR Kd 0.90
 TOPOGRAPHIC FACTOR Kzt 1.00
 GUST EFFECT FACTOR N/A

WIND LOAD METHOD:

VELOCITY PRESSURE:
 based on ASCE 7-10, Eq. 29.3-1
 $qz = 0.00256 Kz Kzt Kd V^2$ psf
 $Kz = 1.37$
 $V = Vult$
 $qz = 109.2$ psf

WIND PRESSURES:
 based on ASCE 7-10 Eq. 29.5.1 & FBC 1620.6
 $F = qh GcF Af$ psf Eq. 29.5-2
 $GcF = 3.10$ FOR LATERAL FORCES
 $GcF = 1.50$ FOR VERTICAL FORCES

LOAD COMBINATIONS:

POSITIVE VERTICAL FORCE: $1.0 \cdot D + 0.6 \cdot W$ [FBC 1605.3.1 EQ. 16-12]
 SLIDING & ANCHOR PULLOUT: $0.6 \cdot D + 0.6 \cdot W$ [FBC 1605.3.1 EQ. 16-15]
 OVERTURNING: $0.67 \cdot D + 0.78 \cdot W$ [FBC 1605.3.2 EQ. 16-18]

GENERAL NOTES:

- THIS ENGINEERING REPORT DOCUMENTS THE ANALYSIS OF AC EQUIPMENT MOUNTED ON A ROOF STAND AND THE ASSOCIATED ANCHORING SYSTEMS TO RESIST DEAD WEIGHT AND WIND LOAD FORCES.
- THE ANALYSIS CONFORMS TO THE REQUIREMENTS OF THE FLORIDA BUILDING CODE 2014 AND ASCE 7-2010, FOR USE WITHIN & OUTSIDE HVHZ.
- THE AC UNIT IS MOUNTED ON A METAL STAND WHICH IS SECURED TO THE ROOF.
- ANCHORS USED TO FASTEN THE UNIT TO THE ROOF STAND ARE A307 OR HIGHER STRENGTH STEEL BOLTS.
- THE ROOF STAND IS DESIGNED AND VERIFIED BY STRUCTURAL ANALYSIS BY THIS ENGINEER.
- ALTERNATE ROOF STAND DESIGNS (E.G. ALUMINUM) THAT ARE DESIGNED TO RESIST THE ABOVE WIND LOADS MAY BE USED AT THE CONTRACTOR'S OPTION. FOR ALTERNATE ROOF STAND DESIGNS, PROVIDE DETAILS AND CALCULATIONS SIMILAR TO THIS SHEET AND DETAILED CALCULATIONS ON DRAWING 2, STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA.
- THE CONTRACTOR IS RESPONSIBLE FOR SAFETY, INSTALLATION, AND SPECIAL INSPECTIONS & TESTS PER FBC CHAPTER 17.

CALCULATIONS: SEE DETAILED CALCULATIONS ON DRAWING 2.

WIND LATERAL AND VERTICAL FORCES:

- THE WIND LOAD ACTING NORMAL TO THE LARGE VERTICAL SIDE OF THE AC UNIT IS USED FOR WORST CASE SHEAR.
- THE WIND LOAD ACTING ON THE TOP OF THE UNIT UPWARD AND THE HORIZONTAL WIND LOAD IS USED TO CALCULATE UPLIFT AND MOMENT.
- THESE FORCES MUST BE RESISTED BY THE SHEAR AND TENSILE STRENGTHS OF THE ANCHORS HOLDING THE UNIT TO THE SUPPORT BAR AND ALSO THE ANCHORS HOLDING THE SUPPORT BAR TO THE ROOF STAND. THE ROOF STAND INTERNAL STRESSES ARE VERIFIED BY THIS ENGINEER TO BE WITHIN THE ALLOWABLE STRENGTHS OF ITS ELEMENTS AND CONNECTIONS.

