ESSCO
TM22-9337
INSTALLATION, OPERATIONS & MAINTENANCE MANUAL
MODEL S27-83 RADOME

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REVISION STATUS OF PAGES

Revision	Description	Page
A	Initial Release	All

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SECTION I: DESCRIPTION AND INFORMATION

1 Description and Purpose

This manual contains installation, operation, and maintenance instructions for an CPI S27-83 shell radome. The radome is a rigid, spherical structure that encloses and protects antenna equipment from the elements. The radome is constructed of pentagonal and hexagonal shaped panels of a sandwich type construction with a foam core and high-strength fiber-reinforced plastic laminate skins. The panels are bolted together in a predetermined manner to form the spherical radome. The base panels have an integrally molded flange for mounting to the radome foundation with anchor bolts. When needed, panel edges are electromagnetically tuned to ensure that the enclosure has a minimal effect on the radiation pattern and transmission efficiency of the antenna. (For elevation view, see Figure 1-1).

1.1 Preliminary Inspection

The installation supervisor, should if possible, visit the site prior to start of construction to familiarize themselves with the site and check that everything is ready to begin the installation. The radome foundation should be examined carefully to verify that anchor bolts are located within the required tolerances

1.2 Accessories

The radome is equipped with the following accessories:

Anchor Bolt Template
Base Hardware Kit
Zenith Hatch with Vent
Air Terminal Kit
Down Conductor Kit
Interior Lighting Kit
Radome Lift Sling

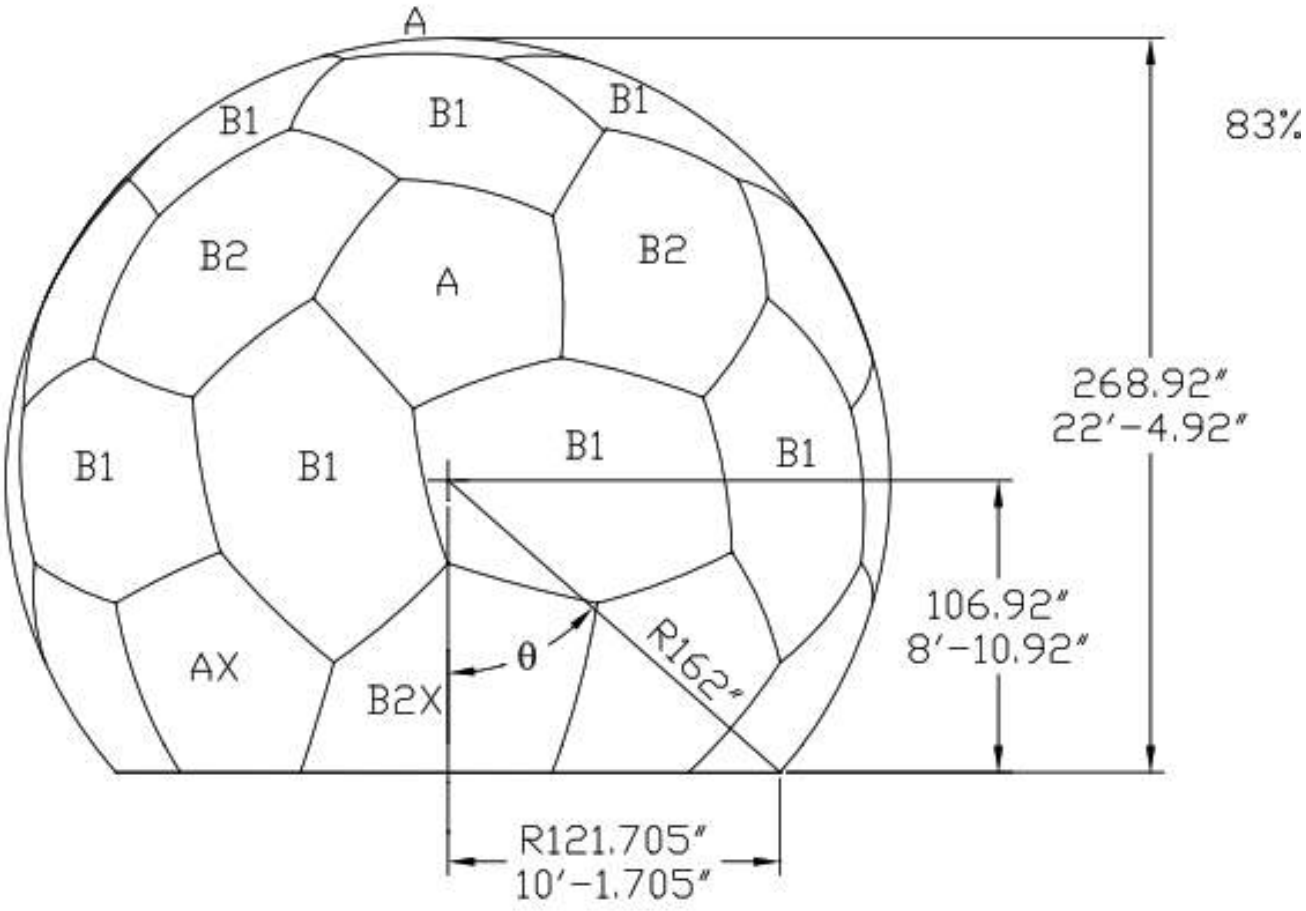


Figure 1-1 S27-83 Radome Elevation

SECTION II: ASSEMBLY AND INSTRUCTION

2 General

This section describes the procedures and precautions associated with assembly of the basic radome. Instructions for installation of accessory items are included in Section IV.

The installation supervisor should record and date the results of any inspections made, or discrepancies found throughout the radome installation. A copy of the record of discrepancies should be forwarded to:

CPI ESSCO Inc.
90 Nemco Way, Suite 1
Ayer, MA 01432
U.S.A.
Attention: Engineering Manager

2.1 Installation Planning

The radome can be assembled with considerable flexibility in procedures and equipment used. The specific site conditions and the personnel and equipment available should be studied carefully during the installation planning. Among the items to be considered are the following:

a) Height of radome foundation deck above grade.
b) Overhang of radome equator beyond the radome base ring.
c) Interior floor space available.
d) Clear space within the radome.
e) Availability of electrical power and equipment such as crane, lifting tackle, scaffolding, compressors, etc.
f) Interference with other work on site.
g) Weather history for the time of year during which the installation is planned.
h) Time available to work and to complete.

2.2 Parts List

The Parts Lists in Section IV identify the parts necessary for the installation of the radome and accessories. Before beginning assembly, check the equipment on hand against the Parts List. Any shortages, or damage due to shipping, should be reported immediately. Note that panels may become dirty in transit. See Section III for cleaning procedure.

2.3 Panel Weights and Areas

The following are the estimated panel weights and areas of the radome panels:

Panel type	Weight lbs.
AZ	86
A	40
B1	64
B2	64
AX	58
B2X	82

2.4 Preparation for Assembly

Precautions must be taken to avoid damaging panels after they are removed from the packaging. Do not stack panels together without foam pads between each panel. Plan installation periods to minimize the number of panels unpacked and loose around the Radome.

The careful preparation of resources, site access, assembly schedule, procedures, work crews and licenses, permits and equipment are of vital importance for the radome installation. The partially erected radome is vulnerable to damage from high winds. Once construction has started it is imperative that the assembly move rapidly and uninterrupted to completion.

2.5 Safety Precautions

W A R N I N G

Safety precautions dictate that all radar and/or communication transmitters in the immediate area be shut down or properly blanked when personnel are working on the radome.

It will be the responsibility of the site supervisor or their authorized representative to ensure that the Safety Hazard/Risk Assessment and Mitigation Plan is prepared and reviewed, and all safety interlocks are operational to prevent transmitters from being activated while personnel are working on the radome. Close coordination must be maintained between site operating personnel and the supervisor of the radome installation crew to prevent premature operation of either antennas or transmitters.

Only skilled climbers with proper training should be permitted to work on the radome above ground level.

Inspect each item of equipment before working on the radome - life is in danger.

Safety helmets and other forms of Personal Protective Equipment must be worn by all members of the installation crew, working at ground level.

Note: Personnel Certification Requirements and Mandatory Personal Protective Equipment are regulated by the Site Country

Avoid prolonged skin contact or breathing of fumes of sealant compound, surface coatings, patching resins, and cleaning solvents. Wash hands thoroughly after using these materials and before smoking or eating.

Prior to the installation of the lightning protection system the radome is susceptible to lightning strikes. It is imperative that the lightning rod be installed and connected to the grounding system immediately following the installation of the zenith panel.

If there are any indications of electrical storms in the area during the radome assembly and before the lightning grounding system is in place, all personnel must evacuate the radome area.

2.6 Weather Forecast

During assembly of the radome, installing panels becomes difficult in winds over 25 mph (40 km/hr). A communications system should be set up with the nearest weather forecasting agency for long range forecasts and notification of sudden storms. If storms are expected, the radome should be secured with ropes as described in paragraph 2.10.6.

2.7 Installation Crew

The installation work force should consist of a supervisor, experienced climber-technicians, and material handlers with rigging experience. The number of bolt-up crews that can be used effectively is dependent upon radome size, availability of equipment to place the crews in bolt-up locations and means for supplying the crews with panels for assembly.

Recommended crew member credentials:

- Supervisor
  - Experienced in all aspects of Radome System Assembly and Installation
  - Experienced authoring the Safety Hazard/Risk Analysis and Mitigation Plan
  - Experienced Project Planner – Scheduling and definition of Daily Tasks

- Material Handlers
  - Experienced in Proper handling of individual composite panels
  - Experienced Rigging and Knot Tying

- Assembly Technicians
  - Experienced (and Certified) – Access by Rope/Climber
  - Experienced (and Certified) – Scaffolding Assembly/Rearrangement/Disassembly
  - Experienced (and Certified) – MEWP Operator
  - Experienced in CPI ESSCO Composite Radome Assembly and Installation Crew

2.8 Equipment

The type of antenna, floor obstructions etc., will dictate the choice of equipment required to place technicians at the bolt-up locations. In most cases, commercial knock-down scaffold can be assembled into rolling towers in such a fashion that all areas will be accessible. A forklift truck is desirable for handling material at ground level.

2.9 Installation Tools

The number and type of tools is dependent upon the contractor's preference and size of the work force. Table 2-3 contains a list of recommended tools.

Table 2-1 Recommended Tool/Bolt Wrench Size

Imperial Units		Metric Units	
Bolt Diameter	**Wrench Size**	**Bolt Diameter**	**Wrench Size**
(fractional inch)	(fractional inch)	(mm)	(fractional inch)
3/8	9/16	10	17
1/2	3/4	12	19
5/8	15/16	16	24
3/4	1 1/8	20	30
7/8	1 5/16	22	32
1	1 1/2	27	41
1 1/8	1 11/16	30	46
1 1/4	1 7/8	33	50
1 3/8	2 1/16	36	55

Table 2-2 Recommended Personnel & Tool Requirement List

Crew Size	Panel to Panel	Base
4	3/8”	5/8”

Table 2-3 Recommended Tools

ITEM	DESCRIPTION	Qty
1	Ratchet Wrench – 3/8” drive	4
2	Ratchet Wrench – 1/2" drive	2
3	1/2" drive cordless impact wrench	3
4	1/2" drive electric impact wrench	1
5	7/16” – 3/8” drive standard socket 6-point	1
6	1/2" – 3/8” drive standard socket 6-point	1
7	9/16” – 3/8” drive deep socket 6-point	4
8	9/16” – 1/2" drive impact socket 6-point	4
9	3/4" – ½” drive deep socket 6-point	1
10	15/16” – 1/2" drive deep impact socket 6-point	1
11	1-1/16” – 1/2" drive deep socket 6-point	1
12	1-1/8” – 1/2" drive standard socket 6-point	1
13	1-1/2” – 1/2" drive standard socket 6-point	1
14	3/8” to 1/2” drive adapter	1

ITEM	DESCRIPTION	Qty
15	1/2" to 3/8” drive adapter	1
16	3/8” drive extension, 3”	1
17	1/2" drive extension, 5”	1
18	Combination wrench set 7/16”-1” (x16’s)	1
19	Combination wrench 9/16”	2
20	Combination wrench 7/8”	2
21	Combination wrench 1-1/8”	1
22	Combination wrench 1-1/16”	1
23	Combination wrench 1-1/4”	2
24	Combination wrench 1-5/16”	2
25	Combination wrench 1-1/2”	1
26	Combination wrench 1-5/8”	1
27	9/16” ratcheting box-end wrench	1
28	Adjustable wrench – 12”	1
29	Adjustable wrench – 16”	1
30	Socket set – 3/8” drive, 6-point	1
31	Socket set – 1/2" drive, 6-point	1
32	Allen wrench set (includes 5/16”)	1
33	1/2” cordless drill	1
34	Phillips screwdriver bits for drill	6
36	Grinder (4-1/2” angle)	1
37	Disks for grinder	4
38	3/8”-16 plug tap	5
39	1/4"-20 plug tap	2
40	Tap wrench (T-handle)	4
41	Circular saw (7-1/4”)	1
42	Hack saw	1
43	Hack saw blades (12”)	5
44	Torque wrench (0-75 ft-lbs)	1
45	Screwdriver set (8-piece, Philips & flat head)	1
46	Claw hammer (16oz)	2
47	2 lb hammer	1
48	Ball peen hammer	1
49	Metal chisel	1
50	Pliers (8” slip-joint)	1

ITEM	DESCRIPTION	Qty
51	Needle nose pliers with side cutter	1
52	Channel locks, 6-1/2”	1
53	Channel locks, 12”	1
54	Vice grips (7”)	1
55	Vice grips (10”)	1
56	Scissors	1
57	Utility knives (retractable blade) (10-099)	4
58	Knife blades (for above)	20
59	Wrecking bar, 24”	1
60	Wonder Bar pry bar, 12”	1
61	Tin snips	1
62	Wire snips, 8”	1
63	Wire strippers	1
64	1/2” diameter round file	1
65	Flat file	1
66	Triangle file	1
67	Wire brush	1
68	Steel measuring tape – 25’	1
69	Steel measuring tape – 100’	1
70	Caulking guns	4
71	Chalk line	1
72	Level, 24”	1
73	Alignment pins, 1/4" x 12”	8
74	C-clamps, 5”	2
75	Shoulder eyebolts – 3/8” x 1-1/4”	20
76	Eye nuts, 5/8”-11	10
77	1/2" shackles	5
78	5/8” shackles	5
79	Bolt bags	8
80	Bolt bag belt, medium	4
81	Bolt pail	2
82	Black electrical tape (3M 33+)	10 rolls
83	Rags, 5lb bag	1
84	Markers – black	2
85	5/8” SSR rope (varies by job)	150 ft

ITEM	DESCRIPTION	Qty
86	1/2" rope (double braided nylon)	600 ft
87	3/8” rope (double braided nylon)	300 ft
88	1/4" rope (double braided nylon)	300 ft
89	1/8” rope (solid braided nylon)	100 ft
90	100’ extension cord	1
91	50’ extension cords	2
92	25’ extension cords	2
93	3-Way plug adapter	2
94	GFCI plug (circuit interrupter)	1
95	5” single wood shell block	1
96	11’ self-retracting lifeline	3
97	21’ self-retracting lifeline	1
98	Shock absorbing lanyards	3
99	Sinco rope grabs	1
100	Hard hats	4
101	Safety glasses	4
102	Earplugs	12
103	First Aid kit	1

Table 2-4 Optional Tools

ITEM	DESCRIPTION
1	Hammer drill
2	Drill bits for hammer drill
3	Transformer
4	Sawsall
5	Band saw
6	Wire snake
7	Ratchet straps
8	Lift attachment points

Table 2-5 Bolt - Wrench Sizes

Imperial Units		Metric Units	
Bolt Diameter	**Wrench Size**	**Bolt Diameter**	**Wrench Size**
(fractional inch)	(fractional inch)	(mm)	(fractional inch)
3/8	9/16	10	17
1/2	3/4	12	19
5/8	15/16	16	24
3/4	1 1/8	20	30
7/8	1 5/16	22	32
1	1 1/2	27	41
1 1/8	1 11/16	30	46
1 1/4	1 7/8	33	50
1 3/8	2 1/16	36	55

Table 2-6 Required Bolt Torquing Values at Installation

*For Panel-to-Panel Bolts

Imperial Units			Metric Units		
Bolt Diameter	**Bolt Torque**	**Torque Tolerance**	**Bolt Diameter**	**Bolt Torque**	**Torque Tolerance**
(fractional inch)	(ft-lb)	(+/- ft-lb)	(mm)	(N-m)	(+/- N-m)
3/8	25	3	8	34	4

Table 2-7 Required Bolt Torquing Values at Installation

*For Anchor Bolts

Imperial Units			Metric Units		
Bolt Diameter	**Bolt Torque**	**Torque Tolerance**	**Bolt Diameter**	**Bolt Torque**	**Torque Tolerance**
(fractional inch)	(ft-lb)	(+/- ft-lb)	(mm)	(N-m)	(+/- N-m)
5/8	75	5	16	102	7
3/4	108	7	19	146	10
7/8	147	10	22	199	13

2.10 Installation Procedures

2.10.1 General

A Composite Sandwich Radome is an assembly of identical segments (except segments containing modified panels with doors and hatches) that repeat 360 degrees around the radome. Each segment consists of “Horizontal Layers” of identical pentagonal and hexagonal shaped panels that form a Quasi-Random pattern when assembled. The radome is assembled in layers by adding panels to a layer until it is complete before moving to the next layer. See Section IV for Radome Segments drawing.

2.10.2 Anchor Bolt Template Assembly and Use

The template is made up of flat metal sections with holes at anchor bolt locations and assembly holes at each end for connecting with the sections into a circular assembly. see “Anchor Bolt Template Assembly” Drawings in Section IV of this technical manual.

2.10.2.1 Template Assembly

Place each template section around the foundation perimeter overlapping the ends of each section

Connect section –to-section with the shoulder bolts supplied using the two 0.375 inch diameter holes at the ends of the sections. The shoulder on each bolt must pass through both templates to form a pinned joint that will ensure correct alignment, See Figure 2-1.

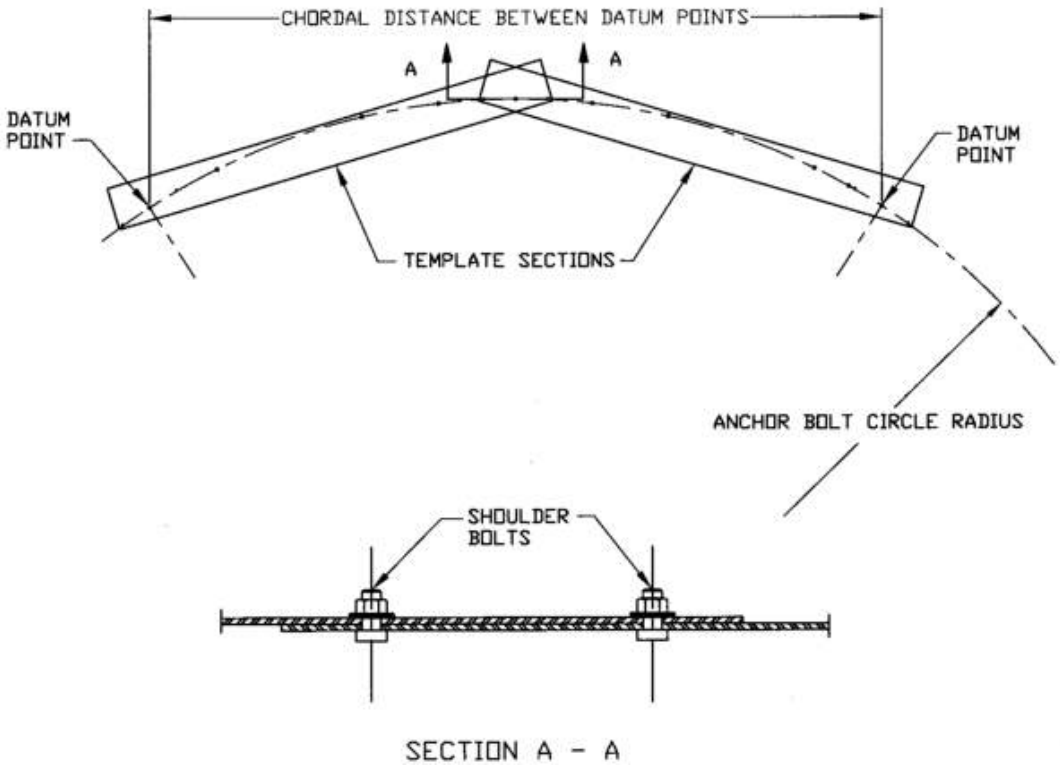


Figure 2-1 Details of Typical Template Assembly

After the template assembly is completed, verify by measurement, the chordal distances between ABT Datum Points around the entire perimeter of the assembled ABT meet the dimensions on the ABT drawing.

Check that the center of the template circle is at the center of the antenna rotation axis.

2.10.2.2 Installation

Once ABT is assembled and oriented correctly per assembly drawing, trace each ABT anchor bolt (AB) hole location onto the steel ring. Remove the ABT. Drill AB holes at each traced location on the steel ring

2.10.3 Base Panel Leveling

Use two (2) flat washers as shims under the base panel flanges at anchor bolt locations. Check the level at each anchor bolt, find the highest point on the foundation surface and, using this point as a datum elevation, add washers as necessary to bring all mounting points to a common level. See Figure 2-1 for location of shimming washers

N O T E

Anchor bolts, nuts & washers are not supplied with the Radome.

2.10.4 Base Panel Installation

All panels are marked with panel type and are color coded to facilitate installation. After determining the correct orientation of the radome, install the base panels on the anchor bolts. Refer to 1/4th assembly drawing in Section IV for panel placement

C A U T I O N

Prior to installation of the base panels, a backer rod should be installed on the radome support ring or foundation as shown on Figure 2-1. Backer rod is supplied with the radome.

Position the base panels on the mounting shim washers. Install the plate washer, lock washer and nuts on the anchor bolts; assemble nuts by hand tightening. See Figure 2-1 for assembly details. Install the bolts along the lapped flanges of adjoining panels. Leave all bolts only snug-tight, i.e., until head of bolt makes contact with panel flange.

Install the next course above the base course. Tighten bolts on adjoining flanges only to the extent necessary to bring adjacent panels into alignment.

With base anchor bolt nuts loose, tighten bolts along the edges of adjoining panels of the base ring starting at the top and proceeding downward. This procedure allows the base to shift into alignment within the tolerance of the base bolt holes. Tighten all panel-to-panel bolts of the base course; leave the nuts on the base anchor bolts only snug tight. Final tightening of the 3/8" panel-to-panel bolts should be to a torque of 34 N-m ± 4 N-m (25 ft-lbs ± 3 ft-lbs).

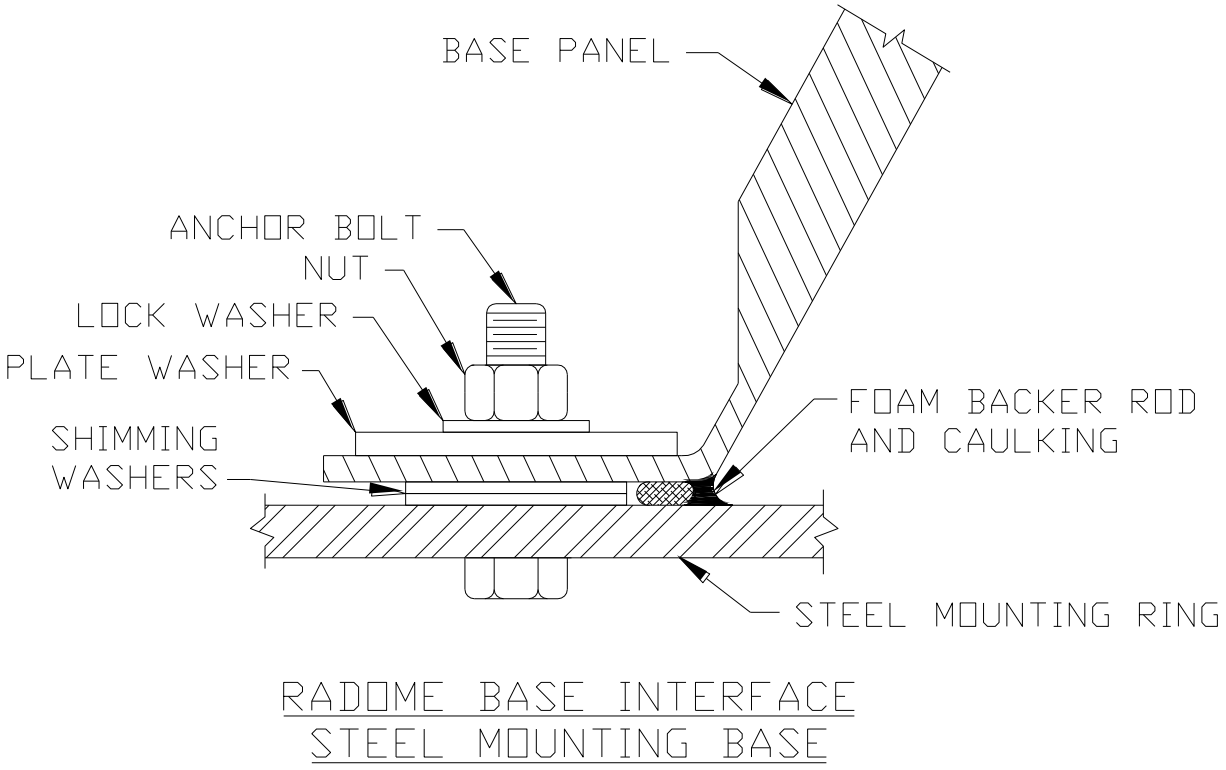


Figure 2-2 Radome Base Interface Detail - Through Bolt

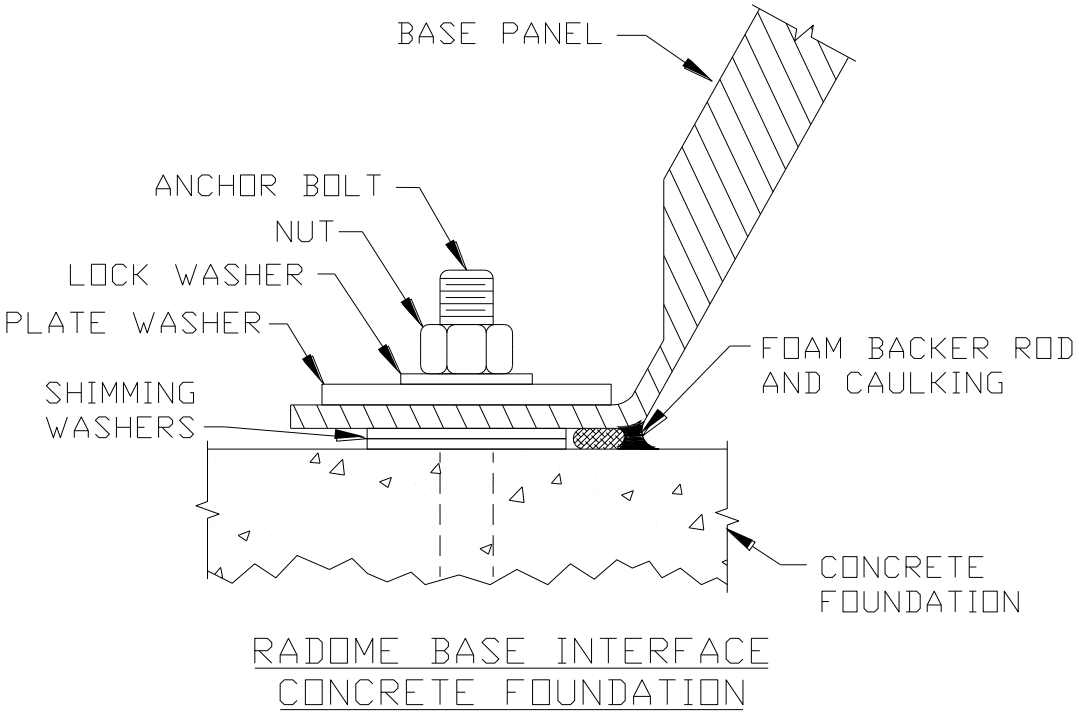


Figure 2-3 Radome Base Interface Detail - Cast Bolt

2.10.5 Electrical Components

Installation of lightning conductors, power cables and wires that must be brought to the top of the radome for operation of the accessory equipment may be started at this point and carried upward as scaffolding progresses. Install lightning ground conductors with a minimum of sharp changes in direction; make all bends with uniform large radii with minimum radius of 12 inches. Run aircraft warning light from the lightning ground system conductors.

