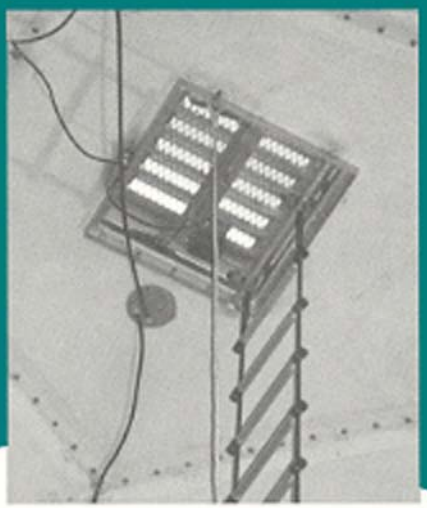
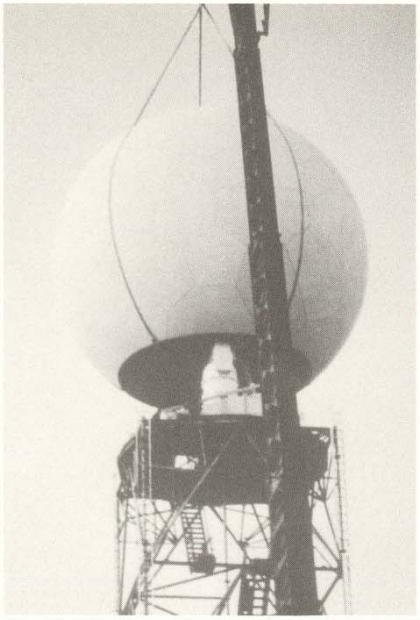
L3 communications
ESSCO



Radome Accessory Catalog



Introduction

This catalog provides a description of the standard accessories available for use with ESSCO sandwich and space frame radomes. Most of the accessories described here can be adapted for use with other radome types. In addition, custom accessories are available for all radomes. Contact ESSCO for more information.

The accessories described in this catalog are presented in six major sections:

1. Doors, Hatches, and Windows
2. Exterior Accessories
3. Interior Accessories
4. Installation Accessories
5. Maintenance Accessories
6. Climate Control Equipment

Within each section, accessories that are designed for sandwich radomes are described first, followed by accessories designed for space frame radomes, and then those designed for both sandwich and space frame radomes. Headings for accessories used on sandwich radomes are indicated by a ● and those used for space frame radomes are indicated by a ▼. Accessories that are the same for either type of radome are marked with both (●,▼).

This catalog is designed as an overview. ESSCO's marketing department can make recommendations for specific sites and applications.

Table of Contents

Legend:

- ● Sandwich Radomes
- ▼ Space Frame Radomes
- ●,▼ Both Sandwich and Space Frame Radomes

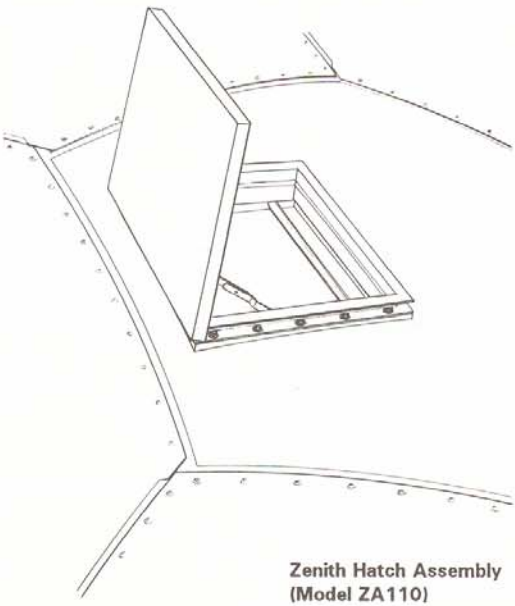
Doors, Hatches, and Windows

ESSCO offers a number of doors and hatches to allow easy access to the inside and outside of the radome. Doors and personnel access hatches are located near the base of the radome. They can be used for direct entry into ground mounted radomes or for access to outside catwalks on tower mounted radomes.

The preferred method to gain access to the exterior of all but the smallest radomes is via the interior through a zenith hatch. Once access to the radome zenith has been made, external maintenance or inspection can be easily performed using a climber's harness and maintenance rope.

Zenith hatches can be combined with vents to provide a simple radome ventilation system using natural convection to minimize stratification of air inside the radome. This system uses a zenith vent for exhaust and a manually adjustable louver (optional accessory), located in a radome base panel, for an intake vent.

Windows or modified panels can be included in the radome to allow boresight measurements to be made at optical wavelengths.