SUPPORT BAR STRENGTH:

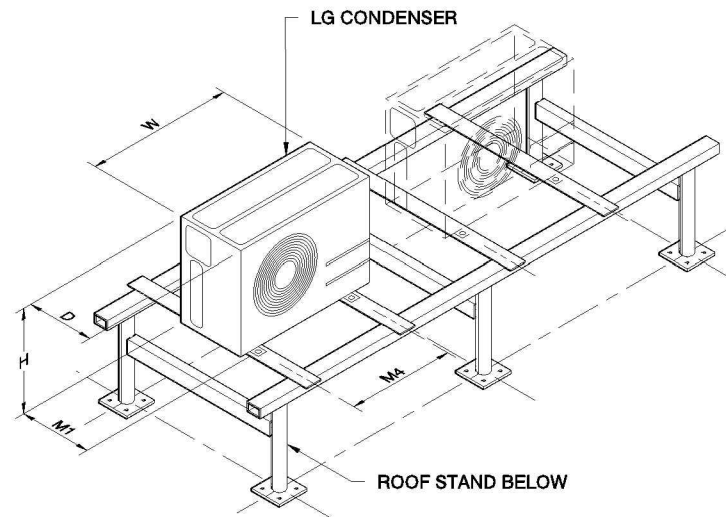
- THE MOMENT AND SHEAR MUST BE TRANSFERRED FROM THE AC UNIT TO THE ROOF STAND BY A SUPPORT BAR AS THE AC UNIT DEPTH CAN BE UNEQUAL TO THE ROOF STAND DEPTH.
- MAX MOMENT AND SHEAR TO THE SUPPORT BAR DETERMINE SELECTION OF THE SUPPORT BAR.

ROOF STAND STRENGTH:

- CRITICAL LIMITS ARE THE POST LEGS AND WELD STRENGTH TO THE BASE, CROSS BRACE TO POST CONNECTION, AND RAILING TO POST CONNECTION.

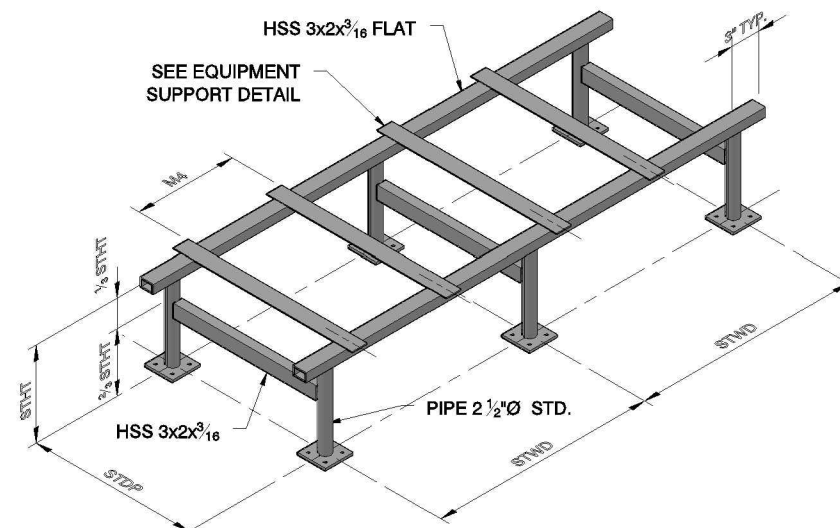
ENCLOSURE FASTENERS:

- THE METAL SHELL FASTENERS MUST RESIST THE NEGATIVE WIND PRESSURES CAUSING TENSILE STRESS IN THE SCREWS AND PULL-OVER EFFECTS OF THE SHEET METAL.



ROOF-MOUNT CONFIGURATION

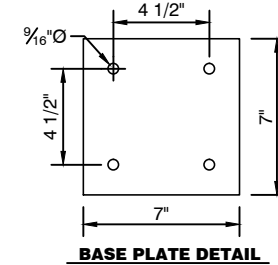
SCALE: NTS



STEEL ROOF STAND

SCALE: NTS

| ROOF STAND STRENGTH LIMITS | | |
|----------------------------|--------|--------|
| LIMIT TYPE | AMOUNT | UNITS |
| MAX SHEAR AT POST BASE | 1.02 | KIP |
| MAX PULLOUT AT POST BASE | 2.710 | KIP |
| MAX MOMENT AT POST BASE | 14.50 | KIP*IN |
| MAX MOMENT AT CROSS BRACE | 16.7 | KIP*IN |