N O T E

Connect the conductors and power cables to the radome using the bolts along the panel flanges to attach cable clips. Install clips near each vertex and with a maximum of three feet spacing along the flanges for the ground conductors and approximately 2 feet spacing for power cables. See Figures 2-4 and 2-5 for details.

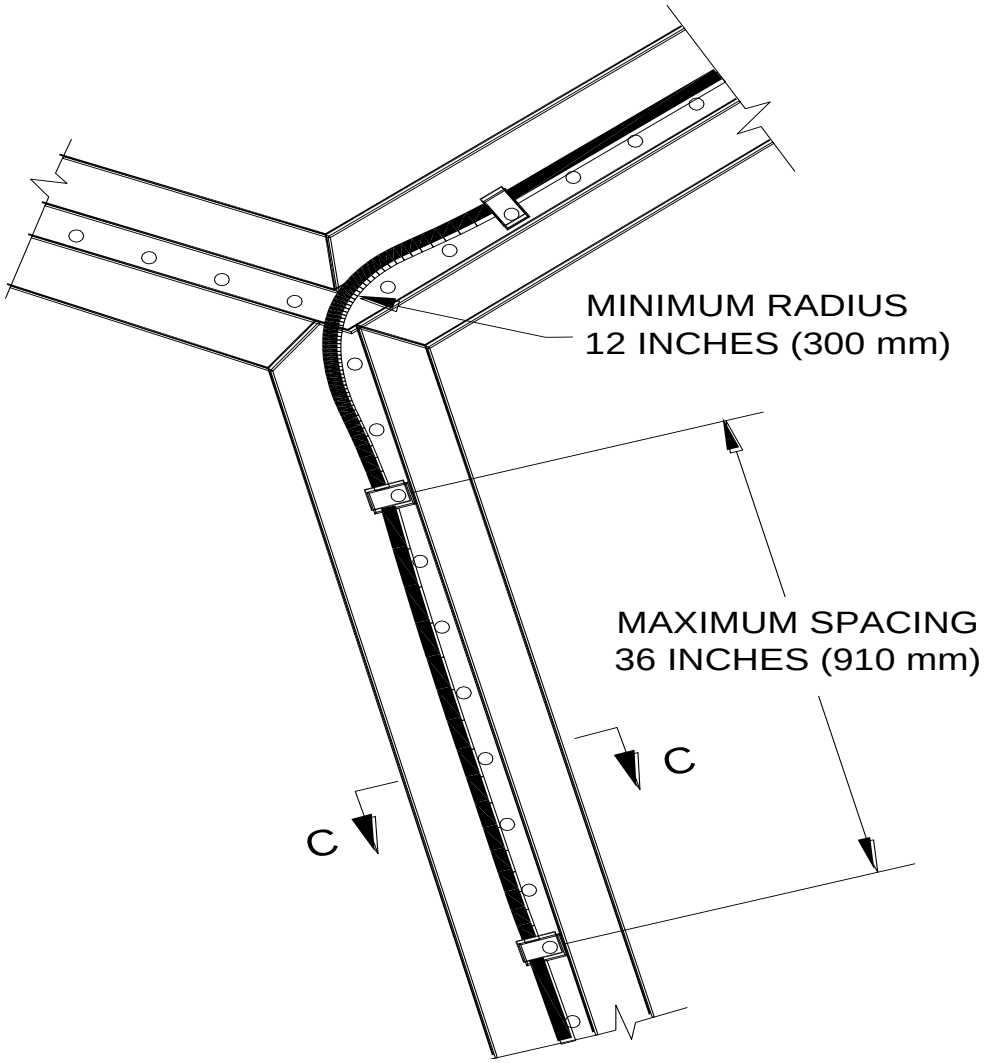


Figure 2-4 Conductor Detail at Vertex

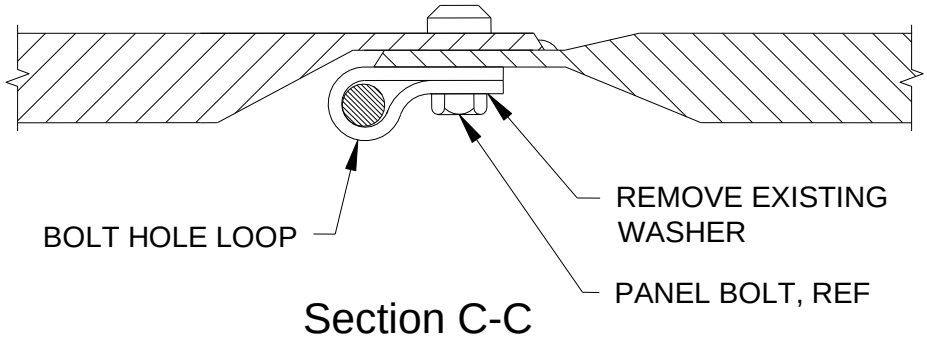


Figure 2-5 Conductor Attachment to Panel Flange

2.10.6 Panel Placement

Panel-to-panel bolts should be snug tightened as each panel is placed in the radome. Start by installing a bolt at each end of the adjoining panel flanges then install remaining bolts. After completion of each course, the bolts on the previous course are fully tightened. This procedure allows panels to shift into proper spherical alignment before tightening and also facilitates placement of adjoining panels.

A given layer may be worked on in as many locations as feasible; however, each layer should be completed prior to the start of a new layer. Variations in the listed sequence may be made if equipment or conditions force an abnormal procedure. Any variation should attempt to minimize the installation of peaking elements above any course.

The usual method of assembly is to lift individual panels into place one at a time. 3/8-16 carriage bolts with the heads removed can be used as guide pins when assembling panels. The method of rigging used for the lifting must be carefully arranged to prevent excessive stress on the panel. Lifting of each panel can be done by use of shoulder eyebolts assembled to the T-nuts of panel being lifted. Tag lines can be attached to the panel for control during lifting.

Scaffolding and Rolling Towers are Configured and Repositioned for Optimal Access to a Layer by the Assembly Technicians

C A U T I O N

Do not lift panel by one T-nut or hole only. A minimum of two is required.

After installation of all panels in the radome, tighten all anchor bolts to torque listed in Table 2-7. Final tightening of 3/8" panel-to-panel bolts should be to a torque listed in Table 2-6

2.10.7 High Wind Precautions

C A U T I O N

If sudden storms are expected, the partially erected radome must be secured by guying with ropes or by other means of stabilizing the open edge. If possible, assembly should continue until the layer in process is completed. All other material on the site should be secured.

The Radomes are not designed to meet peak wind loads until assembly is completed. Because of this, the partially erected structure will exhibit increasing deflections in winds over 25 mph (40 km/hr). After the second layer has been installed, the radome should be restrained when winds are greater than 25 mph (40 km/hr) and when the installation crew leaves the site at the end of the workday. See Figures 2-4, 2-5 and 2-6 for methods of guying the radome.

The open edges of panels can be tied off by attaching ropes to eyebolts in the T-nuts. If there is a threat of high winds, eyebolts should be installed, and the restraining lines moved up as each new layer is installed so that the lines are always near the highest edge.

The lines should be secured to strong anchoring points. When the radome assembly is below the equator, possible anchoring locations are the antenna tower, the radome anchor bolts, the antenna pedestal base, or the antenna structure if it is in place. At the equator, the lines can be brought across the opening and secured to the top edge of the radome on the opposite side, similar to spokes on a bicycle wheel. A general rule is to tie off the line so that it is as close to being perpendicular to the radome surface as possible.

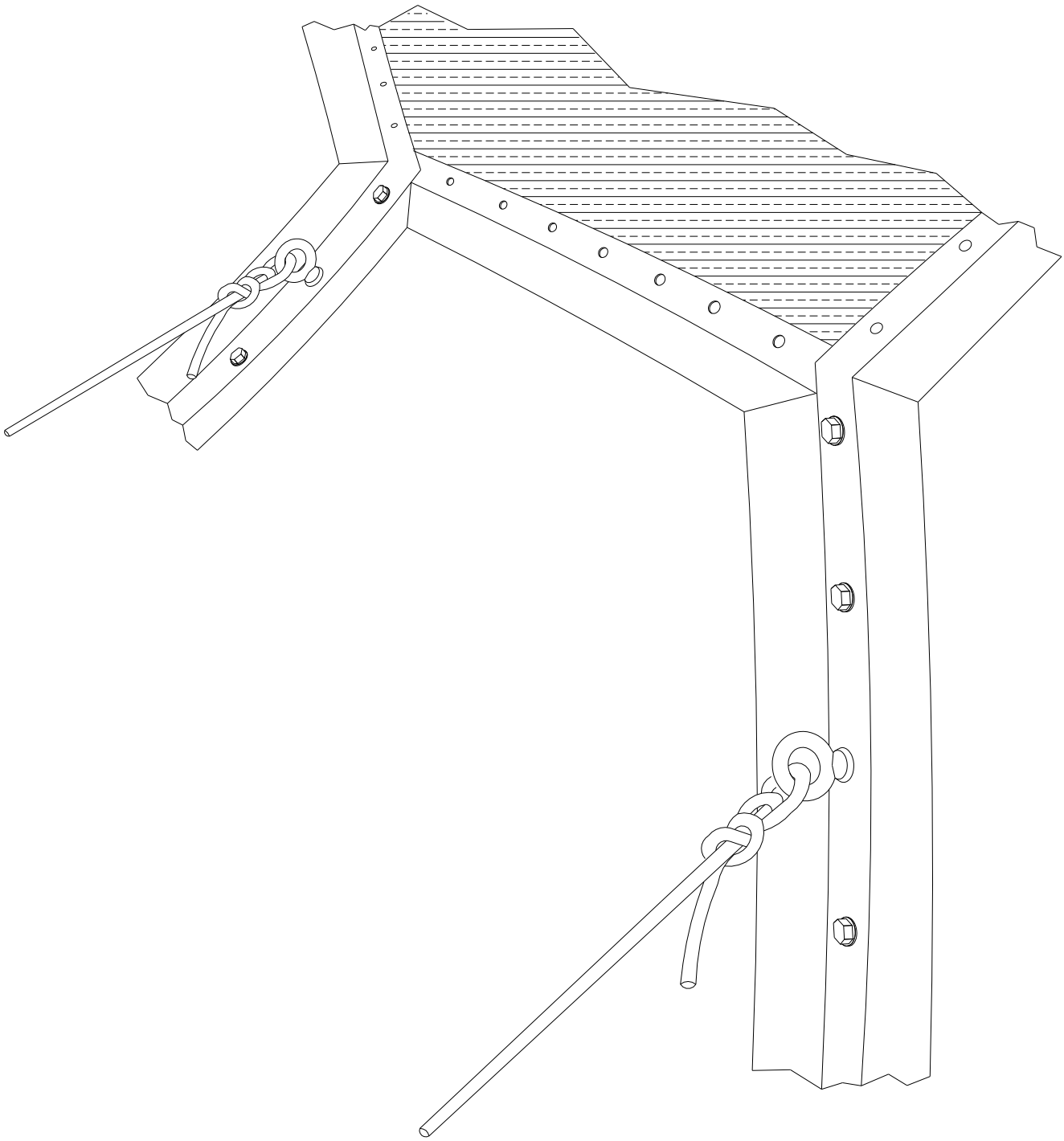


Figure 2-6 Guy Line Connections

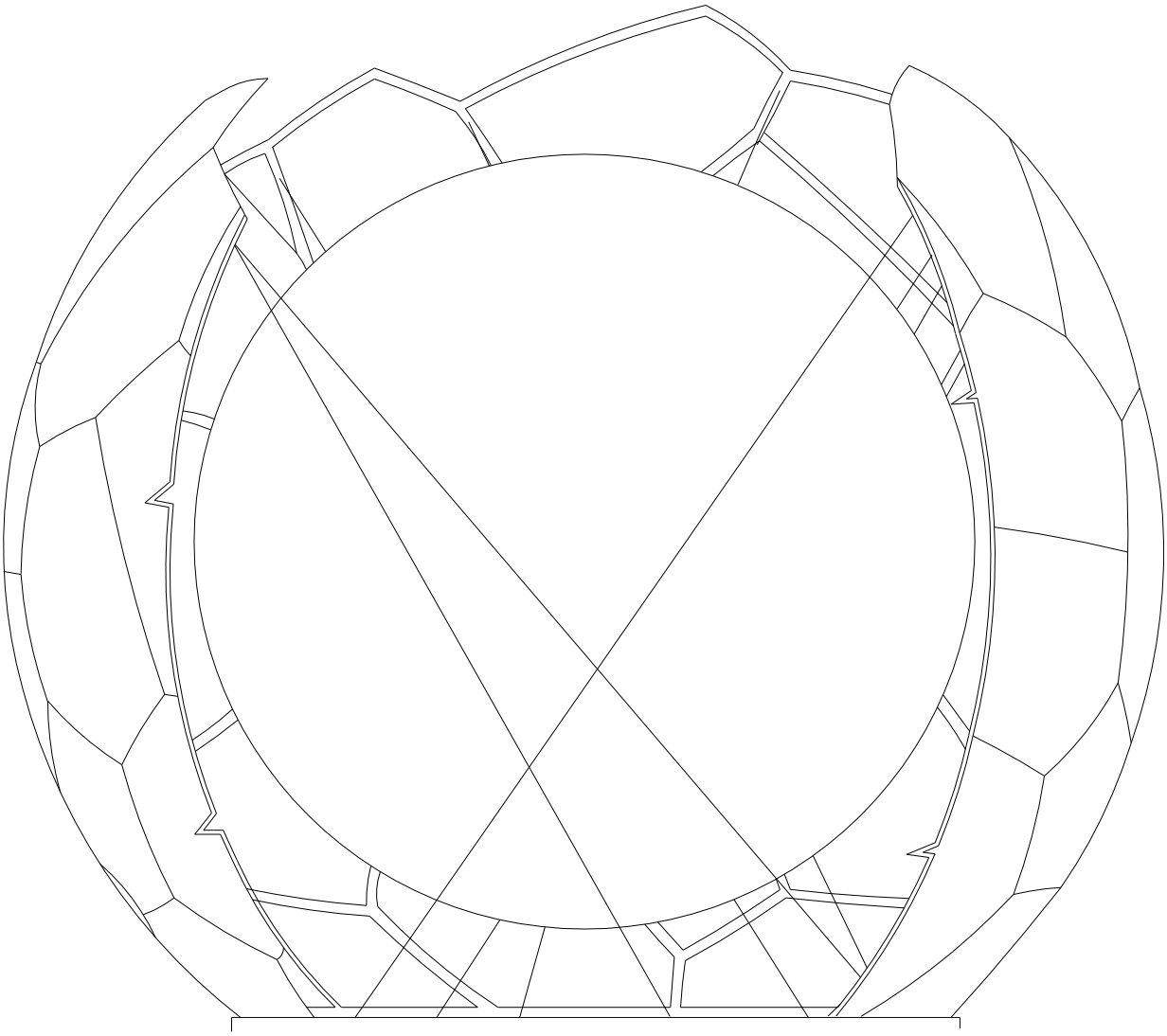


Figure 2-7 Radome Guying Against High Winds - Elevation Section

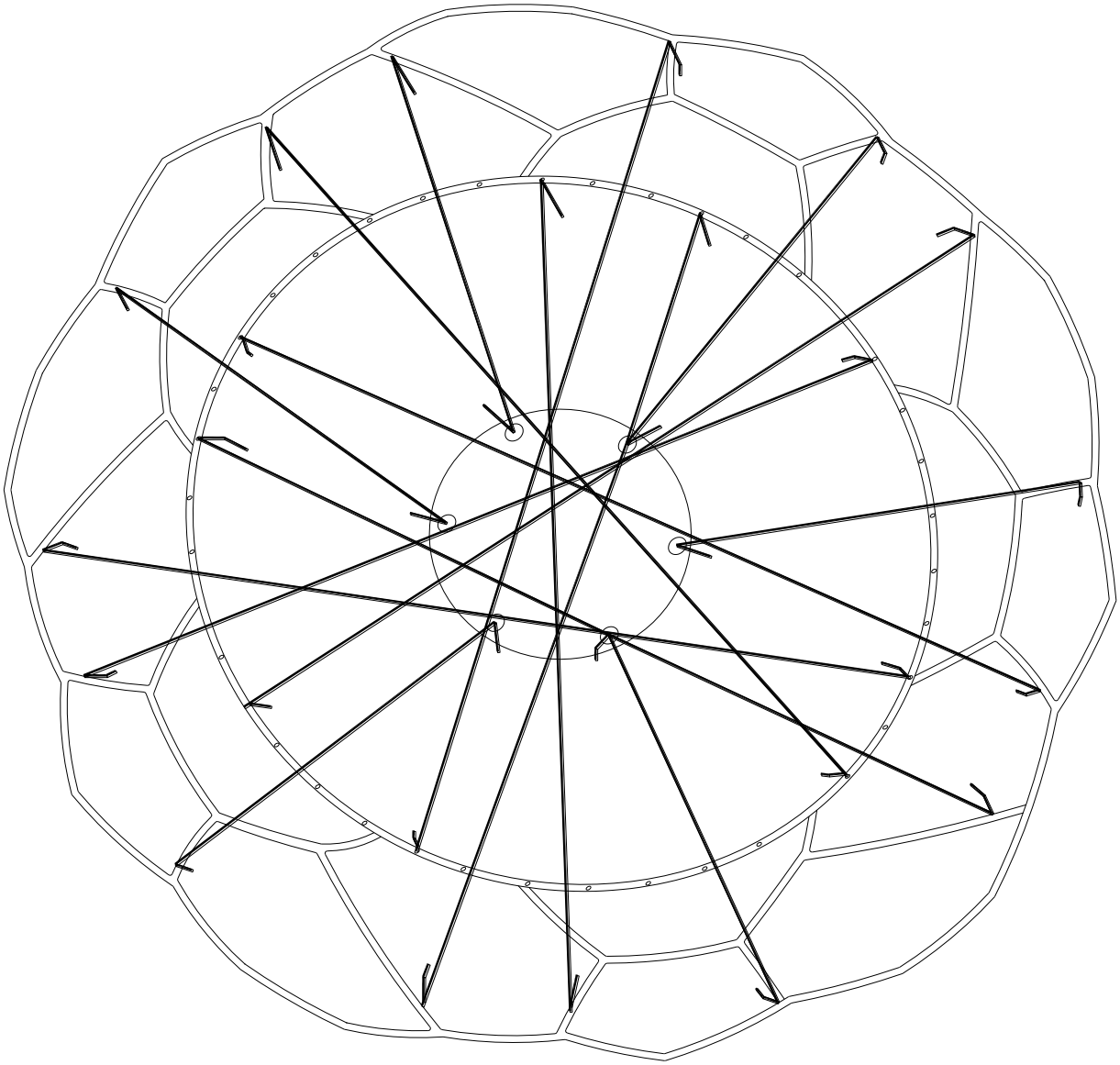


Figure 2-8 Radome Guying Against High Winds - Top View

2.10.8 Caulking

C A U T I O N

Precautions must be taken to avoid damaging panels, or the panel coating, when working on the exterior of the radome. Soft, rubber-soled footwear must be worn. Stepping must be restricted to the panel joint areas as much as possible. Take special care to prevent placing high point loads on the center, sandwich area of the panels. Plan sealing procedures to avoid pulling ropes or other equipment across newly sealed joints.

The basic weather sealing of the radome is by means of caulking along the edges of the panels. See drawing 1532-67 for panel-to-panel caulking location. After assembly of the panels each vertex has a small hole where special care in sealing should be taken in order to make the radome weather tight.

Sealant must be applied along the periphery of outside attachments to the radome including accessory mounting plates, brackets and bolt heads. Mark the location of any T-nut that may have been broken loose during installation and apply sealant around the outside head of the T-nut.

There is a small open slot that occurs between base panels just above the base flange which must be sealed. If the hole is too wide to retain the sealant, partially seal by applying compound to each side of the edge and allow to set before making a succeeding pass with sealant to fill the seam.

The joint between the panel base flange and the mounting base ring is made weather-tight by applying caulking against the foam backer rod which is installed around the radome base.

2.10.9 Clean Up

After completing the installation, clean any dirt, oil or grease from both exterior and interior surfaces of the radome panels by following the procedures for cleaning described in Section III of this manual.

Remove any debris from the site and leave interior areas broom-clean and exterior areas rake-clean.

2.10.10 Lifting the Radome

The radome can be assembled at grade level and lifted into place on a tower or removed from an installed location by means of lifting equipment and a crane.

Lifting an object of this size requires careful planning since costly equipment can be destroyed and there can be danger to personnel if precautions are not taken.

2.10.11 Temporary Assembly Location

If the radome is to be assembled or held at a temporary location, there are important requisites for the temporary site:

a) The foundation base ring must be level or capable of being leveled to within ± 6 mm (1/4 inch).
b) There must be a means of anchoring the radome against wind forces.
c) If a crane is to be used for the lift, it must be located to permit the swing of the radome from the original location to the new location.

An ideal site for assembly is a level concrete slab on grade with anchor bolts to match the radome base anchor bolt configuration.

The radome can be erected on a bare ground site that is reasonably level if a circumferential foundation ring can be provided which can be leveled. If the tower has a structural steel ring for mounting the radome, it is recommended that this ring be used for assembling the radome at the temporary site. The ring can be lifted with the radome onto the tower and serve an additional function of stiffening the bottom edge of the radome during the lift.

2.10.12 Radome Tie-Down

The radome at the temporary site must be anchored against high winds. The partially assembled radome has an area and configuration that result in large horizontal forces under wind loads; the completed or nearly completed radome has, additionally, high lift and overturning forces under high winds. Methods for anchoring the radome include:

a) Foundation with integral anchor bolts and sufficient mass to offset the forces due to wind.
b) Ground anchor tie-downs, buried or driven into the ground to develop pull-out resistance.
c) Tie-off to precast concrete or other weights or to heavy equipment.

The required strength of the anchoring system must be evaluated carefully and is a function of radome size, site exposure, probable wind velocities and time needed to complete the assembly and lift. The L-3 HARRIS Product Line Manager should be contacted for temporary anchoring evaluation and advice.

2.10.13 Lift Preparations

A radome lifting kit is supplied with the radome consisting of lift brackets, lift straps and attachment fasteners.

This equipment is used by first installing 4 lift brackets around the base of the radome. See Section IV for drawings for installing the lift brackets.

Lift straps are then attached to the crane or helicopter hook and positioned over the radome, and the ends fastened to the lift brackets.

Tag lines must be attached to several points around the base perimeter to control the radome during the lift.

2.10.14 Lift

The lift should be started by raising the radome a few inches above the foundation and holding it in place while all connections are checked and tag lines studied for stability.

The lift can then proceed slowly, making sure that the radome is under full control at all times. Special care must be taken to monitor the clearance around the antenna as the radome is lowered into place.

The base flange of the radome must be positioned over the anchor bolt points before being lowered slowly onto the base ring. Then all anchor bolts can be secured.

SECTION III: MAINTENANCE AND REPAIR

3 Preventative Maintenance

3.1 Inspection

A thorough inspection of the radome should be made at two-year periods. Radomes located in areas of high urban or industrial air pollution or subjected to corrosive salt air deterioration or wind driven sand should be inspected at one-year periods to determine need for maintenance.

In the event of a sever or seismic climatic event such as heavy hail storms, long lasting sand storms, wind speeds or earthquake magnitudes that exceed the design limit, the Radome should be inspected immediately

During inspection, document all required repairs.

3.2 Access

Lower areas of the interior of the radome may be reached by extension ladders equipped with cushioning pads at their upper ends to prevent damage to the panels. Access to higher interior areas of the radome can be made with standard scaffolding.

Ladders, conventional scaffolding or a "cherry picker" can be used for access to the exterior surface. When using an extension ladder, the upper rails must have cushioning pads on the ends to prevent panel damage, and rubber pads on the ends to prevent slipping.

3.3 Panel Inspection

The panels must be visually inspected from inside and outside the radome. Check for excessive dirt build-up, punctures, tears or other damage to the panel laminate and for damage to the exterior surface coating.

3.4 Exterior Surface Coating Inspection

The exterior of the radome has a surface coating which is weather- resistant and protects the panel laminate from solar radiation. The surface coating should be inspected, pay attention for the following areas for need of repairs;

- Excessive dirt build-up
- Exterior Surface Coating
  - Scratches
  - Abrasions
  - Coverage discontinuity (i.e. flaked off areas*)
- Structure
  - Punctures
  - Tear
  - Delamination

*Top Coat (paint) coverage discontinuities should be repaired immediately to restore the affected areas Hydrophobic, UV and Weather Protection Features.

3.5 Inspection Fasteners

Conduct a torque test with a calibrated torque wrench to a sample of 50 of the panel-to-panel bolts on a random basis over various areas of the radome. Bolts should not rotate when subjected to a tightening torque of 1.0 kg-m (7 ft-lbs).

The inspection has passed when less than 10% of the tested sample have failed, in which case all marked bolts should be re-torqued. If more than 10% of the tested sample have failed, continue the inspection to include an additional 150 bolts. If less than 7% of the new sample size have failed, then the test has passed, and all marked bolts should be re-torqued. If more than 7% of the new sample fail, all Panel-to-Panel should be inspected

Re-torque marked rotating bolts to the design torque of $\approx 34 \pm 4\mathrm{N} - \mathrm{m}\ (25 \pm 3\mathrm{ft.} - \mathrm{lb.})$

Check all anchor bolts for a minimum torque of 9.7 kg-m (70 ft-lbs).

3.6 Mechanical Fasteners Inspection – Anchor Bolts

All base panel to foundation anchor bolts should be tested. With the calibrated torque wrench, bolts should not rotate when subjected to a tightening torque ≈ 95 N-m (70ft.-lb.)

Nuts and chemical bolts pass when they do not rotate. When nuts fail, re-torque the nut to the installation torque of ≈ 120 ± 7 N-m (75 ± 5 ft.-lb.) When chemical bolts with nut rotate fail, the chemical anchor bolt installation in concrete will need to be repaired and will need to reinstall the nut.

Base Mounting Hardware

1. Determine Hardware size and torque required
2. Conduct a 100% check of base bolts.
3. Re-torque as necessary and record results in Table 3-1

3.7 Inspection of Sealant

Inspection of the Panel-to-Panel sealant for leaks should be conducted when raining, when possible. Standing inside the radome, look for any points of dripping or leaks, leaks should be located for repair during fair weather. Note that the point of dripping may not be the location of the actual leak; sealing above the drip point should be inspected for tightness. Care should be taken in checking the panel vertex areas.

Also note any loose, pealing, or missing sealant beads that may have been found through visual inspections.