ROOF STAND NOTES:

- ROOF STAND IS DESIGNED AND VERIFIED FOR THE FORCES DESCRIBED IN THIS DOCUMENT AS SUMMARIZED IN THE ENGINEERING CALCULATIONS INCLUDED.
- STHT = STAND HEIGHT = MIN 18", MAX 30".
- STWD = STAND POST SPACING = 30" MIN, 36" MAX.
- STDP = STAND DEPTH = 24" MIN, 30" MAX.
- EQUIPMENT SUPPORT AND FASTENERS TO STAND TOP RAIL ARE DEFINED IN SEPARATE DETAIL.
- AC UNIT MUST BE CENTERED ON SUPPORT.
- 3/8" BASE PLATE IS ANCHORED TO CONCRETE SLAB W/ 1/2" Ø ADHESIVE ANCHORS (HILTI HIT-HY 200+HAS) WITH MIN. 3" EMBED. OF GALV HAS RODS IN CONCRETE. ANCHOR GROUP CAPACITY COMBINED TENSION = 2710 LBS, SHEAR = 1020 LBS, AND MOMENT 14500 IN*LBS.
- IF NO ROOF SLAB, BASE PLATES SHALL BE ANCHORED TO STEEL ROOF FRAMING (DESIGNED BY OTHERS FOR THESE LOADS) WITH 1/2" Ø A307 BOLTS.

STEEL FABRICATION NOTES:

- ALL MATERIAL IS STEEL WITH MIN Fy = 35 KSI.
- ALL JOINTS SHALL BE WELDED CONTINUOUS ALL AROUND W/ 3/16" FILLET.

OTHER NOTES:

- EQUIPMENT SUPPORT IS NOT PART OF ROOF STAND.
- MIN NUMBER OF POSTS IS 4; 6 OR MORE AS INDICATED IN SKETCH TYPICALLY USED FOR DOUBLE OR MULTIPLE CONDENSERS. FOR SINGLE UNIT W/ 4 POSTS, USE 3/8" Ø HAS RODS W/ 7/16" Ø HOLES IN BASE PLATES & 3" EMBED.
- 1" ± NON-METALLIC NON-SHRINK GROUT MAY BE USED UNDER THE BASE PLATES.

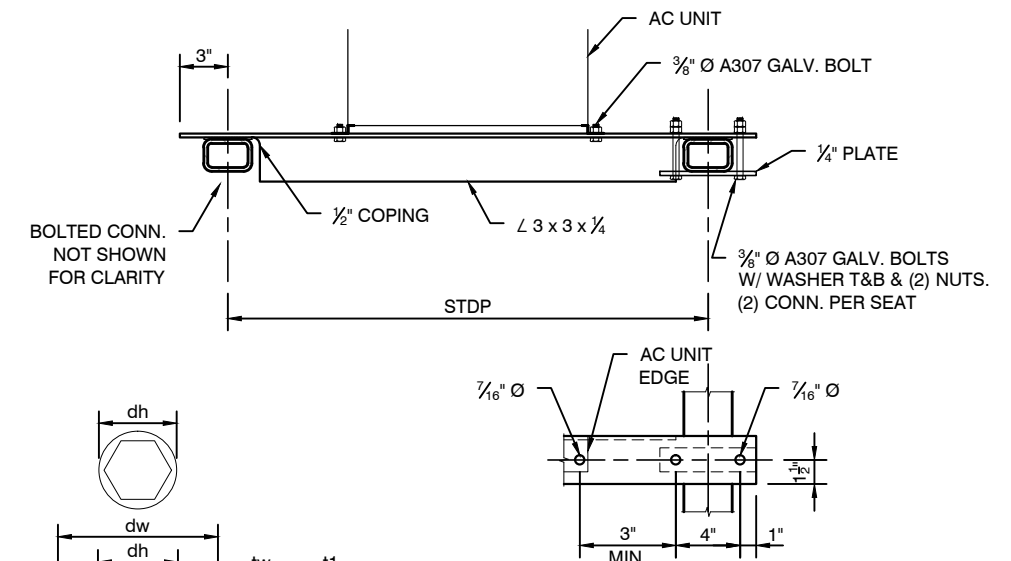
ENGINEERING CONFORMANCE ANALYSIS:

THE TABLE BELOW SHOWS DIMENSIONS, MIN STAND DEPTH, & SHELL ENCLOSURE SCREWS FOR SOME MODELS OF LG ELECTRONICS USA HVAC OUTDOOR EQUIPMENT THAT MEET THE FOLLOWING ANALYSIS:

- ROOF STAND STRENGTH: POST AND CROSS-BRACE STRENGTH TO RESIST UNIT WEIGHT AND WIND LOAD LATERAL AND VERTICAL SURFACES
- STAND POST ANCHORS: PULLOUT AND SHEAR DUE TO OVERTURNING AND SLIDING FORCE IS WITHIN REQUIREMENTS
- EQUIPMENT METAL COVER FASTENERS: MIN NUMBER AND SIZE

| MODEL # | CONDENSER DIMENSIONS | | | | | | ROOF STAND DIMS: STDP MIN (IN) | SHELL SCREWS ON LONG SIDE, QTY. & SIZE | STAND STRENGTH | | | METAL SHELL |
|------------|--|-------|-------|-------|-------|--------|--------------------------------|--|----------------|--------|--------------|-------------|
| | W | D | H | M1 | M4 | Wt | | | ANCHOR SHEAR | UPLIFT | BRACE MOMENT | |
| | DESIGN CHECK W/ NOM/REQ'D >= 1.00 = OK | | | | | | | | | | | |
| LSU240HLV | 34.25 | 12.63 | 31.50 | 14.19 | 21.50 | 124.56 | 24 | 12, #10 | 0.37 | 0.5 | 0.46 | 0.75 |
| LSU300HLV | 34.25 | 12.63 | 31.50 | 14.19 | 21.50 | 124.56 | 24 | 12, #10 | 0.37 | 0.5 | 0.46 | 0.75 |
| LSU360HLV | 34.25 | 12.63 | 31.50 | 14.19 | 21.50 | 124.56 | 24 | 12, #10 | 0.37 | 0.5 | 0.46 | 0.75 |
| LAU180HYV1 | 34.25 | 12.63 | 31.50 | 14.19 | 21.50 | 132.3 | 24 | 12, #10 | 0.37 | 0.5 | 0.46 | 0.75 |
| LSU180HSV4 | 34.25 | 12.63 | 31.50 | 14.19 | 21.50 | 120.2 | 24 | 12, #10 | 0.37 | 0.5 | 0.46 | 0.75 |
| LAU240HSV2 | 34.25 | 12.63 | 31.50 | 14.19 | 21.50 | 132.3 | 24 | 12, #10 | 0.37 | 0.5 | 0.46 | 0.75 |
| LAU240HYV1 | 34.25 | 12.63 | 31.50 | 14.19 | 21.50 | 132.3 | 24 | 12, #10 | 0.37 | 0.5 | 0.46 | 0.75 |
| LAU240HSV3 | 34.25 | 12.63 | 31.50 | 14.19 | 21.50 | 127.8 | 24 | 12, #10 | 0.37 | 0.5 | 0.46 | 0.75 |
| LSU240HSV3 | 34.25 | 12.63 | 31.50 | 14.19 | 21.50 | 127.8 | 24 | 12, #10 | 0.37 | 0.5 | 0.46 | 0.75 |
| LSU243HLV | 34.25 | 12.63 | 31.50 | 14.19 | 21.50 | 127.8 | 24 | 12, #10 | 0.37 | 0.5 | 0.46 | 0.75 |
| LSU307HV3 | 34.25 | 12.63 | 31.50 | 14.19 | 21.50 | 127.8 | 24 | 12, #10 | 0.37 | 0.5 | 0.46 | 0.75 |
| LSU360HV3 | 34.25 | 12.63 | 31.50 | 14.19 | 21.50 | 127.8 | 24 | 12, #10 | 0.37 | 0.5 | 0.46 | 0.75 |
| LSU240HEV1 | 34.25 | 12.63 | 25.81 | 13.38 | 21.50 | 94.6 | 24 | 12, #10 | 0.31 | 0.39 | 0.37 | 0.61 |
| LMU18CHV | 34.25 | 12.63 | 25.78 | 13.38 | 21.50 | 99.2 | 24 | 12, #10 | 0.31 | 0.39 | 0.37 | 0.61 |
| LMU24CHV | 34.25 | 12.63 | 25.78 | 13.38 | 21.50 | 99.2 | 24 | 12, #10 | 0.31 | 0.39 | 0.37 | 0.61 |