Table 3-1 Base Mounting Hardware

Base Mounting Hardware			
Hardware Size (ref. TM) _____	Torque Req. (ref D83-12) _____	±20%ft. lbs.	
Qty. of Bolts Checked: _____	Qty. Out of Tolerance: _____		
Qty. Missing: _____	Qty. Replaced: _____		
Comments: _____			
_____			
_____			
Completed By: _____	Date: _____		

Table 3-2 Panel to Panel Hardware

Panel to Panel Hardware

Hardware Size (ref. TM) _____ Positive Torque Required

Hardware Type:

☐ Stainless Steel ☐ Nylon Patch on Bolt ☐ Twin Whiz Nut

☐ Plated ☐ Nylon Locking Nut ☐ Other

Initial Check: Additional Check:

Qty. Bolts Checked _____

Qty. Out of Tolerance _____

Qty. Missing _____

Qty. Replaced _____

Above Equator Inspection Acceptable ☐ Yes ☐ No (Explain)

Comments: _____

_____

_____

Completed By: _____ Date: _____

Table 3-3 Laminates and Core

Laminates and Core

Qty. of repairs required: None Qty. of repairs completed: _____

Panel Type	Layer	Compass Position	Damage Description and Results

Comments: No visible damage to panel laminates or cores

_____

_____

Completed By: _____ Date _____

Table 3-4 Surface Coating

Surface Coating

Qty. of repairs required: Polyurethane

Panel Type	Layer	Compass Position	Damage Description and Results

Comments: Coating in good condition

Completed By: _____ Date _____

Table 3-5 Radome Sealing

Radome Sealing

Number of Leaks Reported: None Number of Leaks Repaired: _____

Layer Location of Leaks _____ / _____ / _____ / _____ / _____ / _____ /

Compass Direction: _____ / _____ / _____ / _____ / _____ / _____ /

Comments: No visible signs of leaking

Completed By: _____ Date: _____

3.8 Repair Criteria

The overall structural integrity of the radome is dependent upon the integrity of the individual panels. It is therefore imperative that any panels having major damage be replaced promptly and that minor damage be repaired as soon as possible to prevent propagation of the damage.

Damage to a panel must be examined carefully to determine if it is field repairable. The following criteria should be used to assess whether a panel is field repairable for various types of damage.

3.8.1 Fracture of one surface laminate with little damage to the sandwich core.

Field repairable if length of fracture does not exceed 20".

3.8.2 Fracture or hole in one surface laminate with major damage to the sandwich core.

Field repairable if the damage does not exceed 8" and there is no fracture or delamination of the core extending beyond the area of the surface laminate damage.

3.8.3 Fracture or hole through the panel

Field repairable if fracture or hole is not greater than 6" in the longest dimension and there is no delamination between the core and surface laminates or core failure beyond the fracture or hole area.

3.9 Panel Repair Kit

A panel repair kit is not provided with the radome. If purchased the repair kit contains materials necessary for the panel repairs. Before using, check the date on the patching resin and catalyst. If the shelf-life date has been exceeded, obtain fresh material before proceeding.

Table 3-6 Panel Field Repair Criteria

Case	Sandwich Item	Damage Description	Fracture Length		Indentation OR Hole Longest Dimension		Depth		Field Repairable Allowance and Limitation
			(mm)	(in)	(mm)	(in)	(mm)	(in)	
I	Laminate	Fracture, One (1) Panel Surface Only	≤ 508	≤ 20	NA	NA	Laminate Thickness	Laminate Thickness	**YES**, subject to the following Conditions: I. Minor Core Damage Can Note Extend Beyond the Laminate Damage Area
	Foam Core	No Damage OR Minor Damage = Shallow Indentations Under Damaged Laminate	≤ 508	≤ 20	≤ 203	≤ 8	≤ 2.5	≤ 0.10	
II	Laminate	Fracture OR Hole, One (1) Panel Surface Laminate	≤ 203	≤ 8	≤ 203	≤ 8	Laminate Thickness	Laminate Thickness	**YES**, Subject to the following to conditions: I. Core Damage Can Not Extend Beyond the Laminate Damage Area II. No Damage to the Opposite Laminate
	Foam Core	Major Damage (= Deep Cracks/Hole/Delamination) Under Damaged Laminate	≤ 203	≤ 8	≤ 203	≤ 8	≥ 2.5	≥ 0.10	
III	Laminate	Fracture OR Hole, Both (2) Opposing Panel Surfaces	152	6	152	6	Laminate Thickness	Laminate Thickness	**YES**, Subject to the following to conditions: I. Core Damage Can Not Extend Beyond the Laminate Damage Area on Either Side
	Foam Core	Extreme Damage (= Through Cracks/Hole; Delamination Under Both (2) Opposing Damaged Laminated)	152	6	152	6	Core Thickness	Core Thickness	
IV	Laminate	Single Damage Site, Dimensions Exceed Case III Three or more Case I Damage Site Two or more Case II Damage Sites Combination of Cases Damage Sites	>Case III ≥ 3 Case I ≥ 2 Case II Combinations	>Case III ≥ 3 Case I ≥ 2 Case II Combinations	>Case III ≥ 3 Case I ≥ 2 Case II Combinations	>Case III ≥ 3 Case I ≥ 2 Case II Combinations	As Applicable	As Applicable	**NO**, Replace the Panel
	Foam Core	Single Damage Site, Dimensions Exceed Case III Three or more Case I Damage Sites Two or more Case II Damage Sites Combination of Cases Damage Sites	>Case III ≥ 3 Case I ≥ 2 Case II Combinations	>Case III ≥ 3 Case I ≥ 2 Case II Combinations	>Case III ≥ 3 Case I ≥ 2 Case II Combinations	>Case III ≥ 3 Case I ≥ 2 Case II Combinations	As Applicable	As Applicable	

3.10 Panel Repair Procedures

The primary objective in repairing damage to radome panels is to restore the strength of the panel to that of an undamaged panel.

The following steps outline the general procedures for panel repair. Since the type of damage can vary, it will be necessary to adapt the procedures for the specific damage case which can be determined using Table 3-6. See procedures for Case I, II, III, and IV below.

3.10.1 Case I

3.10.1.1 Removing Damaged Laminate

Using a sharp knife or oscillating fine tooth saw, cut away all un-bonded ragged edges of damaged laminate. Cut the laminate beyond the visible damaged area to the foam core surface and remove it to expose the foam core

Inspect the exposed foam core conditions to establish it meets the following criteria by visual and tap test means:

I. Dents/Holes: Largest Feature ≤ 10mm; Distance between features ≥ 10mm: Depth ≤ 2.5mm
II. Cuts/Cracks: Depth ≤ 2.5mm
III. Delamination within a ≈ 100m (4in) boundary from the edge of the removed laminate.

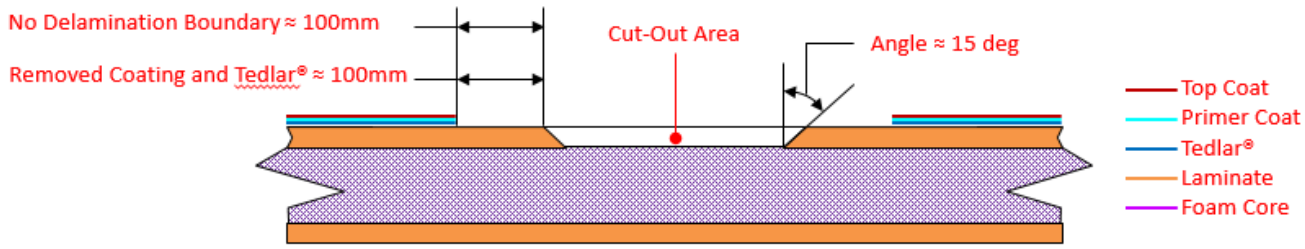
If criteria I, II, and III are satisfied, continue to 3.10.1.3. If criteria III is not satisfied, follow 3.10.1.2.

3.10.1.2 Repair delamination by drilling small holes and injecting resin (as applicable); Re-Tap Test to Verify Successful Repair.

3.10.1.3 Sand the laminate cross section on all sides of the cut-out area to a feather edge that tapers towards the cut-out area at an angle of ≈ 15°

3.10.1.4 Lightly sand the exterior laminate surface surrounding the cut-out area to a distance of 100mm (4in) from all edges removing:

- Surface Coating and Tedlar Down to bare laminate
- Laminate resin gloss (Careful not to Sand Down Fibers)



Note: The replacement parts listed below are to be fabricated from Panel Repair Kit Materials

3.10.1.5 Using a scissor or a sharp knife on a cutting surface, cut three (3) pieces of fabric sized as follows:

- Piece (1): Each edge extends ≈ 76mm (3in) beyond a corresponding cut-out edge
- Piece (2): Each edge extended ≈ 25mm (1in) smaller than Piece (1)
- Piece (3): Same dimensions as the removed laminate

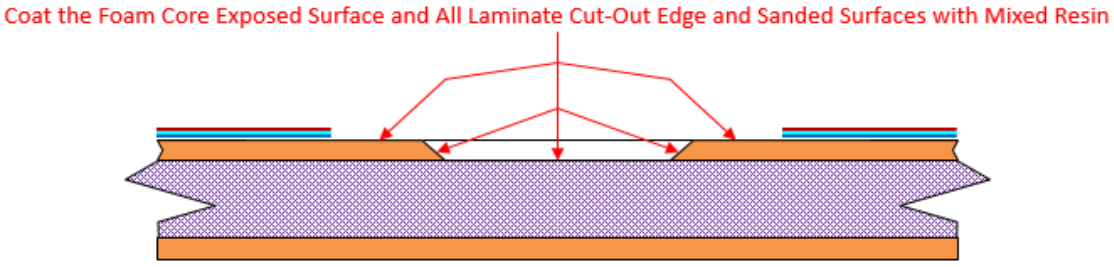
3.10.1.6 Clean all Debris/Dust from the

- Exposed foam core surface
- Surfaces of the laminate cut-out edge
- Sanded laminate surfaces

3.10.1.7 Mix a sufficient quantity of the two-part resin in proportions specified on the resin and catalyst containers

Note the time the resin and catalyst are mixed to ensure the mixed resin is consumed within the allowed working time

3.10.1.8 Coat the surface of the exposed foam core, and the surfaces of the laminate cut-out edge and sanded surfaces thoroughly with the mixed resin



3.10.1.9 Place the smallest cut fabric, piece (3), on top of the exposed, resin coated foam core.

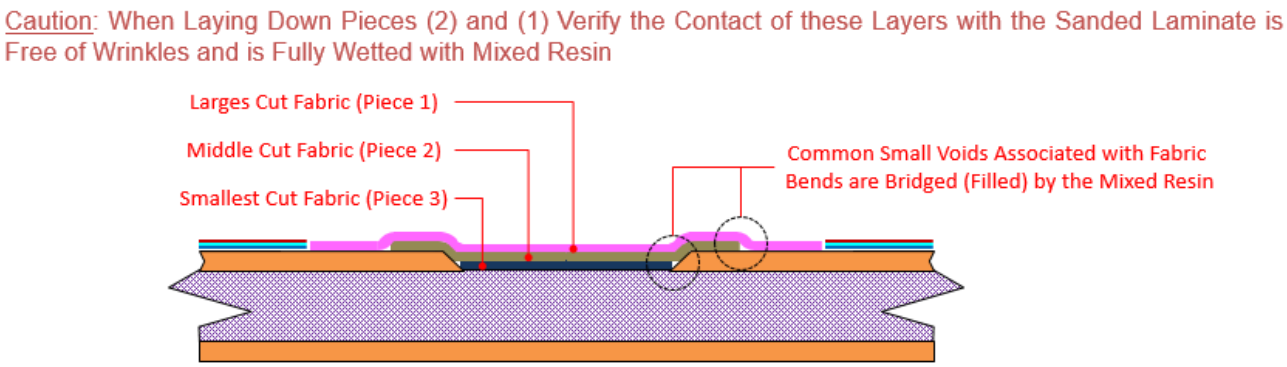
3.10.1.10 Impregnated Piece (3) with mixed resin, distributing it evenly across the fabricated with a squeegee tool and ensuring bubbles and/or excess resin are removed.

3.10.1.11 Place the next larger cut fabric, piece (2), centered over the previously placed fabric and extending to the panel sanded laminate surface

3.10.1.12 Impregnate piece (2) with mixed resin, distributing it evenly across the fabric with a squeegee tool, and ensuring bubbles and/or excess resin are removed.

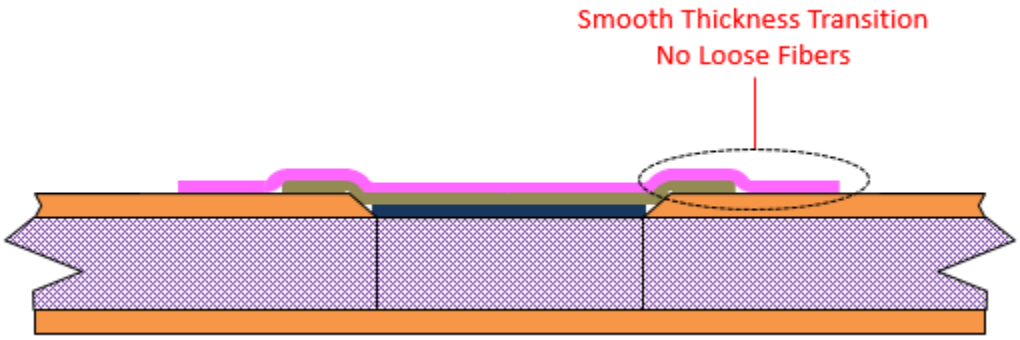
3.10.1.13 Place the final and largest cut fabric, piece (1), centered over the previously placed fabric and extending to the panel sanded laminate surface.

3.10.1.14 Impregnate piece (1) with mixed resin, distributing it evenly across the fabric with a squeegee tool and ensuring bubbles and/or excess resin are removed.



3.10.1.15 Smooth the edges of the multi-layer patch, fairing the patch build-up into the adjoining panel laminate surface to create a smooth transition in the patch thickness

3.10.1.16 Allow the patch to fully set (cure)



3.10.1.17 Smooth uneven areas by Hand Sanding

3.10.1.18 Clean the entire patch surface by wiping it with acetone

3.10.1.19 Visually inspect the patch surface for exposed fibers

3.10.1.20 Coat discovered exposed fibers lightly with mixed resin (using a new match of mixed resin)

3.10.1.21 Allow for the newly applies mixed resin to fully set (cure)

For External Surfaces Only

Using a paint roller and/or brush:

3.10.1.22 Apply a light coat of primer

3.10.1.23 Allow surface to dry to the touch

3.10.1.24 Mix the topcoat (paint) materials in specified ratios thoroughly

3.10.1.25 Apply a uniform topcoat to the outside panel surface, covering the patch and surrounding sanded laminate area to create a smooth transition.

3.10.2 Case II

3.10.2.1 Using a sharp knife or an oscillating fine tooth saw, cut away all unbonded ragged edges of damaged laminate

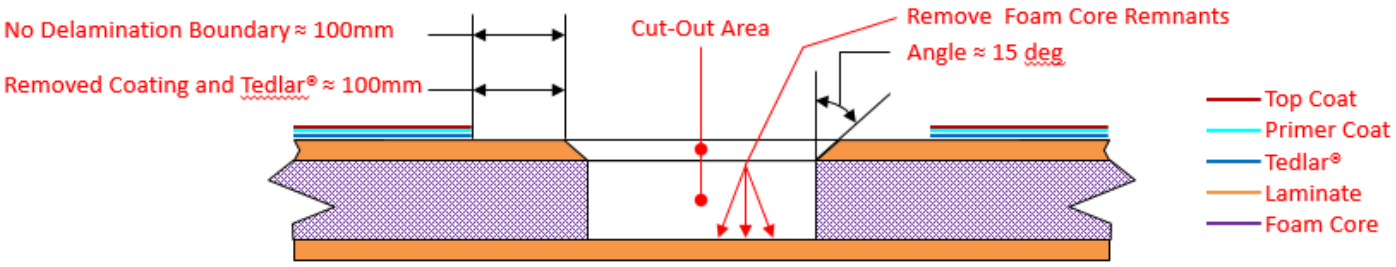
3.10.2.2 Cut the laminate beyond the damaged area to where the foam core is intact and there is no damage to or delamination of the foam core

3.10.2.3 Remove the cut-out foam and clean the opposite laminate interior face scraping and sanding any foam core remnants bonded to the laminate interior surface.

3.10.2.4 Sand the laminate surface on all sides of the cut-out area to a feather edge that tapers towards the cut-out area at an angle of ≈ 15°

3.10.2.5 Lightly sand the laminate surface surrounding the cut-out area to a distance of 100mm (4in) from all edges to remove:

- Surface coating and Tedlar Down to a bare Laminate
- Laminate Resin Gloss (Careful not to sand down fibers)



Note: the replacement parts listed below are to be fabricated from Panel Repair Kit materials

3.10.2.6 Trace the shape of the removed foam core block onto a new repair kit foam core

3.10.2.7 Using a sharp knife or a fine tooth saw, cut a replacement foam core block of the same thickness, sized and shaped as follows:

- Shape: Same shape as the Cut-Out (i.e. along the traced lines)
- Fit: When Inserted into the Cut-Out Cavity

≈ 1mm (0.04 in.) ≤ Gap when Dry ≤ ≈ 2mm (0.080 in.)

(only if necessary, cut full thickness foam core shims with width necessary to attain the allowed gap; use no more than one shim per side)

3.10.2.8 Using scissor or a sharp knife on a cutting surface, cut three (3) pieces of fabric sized as follows:

- Piece (1): each edge extends ≈ 76mm (3in) beyond a corresponding cut-out edge
- Piece (2): each edge extended ≈ 25mm (1in) smaller than piece (1)
- Piece (3): same size as the replacement foam core block face

3.10.2.9 Clean all debris/dust from the:

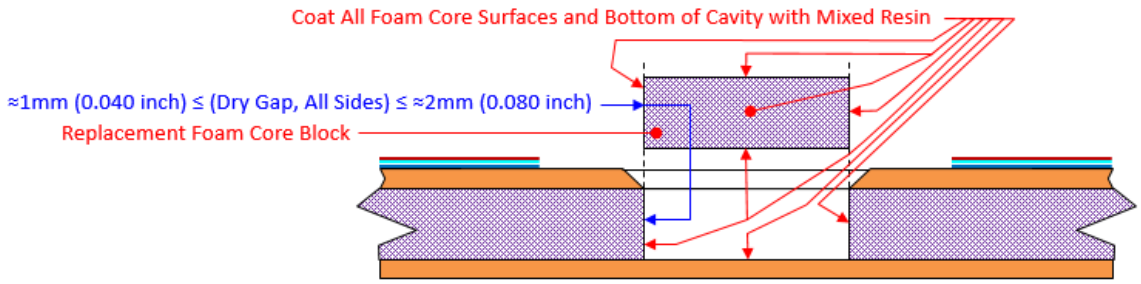
- Cut-out cavity surfaces
- Replacement foam core block surfaces
- Sanded laminated surface

3.10.2.10 Mix a sufficient quantity of the two-part resin in proportions specified on the resin and catalyst containers

Note the time the resin and catalyst are mixed to ensure the mixed resin is consumed within the allowed working time

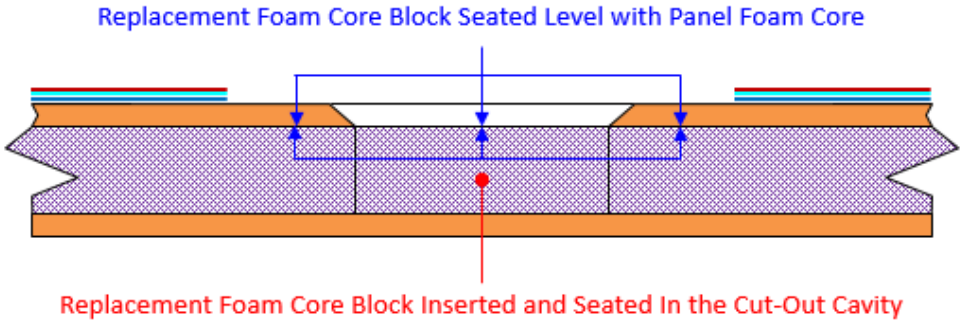
3.10.2.11 Coat all foam core surfaces of the cut-out cavity thoroughly with mixed resin

3.10.2.12 Coat all surfaces of the replacement foam core block (and shims if used) thoroughly with Mixed Resin.

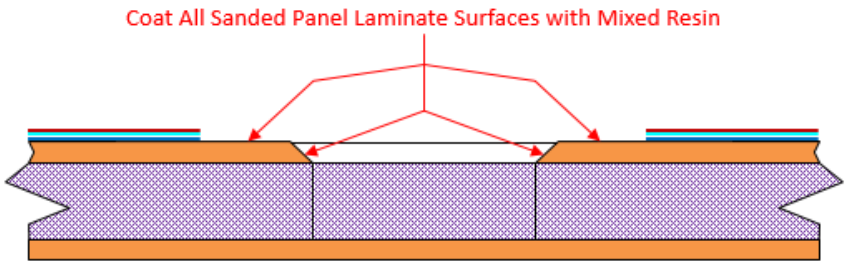


3.10.2.13 Insert the mixed resin coated replacement foam core block into the panel cut-out cavity seating it firmly and verify:

- A good bond exists between the replacement foam core block walla and the surrounding cut-out foam core walls.
  - Fill small voids with mixed resin
  - Use foam shims as necessary to eliminate large gaps
- The load core block visible durface does not protrude above the panel foam core surface



3.10.2.14 Coat the panel sanded laminate surface thoroughly with mixed resin



3.10.2.15 Place the smallest cut fabric, piece (3), on top of the inserted foam core block

3.10.2.16 Impregnate piece (3) with mixed resin, distributing it evenly across the fabric with a squeegee tool, and ensuring bubbles and/or excess resin are removed

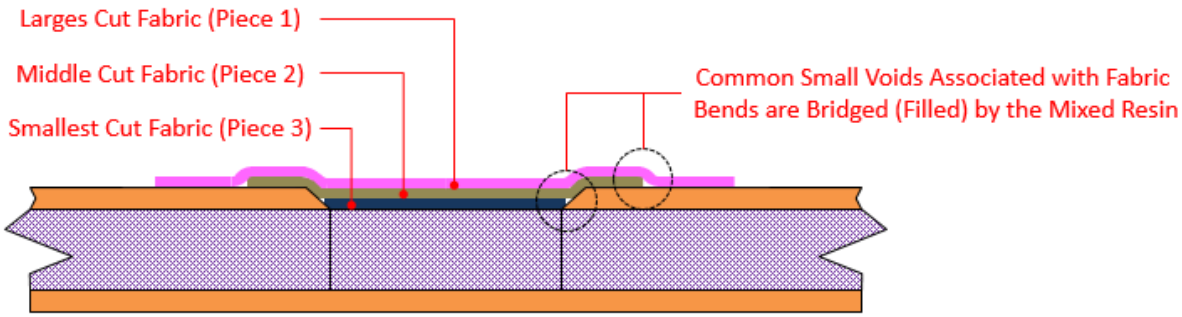
3.10.2.17 Place the next larger cut fabric, piece (2), centered over the previously placed fabric and extending to the panel sanded laminate surface.

3.10.2.18 Impregnate piece (2) with mixed resin, distributing it evenly across the fabric with a squeegee tool, and ensuring bubbles and/or excess resin are removed.

3.10.2.19 Place the final and largest cut fabric, piece (1), centered over the previously placed fabric and extending to the panel sanded laminate surface.

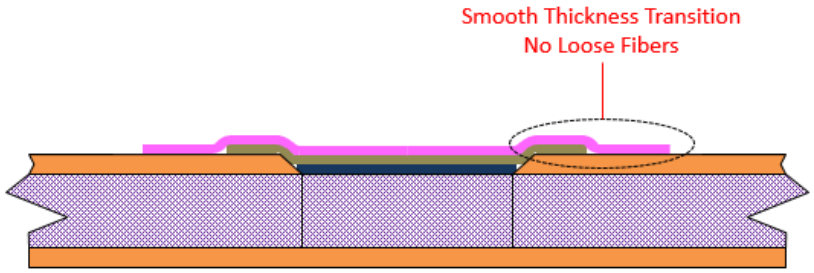
3.10.2.20 Impregnate piece (1) with mixed resin, distributing it evenly across the fabric with a squeegee tool and ensuring bubbles and/or excess resin are removed.

Caution: When laying down pieces (2) and (1) verify the contract of these layers with the sanded laminate is free of wrinkles and is fully wetted with mixed resin



3.10.2.21 Smooth the edges of the multi-layer patch, fairing the patch build-up into the adjoining panel laminate surface to create a smooth transition in the patch thickness

3.10.2.22 Allow the patch mixed resin to fully set (cure)



3.10.2.23 Smooth uneven areas by hand sanding

3.10.2.24 Clean the entire patch by washing it with acetone

3.10.2.25 Visually inspect the patch surface for exposed fibers

3.10.2.26 Coat discovered exposed fibers lightly with mixed resin (using a new batch of mixed resin)

3.10.2.27 Allow for the newly applied mixed resin to fully set (cure)

For Exterior Use Only

3.10.2.28 Using a paint roller and/or a brush:

- Apply a light coat of primer
- Allow surface to dry to the touch
- Mix the topcoat (paint) materials in specified ratios thoroughly
- Apply a uniform topcoat to the outside panel surface, covering the patch and surrounding sanded laminate area to create a smooth transition.

3.10.3 Case III

Repeat Case II Procedures on Both Sides of the Panel

3.10.4 Case IV

Replace Plane (Section 3.11)

3.11 Panel Removal and Replacement

WARNING

Plan panel removal and replacement only during a period of low winds. Do not attempt removal of a panel if winds are expected to exceed 10 knots (18 km/hr) before panel can be replaced.

Note: if panels cannot be carried through tower platform hatch, then one base panel can be removed to provide access to the ground. The base panel should be reinstalled immediately after moving replacement panel through opening in radome.

Place a person on the outside of the radome to cut the sealant around all edges of the panel to be replaced.

Place two people on the inside of the radome adjacent to the panel to be removed.

Attached a safety line to the panel as soon as possible by removing panel connecting bolts to free a panel edge and connecting with a line as showing in Figures 3-1 and 3-2. Secure the line on the inside by tying to an adjacent panel or scaffolding.

Free the panel by removing the remaining connecting bolts. As soon as possible attach a line for lowering the panel. In some cases, it may be necessary to loosen or remove connecting bolts on surrounding panels in order to free the panel

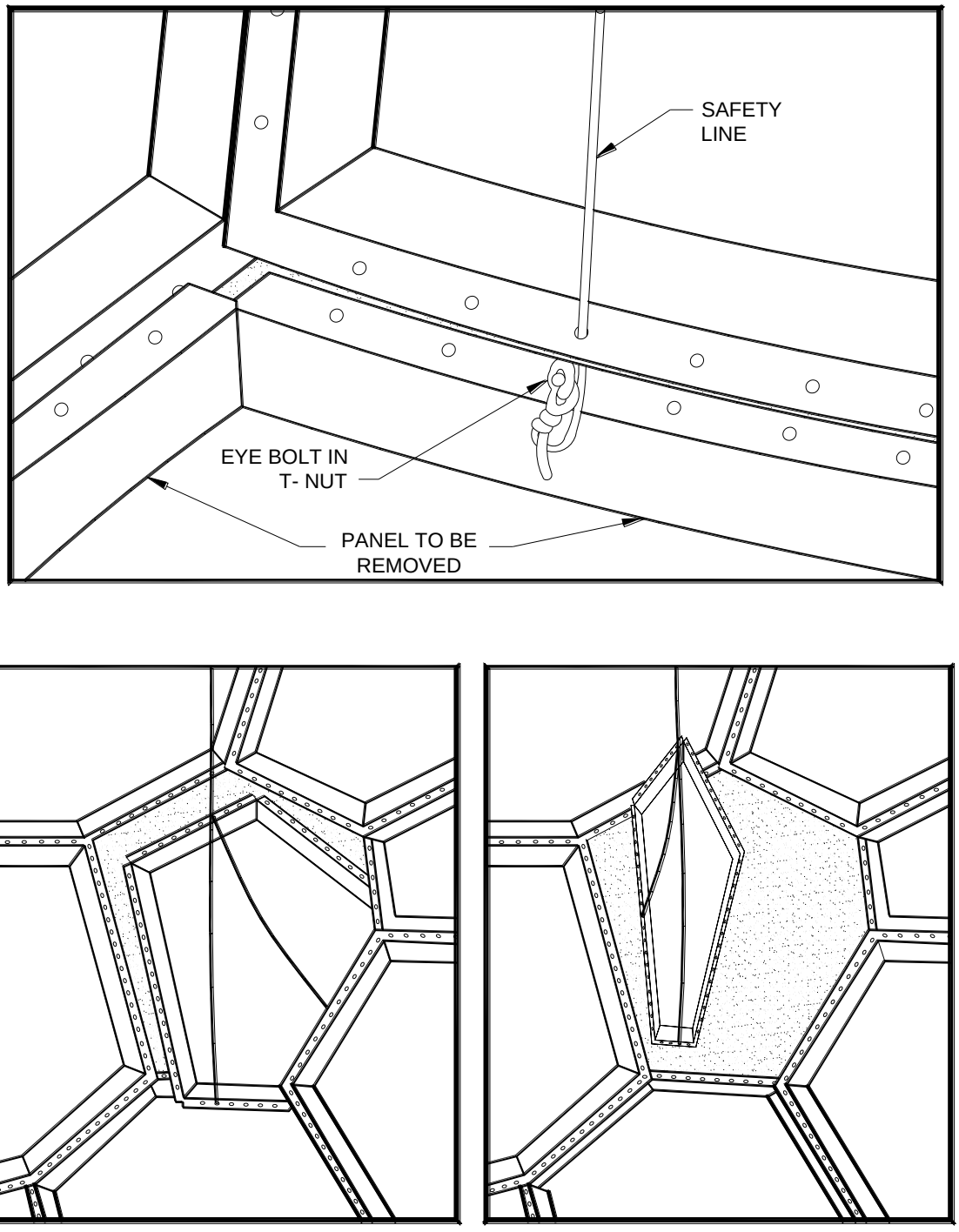
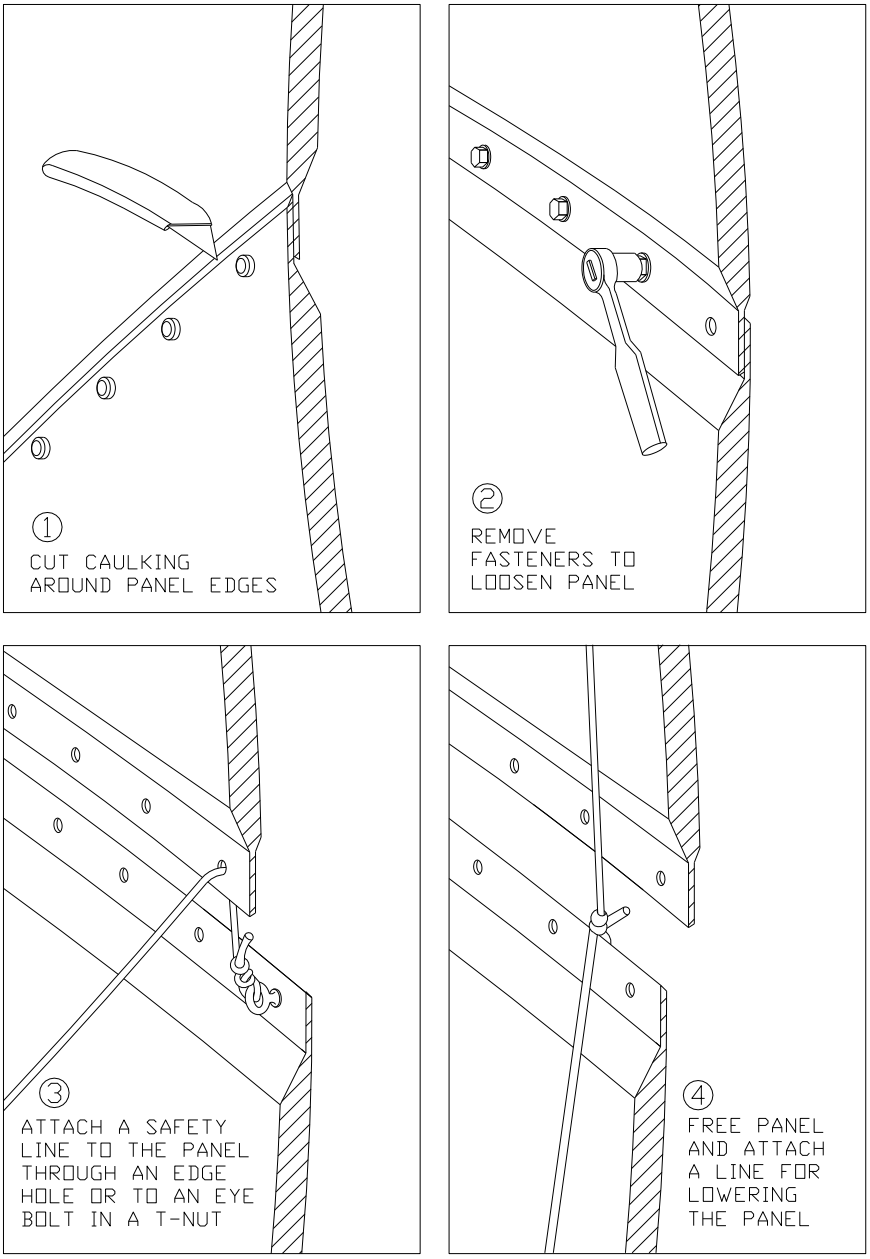


Figure 3-1 Panel Removal



PANEL REMOVAL

Figure 3-2 Panel Removal

3.11.1 Bring the panel through the opening and lower it to the deck on the inside of the radome.

3.11.2 Raise the replacement panel into position and attach with connecting bolts.

3.11.3 Tighten all bolts and reseal panel.

3.11.4 Base panels can be replaced following the above procedure. Anchor bolts are detachable at the base to facilitate base panel removal. It may be necessary to free the edges of adjacent panels, or completely disconnect adjacent panels in order to remove the base panels having outside edge flanges.

3.11.5 After replacing panels, tighten all panel-to-panel bolts that have been loosened or replaced to torques per values found in Table 2-6 and Table 2-7.

3.12 Radome Surface Cleaning

To clean the surfaces of the radome panels, a cleaning solution should be prepared using a mild industrial detergent and clear water. Wash the surface using soft bristle brushes or clean cotton rags. As an alternate, a 5% to 9% ammonia to water solution may be used. Rinse the cleaned area with a copious flow of clear water to remove all dirt and cleaning solution.

C A U T I O N

SCRUBBING OF SURFACE SHOULD BE AVOIDED. DAMAGE TO TOPCOAT WILL RESULT FROM EXCESSIVE RUBBING.

SECTION IV: DRAWINGS AND ACCESSORIES

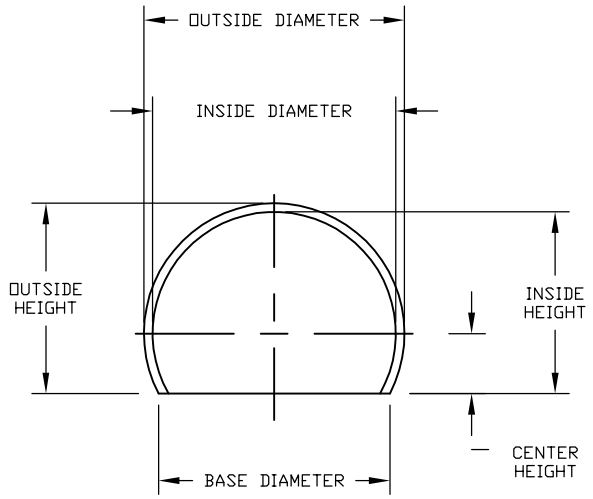
4 Drawings and Parts Lists

The following documents are provided for installation and maintenance requirements.

REVISIONS			
REV	DESCRIPTION	DATE	APVD
-			

DIMENSIONS

OUTSIDE DIAMETER	27.000 FT	(8.230 m)
INSIDE DIAMETER	26.813 FT	(8.173 m)
OUTSIDE HEIGHT	22.410 FT	(6.831 m)
INSIDE HEIGHT	22.317 FT	(6.802 m)
CENTER HEIGHT	8.910 FT	(2.716 m)
BASE DIAMETER	20.284 FT	(6.183 m)



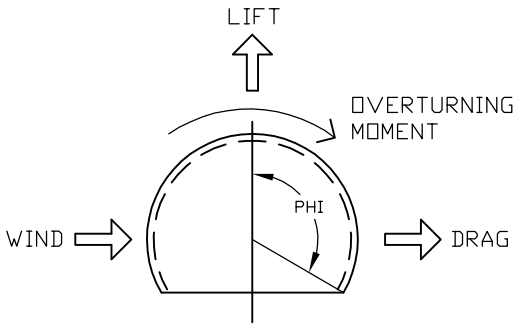
RADOME SECTION

DESIGN LOADS

DESIGN WIND VELOCITY	139 MPH
DYNAMIC WIND PRESSURE	0.373 PSI
ICE/SNOW LOAD	27.72 PSF (TAPERED)

BASE LOADS

GROSS LIFT	24,382 LBS
GROSS DRAG	15,930 LBS
HT OF AREA CG	123.35 IN
OVERTURNING MOMENT	163,747 FT-LBS
WEIGHT OF RADOME	2,800 LBS (ESTIMATED)



FORCES DUE TO WIND

NOTES:
1. ANCHOR BOLTS AND SHEAR PLATES ARE TO BE SUPPLIED BY CUSTOMER, OR BY ESSCO AT EXTRA COST.
2. RADOME MOUNTING PLANE TO BE FLAT WITHIN ±1/8" AT INSTALLATION.
3. ANCHOR BOLTS TO BE LOCATED WITHIN 1/8" OF TRUE POSITON, HOLE TO HOLE, AND WITHIN 1/2" TOTAL INDICATED READING OF WORK POINT RADIUS FOR FULL 360°.
4. ANCHOR BOLTS ARE ASTM A449 OR EQUIVALENT.
5. SEE NOTE DELINEATING CUSTOMER RESPONSIBILITY ON SHT 3.

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DOC. CONTROLLED

ENGINEER:	AFP
DRAFTER:	AFP
CHECKER:	BL
MFG:	
QA:	

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:

MACHINED FEATURES	COMPOSITES
.XX ±.010	.XX ± .050
.XXX ± .005	∠ ± 3°
∠ ± 0.5°	

Communications & Power Industries

ESSCO OPERATIONS
90 NEMCO WAY
AYER, MA 01432

TITLE:

RADOME INTERFACE DATA S27-83

SIZE	CAGE CODE:	DRAWING NO.:	REV.
A	15175	1858-2783-15	-

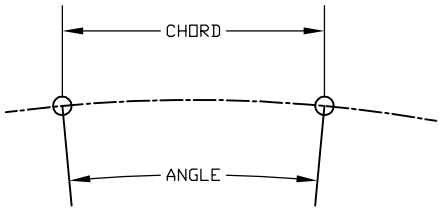
SCALE: | DATE: 03/17/22 | SHEET 1 OF 13

ANCHOR BOLTS

ANCHOR BOLT QUANTITY:	40	
BOLT CIRCLE RADIUS:	119.700 IN.	(3040 mm)
EQUALLY SPACED BOLTS:		
ANGLE	9.000	DEGREES
CHORD	18.780 IN.	(477.0 mm)
BOLT DIAMETER	0.625 IN.	(16 mm)
BOLT PROJECTION	3.000 IN.	(76 mm)

MAXIMUM LOAD PER BOLT:

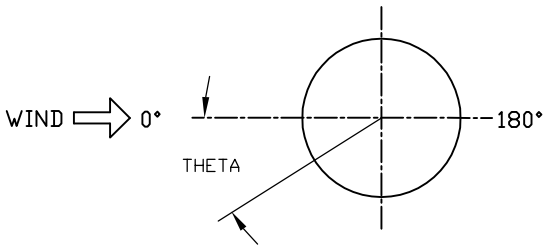
TENSION	1,302 LB	(5,792 N)
SHEAR	1,192 LB	(5,302 N)



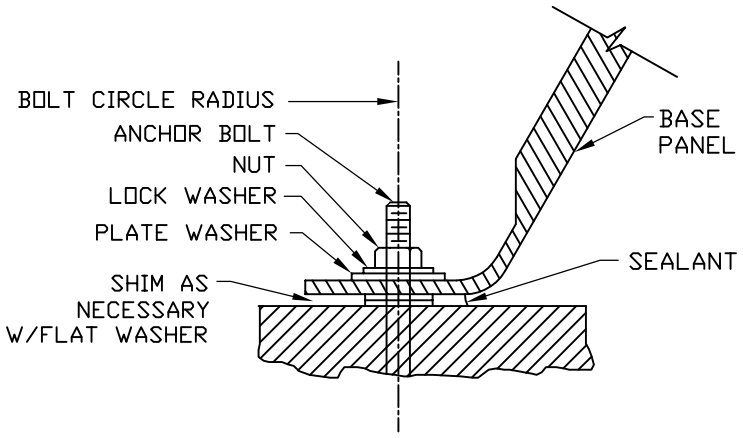
ANCHOR BOLT SPACING

NOTE: THE BOLT MAX TENSION LOAD HAS BEEN FACTORED UP(2X)TO INCLUDE THE EFFECTS OF PRYING ACTION.

ANCHOR BOLTS SPECIFICATION:
ASTM A449 OR EQUIVALENT WITH MINIMUM TENSILE STRENGTH OF 120,000 PSI (827,371 kPa)



THETA ANGLE IN BASE PLANE



SECTION AT BASE INTERFACE

NOTE:

THE RADOME WEIGHT SHOWN IS AN APPROXIMATE WEIGHT AND CAN VARY DUE TO SPECIAL LOAD REQUIREMENTS OR WITH THE ACCESSORIES PROVIDED.

CUSTOMER RESPONSIBILITIES (UNLESS OTHERWISE NOTED)

THE CUSTOMER IS RESPONSIBLE FOR:

1. DESIGNING AND CONSTRUCTING THE RADOME FOUNDATION TO WITHSTAND THE OVERALL LIFT, DRAG AND OVERTURNING FORCES FROM THE RADOME.
2. DESIGNING THE FOUNDATION RING BEAM TO WITHSTAND THE AXIAL AND BENDING STRESS RESULTANTS INTRODUCED INTO THE FOUNDATION RING AT THE BASE OF THE RADOME.
3. SUPPLYING THE ANCHOR BOLTS WITH NUTS AND WASHERS. EACH ANCHOR BOLT MUST BE SUPPLIED WITH THE FOLLOWING:
   - 1 - NUT OF GRADE EQUIVALENT TO THE ANCHOR BOLT. IF ANCHOR BOLTS ARE TO BE CAST IN CONCRETE, TWO (2) NUTS MUST BE SUPPLIED FOR EACH ANCHOR BOLT TO HOLD BOLTS IN POSITION WHILE CONCRETE IS PLACED.
   - 1 - LOCK WASHER
   - 4 - FLAT WASHERS, MINIMUM OUTSIDE DIAMETER 1-3/8" [35 MM], (FOR SHIMMING TO LEVEL AS NECESSARY).
   - 1 - PLATE WASHER, 2-1/4" X 2-1/4" X 3/16" [60 X 60 X 5 MM]. IF MAXIMUM TENSILE LOAD PER BOLT IS GREATER THAN 2,500 LB [11.12 kN], USE PLATE WASHER 3" X 4" X 1/4" [80 X 100 X 6.5 MM].
4. LOCATING ACCURATELY ALL ANCHOR BOLTS WITHIN ±1/8" [±3.3 MM] OF TRUE POSITION AND THE RADOME MOUNTING PLANE LEVEL WITHIN ±1/8" [±3.3 MM].
5. INSTALLING THE ANCHOR BOLTS IN THE FOUNDATION TO DEVELOP THE FULL STRENGTH OF THE BOLTS.
6. PROTECTING AND CLEANING THE ANCHOR BOLT THREADS TO PERMIT THE FREE RUNNING OF NUTS ON ALL BOLTS.
7. PROVIDING A LEVEL AND CLEAN MOUNTING SURFACE AROUND THE RADOME BASE TO FACILITATE THE WEATHER SEALING BETWEEN THE RADOME AND THE FOUNDATION.

Load Case 1 - Dead Load					
Foundation Loads					
Node	Theta	FX	FY	FZ	Shear
	(deg)	(lb)	(lb)	(lb)	(lb)
6	0	64	-70	0	64
12	9	63	-70	-10	64
25	18	61	-70	-20	64
37	27	57	-70	-29	64
49	36	52	-70	-37	64
61	45	45	-70	-45	64
73	54	37	-70	-52	64
85	63	29	-70	-57	64
97	72	20	-70	-61	64
109	81	10	-70	-63	64
122	90	0	-70	-64	64
133	99	-10	-70	-63	64
145	108	-20	-70	-61	64
157	117	-29	-70	-57	64
169	126	-37	-70	-52	64
181	135	-45	-70	-45	64
193	144	-52	-70	-37	64
205	153	-57	-70	-29	64
217	162	-61	-70	-20	64
230	171	-63	-70	-10	64
235	180	-64	-70	0	64
229	189	-63	-70	10	64
216	198	-61	-70	20	64
204	207	-57	-70	29	64
192	216	-52	-70	37	64
180	225	-45	-70	45	64
168	234	-37	-70	52	64
156	243	-29	-70	57	64
144	252	-20	-70	61	64
132	261	-10	-70	63	64
119	270	0	-70	64	64
108	279	10	-70	63	64
96	288	20	-70	61	64
84	297	29	-70	57	64
72	306	37	-70	52	64
60	315	45	-70	45	64
48	324	52	-70	37	64
36	333	57	-70	29	64
24	342	61	-70	20	64
11	351	63	-70	10	64
	Sum =	0	-2800	0	N/A
	Max =	64	-70	64	64
	Min =	-64	-70	-64	64

Load Case 3 - Snow Load Only					
Foundation Loads					
Node	Theta	FX	FY	FZ	Shear
	(deg)	(lb)	(lb)	(lb)	(lb)
6	0	195	-208	0	195
12	9	193	-208	-31	195
25	18	186	-208	-60	195
37	27	174	-208	-89	195
49	36	158	-208	-115	195
61	45	138	-208	-138	195
73	54	115	-208	-158	195
85	63	89	-208	-174	195
97	72	60	-208	-186	195
109	81	31	-208	-193	195
122	90	0	-208	-195	195
133	99	-31	-208	-193	195
145	108	-60	-208	-186	195
157	117	-89	-208	-174	195
169	126	-115	-208	-158	195
181	135	-138	-208	-138	195
193	144	-158	-208	-115	195
205	153	-174	-208	-89	195
217	162	-186	-208	-60	195
230	171	-193	-208	-31	195
235	180	-195	-208	0	195
229	189	-193	-208	31	195
216	198	-186	-208	60	195
204	207	-174	-208	89	195
192	216	-158	-208	115	195
180	225	-138	-208	138	195
168	234	-115	-208	158	195
156	243	-89	-208	174	195
144	252	-60	-208	186	195
132	261	-31	-208	193	195
119	270	0	-208	195	195
108	279	31	-208	193	195
96	288	60	-208	186	195
84	297	89	-208	174	195
72	306	115	-208	158	195
60	315	138	-208	138	195
48	324	158	-208	115	195
36	333	174	-208	89	195
24	342	186	-208	60	195
11	351	193	-208	31	195
	Sum =	0	-8318	0	N/A
	Max =	195	-208	195	195
	Min =	-195	-208	-195	195

Load Case 4 - Seismic Load Horizontal Only					
Foundation Loads					
Node	Theta	FX	FY	FZ	Shear
	(deg)	(lb)	(lb)	(lb)	(lb)
6	0	-25	26	0	25
12	9	-23	26	11	25
25	18	-18	25	20	27
37	27	-10	23	28	30
49	36	-1	21	33	33
61	45	10	18	35	36
73	54	21	15	33	39
85	63	31	12	28	42
97	72	38	8	20	43
109	81	43	4	11	45
122	90	45	0	0	45
133	99	43	-4	-11	45
145	108	38	-8	-20	43
157	117	31	-12	-28	42
169	126	21	-15	-33	39
181	135	10	-18	-35	36
193	144	-1	-21	-33	33
205	153	-10	-23	-28	30
217	162	-18	-25	-20	27
230	171	-23	-26	-11	25
235	180	-25	-26	0	25
229	189	-23	-26	11	25
216	198	-18	-25	20	27
204	207	-10	-23	28	30
192	216	-1	-21	33	33
180	225	10	-18	35	36
168	234	21	-15	33	39
156	243	31	-12	28	42
144	252	38	-8	20	43
132	261	43	-4	11	45
119	270	45	0	0	45
108	279	43	4	-11	45
96	288	38	8	-20	43
84	297	31	12	-28	42
72	306	21	15	-33	39
60	315	10	18	-35	36
48	324	-1	21	-33	33
36	333	-10	23	-28	30
24	342	-18	25	-20	27
11	351	-23	26	-11	25
	Sum =	407	0	0	N/A
	Max =	45	26	35	45
	Min =	-25	-26	-35	25

Load Case 5 - Seismic Load Vertical Only					
Foundation Loads					
Node	Theta	FX	FY	FZ	Shear
	(deg)	(lb)	(lb)	(lb)	(lb)
6	0	3	-3	0	3
12	9	3	-3	-1	3
25	18	3	-3	-1	3
37	27	3	-3	-1	3
49	36	3	-3	-2	3
61	45	2	-3	-2	3
73	54	2	-3	-3	3
85	63	1	-3	-3	3
97	72	1	-3	-3	3
109	81	1	-3	-3	3
122	90	0	-3	-3	3
133	99	-1	-3	-3	3
145	108	-1	-3	-3	3
157	117	-1	-3	-3	3
169	126	-2	-3	-3	3
181	135	-2	-3	-2	3
193	144	-3	-3	-2	3
205	153	-3	-3	-1	3
217	162	-3	-3	-1	3
230	171	-3	-3	-1	3
235	180	-3	-3	0	3
229	189	-3	-3	1	3
216	198	-3	-3	1	3
204	207	-3	-3	1	3
192	216	-3	-3	2	3
180	225	-2	-3	2	3
168	234	-2	-3	3	3
156	243	-1	-3	3	3
144	252	-1	-3	3	3
132	261	-1	-3	3	3
119	270	0	-3	3	3
108	279	1	-3	3	3
96	288	1	-3	3	3
84	297	1	-3	3	3
72	306	2	-3	3	3
60	315	2	-3	2	3
48	324	3	-3	2	3
36	333	3	-3	1	3
24	342	3	-3	1	3
11	351	3	-3	1	3
	Sum =	0	-138	0	N/A
	Max =	3	-3	3	3
	Min =	-3	-3	-3	3

Load Combination 12 - Wind Load Only					
Foundation Loads					
Node	Theta	FX	FY	FZ	Shear
	(deg)	(lb)	(lb)	(lb)	(lb)
6	0	120	-182	0	120
12	9	84	-176	-212	228
25	18	-19	-158	-389	390
37	27	-175	-123	-503	532
49	36	-362	-65	-534	645
61	45	-560	22	-475	734
73	54	-749	139	-331	819
85	63	-916	285	-112	923
97	72	-1050	454	167	1063
109	81	-1140	633	489	1240
122	90	-1180	808	834	1445
133	99	-1170	964	1180	1662
145	108	-1080	1090	1500	1848
157	117	-908	1170	1770	1989
169	126	-662	1200	1940	2050
181	135	-352	1200	1990	2021
193	144	-6	1160	1880	1880
205	153	335	1110	1600	1635
217	162	624	1050	1170	1326
230	171	818	1020	617	1025
235	180	887	1000	0	887
229	189	818	1020	-617	1025
216	198	624	1050	-1170	1326
204	207	335	1110	-1600	1635
192	216	-6	1160	-1880	1880
180	225	-352	1200	-1990	2021
168	234	-662	1200	-1940	2050
156	243	-908	1170	-1770	1989
144	252	-1080	1090	-1500	1848
132	261	-1170	964	-1180	1662
119	270	-1180	808	-834	1445
108	279	-1140	633	-488	1240
96	288	-1050	454	-167	1063
84	297	-916	285	112	923
72	306	-749	139	331	819
60	315	-560	22	475	734
48	324	-362	-65	534	645
36	333	-175	-123	503	532
24	342	-19	-158	389	390
11	351	84	-176	212	228
	Sum =	-15930	24382	0	N/A
	Max =	887	1200	1990	2050
	Min =	-1180	-182	-1990	120

Load Combination 22 - Dead Load + (0.6 * Wind Load)					
Foundation Loads					
Node	Theta	FX	FY	FZ	Shear
	(deg)	(lb)	(lb)	(lb)	(lb)
6	0	136	-179	0	136
12	9	113	-176	-137	178
25	18	49	-165	-253	258
37	27	-48	-144	-331	334
49	36	-166	-109	-358	394
61	45	-291	-57	-330	440
73	54	-412	13	-250	482
85	63	-521	101	-124	535
97	72	-610	202	40	611
109	81	-675	310	230	713
122	90	-710	415	437	834
133	99	-709	508	646	959
145	108	-665	582	842	1073
157	117	-574	630	1010	1162
169	126	-435	651	1110	1192
181	135	-256	648	1150	1178
193	144	-55	626	1090	1091
205	153	144	594	931	942
217	162	314	562	682	750
230	171	428	539	360	559
235	180	468	531	0	468
229	189	428	539	-360	559
216	198	314	562	-681	750
204	207	144	594	-931	942
192	216	-55	626	-1090	1091
180	225	-256	648	-1150	1178
168	234	-435	651	-1110	1192
156	243	-574	630	-1010	1162
144	252	-665	582	-842	1073
132	261	-709	508	-646	959
119	270	-710	415	-437	834
108	279	-675	310	-230	713
96	288	-610	202	-40	611
84	297	-521	101	124	535
72	306	-412	13	250	482
60	315	-291	-57	330	440
48	324	-166	-109	358	394
36	333	-48	-144	331	334
24	342	49	-165	253	258
11	351	113	-176	137	178
	Sum =	-9554	11815	0	N/A
	Max =	468	651	1150	1192
	Min =	-710	-179	-1150	136

Load Combination 23 - Dead Load + Snow Load					
Foundation Loads					
Node	Theta	FX	FY	FZ	Shear
	(deg)	(lb)	(lb)	(lb)	(lb)
6	0	259	-278	0	259
12	9	256	-278	-41	259
25	18	246	-278	-80	259
37	27	231	-278	-118	259
49	36	210	-278	-152	259
61	45	183	-278	-183	259
73	54	152	-278	-209	259
85	63	118	-278	-231	259
97	72	80	-278	-246	259
109	81	40	-278	-256	259
122	90	0	-278	-259	259
133	99	-41	-278	-256	259
145	108	-80	-278	-246	259
157	117	-118	-278	-231	259
169	126	-152	-278	-210	259
181	135	-183	-278	-183	259
193	144	-209	-278	-152	259
205	153	-231	-278	-118	259
217	162	-246	-278	-80	259
230	171	-256	-278	-40	259
235	180	-259	-278	0	259
229	189	-256	-278	41	259
216	198	-246	-278	80	259
204	207	-231	-278	118	259
192	216	-210	-278	152	259
180	225	-183	-278	183	259
168	234	-152	-278	209	259
156	243	-118	-278	231	259
144	252	-80	-278	246	259
132	261	-40	-278	256	259
119	270	0	-278	259	259
108	279	41	-278	256	259
96	288	80	-278	246	259
84	297	118	-278	231	259
72	306	152	-278	210	259
60	315	183	-278	183	259
48	324	209	-278	152	259
36	333	231	-278	118	259
24	342	246	-278	80	259
11	351	256	-278	40	259
	Sum =	0	-11118	0	N/A
	Max =	259	-278	259	259
	Min =	-259	-278	-259	259