NOTE: THE STAND DIMENSIONS ARE MINIMUMS. STAND MAY BE BUILT TO SUPPORT MORE THAN ONE CONDENSER UNIT AS OUTLINED IN THE LG ELECTRONICS USA INSTALLATION MANUAL.



EQUIPMENT SUPPORT DETAIL

SCALE: NTS

| ENCLOSURE FASTENERS | | |
|-----------------------------------|-------|-------|
| DESCRIPTION | SIZE | UNITS |
| SCREW SIZE (d) | #10 | |
| INTEGRAL WASHER SIZE (dw) | 0.50 | IN |
| THICKNESS OF SHEET METAL (t1) | 0.043 | IN |
| MIN. THICKNESS OF FRAME (t2) | 0.07 | IN |
| DEPTH OF PENETRATION | 0.25 | IN |
| SCREW YIELD STRENGTH | 55 | KSI |
| ALLOWABLE TENSILE STRENGTH/SCREW | 321 | LBS |
| ALLOWABLE PULLOVER STRENGTH/SCREW | 371 | LBS |
| ALLOWABLE PULL-OUT STRENGTH/SCREW | 170 | LBS |



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DRAWING TITLE
34-12-R-109 INFORMATION & DIAGRAMS

PROJECT TITLE
**LG ELECTRONICS USA HVAC
 OUTDOOR CONDENSING UNIT
 ROOF MOUNT CONFIGURATION**

| NO. | DATE | BY | DESCRIPTION |
|-----|------|----|-------------|
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|--------------|-------------|
| SCALE | DATE |
| NTS | 11/02/16 |
| DRAWN BY | PROJECT MGR |
| JDP | PCP |
| PROJECT NO. | FLAT FILE |
| 160387 | |
| DRAWING NO. | |
| 34-12-R-109 | |
| SHEET 1 OF 2 | |

ENGINEERING CALCULATION DETAIL SHEET

Outdoor Condensator Units on Roof Stand - Suitability Verification
Designed by: Paul C. Perrin, PE, SE

DESIGN METHODOLOGY: ASD

OBJECTIVE:

Determine Wind Load on AC unit mounted on roof stand using ASCE 7 (2010), Section 29.5. Confirm stability, roof stand strength, anchor configuration and strength, and equipment envelope fastening.

WIND LOAD: (See also "Wind Design Requirements" on Drawing 1)

Vult = 186 mph (FBC 2014 1620.2) for Miami-Dade, Risk Category IV

From "29.3 Velocity Pressure"

$$q_z = 0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^2 = 109.2 \text{ psf (Eq. 29.3-1)}$$

From "29.5 Design Wind Loads - Other Structures"

$$F = q_z(GCr)A_f \text{ (Eq. 29.5-1)}$$

$$F_{vertical} = 109.2 \text{ psf} \cdot (1.50) \cdot A_f = 163.8 \text{ psf} \cdot \text{Area (ft}^2\text{)}$$

$$F_{lateral} = 109.2 \text{ psf} \cdot (3.10) \cdot A_f = 338.5 \text{ psf} \cdot \text{Area (ft}^2\text{)}$$

Example AC Unit:

Use LSU180HSV4 in Table w/ dims (W, D, H, Wt) = (34.25", 12.625", 31.5", 120.2 lbs)