Load Combination 24 - Dead Load + (0.75 * (0.6 * Load Case 12)) + (0.75 * LC3)					
Foundation Loads					
Node	Theta	FX	FY	FZ	Shear
	(deg)	(lb)	(lb)	(lb)	(lb)
6	0	264	-308	0	264
12	9	245	-305	-128	277
25	18	191	-297	-240	307
37	27	109	-281	-322	339
49	36	7	-255	-364	364
61	45	-103	-216	-362	377
73	54	-214	-163	-319	384
85	63	-317	-98	-237	396
97	72	-407	-22	-125	426
109	81	-481	59	12	481
122	90	-533	138	165	558
133	99	-557	208	324	645
145	108	-549	263	477	728
157	117	-504	299	610	791
169	126	-421	315	705	821
181	135	-307	312	746	807
193	144	-173	296	721	742
205	153	-37	272	625	626
217	162	81	248	461	468
230	171	161	231	245	293
235	180	189	225	0	189
229	189	161	231	-245	293
216	198	81	248	-461	468
204	207	-37	272	-625	626
192	216	-173	296	-721	742
180	225	-307	312	-746	807
168	234	-421	315	-705	821
156	243	-504	299	-610	791
144	252	-549	263	-477	728
132	261	-557	208	-324	645
119	270	-533	138	-165	558
108	279	-481	59	-12	481
96	288	-407	-22	125	426
84	297	-317	-98	237	396
72	306	-214	-163	319	384
60	315	-103	-216	362	377
48	324	7	-255	364	364
36	333	109	-281	322	340
24	342	191	-297	240	307
11	351	245	-305	128	277
	Sum =	-7166	1922	0	N/A
	Max =	264	315	746	821
	Min =	-557	-308	-746	189

Load Combination 25 - Dead Load + (0.7 * Eh) + (0.7 * Ev)					
Foundation Loads					
Node	Theta	FX	FY	FZ	Shear
	(deg)	(lb)	(lb)	(lb)	(lb)
6	0	49	-54	0	49
12	9	49	-54	-3	49
25	18	50	-55	-6	51
37	27	52	-56	-10	53
49	36	53	-58	-16	55
61	45	54	-59	-22	58
73	54	53	-62	-30	61
85	63	51	-64	-39	65
97	72	47	-67	-48	68
109	81	41	-70	-58	71
122	90	32	-72	-66	73
133	99	20	-75	-73	75
145	108	6	-78	-77	77
157	117	-9	-81	-79	79
169	126	-24	-83	-77	80
181	135	-40	-85	-71	81
193	144	-54	-87	-62	82
205	153	-66	-89	-50	83
217	162	-75	-90	-35	83
230	171	-81	-90	-18	83
235	180	-83	-91	0	83
229	189	-81	-90	18	83
216	198	-75	-90	35	83
204	207	-66	-89	50	83
192	216	-54	-87	62	82
180	225	-40	-85	71	81
168	234	-24	-83	77	80
156	243	-9	-81	79	79
144	252	6	-78	77	77
132	261	20	-75	73	75
119	270	32	-72	66	73
108	279	41	-70	58	71
96	288	47	-67	48	68
84	297	51	-64	39	65
72	306	53	-62	30	61
60	315	54	-59	22	58
48	324	53	-58	16	55
36	333	52	-56	10	53
24	342	50	-55	6	51
11	351	49	-54	3	49
	Sum =	285	-2897	0	N/A
	Max =	54	-54	79	83
	Min =	-83	-91	-79	49

Load Combination 26 - Dead Load + (0.525 * Eh) + (0.525 * Ev) + (0.75 * Load Case 3)					
Foundation Loads					
Node	Theta	FX	FY	FZ	Shear
	(deg)	(lb)	(lb)	(lb)	(lb)
6	0	199	-214	0	199
12	9	197	-214	-28	199
25	18	192	-215	-55	200
37	27	183	-216	-81	201
49	36	171	-217	-107	202
61	45	155	-218	-131	203
73	54	136	-220	-154	205
85	63	112	-222	-174	207
97	72	86	-224	-191	209
109	81	56	-226	-204	211
122	90	24	-228	-212	213
133	99	-10	-230	-215	215
145	108	-45	-232	-212	217
157	117	-80	-234	-204	219
169	126	-114	-236	-189	220
181	135	-144	-237	-168	222
193	144	-172	-239	-142	223
205	153	-194	-240	-111	224
217	162	-211	-241	-76	224
230	171	-221	-241	-39	225
235	180	-225	-242	0	225
229	189	-221	-241	39	225
216	198	-211	-241	76	224
204	207	-194	-240	111	224
192	216	-172	-239	142	223
180	225	-144	-237	168	222
168	234	-114	-236	189	220
156	243	-80	-234	204	219
144	252	-45	-232	212	217
132	261	-10	-230	215	215
119	270	24	-228	212	213
108	279	56	-226	204	211
96	288	86	-224	191	209
84	297	112	-222	174	207
72	306	136	-220	154	205
60	315	155	-218	131	203
48	324	171	-217	107	202
36	333	183	-216	81	201
24	342	192	-215	55	200
11	351	197	-214	27	199
	Sum =	214	-9111	0	N/A
	Max =	199	-214	215	225
	Min =	-225	-242	-215	199

PARTS LIST	CPI Communications & Power Industries **ESSCO**	CAGE CODE	PL **22-9337-1**	REV	SHEET	1
	AYER, MASSACHUSETTS USA	15175		-	OF	1

LIST TITLE	S27-83 RADOME WITH ACCESSORIES	DRAWING NO.	22-9337-1

Engineered By:	M. ONATE	Engineered Date: 04/12/2022	Approved By: Brian Lustig	Approved Date: 4/13/2022

Revision History:

REV - INITIAL RELEASE 4/12/2022

FIND NUMBER	QTY REQUIRED	UNIT OF MEASURE	PART NUMBER	DESCRIPTION	DRAWING	REV
1	1.00	EA	11491-2-AZ	ACCESSORY PANEL AZ, S27-83 RADOME	11491-2-AZ	-
2	5.00	EA	11491-2-A	MAJOR PANEL A, S27-83 RADOME	11491-2-A	-
3	15.00	EA	11491-2-B1	MAJOR PANEL B1, S27-83 RADOME	11491-2-B1	-
4	5.00	EA	11491-2-B2	MAJOR PANEL B2, S27-83 RADOME	11491-2-B2	-
5	5.00	EA	11491-2-AX	BASE PANEL AX, S27-83 RADOME	11491-2-AX	-
6	5.00	EA	11491-2-B2X	BASE PANEL B2X, S27-83 RADOME	11491-2-B2X	-
7	1.00	KT	11491-HSI	S27-83 PANEL TO PANEL HARDWARE KIT		
8	70.00	FT	2262-34	ROD-3/4"DIA.BACKER- POLYETHYLENE FOAM		
9	15.00	EA	688-2	CLEAR SILICONE SEALANT	688	W
10	2.00	EA	816-1	CAULKING GUN- HEAVY DUTY SMOOTH ROD	816	H
11	1.00	EA	1567-2783	ANCHOR BOLT TEMPLATE ASSY S27-83 RADOME	1567-2783	A
12	1.00	KT	11491-BH	BASE HARDWARE KIT, S27-83 RADOME	1532-148	-
13	1.00	EA	1602-1-2	ZENITH HATCH W/VENT 120VAC MODEL #ZA131	1602-1	A
14	1.00	EA	1602-10-1	WIRING KIT-ZENITH VENT 20-30' DIA RADOME	1602-10	E
15	1.00	EA	705-290	AIR TERMINAL KIT UP TO S42' ONLY	PL705-290	H
16	1.00	EA	1613-DC-1	DOWN COND KIT- 20-30' RADOME	PL1613-DC	B
17	1.00	EA	ILK1-USC2-30	ILK; 2 STATION 30' RADOME COMP	PLILK1-USC	E
18	1.00	EA	1593-1-1	RADOME LIFT SLING ASSY MODEL IA130-1	PL1593-1-1	A

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PARTS LIST	CPI Communications & Power Industries **ESSCO**	CAGE CODE	PL **11491-BH**	REV	SHEET	1
	AYER, MASSACHUSETTS USA	15175		-	OF	1

LIST TITLE	BASE HARDWARE KIT, S27-83 RADOME	DRAWING NO.	1532-148

Engineered By:	M. ONATE	Engineered Date: 04/13/2022	Approved By:	Approved Date:

Revision History:

REV - INITIAL RELEASE 4/13/2022

FIND NUMBER	QTY REQUIRED	UNIT OF MEASURE	PART NUMBER	DESCRIPTION	DRAWING	REV
1	40.00	EA	5838-5811-3	BOLT- HVY HX HD- 5/8-11UNC X 3"L- HOT		
2	40.00	EA	5839-58	NUT- HEAVY HX HD-5/8"-11 HOT DIPPED GAL		
3	40.00	EA	5841-58	WASHER- SPRING 5/8" DIA. HOT DIPPED GAL		
4	40.00	EA	5840-58	WASHER- FLAT- ROUND- 5/8" NOM DIA. HOT		
5	40.00	EA	1532-155-2783	SQUARE PLATE WASHER 2.5" X 2.5" X 3/16" THK	1532-155-2783	-

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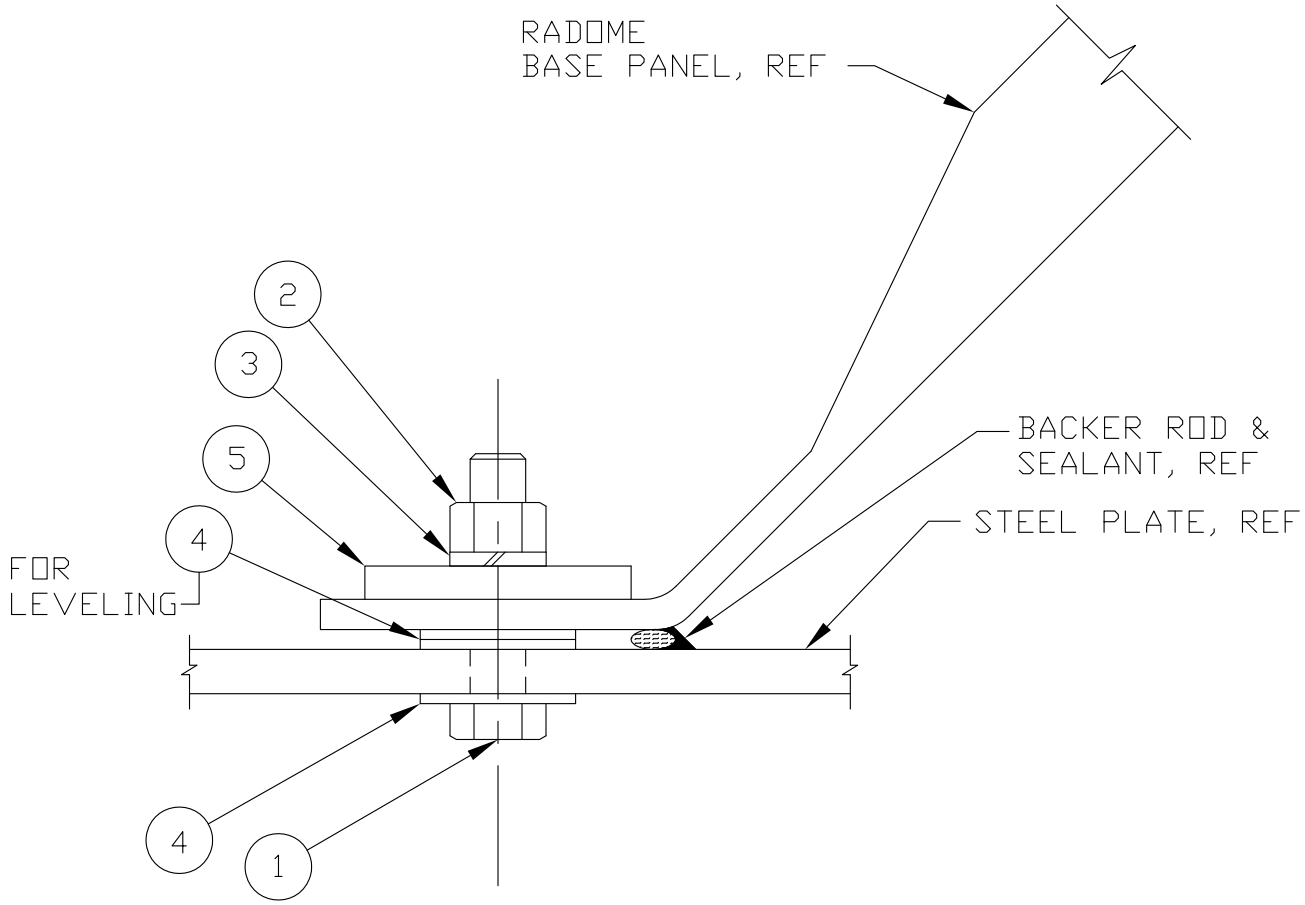
PART NO.	APPLICATION		QTY REQD	THIS DRAWING WAS PRODUCED ELECTRONICALLY. REVISIONS MAY NOT BE MADE MANUALLY
	NEXT ASSY	USED ON		

REVISIONS

REV	DESCRIPTION	DATE	APVD

NOTE: FOR BASE RING APPLICATIONS



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	SIGNATURE & DATE	ELECTRONIC SPACE SYSTEMS CORPORATION CONCORD, MASSACHUSETTS
	DRAWN BJM 4/1/02	
	CHECKED EJP 4/1/02	
TOLERANCES .XX± .XXX± FRACTION± ANGLE± ° SURFACE ROUGHNESS ✓ BREAK ALL SHARP EDGES	FINISH	BASE HARDWARE KIT COMPOSITE RADOMES
	MATERIAL	CAGE CODE 15175 / SIZE A / 1532-148 / REV –
		SCALE NONE / SHEET 1 OF 1

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PARTS LIST	CPI Communications & Power Industries **ESSCO** **AYER, MASSACHUSETTS USA**	CAGE CODE 15175	PL **11491-HSI**	REV -	SHEET OF	1 1

LIST TITLE	S27-83 PANEL TO PANEL HARDWARE KIT	DRAWING NO.	1532-67

Engineered By:	M. ONATE	Engineered Date: 04/12/2022	Approved By: Brian Lustig	Approved Date: 4/12/2022

Revision History:

REV - INITIAL RELEASE 4/12/2022

FIND NUMBER	QTY REQUIRED	UNIT OF MEASURE	PART NUMBER	DESCRIPTION	DRAWING	REV
1	1,056.00	EA	2178-3816-58	BOLT- HEX HD 3/8-16UNC X 5/8 L		
2	1,056.00	EA	850-38	FLATWASH 3/8ID X 13/16OD X .060 +/-.010 THK 18-8 SST		

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PART NO.	APPLICATION		QTY REQD
	NEXT ASSY	USED ON	

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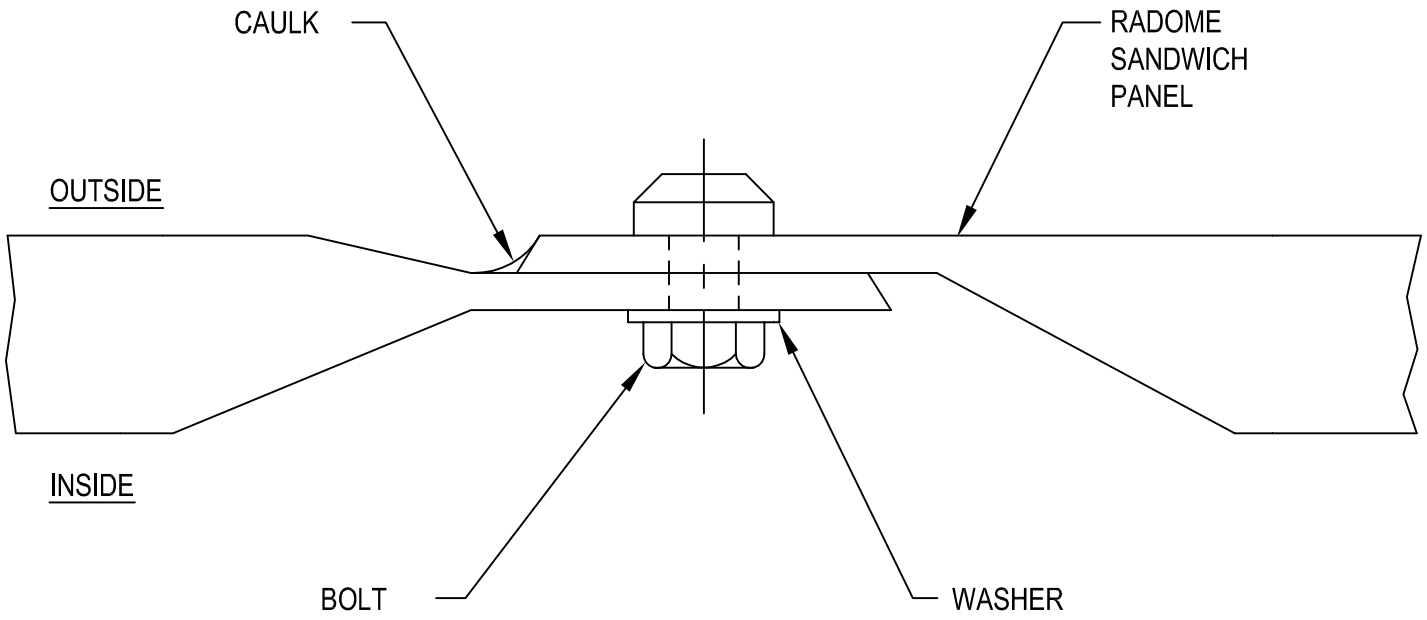
REVISIONS

REV	DESCRIPTION	DATE	APVD
A	ADDED NOTE	11/27/89	JWB
B	PER ECO NO. 2517	10/18/93	JWB
C	ITEM NO'S DELETED, ..KIT WAS ..ASS'Y	1/15/08	EJP
D	CAULK TO BE CONCAVE VS CONVEX. ADDED NOTE 2.	9/17/14	KML



NOTES:
1. SEE JOB SPECIFIC "RADOME PANEL HARDWARE KIT" PARTS LIST.
2. DRAWING FOR REFERENCE ONLY. SUBJECT TO CHANGE WITHOUT NOTIFICATION.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	SIGNATURE & DATE
	DRAWN HM 2/17/89
	CHECKED BV 2/17/89
TOLERANCES .XX± .XXX± FRACTION± ANGLE± ° SURFACE ROUGHNESS ✓ BREAK ALL SHARP EDGES	APPR JWB 3/16/89
	FINISH NONE
	MATERIAL NONE

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ESSCO ELECTRONIC SPACE SYSTEMS CORPORATION
CONCORD, MASSACHUSETTS

PANEL TO PANEL ASSY

CAGE CODE	SIZE		REV
15175	A	1532-67	D
WEIGHT	SCALE	SHEET	
	NONE	1 OF 1	

PART NO.	APPLICATION		QTY REQD	THIS DRAWING WAS PRODUCED ELECTRONICALLY REVISIONS MAY NOT BE MADE MANUALLY
	NEXT ASSY	USED ON/TEDLAR COLOR		
				REVISIONS

REV	DESCRIPTION	DATE	APVD
A	QTY FOR ITEMS 1, 2, 3 & 4 WERE 8, 16, 32 & 16, RESPECTIVELY	9/10/1991	JWB
B	REDRAWN ELECTRONICALLY	8/24/2011	EJP

S

SIGNATURE & DATE		
DRAWN	BRN	7/24/1991
CHECKED	WA	7/25/1991
DWG NO.		1567-2783

CPI - ESSCO
AYER, MASSACHUSETTS

ANCHOR BOLT TEMPLATE ASS'Y
S27-83 RADOME

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CAGE CODE		REV
15175	PL1567-2783	B
PARTS LIST	SHEET 1 OF 2	

PARTS LIST	CPI - ESSCO AYER, MASSACHUSETTS USA	CAGE CODE 15175	PL 1567-2783	REV. B	SHEET 2 OF 2
LIST TITLE	ANCHOR BOLT TEMPLATE ASS'Y, S27-83 RADOME		DRAWING NO.	1567-2783	

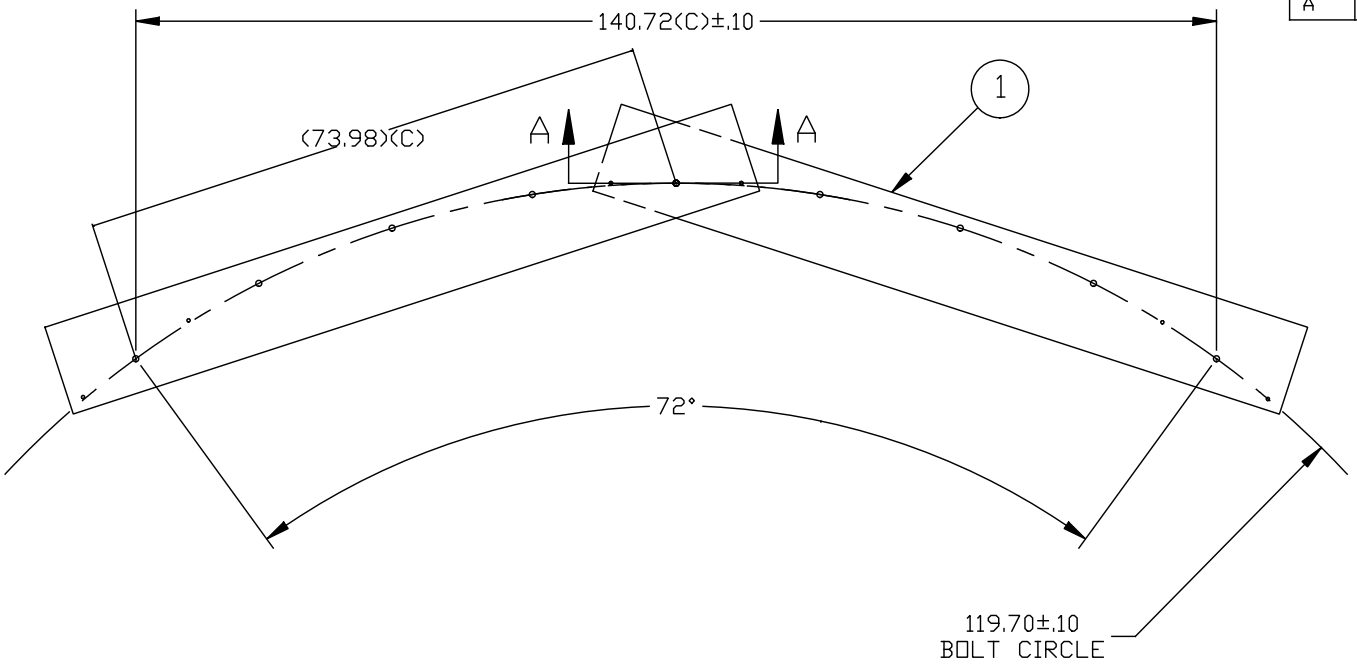
ITEM OR FIND NUMBER	QTY REQD	UNIT OF MEASURE	DRAWING/PART SIZE	DRAWING/PART NUMBER	NOMENCLATURE OR DESCRIPTION	NOTES
1	10	EA	B	1567-1-2783	ANCHOR BOLT TEMPLATE	
2	20	EA		4264-375-313	SLOTTED PRECISION SHOULDER SCREW, .375" DIA. X .313" L SHOULDER, 1/4"-20UNC-2A X 7/16" L THREAD, SST	
3	40	EA		850-38	WASHER, FLAT, 3/8" NOM. DIA., .406" ID X .870" OD X .040" THK, 18-8 SST	
4	20	EA		831-1420	NUT, HEX, 1/4"-20UNC-2B, 18-8 SST	

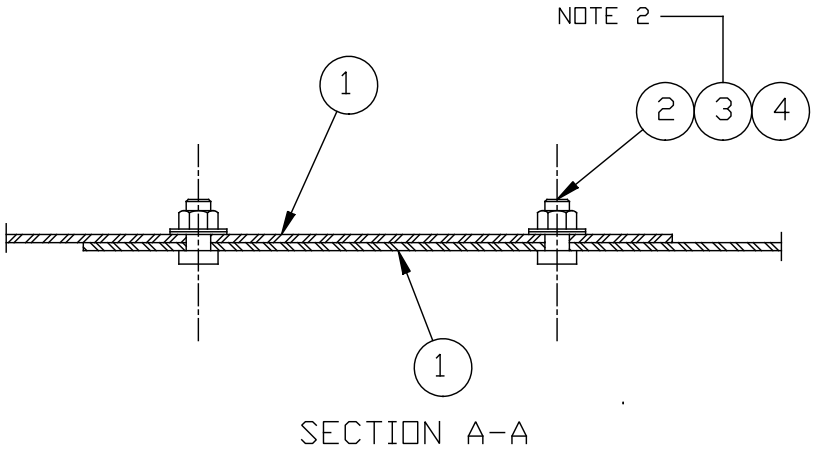
PART NO.	APPLICATION		QTY REQD
	NEXT ASSY	USED ON	

THIS DRAWING WAS PRODUCED ELECTRONICALLY
REVISIONS MAY NOT BE MADE MANUALLY

REVISIONS

REV	DESCRIPTION	DATE	APVD
A	REDRAWN ELECTRONICALLY	8/24/11	EJP





SECTION A-A

NOTES:
1. DIMENSIONS MARKED (C) ARE CHORDAL DIMENSIONS.
2. TWO AT EACH FASTENER USED AS SPACERS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	SIGNATURE & DATE	CPI Communications & Power Industries
	DRAWN BRN 7/24/91	
	CHECKED WA 7/25/91	
TOLERANCES .XX± .XXX± FRACTION± ANGLE± ° SURFACE ROUGHNESS ✓ BREAK ALL SHARP EDGES	APPROVED JWB 7/26/91	ANCHOR BOLT TEMPLATE ASS'Y S27-83 RADOME
	FINISH	
	MATERIAL	CAGE CODE 15175 / SIZE B / 1567-2783 / REV A
THE INFORMATION CONTAINED IN THIS DOCUMENT IS PROPRIETARY AND THE SOLE PROPERTY OF ESSCO. ANY USE OR DISCLOSURE OF THIS INFORMATION IS EXPRESSLY PROHIBITED WITHOUT THE WRITTEN CONSENT OF ESSCO.	WEIGHT	SCALE NONE / SHEET 1 OF 1

PART NO.	APPLICATION		QTY REQD
	NEXT ASSY	USED ON/TEDLAR COLOR	

THIS DRAWING WAS PRODUCED ELECTRONICALLY
REVISIONS MAY NOT BE MADE MANUALLY

REVISIONS

REV	DESCRIPTION	DATE	APVD
A	ECO #3710.	6/21/96	JWB
B	Item 4: P/N 1602-24 was 1602-6, PL1602-24 was B1602-6, Frame Assy was Frame w/Ladder Bar.	11/18/96	JWB
C	Items 2, 3 & 7 were 3/4 NPT.	12/6/96	JWB
D	Item 16 was P/N 855-3816-134. Item 17 was P/N 855-3816-214. Item 18 was P/N 855-3816-234.	4/22/04	EJP
E	ADDED -4 ASSEMBLY FOR 2" THK CORE	11/15/16	EJP
F	REMOVED 1602-9 FROM ITEM 1. ITEM 5 WAS 760-90-1. THE -1 DOES NOT EXIST.	4/10/17	EJP

NOTES:

1. P/N 1602-1-1 FOR PANEL W/0.5 THK CORE.
2. P/N 1602-1-2 FOR PANEL W/1.0 THK CORE.
3. P/N 1602-1-3 FOR PANEL W/1.5 THK CORE.
4. P/N 1602-1-4 FOR PANEL W/2.0 THK CORE.
5. WIRING KIT B1602-10-1 IS USED WITH 20-30 FT. DIA. RADOME.
6. WIRING KIT B1602-10-2 IS USED WITH 31-40 FT. DIA. RADOME.
7. WIRING KIT B1602-10-3 IS USED WITH 41-50 FT. DIA. RADOME.
8. WIRING KIT B1602-10-4 IS USED WITH 51-60 FT. DIA. RADOME.
9. WIRING KIT B1602-10-5 IS USED WITH 61-70 FT. DIA. RADOME.
10. FOR COMPLETE LIST OF DRAWINGS, SEE DL1602.