WIND LOAD FORCES:

$$\begin{aligned} \text{Top Area} &= 12.625" \cdot 34.25" / (144 \text{ in}^2/\text{ft}^2) = 3.00 \text{ sf} \\ \text{Fw vertical (Fw}_{vert}) &= 163.8 \text{ psf} \cdot 3.00 \text{ sf} = 492 \text{ lbs (unfactored)} \end{aligned}$$

$$\begin{aligned} \text{Long side Area} &= 34.25" \cdot 31.5" / (144 \text{ in}^2/\text{ft}^2) = 7.49 \text{ sf} \\ \text{Fw lateral (Fw}_{lat}) &= 338.5 \text{ psf} \cdot 7.49 \text{ sf} = 2536 \text{ lbs (unfactored)} \end{aligned}$$

LOAD COMBINATIONS:

$$\begin{aligned} 0.67D + 0.78W \text{ for overturning} & \text{ FBC 1605.3.2 Eq. 16-18} \\ 0.6D + 0.6W \text{ for sliding and anchors} & \text{ FBC 1605.3.1 Eq. 16-15} \end{aligned}$$

CALCULATE REACTION FORCES ON ROOF STAND:

$$\begin{aligned} \text{Shear } V_1 &= 0.6 \cdot Fw_{lat} / 4 \text{ posts} = 0.6 \cdot 2536 \text{ lb} / 4 = 380 \text{ lbs} \\ \text{Pull-up } R_1 &= [0.6 \cdot Fw_{lat} \cdot b + (0.6 \cdot Fw_{vert} - 0.6 \cdot Wt) \cdot (a+3")] / (2 \cdot a+3") / 2 \text{ posts} \\ &= [0.6 \cdot 2536 \text{ lb} \cdot (30" + 31.5"/2) + (0.6 \cdot 492 \text{ lb} - 0.6 \cdot 120.2 \text{ lb}) \cdot (12"/2 + 3")] / (12" + 3") / 2 \\ &= 1.351 \text{ kips} \\ \text{Moment } MB &= V_1 \cdot ST-U = 380 \text{ lb} \cdot 20" = 7.609 \text{ kip}\cdot\text{in} \end{aligned}$$

NOMINAL STRENGTH OF ROOF STAND:

All limits are based on posts at min. depth of 24", max. height of 30", and max. spacing of 36". Limits: Shear at base, Uplift at one post, Moment on frame Given:

- (4) anchors per base with allowable max pull-up of 2710 lbs, allowable max shear of 1020 lbs and allowable max moment of 14,500 kip*in per anchor group, (1/2" diameter adhesive anchor with 3" embedment in min 3000 psi concrete).
- All welds 3/16" fillet. All materials steel with min Fy = 35 ksi.

Posts are 2.5" Ø standard pipe.

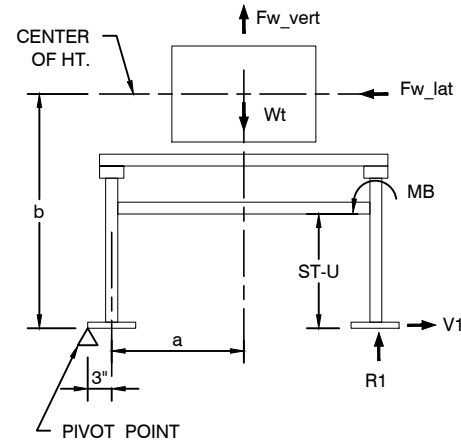
Cross brace is HSS 3 x 2 x 3/8

Limits per post:

$$\begin{aligned} \text{Max shear} &= \min(\text{pipe shear, anchor shear}) \\ &= \min(0.6 \cdot 35 \text{ ksi} \cdot 1.01 \cdot \text{in}^2 / 1.67, 1.02 \text{ kips}) \\ &= 1.02 \text{ kips} \end{aligned}$$

$$\text{Max uplift at one post} = \text{anchor pull-up capacity} = 2710 \text{ lbs} = 2.710 \text{ kips}$$

$$\begin{aligned} \text{Max moment at brace} &= \min(\text{brace flexural strength, weld strength, post flexural strength}) \\ &= \min(46 \text{ ksi} \cdot 1.18 \text{ in}^3 / 1.67, 2.78 \text{ kip}\cdot\text{in} \cdot 2" \cdot 3", 35 \text{ ksi} \cdot 1.01 \text{ in}^3 / 1.67) \\ &= \min(32.5 \text{ kip}\cdot\text{in}, 16.7 \text{ kip}\cdot\text{in}, 21.2 \text{ kip}\cdot\text{in}) \\ &= 16.7 \text{ kip}\cdot\text{in} \end{aligned}$$



SINCE THIS DESIGN IS BASED ON WIND PRESSURE, qz, THIS DESIGN IS ALSO SUITABLE FOR THE FOLLOWING CASES:

- MIAMI DADE WIND SPEED = 186 MPH, RISK CATEGORY IV, EXPOSURE CATEGORY C, HEIGHT UP TO 146 FT.
- MIAMI DADE WIND SPEED = 186 MPH, RISK CATEGORY II, EXPOSURE CATEGORY D, HEIGHT UP TO 160 FT.
- BROWARD WIND SPEED = 180 MPH, RISK CATEGORY IV, EXPOSURE CATEGORY D, HEIGHT UP TO 116 FT.

DESIGN METHODOLOGY: ASD

VERIFY ANCHOR SHEAR RESISTANCE TO SLIDING:

Use Load Combination FBC 1605.3.1 Eq. 16-15
 $0.6D + 0.6W = 0.6 \cdot Fw_{lat} = 0.6 \cdot 2536 \text{ lb} = 1522 \text{ lbs}$
Shear per post = $1522 \text{ lb} / 4 = 380 \text{ lbs}$
Fsliding nominal = 1.02 kips
Since 1.02 kips > 0.380 kips

Resistance to Sliding Checks OK.

CHECK OVERTURNING ANCHOR PULLOUT/UPLIFT RESISTANCE:

Use Load Combination FBC 1605.3.1 Eq. 16-15
 $0.6D + 0.6W$

On one post
Pull-up R1 = 1.351 kips
Max uplift at one post = 2.710 kips
Since 2.710 kips > 1.351 kips

Anchor Resistance to Overturning Checks OK.

CHECK BRACE RESISTANCE TO MOMENT:

Use worst case on one post
Moment at brace MB = 7.609 kip-in per post
Max moment at brace = 16.7 kip-in
Since 16.7 kip-in > 7.609 kip-in

Moment at Stand Brace Checks OK.

CHECK SHEET METAL ENVELOPE FASTENER RESISTANCE:

Analysis based on AISI S100-2007 "Cold Formed Steel Structural Members" Section E4: Screw Connections
Use Load Combination FBC 1605.3.1 Eq. 16-15

$0.6D + 0.6W$
On long side worst case
 $0.60 \cdot Fw_{lat} = 0.60 \cdot 2536 \text{ lb} = 1522 \text{ lbs}$

Resistance to the metal shell pull-off is the minimum of the tensile strength of the screw and the pull-over strength of the sheet metal.

Inputs:

#10 screw, d = 0.19" with integral 0.5"-diameter washer
Thickness of metal shell, t1 = 0.043" (18 gauge)
Depth of penetration of screw into frame, tc = 0.25"
Strength of screw, Fu1 = 55 ksi

Based on the above data:

Allowable tensile of the screw, $Pts/\Omega = 321 \text{ lbs per screw (where } \Omega = 3.0)$
Allowable Pull-out strength, $P_{not}/\Omega = 170 \text{ lbs per screw}$
Allowable Pull-over strength, $P_{nov}/\Omega = 371 \text{ lbs per screw}$
Therefore the min number of screws per long side = $1522 \text{ lb} / 170 \text{ lb/screw} = 8.95 \text{ screws}$
Rounds up to min 9 screws per side, use 12 screws for symmetry.

Anchor Resistance to Metal Enclosure Pull-Off Checks OK.