S

SIGNATURE & DATE		
DRAWN	WK	3/3/89
CHECKED	JWB	4/18/89
APPROVED	BRN	5/10/89
DWG NO.	B1602-1	

CPI - ESSCO
AYER, MASSACHUSETTS

ZENITH HATCH W/VENT

(120 VAC) MODEL ZA-131

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CAGE CODE		REV
15175	PL 1602-1	F
PARTS LIST	SHEET 1 OF 2	

PARTS LIST	CPI - ESSCO AYER, MASSACHUSETTS USA	CAGE CODE 15175	PL1602-1	REV. F	SHEET 2 OF 2
LIST TITLE	ZENITH HATCH W/VENT (120 VAC) MODEL ZA-131		DRAWING NO.	B1602-1	

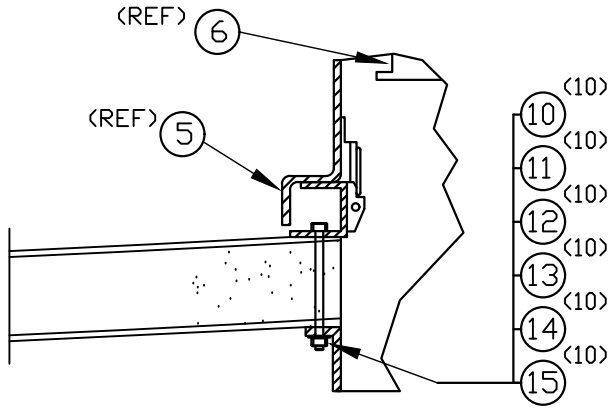
ITEM OR FIND NUMBER	QUANTITY REQUIRED -1	-2	-3	-4	UNIT OF MEASURE	DRAWING/PART SIZE	NUMBER	NOMENCLATURE OR DESCRIPTION	NOTES
1	1	1	1	1			REF	PANEL TAKEN FROM BASIC RADOME ASSEMBLY	
2	1	1	1	1	EA.		2035-12-25	CORD STRAIN RELIEF, 1/2 NPT	T&B CO. #2521
3	1	1	1	1	EA.		2033-12	LOCKNUT, 1/2 NPT	T&B CO. #141
4	1	1	1	1	EA.	PL	1602-24	PANEL DOOR FRAME ASSY	
5	1	1	1	1	EA.	PL	760-90	ZENITH HATCH W/VENT HOOD	
6	1	1	1	1	EA.	A	760-82-1	ADJUST-O-VENT LOUVRE ASSY (120 VAC) 24"X24" SIZE	
7	1	1	1	1	EA.		2032-12	PLASTIC INSULATING BUSHING 1/2 NPT	T&B CO. #222
8	10	10	10	10	EA.		830-1024-1/2	PAN HEAD SCREW (#10-24UNC x 1/2 LG)	18-8 STN STL
9	10	10	10	10	EA.		829-1024	NUT, HEX, SELF-LOCKING W/NYLON INSERT, #10-24 SERIES NM	303 STN STL
10	10	10	10	10	EA.		2005-3816	NUT, HEX, SELF-LOCK (3/8-16)	STN STL
11	10	10	10	10	EA.		850-38	FLAT WASHER (3/8)	STN STL
12	10				EA.		5428-375-3500-2	BOLT, FULL THD HEX HD, 3/8-16UNC-2A x 3-1/2" L	STN STL
13		10			EA.		5428-375-4000-2	BOLT, FULL THD HEX HD, 3/8-16UNC-2A x 4" L	STN STL
14			10		EA.		5428-375-4500-2	BOLT, FULL THD HEX HD, 3/8-16UNC-2A x 4-1/2" L	STN STL
15				10	EA.		5428-375-5500-2	BOLT, FULL THD HEX HD, 3/8-16UNC-2A x 5-1/2" L	STN STL
16	1	1	1	1	REF		SEE NOTES 5-9	WIRING KIT FOR ZENITH VENT	NOTES 4-8
							REF	WIRING DIAGRAM FOR ZENITH VENT (120/220 VAC)	SEE DRW A1602-12

PART NO.	APPLICATION		QTY REQD
	NEXT ASSY	USED ON	

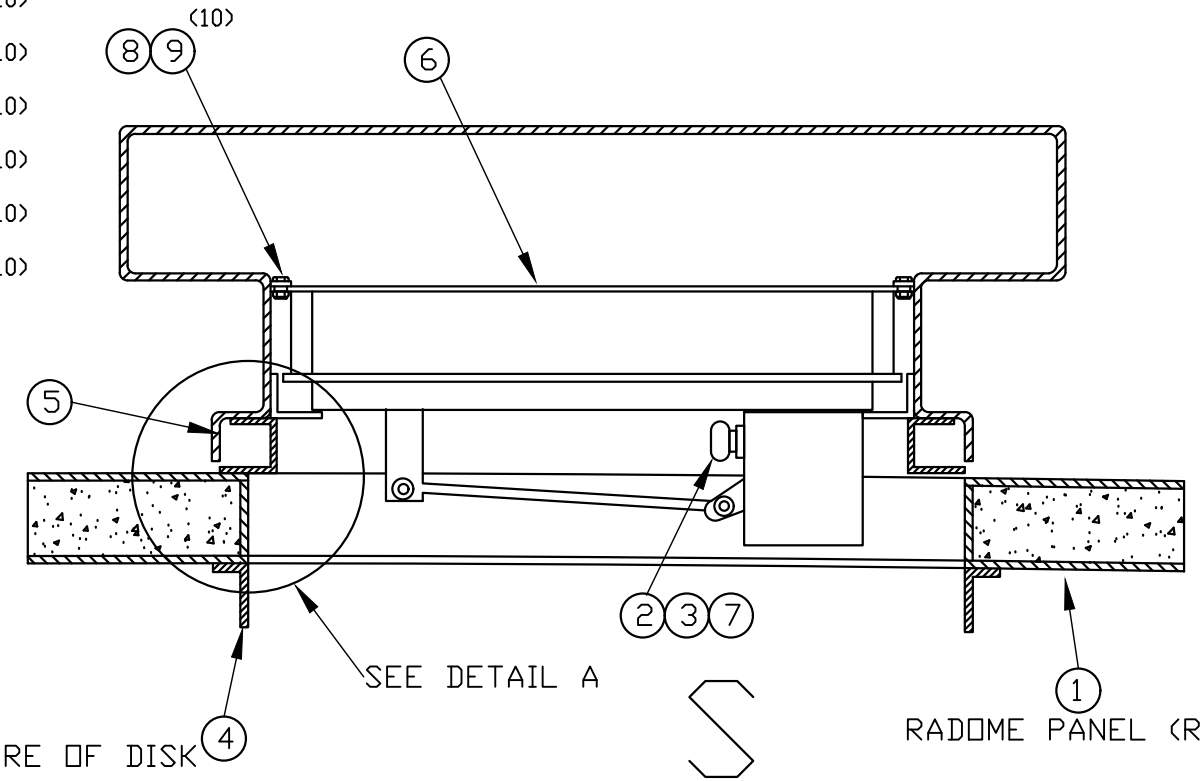
THIS DRAWING WAS PRODUCED ELECTRONICALLY
REVISIONS MAY NOT BE MADE MANUALLY

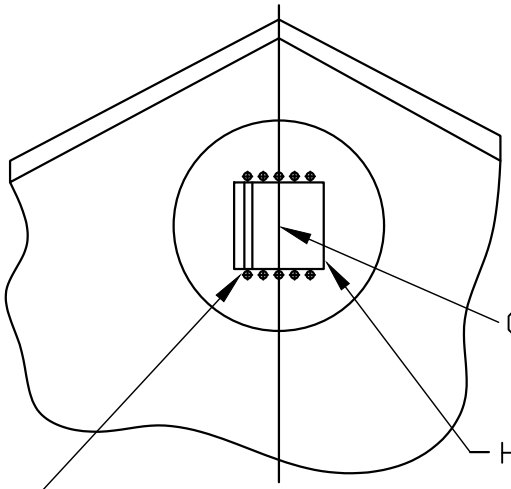
REVISIONS

REV	DESCRIPTION	DATE	APVD
A	REDRAWN ELECTRONICALLY BALLOON REFERANCES CORRECTED	10/19/16	MF



DETAIL A TYP (2) PLACES





PLAN VIEW OF TOP PANEL

7/16 DIA THRU. HOLES TO MATCH PANEL
DOOR FRAME W/LADDER BAR, P/N B1602-6

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	SIGNATURE & DATE DRAWN WR 3/1/89 CHECKED JWB 4/18/89	CPI Communications & Power Industries ZENITH HATCH W/VENT (120VAC) MODEL #ZA-131
TOLERANCES .XX± .XXX± FRACTION± ANGLE± SURFACE ROUGHNESS ✓ BREAK ALL SHARP EDGES	FINISH MATERIAL	CAGE CODE 15175 | SIZE B | 1602-1 | REV A
THE INFORMATION CONTAINED IN THIS DOCUMENT IS PROPRIETARY AND THE SOLE PROPERTY OF ESSCO. ANY USE OR DISCLOSURE OF THIS INFORMATION IS EXPRESSLY PROHIBITED WITHOUT THE WRITTEN CONSENT OF ESSCO.	WEIGHT	SCALE NONE | SHEET 1 OF 1

PART NO.	APPLICATION		QTY REQD
	NEXT ASSY	USED ON/TEDLAR COLOR	

THIS DRAWING WAS PRODUCED ELECTRONICALLY
REVISIONS MAY NOT BE MADE MANUALLY

REVISIONS

REV	DESCRIPTION	DATE	APVD
A	PER ECO #1266	10.20.89	JWB
B	ECO #1308 INCORPORATED ON REVISION A	1.8.90	JWB
C	REDESIGNED	3.21.13	DD
D	QTY ITEM #14, ADD ITEM #21, CH ITEM #19	3/26/2013	DD
E	REDESSIGNED, ADDED NOTES 3, 4 & 5	1.17.14	AD
F	ECO# 5024 REMOVED NOTES 3, 4 & 5.	8.22.16	EJP
G	ADDED 220V TO DESCRIPTION. ADDED -6 TO NOTE 2.	10.24.16	MW
H	ECO 5053, DELETED -6 FROM NOTE 2	2.8.17	EJP

NOTES:

1. THIS KIT IS FOR 120/220 VAC, 1PH, 60 HZ OPERATION
2. APPROX CABLE LENGTH IS EQUAL TO 1.5" x RADOME DIA (FOR 90% TRUNCATION)
   -1 FOR RADOME 20-30 FT
   -2 FOR RADOME 31-40 FT
   -3 FOR RADOME 41-50 FT
   -4 FOR RADOME 51-60 FT
   -5 FOR RADOME 61-70 FT

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S

SIGNATURE & DATE		
DRAWN	WR	03/09/89
CHECKED	BRN	05/10/89
APPROVED	JWB	4/18/1989
DWG NO.		1602-10

CPI ESSCO, INC.
AYER, MASSACHUSETTS

WIRING KIT FOR ZENITH VENTILATOR (120/220V)

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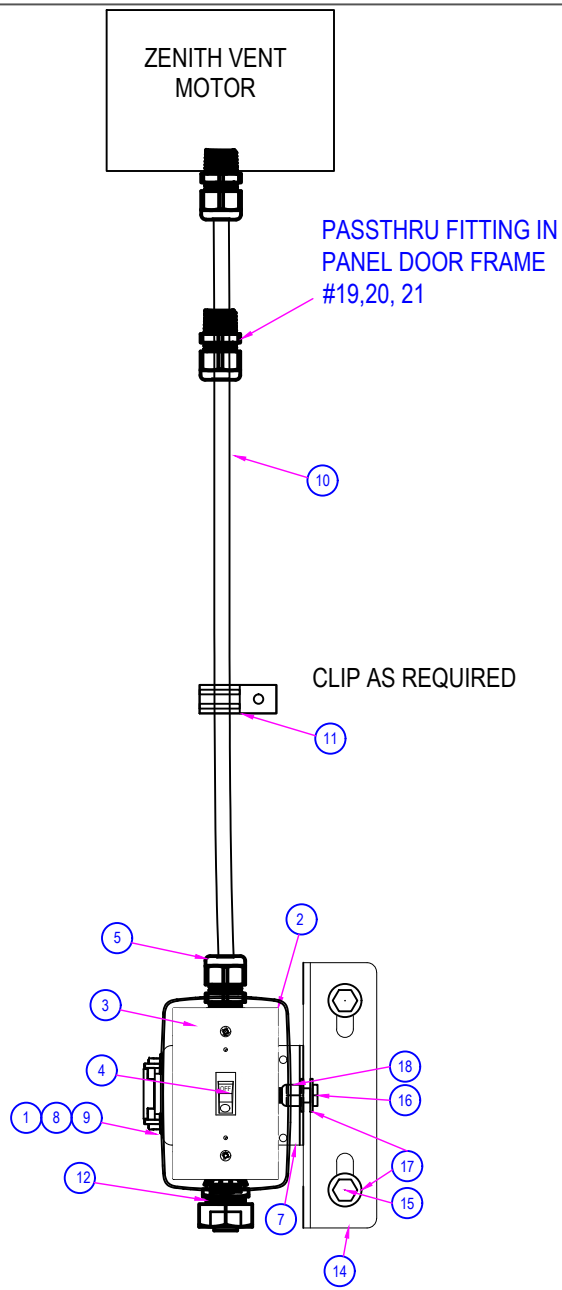
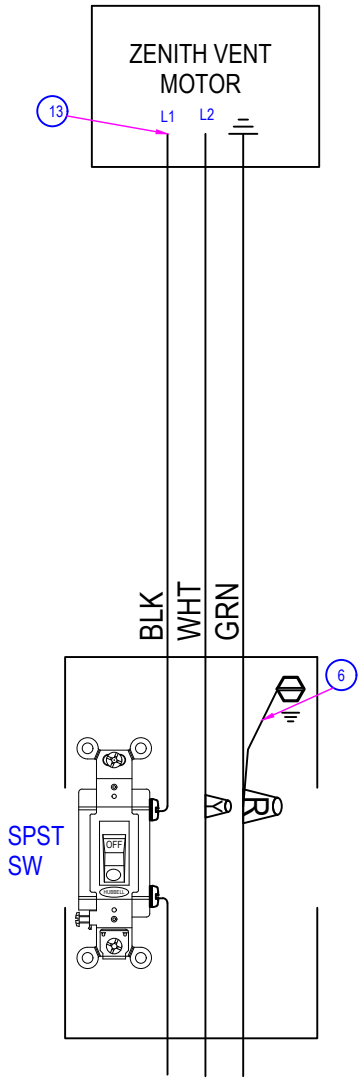
CAGE CODE		REV
15175	PL1602-10	H
PARTS LIST	SHEET 1 OF 2	

PARTS LIST	CPI ESSCO, INC. AYER, MASSACHUSETTS USA	CAGE CODE 15175	PL1602-10	REV. H	SHEET 2 OF 2
LIST TITLE	WIRING KIT FOR ZENITH VENTILATOR (120/220V)		DRAWING NO.	1602-10	

ITEM OR FIND NUMBER	QUANTITY REQUIRED						UNIT OF MEASURE	DRAWING/PART SIZE	DRAWING/PART NUMBER	NOMENCLATURE OR DESCRIPTION	NOTES
	-1	-2	-3	-4	-5						
1	2						EA		850-10	WASHER, FLAT, NO. 10-1/2 OD 18-8 SST	
2	1						EA		2168-123L-1	Box, 1-G, WP, 3-1/2" Hubs	
3	1						EA		032-755	Cover, 1G, WP, Multi-Configurations	
4	1						EA		032-731	SWITCH, TOGGLE, 1P, 20A, BR, 120/277 VAC	
5	1						EA		2035-12-25	CORD, STRAIN RELIEF CONN. (.250-.375), 1/2" NPT	
6	1						EA		032-906	PIGTAIL, GROUNDING, #12 GREEN, 7.75"	
7	1						EA	*	897-ILK-BRKT-2	BRACKET; IlK, MSF, Light Box Mount	
8	2						EA		830-1032-58	SCREW, PAN HEAD PH, 10-32 X 5/8" SS	
9	2						EA		2005-1032	NUT,HEX SELF-LOCKING #10-32UNC W/	
10	50	70	85	100	120		FT		2043-3-16	CABLE, SJOOW, NEOPRENE, BLK, 16-3	
11	25	25	35	50	50		EA		032-815	Clamp, Cable,3/8"x3/4" 3/8 Mt Hole	
12	1						EA		2164-12	Conn, 1/2" LT, ST, Ins Thrt	
13	5						EA		2037-8-RB	WIRE TERMINAL, 'STAKON' #8 BOLT HOLE	
14	1						EA	*	897-ILK-BRKT-COMP	BRACKET; IlK, COMP, Box Mount	
15	2						EA		2178-3816-78	BOLT, HEX HD 3/8-16UNC X 7/8 LG	
16	1						EA		855-3816-1	SCREW, HEX HD 3/8-16UNC-2 X1" LG	
17	4						EA		850-38	FLATWASHER .406 IDX.870 ODX.060 +/-.020 TH	
18	1						EA		2005-3816	NUT, HEX SELF LOCKING W/ NYLON INST	
19	1						EA		2035-34-25	CORD, STRAIN RELIEF CONN. (.250-.375), 3/4" NPT	
20	1						EA		2033-34	LOCKNUT, 3/4 NPT ZINC PLATED STEEL	
21	1						EA		2032-34	BUSHING, 3/4 IN. NPT PLASTIC INSULATING	





CUSTOMER TO PROVIDE POWER 120V/220V

S

REV	ECO #	DESCRIPTION	BY	DATE	APRVD
A	NA	REDESIGN	DD	3/21/13	EJP
B	NA	BALLOON ITEM #21	DD	3/26/13	EJP
C	NA	REDESIGN	AD	1/17/14	DD
D	5024	REMOVED NOTES 4,5 & 6	EP	8/22/16	EV
E	N/A	120V/220V WAS 120V 2A.	EP	12/13/18	MW
-	-	-	-	-	-
-	-	-	-	-	-

CPI Communications & Power Industries
ESSCO
90 NEMCO WAY AYER, MA 01432
(978) 568-5100 (ph) (978) 772-7555 (fax)

DOC.CONTROLLED

ENGINEER: WR
DRAFTER: DD
APPROVER: JWB
DATE CREATED: 3/8/89
SIZE A

TOLERANCES ARE:
FRACTIONS ±1/32
DECIMALS .XX ± .02 .XXX ± .005
ANGLES ±1/2°
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES, ANGLES ARE 90°
THIRD ANGLE PROJECTION

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TITLE: WIRING KIT FOR ZENITH VENTILATOR 120V/220V WIRING KIT

DRAWING NO.: 1602-10
REV. E
CAGE CODE: 15175
SCALE: NONE
SHEET 1 OF 1

PARTS LIST	CPI Communications & Power Industries **ESSCO** **AYER, MASSACHUSETTS USA**	CAGE CODE 15175	PL **705-290**	REV J	SHEET OF	1 1

LIST TITLE	AIR TERMINAL KIT UP TO S42' ONLY	DRAWING NO.	705-290

Engineered By:	MO	Engineered Date: 04/05/2022	Approved By: Brian Lustig	Approved Date: 4/12/2022

Revision History:

REV J ADDED P/N'S TO HARDWARE. MOVED NOTES TO DWG. PL CREATED IN CRYSTAL. 4/8/2022
REV H ADDED NOTE 2, DOWN CONDUCTOR INFO. 3/11/2015
REV G NOTES ON ITEM 2 & 3 WERE 705-292 & 705-293. 3/11/2015
REV F ELIMINATED 36" & 48" AIR TERMINALS. 9/2/2014
REV E DWG 705-291 REV'D TO B REVISED NOTES. 5/28/2014
REV D DWG 705-291 REV'D TO A. 2/11/2014
REV C ADD DWG #2 WAS 705-292, #3 WAS 705-293 CH QTY ON ITEMS 4,5,6. 9/5/2013
REV B ADDED -3 ASSEMBLY. CORRECTED THOMPSON #'S FOR ITEM 9. 10/3/2011
REV A ITEMS 4,5&6: QTY WAS 4. ITEM 13: QTY WAS 1. 1/30/2008

FIND NUMBER	QTY REQUIRED	UNIT OF MEASURE	PART NUMBER	DESCRIPTION	DRAWING	REV
1	1.00	EA	571LA	AIR TERMINAL- AL- 5/8"DIA X 24"L	571LA	-
2	1.00	EA	705-291	AWL AIR TERMINAL SUPPORT SHAFT	705-291	A
3	2.00	EA	5865-1420-14	CUP POINT SET SCR 1/4-20UNC X 1/4 LG		
4	1.00	EA	2013-1420-58	BOLT- HX HD GR5-1/4-20 UNC-2A X 5/8"L ZNP		
5	1.00	EA	2272-14	1/4" LOCK WASHER 18-8SST		
6	1.00	EA	705-306	INSIDE BEARING PLATE	705-306	-
7	1.00	EA	705-305	OUTSIDE BEARING PLATE	705-305	-
8	1.00	EA	705-APP	ANCHOR POINT PLATE	705-APP	A
9	2.00	EA	705-288	SPACER- ANCHOR POINT	705-288	-
10	2.00	EA	2013-18-6	BOLT- HX HD GR5-1-8 UNC-2A X 6"L ZNP		
11	3.00	EA	2005-18	NUT- HEX SLF LCKNG W/NYLN INSRT 1-8 UNC-2B		
12	5.00	EA	850-1	WASHER-FLAT 1"SZ 18-8 1.06 ID X 2.0 OD		
13	6.00	EA	2005-3816	NUT-HEX-SELF LOCKNG 3/8-16 -18-8 SST		
14	6.00	EA	856-3816-312	SCR- FLH SLOTD MACH 3/8-16UNC -2A X 3-1/2L		
15	6.00	EA	850-38	FLATWASH 3/8ID X 13/16OD X .060 +/-.010 THK 18-8 SST		
16	1.00	EA	5397-18	BONDING STRAP- FLEXIBLE 18" LONG		

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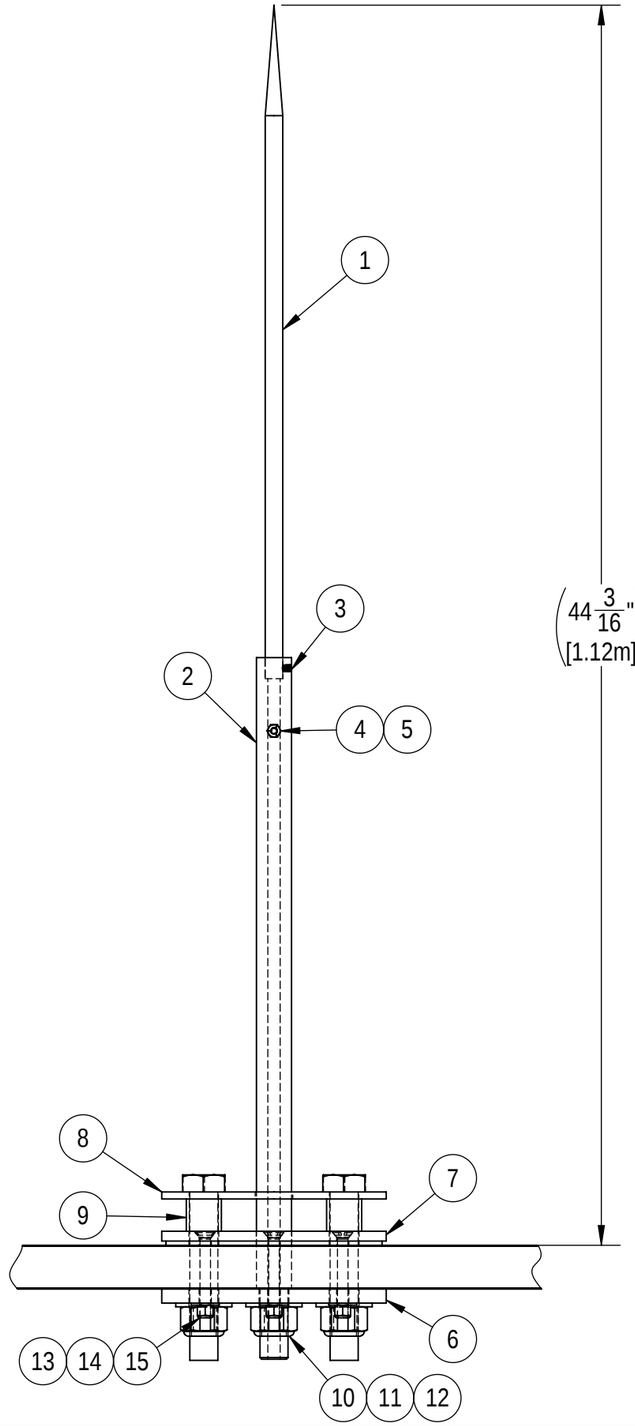
REVISIONS				
REV.	DESCRIPTION	BY	DATE	APRVD
A	REVISED FOR UP TO S38 ONLY	DD	4/11/2022	KL
B	ADDED S42 RADOME TO PAGE 3	DD	4/11/2022	EP
C	REDRAWN. MOVED NOTES FROM PL TO DWG. REMOVED SHT, SHT 3 NOW SHT 2.	MO	4/11/2022	BL



NOTES:
1. THIS AIR TERMINAL KIT CAN BE USED FOR RADOMES UP TO S42 FT DIAMETER ONLY.
2. USE THE APPROPRIATE DOWN CONDUCTOR KIT FOR THE RADOME:
   - USE DOWN CONDUCTOR KIT 1613-DC-1 FOR 20'-30' RADOMES.
   - USE DOWN CONDUCTOR KIT 1613-DC-2 FOR 31'-40' RADOMES.
   - USE DOWN CONDUCTOR KIT 1613-DC-3 FOR 42' RADOMES.
3. USE ITEM 16, ALUMINIUM BONDING STRAP TO GROUND AIRCRAFT WARNING LIGHT WHEN SUPPLIED WITH THE RADOME.