VERIFY STRENGTH OF SUPPORT BARS AND CONNECTIONS:

Use Load Combination
 $0.67D + 0.78W$

Max uplift on one side of AC Unit at mounting anchors:
 $F_{M1} = (0.78 \cdot Fw_{lat} \cdot H/2) / (2 \cdot M1) + (0.78 \cdot Fw_{vert} - 0.67 \cdot Wt) / 4 =$
 $F_{M1} = (0.78 \cdot 2.54 \text{ kips} \cdot 31.5 \text{ in} / 2) / (2 \cdot 14.19 \text{ in}) + (0.78 \cdot 0.49 \text{ kips} - 0.67 \cdot 0.120 \text{ kips}) / 4$
 $F_{M1} = 1.174 \text{ kips}$
Allowable tensile capacity of bolt = 2.49 kips > 1.174 kips
Bolt Resistance at Mounting Anchor Checks OK

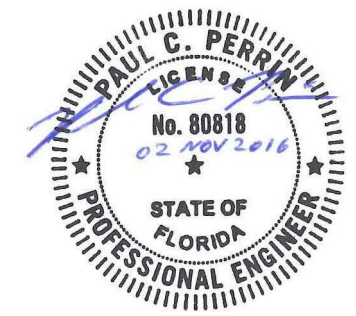
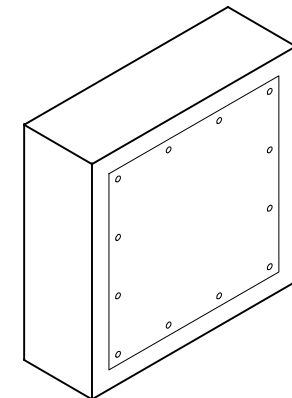
Max uplift on one side of AC Unit at side support HSS:
 $F_{STDP} = (0.78 \cdot Fw_{lat} \cdot H/2) / (2 \cdot STDP) + (0.78 \cdot Fw_{vert} - 0.67 \cdot Wt) / 4 =$
 $F_{STDP} = (0.78 \cdot 2.54 \text{ kips} \cdot 31.5 \text{ in} / 2) / (2 \cdot 30 \text{ in}) + (0.78 \cdot 0.49 \text{ kips} - 0.67 \cdot 0.120 \text{ kips}) / 4$
 $F_{STDP} = 0.595 \text{ kips}$
Allowable tensile capacity of 2 bolts = $2 \cdot 2.49 \text{ kips} = 4.97 \text{ kips} > 0.595 \text{ kips}$
Bolt Resistance at Side Supports Checks OK

Max moment in Support Angle:
 $F_{M1} \cdot (STDP - M1) / 2 = 1.174 \text{ kips} \cdot (30 \text{ in} - 14.19 \text{ in}) / 2 = 9.278 \text{ kip}\cdot\text{in}$
 $S_x \cdot F_y / \Omega = 0.569 \text{ in}^3 \cdot 36 \text{ ksi} / 1.67 = 12.66 \text{ kip}\cdot\text{in} > 9.278 \text{ kip}\cdot\text{in}$
Support Angle Flexural Capacity Checks OK

Max moment in Side HSS:
 $F_{STDP} \cdot (STWD - M4) / 2 = 0.595 \text{ kips} \cdot (36 \text{ in} - 21.5 \text{ in}) / 2 = 4.314 \text{ kip}\cdot\text{in}$
 $S_y \cdot F_y / \Omega = 0.932 \text{ in}^3 \cdot 46 \text{ ksi} / 1.67 = 25.672 \text{ kip}\cdot\text{in} > 4.314 \text{ kip}\cdot\text{in}$
Side HSS Flexural Capacity Checks OK

THE CALCULATIONS ON THE DRAWING ARE REPRESENTATIVE OF THE FOLLOWING LG ELECTRONICS OUTDOOR CONDENSING UNITS:

| |
|------------|
| LSU240HLV |
| LSU300HLV |
| LSU360HLV |
| LAU180HYV1 |
| LSU180HSV4 |
| LAU240HSV2 |
| LAU240HYV1 |
| LAU240HSV3 |
| LSU240HSV3 |
| LSU307HV3 |
| LSU360HV3 |
| LSU240HEV1 |
| LMU18CHV |
| LMU24CHV |



34-12-R-109 CALCULATIONS
LG ELECTRONICS USA HVAC
OUTDOOR CONDENSING UNIT
ROOF MOUNT CONFIGURATION

| NO | DATE | DESCRIPTION |
|----|------|-------------|
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|-------------|-------------|
| SCALE | DATE |
| NTS | 11/02/16 |
| DRAWN BY | PROJECT MGR |
| JDP | PCP |
| PROJECT NO. | FLAT FILE |
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DRAWING NO.
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