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DOC.CONTROLLED

ENGINEER: D. DUFRESNE
DRAFTER: D. DUFRESNE
CHECKER: E. PAUPLIS
THIRD ANGLE PROJECTION

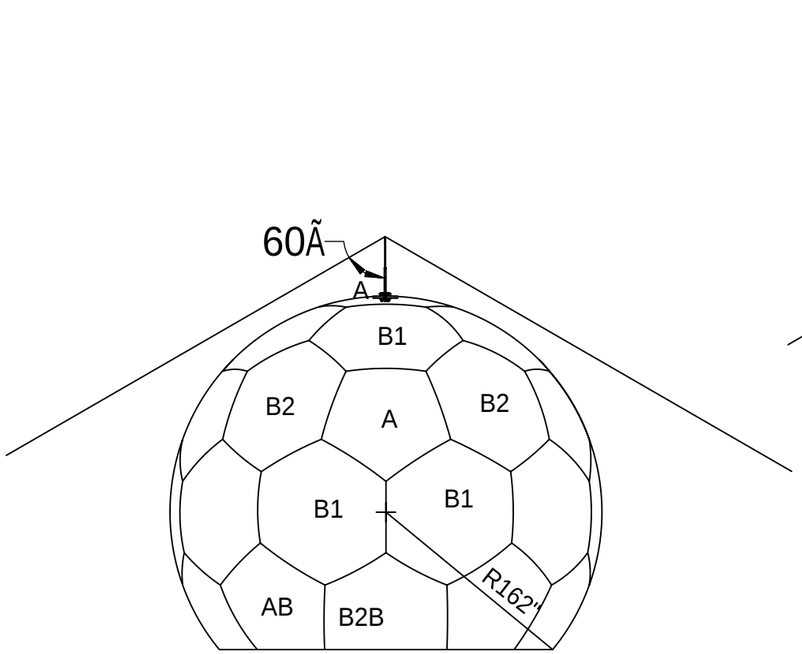
UNLESS OTHERWISE SPECIFIED:
MACHINED FEATURES
.XX ±0
.XXX ±0
∠ ±0
COMPOSITES
.XX ±0
∠ ±0

CPI Communications & Power Industries
ESSCO OPERATIONS
90 NEMCO WAY
AYER, MA 01432

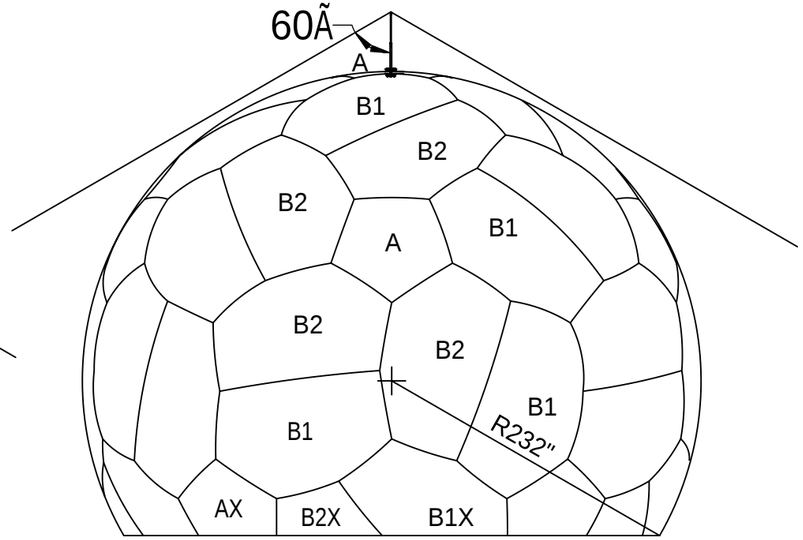
TITLE:
SINGLE ROD, AIR TERMINAL KIT

SIZE	CAGE CODE:	DRAWING NO.:	REV.
B	15175	705-290	C

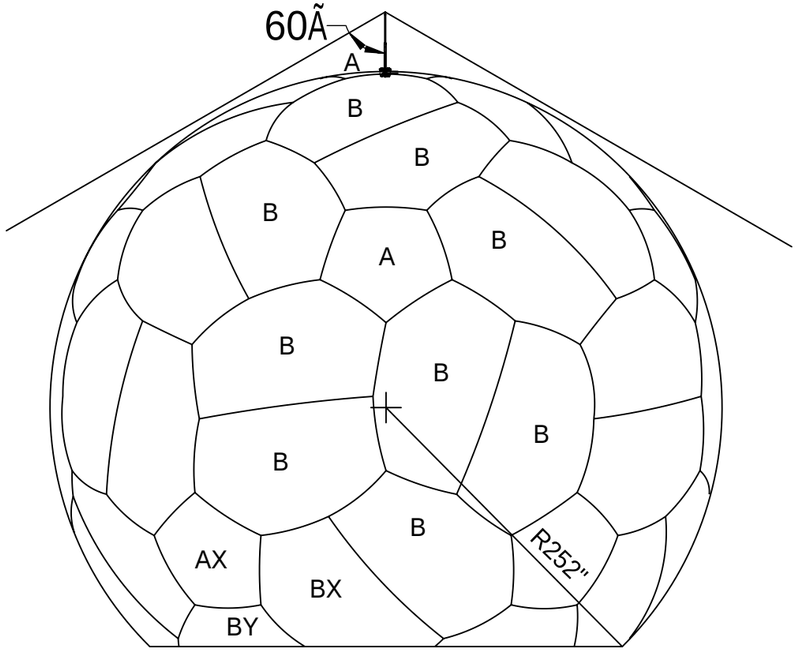
SCALE: N/A DATE: 8/28/2013 SHEET 1 OF 2



S27



S38



S42

EAR CONTROLLED REFER TO SHEET 1	SIZE B	CAGE CODE: 15175	DRAWING NO.: 705-290	REV. C
CPI - ESSCO PROPRIETARY	SCALE: N/A		SHEET 2 OF 2	

PART NO.	APPLICATION		QTY REQD	THIS DRAWING WAS PRODUCED ELECTRONICALLY REVISIONS MAY NOT BE MADE MANUALLY
	NEXT ASSY	USED ON/TEDLAR COLOR		
				REVISIONS

REV	DESCRIPTION	DATE	APVD
A	CORRECTED DESCRIPTION FOR ITEM #4	1/18/19	EJP
B	ADDED STAND-OFF MATERIALS ITEMS 6,7 & 8	1/22/20	EJP
C	QTY OF ITEM 8 WAS DOUBLED	6/24/2020	SMC

NOTES:

-1	20-30' RADOME
-2	31-40' RADOME
-3	41-50' RADOME
-4	51-60' RADOME
-5	61-70' RADOME
-6	71-80' RADOME

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S

SIGNATURE & DATE		
DRAWN	DD	9/4/2013
CHECKED	EJP	9/4/2013
DWG NO.		1613-2

CPI ESSCO
AYER, MA. USA

DOWN CONDUCTOR

KIT

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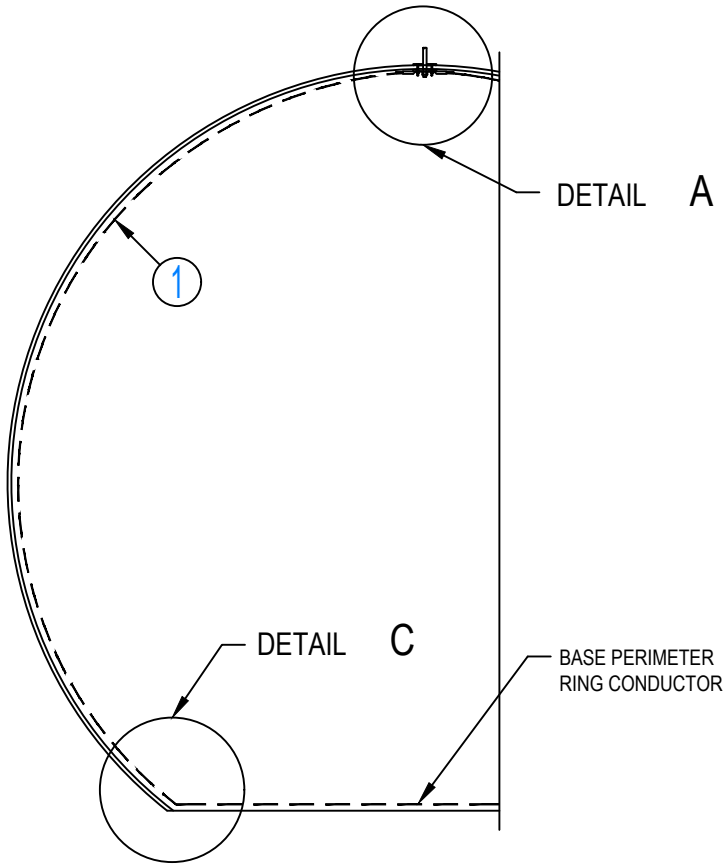
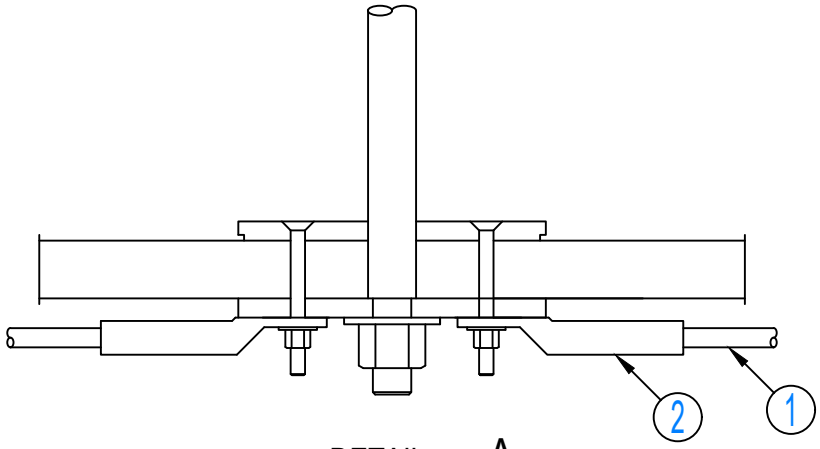
CAGE CODE		REV
15175	PL1613-DC	C
PARTS LIST	SHEET 1 OF	2

PARTS LIST	CPI ESSCO AYER, MA. USA	CAGE CODE 15175	PL1613-DC	REV. C	SHEET 2 OF 2
LIST TITLE	DOWN CONDUCTOR KIT		DRAWING NO.	1613-2	

ITEM OR FIND NUMBER	-1	-2	-3	-4	-5	-6 QTY REQD	UNIT OF MEASURE	DRAWING/PART DWG	DRAWING/PART NUMBER	NOMENCLATURE OR DESCRIPTION	NOTES
1	115	150	190	225	265	300	FT		2041-28R	COPPER CONDUCTOR, 1/2" DIA. 28 STRAND X 14 GA	SHIP QTY = ALL
2	2						EA		5527-551T	BUS TERMINAL, HEAVY DUTY, COATED BRONZE	SHIP QTY = 2
3	46	60	76	90	106	120	EA		5526-166XT	LOOP CABLE HOLDER WITH 3/8" DIA. CLEARANCE HOLE	SHIP QTY = ALL
4	4						EA		5527-706RDC	CLAMP, CABLE BONDING, W/ 5/8" DIA. THRU HOLE, 506 CABLE	SHIP QTY = 4
5	2						EA		5685-423B	SPLICER FOR CABLE FOR CABLE SIZES 1/2" - 5/8	SHIP QTY = 2
6	46	60	76	90	106	120	EA	A	9568A-36	STANDOFF ANGLE, 2" X 2" FRP	SHIP QTY = ALL
7	46	60	76	90	106	120	EA		831-3816	NUT-FINISHED HEX 3/8-16 UNC-2B, 18-8 SST	SHIP QTY = ALL
8	92	120	152	180	212	240	EA		2178-3816-1	BOLT-HX HD 3/8-16 UNC-2A X 1" LONG W/ NYLON LOCKING PATCH PER MIL-F-18240, 18-8 SST	SHIP QTY = ALL



ELEVATION/SECTION



DETAIL A

S

REV	ECO #	DESCRIPTION	BY	DATE	APRVD
A	NA	ADD PERIMETER CONDUCTOR	DD	2/14/14	EJP
B	NA	CORRECTED DETAIL "C" ITEM CALLOUT.	ERV	1/18/19	ERV
C	NA	CORRECTED SECTION A-A	SMC	6/10/20	MO
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

ESSCO
90 NEMCO WAY AYER, MA 01432
(978) 568-5100 (ph) (978) 772-7555 (fax)

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ENGINEER: BRN
DRAFTER: JWB
APPROVER: WA
DATE CREATED: 9.26.96
SIZE A

TOLERANCES ARE:
FRACTIONS ±1/32
DECIMALS .XX ± .02 .XXX ± .005
ANGLES ±1/2°
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES, ANGLES ARE 90°
THIRD ANGLE PROJECTION

TITLE: DOWN CONDUCTOR KIT

DRAWING NO.: 1613-2
REV. C
CAGE CODE: 15175
SCALE: NONE
SHEET 1 OF 2

PA+B2:S52RT NO.	APPLICATION		QTY REQD	THIS DRAWING WAS PRODUCED ELECTRONICALLY REVISIONS MAY NOT BE MADE MANUALLY
	NEXT ASSY	USED ON/TEDLAR COLOR		
				REVISIONS

REV	DESCRIPTION	DATE	APVD
A	SHEET 3 TABLE WAS LABELED ILK-EUC	11/25/13	EJP
B	ADJUSTED QTY FOR ITEMS 19, 20, 21	10/2/14	KLM
C	ECO# 4999 ITEM #48 WAS ILK-USC	3/15/16	ERV
D	ADDED THE -20 OPTION. EXAMPLE KIT WAS ILK1-USC2-30	12/18/16	EJP
E	Added minus values on page 3	5/3/2017	MW

NOTES: 120 VOLT, MULTIPLE STATION, SINGLE LED FLOOD

EXAMPLE KIT NUMBER: **ILK1-USC2-20**

ILK1	INTERIOR LIGHT KIT
US	US VOLTAGE AND OUTLETS
C	COMPOSITE
2	# OF LIGHT STATIONS
20	RADOMES 10' TO 20'
30	RADOMES 20' TO 30'
40	RADOMES 31' TO 40'
50	RADOMES 41' TO 50'
60	RADOMES 51' TO 60'
80	RADOMES 61' TO 80'

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SIGNATURE & DATE			CPI ESSCO AYER, MA. USA
DRAWN	DD	11/11/2013	
CHECKED	EJP	11/11/2013	INTERIOR LIGHTING KIT 120V COMPOSITE
DWG NO.	ILK1-USC		

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CAGE CODE		REV
15175	PLILK1-USC	E
PARTS LIST		SHEET 1 OF 3

PARTS LIST	CPI ESSCO AYER, MA. USA	CAGE CODE 15175	PLILK1-USC	REV. E	SHEET 2 OF 3
LIST TITLE	INTERIOR LIGHTING KIT 120V COMPOSITE		DRAWING NO.	ILK1-USC	

ITEM OR FIND NUMBER	QTY REQD	UNIT OF MEASURE	DRAWING/PART DWG	DRAWING/PART NUMBER	NOMENCLATURE OR DESCRIPTION	NOTES
1	1	EA		032-735	Box, 2-G, WP, 7-1/2" Hubs	SHIP QTY = 1
2	1	EA		028-181	Cover, 2 Gang Weatherproof Blank	SHIP QTY = *
3	1	EA		032-740	Plug, Closure, 1/2"NPT, (4)	SHIP QTY = *
4	15	EA		032-572	Wirenut, Yellow	SHIP QTY = 15
5	1	EA		2168-123L-1	Box, 1-G, WP, 3-1/2" Hubs	SHIP QTY = 1
6	1	EA		032-731	SWITCH, TOGGLE, 1P, 20A, BR, 120/277 VAC	SHIP QTY = *
7	1	EA		032-840	RECPT, WR, GFI, 20A, 125V, DUPLEX, IV	SHIP QTY = *
8					NOT USED	SHIP QTY = *
9					NOT USED	SHIP QTY = *
10					NOT USED	SHIP QTY = *
11	2	EA	*	897-ILK-BRKT-2	BRACKET; ILK, MSF, SWITCH MOUNT	SHIP QTY = *

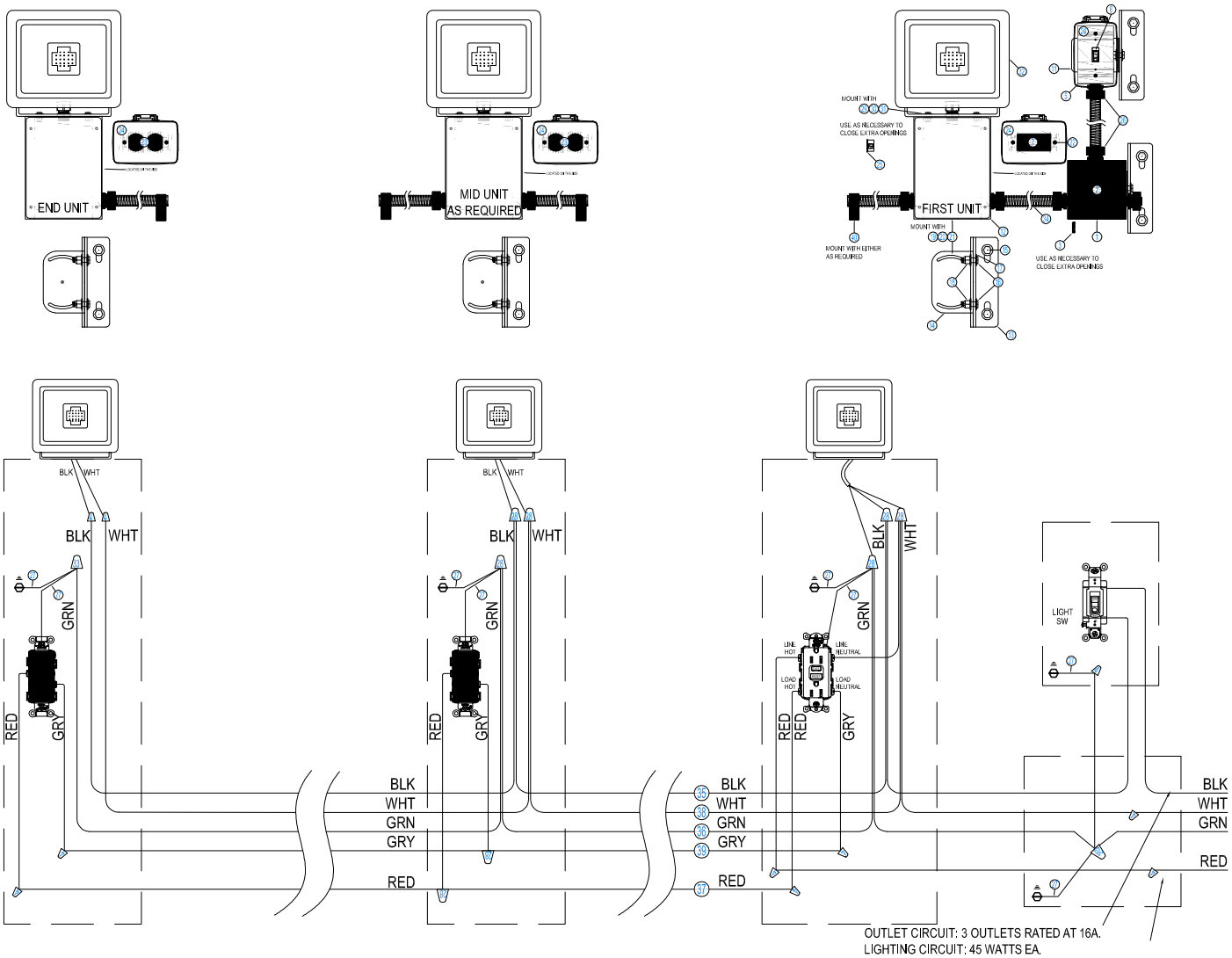
NUMBER OF STATIONS

ILK1-USC	2	3	4	5	6
12	2	3	4	5	6
13	4	5	6	7	8
14	2	3	4	5	6
15	15	20	25	30	35
16	6	8	10	12	14
17	12	16	20	24	28
18	6	8	10	12	14
19	12	16	20	24	28
20	10	13	16	19	22
21	12	16	20	24	28
22	4	6	8	10	12
23	1	2	3	4	5

EA	*	897-ILK-LB	BOX, LIGHT, OUTLET, DISTRIBUTION	SHIP QTY = ALL
EA	*	897-ILK-BRKT-COMP	BRACKET; llK, COMP, Box Mount	SHIP QTY = *
EA	*	897-ILK-LMBRKT-2	BRACKET, ILK, MSF, LIGHT BOX MOUNT	SHIP QTY = *
EA		2178-3816-78	BOLT, HEX HD 3/8-16UNC X 7/8 L	SHIP QTY = ALL
EA		855-3816-1	SCREW, HEX HD 3/8-16UNC-2 X1" LG	SHIP QTY = *
EA		850-38	FLATWASH .406 IDX.870 ODX.060 +/-.020 TH	SHIP QTY = ALL
EA		2005-3816	NUT, HEX SELF LOCKING W/ NYLON INST	SHIP QTY = *
EA		830-1032-58	SCREW, PAN HEAD PH, 10-32 X 5/8" SS	SHIP QTY = *
EA		032-804	WASHER, FLAT, #10X.6875" SS	SHIP QTY = *
EA		2005-1032	NUT,HEX SELF-LOCKING #10-32UNC W/	SHIP QTY = *
EA		2005-632	LOCKNUT 6-32 TYPE NM	SHIP QTY = *
EA		032-839	RECPT, WR, 20A, 125V, DUPLEX, WHT	SHIP QTY = *

PARTS LIST	CPI ESSCO AYER, MA. USA	CAGE CODE 15175	PLILK1-USC	REV. E	SHEET 3 OF 3
LIST TITLE	INTERIOR LIGHTING KIT 120V COMPOSITE		DRAWING NO.	ILK1-USC	

ITEM OR FIND NUMBER	2	2	3	4	5	6	UNIT OF MEASURE	DRAWING/PART SIZE	DRAWING/PART NUMBER	NOMENCLATURE OR DESCRIPTION	NOTES
		QTY REQD									
24	3	3	4	5	6	7	EA		032-755	Cover, 1G, WP, Multi-Configurations	SHIP QTY = *
25	7	7	9	11	13	15	EA		032-860	Plug, Hole, .875, Plastic, Black	SHIP QTY = ALL
26	7	7	9	11	13	15	EA		2164-12	Conn, 1/2" LT, ST, Ins Thrt	SHIP QTY = *
27	6	6	8	10	12	14	EA		032-906	PIGTAIL, GROUNDING, #12 GREEN, 7.75"	SHIP QTY = *
28	10	10	15	20	25	30	EA		032-571	Wirenut, Red	SHIP QTY = ALL
29	4	4	6	8	10	12	EA		855-1420-34	SCREW HEX HD. 1/4-20X3/4 SST	SHIP QTY = *
30	4	4	6	8	10	12	EA		2005-1420	NUT, HEX SELF LOCKING 1/4-20UNC,W/	SHIP QTY = *
31	8	8	12	16	20	24	EA		850-14	WASHER, FLAT 1/4" SIZE	SHIP QTY = *
32	2	2	3	4	5	6	EA		033-002	LIGHT; LED FLOOD 45 WATT	SHIP QTY = *
ILK1-USC*-											
ILK1-USC*-	**20**	**30**	**40**	**50**	**60**	**80**					
34	56	85	150	150	220	220	FT		2165-12-EF	CONDUIT,1/2" LIQUID TIGHT	SHIP QTY = ALL
35	70	105	170	170	240	240	FT		2041-1-12B	WIRE, #12 THHN BLACK	SHIP ALL MINUS 5
36	70	105	170	170	240	240	FT		2041-1-12G	WIRE, #12 THHN GREEN	SHIP ALL MINUS 5
37	70	105	170	170	240	240	FT		2041-1-12R	WIRE, #12 THHN RED	SHIP ALL MINUS 10
38	70	105	170	170	240	240	FT		2041-1-12W	WIRE, #12 THHN, WHT	SHIP ALL MINUS 5
39	70	105	170	170	240	240	FT		2041-1-12GRA	WIRE, #12 THHN, GRA	SHIP ALL MINUS 5
40	15	20	30	30	40	40	EA		032-823	Clamp, Cable,1"x3/4" 3/8 Mt Hole	SHIP QTY =ALL
41										NOT USED	
42	15	25	50	50	75	75	EA		5432-4	TIE, NYLON CABLE MAX. BUNDLE DIA 4"	SHIP QTY =ALL
43	1						EA	*	ILK1-USC	DRAWING PACKAGE	1



S

REV	ECO #	DESCRIPTION	BY	DATE	APRVD
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

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ENGINEER:	DD
DRAFTER:	DD
APPROVER:	EJP
DATE CREATED:	11/11/13
SIZE	A

TOLERANCES ARE:
FRACTIONS ±1/32 DECIMALS .XX ± .02 .XXX ± .005
ANGLES ±1/2°

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES, ANGLES ARE 90°

THIRD ANGLE PROJECTION

TITLE: INTERIOR LIGHT KIT 120V

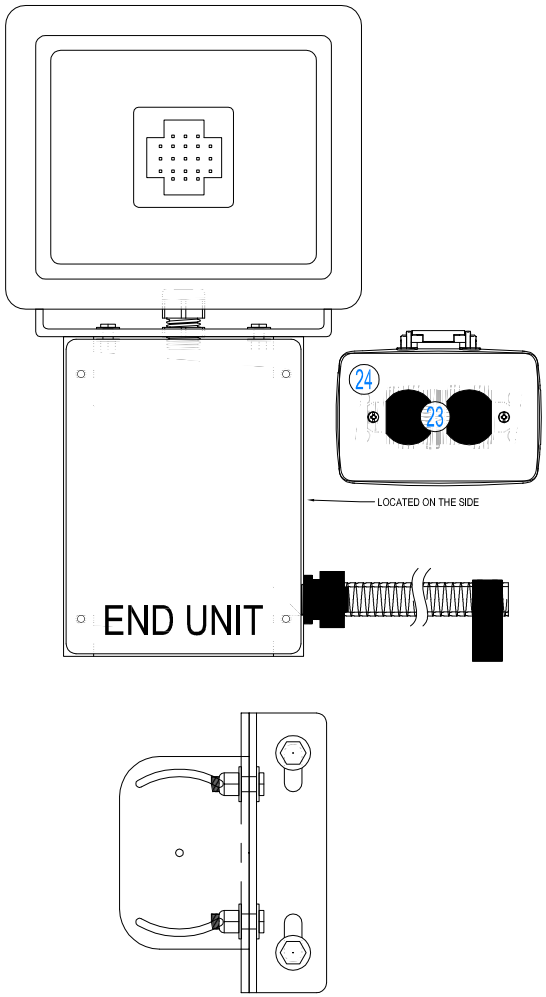
DRAWING NO.: ILK1-USC

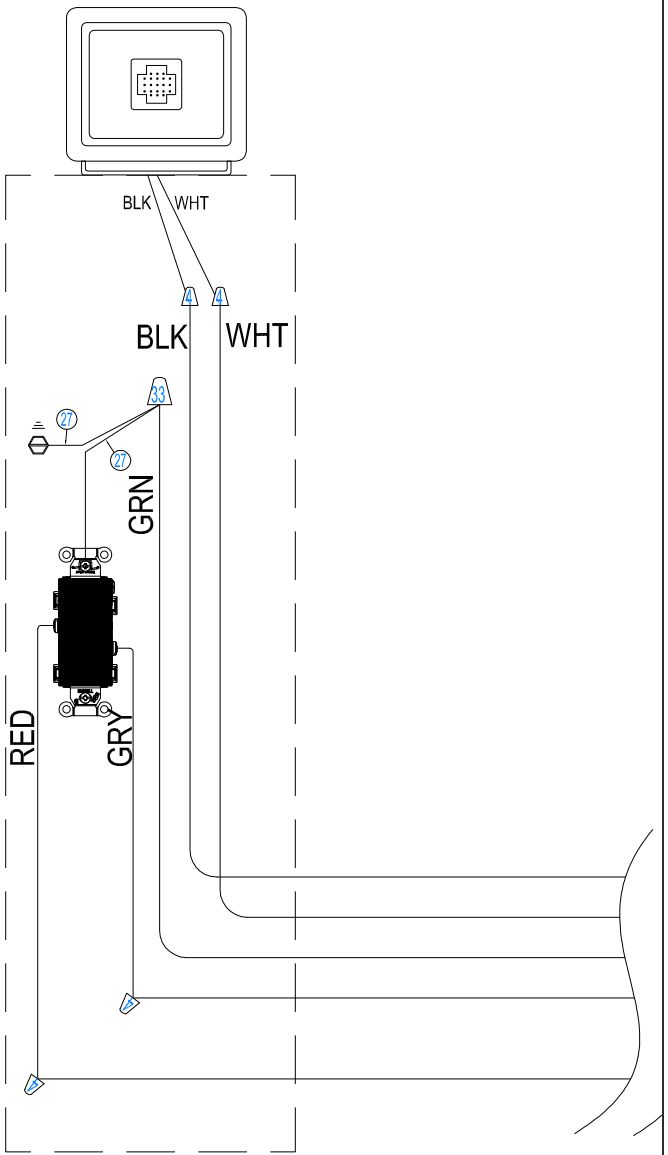
REV. -

CAGE CODE: 15175

SCALE: NONE

SHEET 1 OF 5





END UNIT DETAIL

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ENGINEER:	DD
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DATE CREATED:	11/11/13
SIZE	A

TOLERANCES ARE:
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ANGLES ±1/2°

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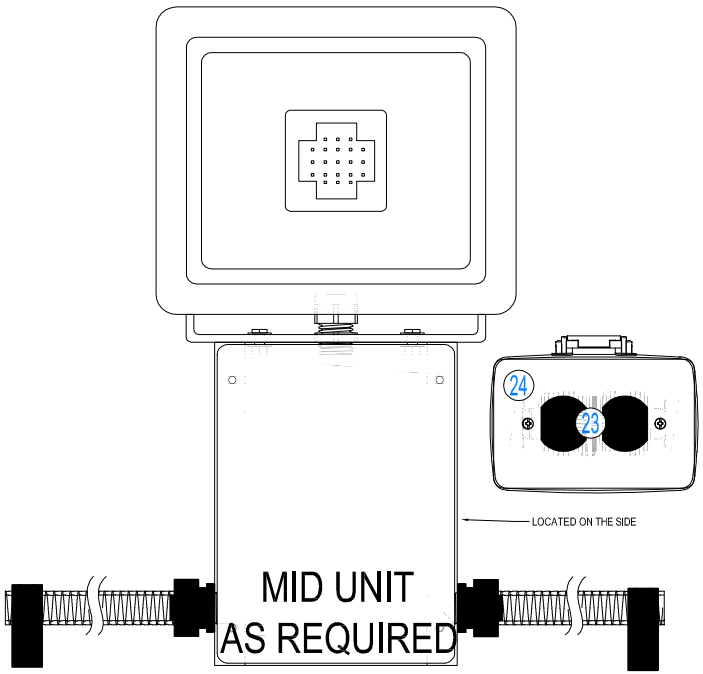
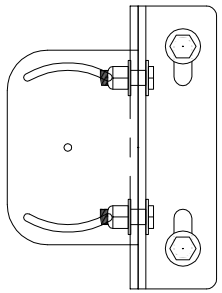
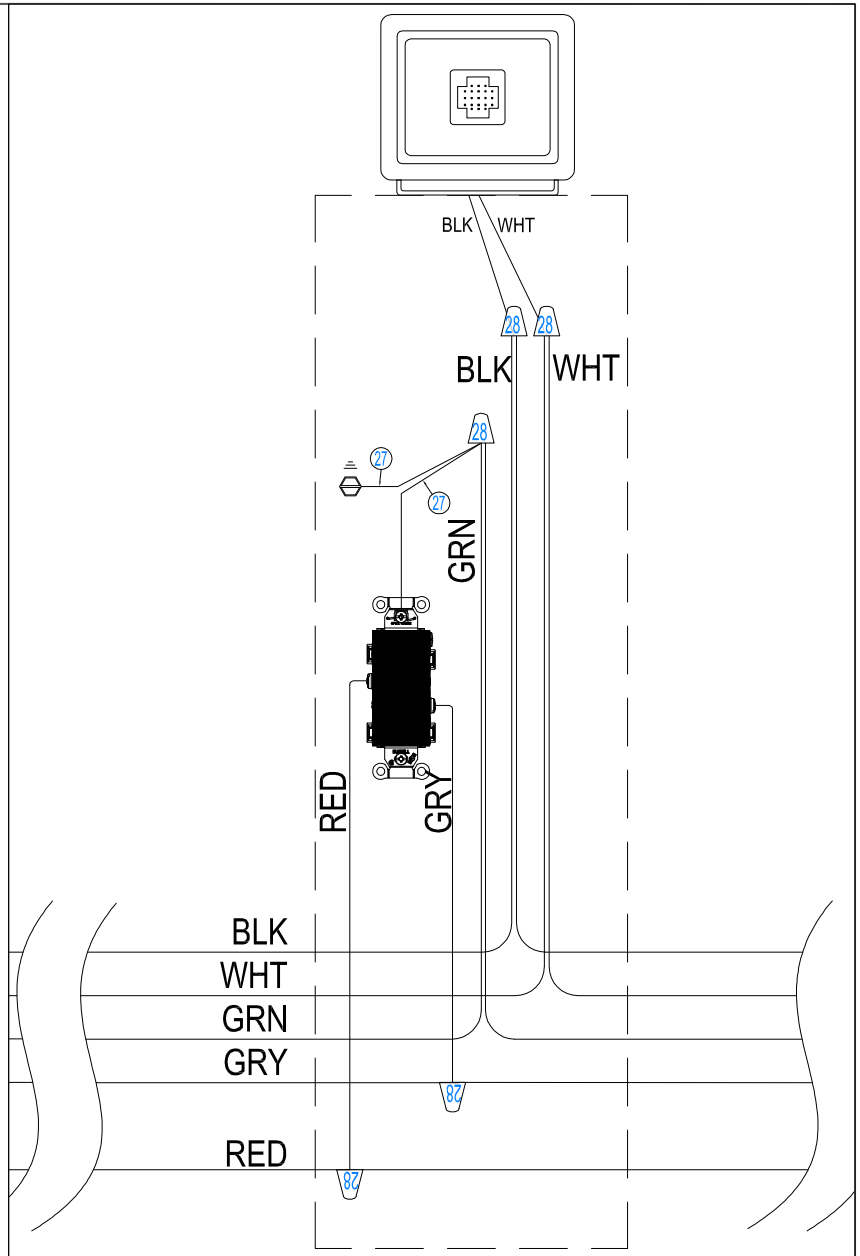
TITLE: INTERIOR LIGHT KIT 120V

DRAWING NO.: ILK1-USC REV. -

CAGE CODE: 15175 SCALE: NONE SHEET 2 OF 5







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ENGINEER:	DD
DRAFTER:	DD
APPROVER:	EJP
DATE CREATED:	11/11/13
SIZE	A

TOLERANCES ARE:
FRACTIONS ±1/32 DECIMALS .XX ±.02 .XXX ±.005
ANGLES ±1/2°

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THIRD ANGLE PROJECTION

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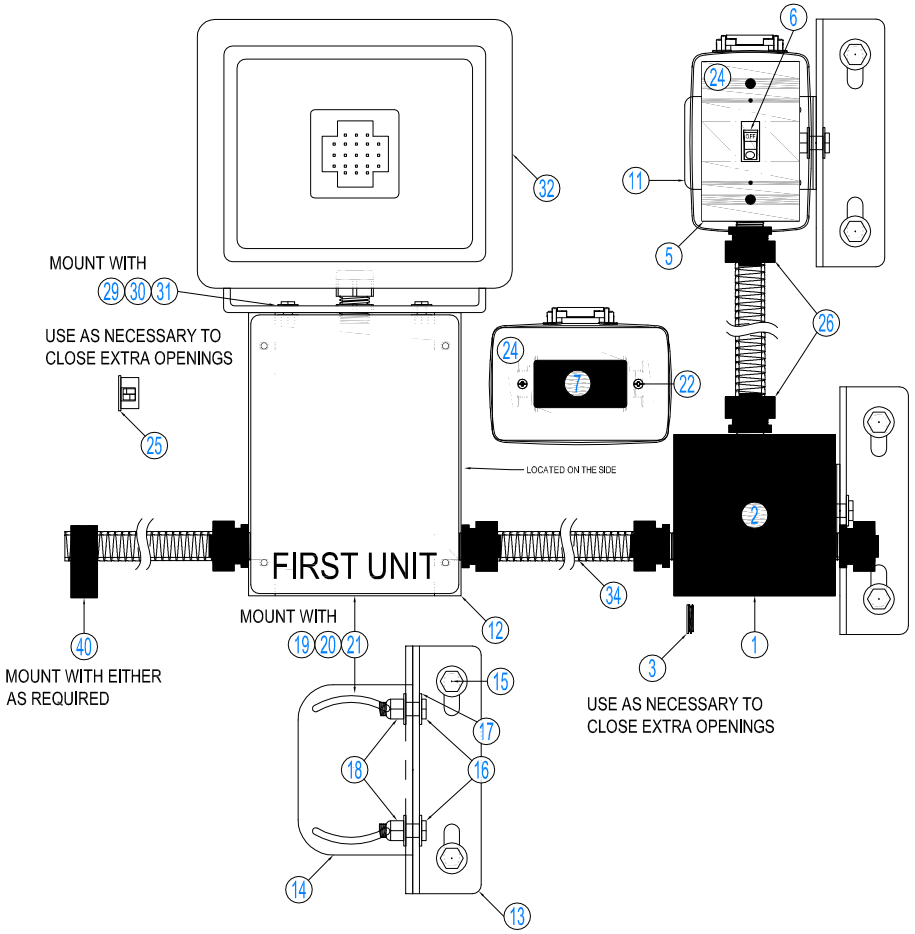
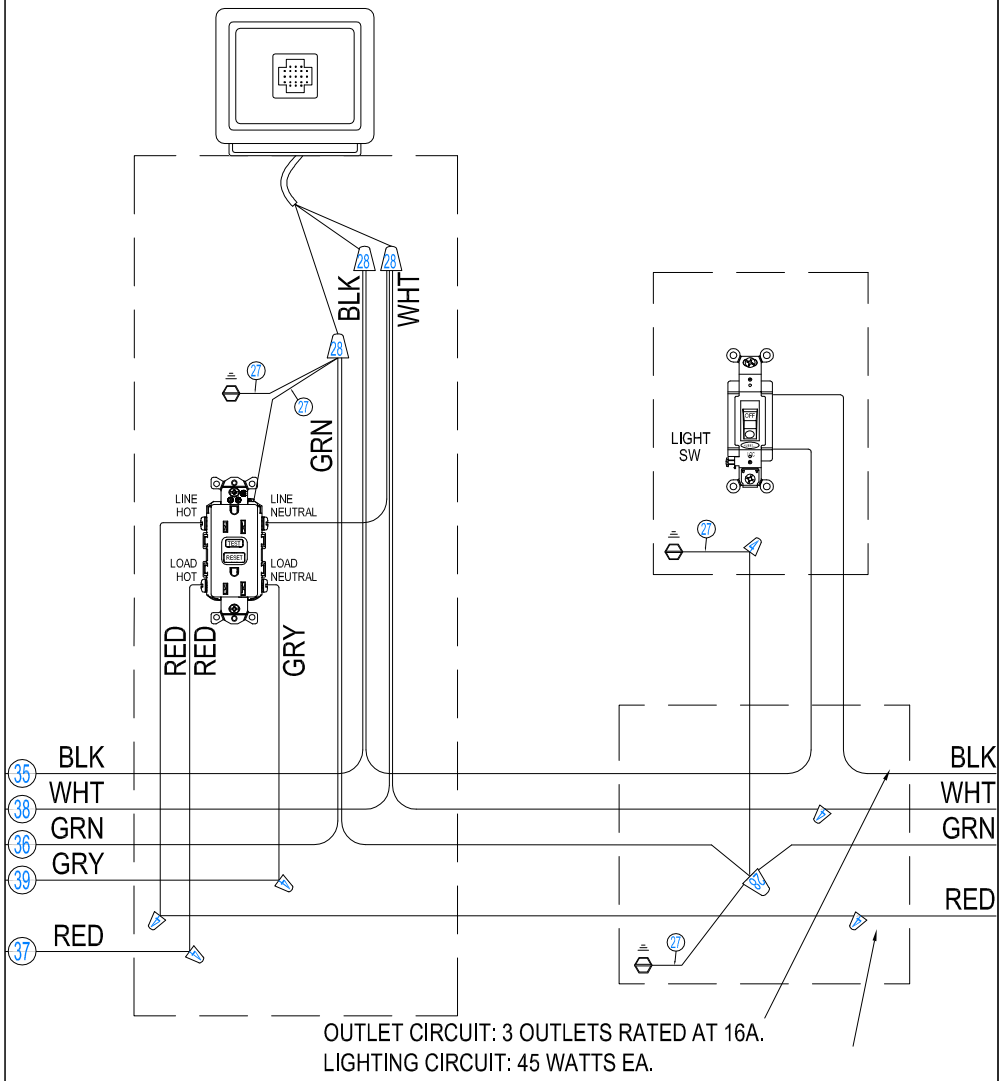
TITLE: INTERIOR LIGHT KIT 120V

DRAWING NO.:	ILK1-USC			REV.
CAGE CODE:	15175	SCALE: NONE	SHEET 3 OF 5	-





FIRST UNIT DETAIL

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ENGINEER:	DD
DRAFTER:	DD
APPROVER:	EJP
DATE CREATED:	11/11/13
SIZE	A

TOLERANCES ARE:
FRACTIONS ±1/32 DECIMALS .XX ±.02 .XXX ±.005
ANGLES ±1/2°

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THIRD ANGLE PROJECTION

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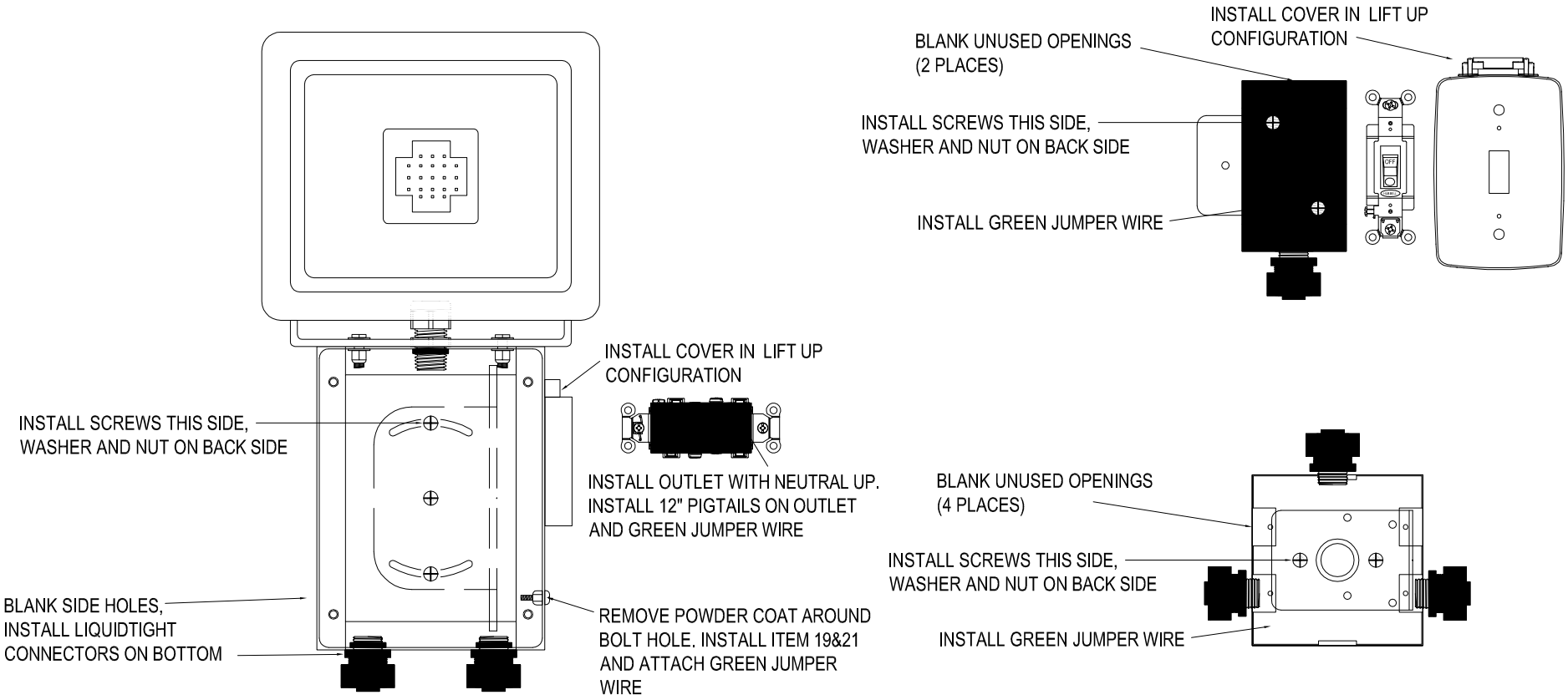
TITLE:	INTERIOR LIGHT KIT 120V
DRAWING NO.:	ILK1-USC
REV.	-
CAGE CODE:	15175
SCALE:	NONE
SHEET	4 OF 5



ASSEMBLY DETAIL

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ENGINEER:	DD
DRAFTER:	DD
APPROVER:	EJP
DATE CREATED:	11/11/13
SIZE	A

TOLERANCES ARE:
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ANGLES ±1/2°

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THIRD ANGLE PROJECTION

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TITLE: INTERIOR LIGHT KIT 120V

DRAWING NO.: ILK1-USC

REV. -

CAGE CODE: 15175

SCALE: NONE

SHEET 5 OF 5

PARTS LIST	CPI Communications & Power Industries **ESSCO**	CAGE CODE	PL **1593-1-1**	REV	SHEET	1
	AYER, MASSACHUSETTS USA	15175		A	OF	1

LIST TITLE	RADOME LIFT SLING ASSY MODEL IA130-1	DRAWING NO.	1593-1

Engineered By:	M.Callery	Engineered Date: 11/04/2021	Approved By: MatiasOnate	Approved Date: 12/7/2021

Revision History:

NOTE: 20'-30' DIA MAX LOAD CAPACITY = 8750#

FIND NUMBER	QTY REQUIRED	UNIT OF MEASURE	PART NUMBER	DESCRIPTION	DRAWING	REV
1	5.00	EA	1593-2	LIFT SLING BRACKET	B1593-2	B
2	5.00	EA	2247-4-45	"SAF-T-GRIP" LIFT STRAPS 4"X45 FT LG		
3	15.00	EA	855-1213-1	SCREW- HEX HD CAP 1/2-13 UNC-2 X 1"LG		
4	15.00	EA	2184-12	WASHER- FLAT SAE 1/2" SZ 18-8SST		
5	5.00	EA	033-729	BLACK OXIDE STL SHACKLE W/SAFETY PIN-3/4		
6	16.00	EA	1532-3	PLUG-SEALING-FOR LIFT SLING ATTACHMEN	A1532-3	C

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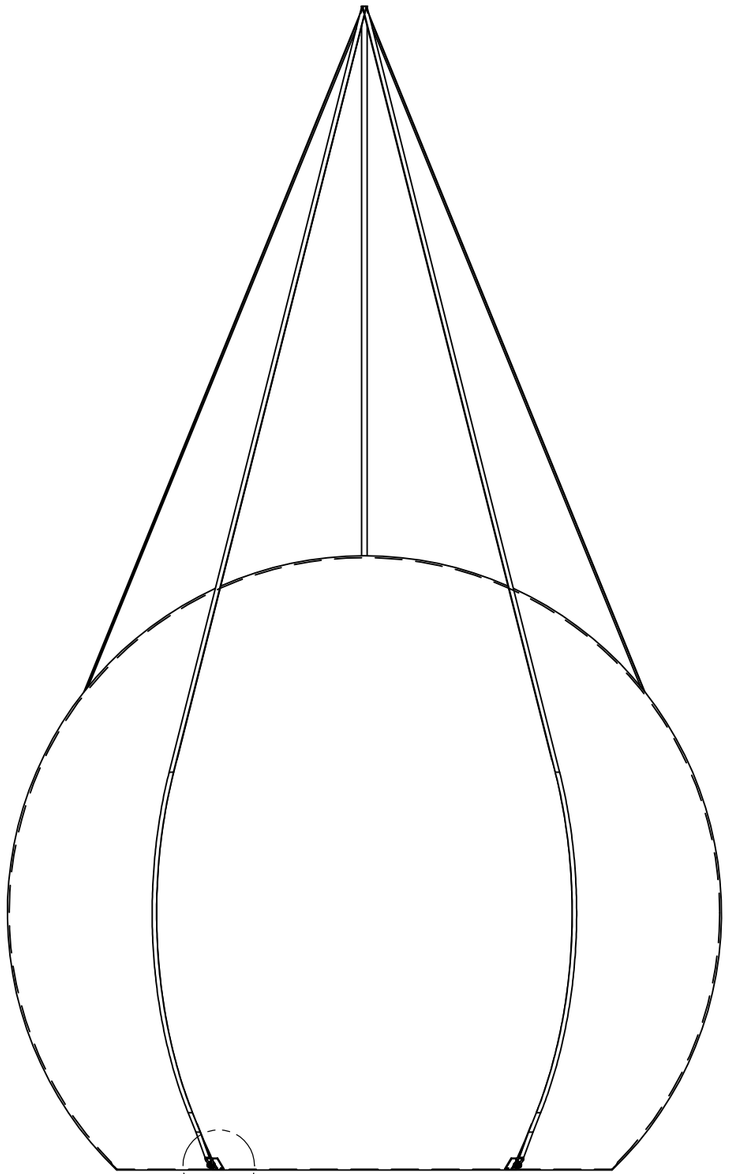
PART NO.	APPLICATION		QTY REQD
	NEXT ASSY	USED ON	

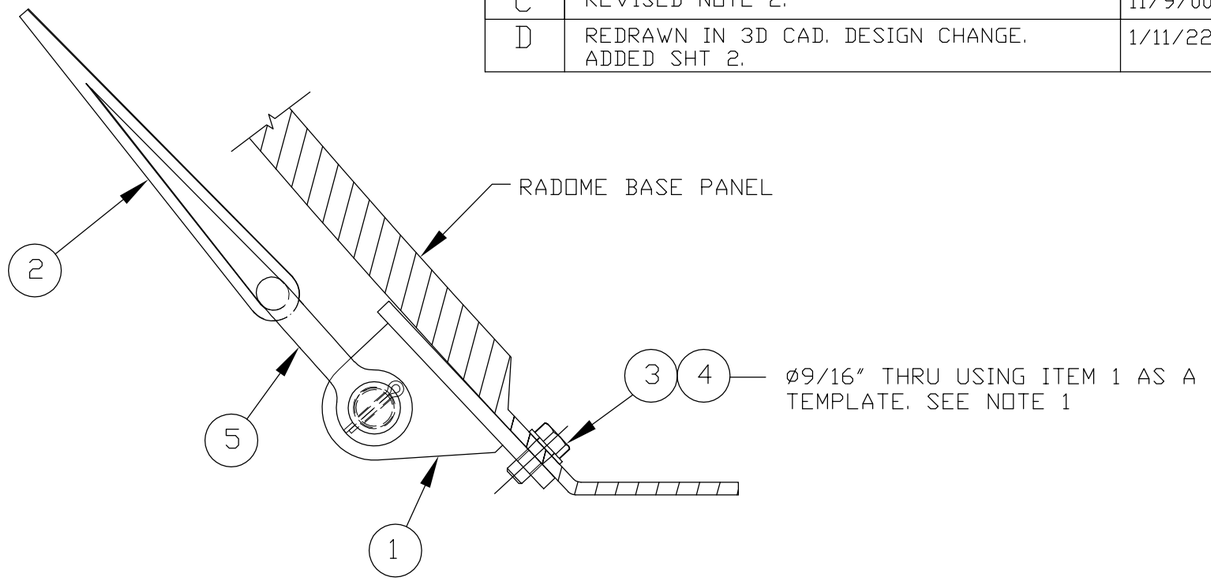
THIS DRAWING WAS PRODUCED ELECTRONICALLY
REVISIONS MAY NOT BE MADE MANUALLY

REVISIONS

REV	DESCRIPTION	DATE	APVD
A	DELETED ITEM 9, REVISED DIRECTION OF BOLT INSERT.	9/19/92	JW
B	IN NOTE 1, ITEM 7 WAS 13. SEE SEPARATE PARTS LISTS. DELETED TEMPLATE NOTE AT DETAIL.	6/27/97	JW
C	REVISED NOTE 2.	11/9/00	EJP
D	REDRAWN IN 3D CAD. DESIGN CHANGE. ADDED SHT 2.	1/11/22	AFP



ELEVATION VIEW



DETAIL AT LIFT PONT

NOTES:
1. AFTER RADOME INSTALLATION REMOVE THE LIFT SLING BRACKETS AND MOUNTING HARDWARE FROM THE PANELS. PLUG ALL HOLES WITH ITEM 6.
2. INSTALL ITEM #1 PER DRAWING 1593-5.
3. 10 LIFT STRAPS ON PART NO'S. 1593-1-4 AND 1593-1-5 SEE SHEET 2.
4. BASE STIFFENER REQUIRED ON 1593-1-5.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	SIGNATURE & DATE
	DRAWN M. ONATE 12/7/21
	CHECKED A. PERREAULT 12/7/21
TOLERANCES .XX± .XXX± FRACTION± ANGLE± ° SURFACE ROUGHNESS ✓ BREAK ALL SHARP EDGES	FINISH
	MATERIAL

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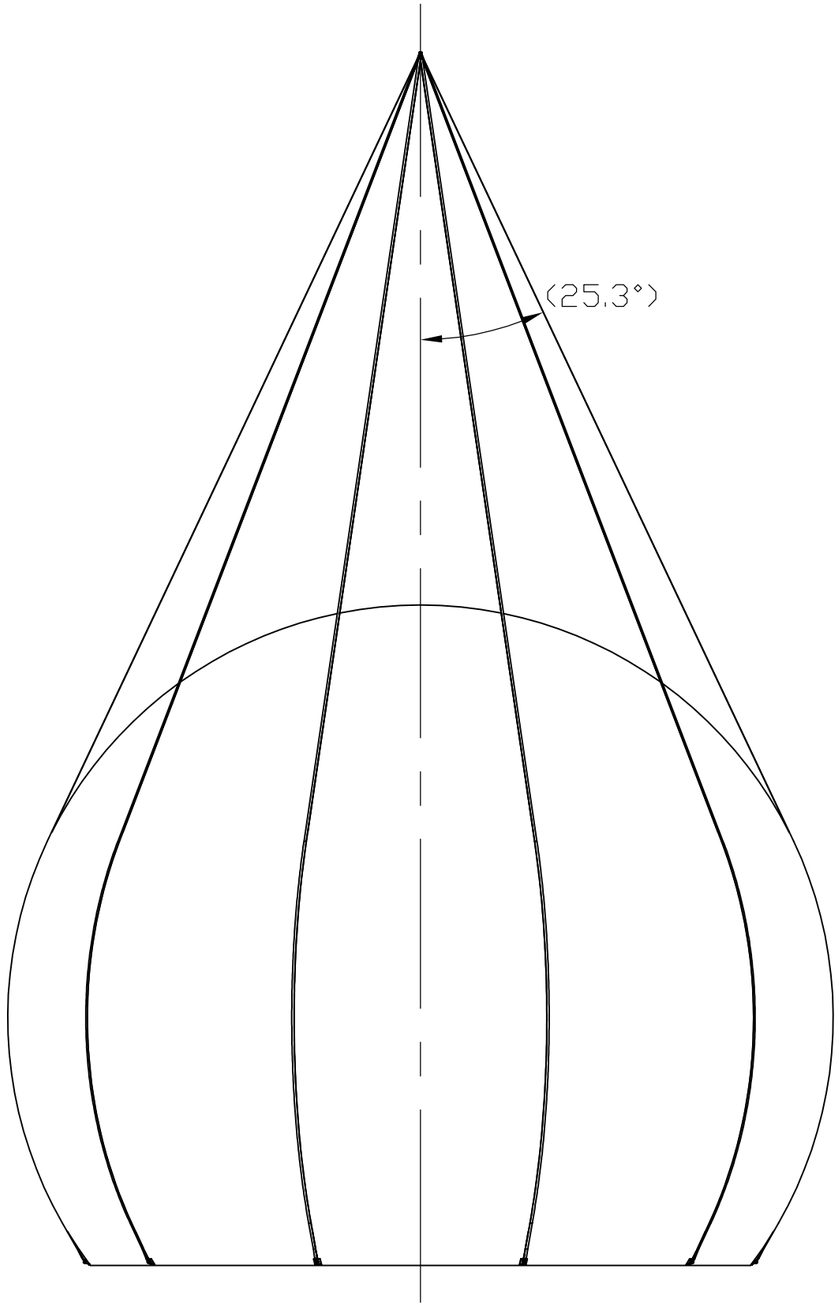
ESSCO OPERATIONS
90 NEMCO WAY
AYER, MA 01432

RADOME LIFT SLING ASSEMBLY MODEL #IA-130

CAGE CODE	SIZE		REV
3J847	B	1593-1	D

WEIGHT	SCALE	SHEET
	NONE	1 OF 2



S57-80 ELEVATION VIEW
(PART NO. 1593-1-4 SHOWN)

EAR CONTROLLED	SIZE B	CAGE CODE: 3J847	DRAWING NO.: 1593-1	REV. D
CPI - ESSCO PROPRIETARY	SCALE NONE	DATE: 1/11/2022	SHEET 2 OF 2	