Zenith Hatch Assembly (Model ZA110)

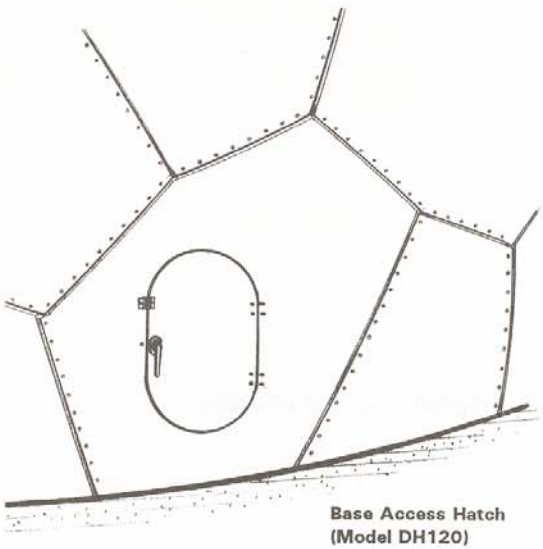
For Sandwich Radomes

- **Base Access Hatch** *(Model DH120)*

The hatch provides access to the radome for personnel and small equipment. It opens inward, is equipped with a quick-opening latch operable from both sides, can be padlocked from the inside or outside, and is weathertight.

Constructed of reinforced fiberglass, the DH120 is available for all sandwich radomes. It matches the radome color and is located in a base panel.

Hatch opening: 28 in. W x 48 in. H (68.6 cm x 121.9 cm)



Base Access Hatch (Model DH120)

- **Zenith Hatch** *(Model ZA110)*

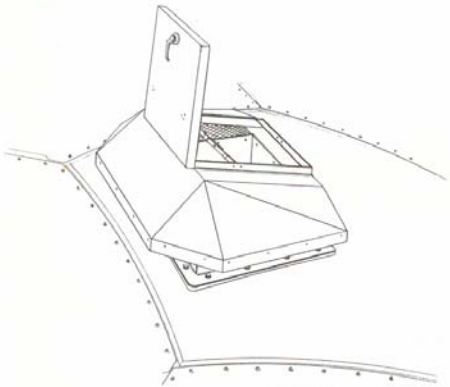
This zenith hatch is available for all sandwich radomes. The hatch has an aluminum frame and a fiberglass cover finished in polyurethane paint to match the radome color. The hatch assembly includes an internal ladder bar.

Hatch opening: 26 in. x 26 in. (66 cm x 66 cm)

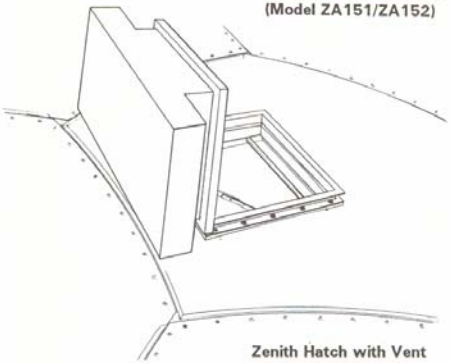
- **Zenith Vent**
  (Model ZA140)

The vent has an aluminum frame and a fiberglass cover finished in polyurethane paint to match the radome color. The vent can be supplied with electrically or manually operated louvers.

Vent area: 180 in^2 (1,161.4 cm^2)



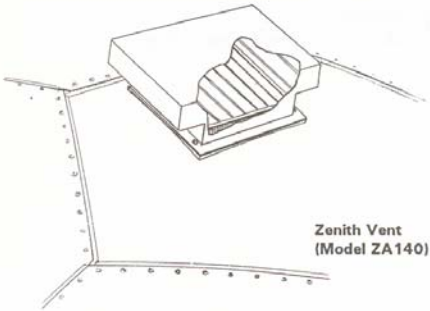
Zenith Hatch with Vent (Model ZA151/ZA152)



Zenith Hatch with Vent (Model ZA131/ZA132)

- **Equipment Access Opening**

For infrequent equipment access, it is possible to remove panels near the radome base. Consult ESSCO for details.



Zenith Vent (Model ZA140)

- **Zenith Hatches with Vents**

These units combine a zenith hatch with an exhaust vent. The vent can be supplied with manually or electrically operated louvers.

Electrically operated louvers are available in two operating voltages, and can be opened or closed with a switch that is installed at the base of the radome. The zenith vent wiring kit includes power cable, switch, mounting brackets, and clips for securing the cable to the radome. These units are furnished with a combination hand-hold/ladder support bar, hatch stays, and two integral quick-opening latches similar to the zenith hatch.

The zenith hatch/vent models are available with or without louvers. Models without louvers provide continuous natural ventilation when used in conjunction with base vents (see page 19). Manual or electrical louver control must be specified for units with louvers.

Model No.	Operating Voltage	Frequency	Vent Area(in^2)
ZA131	120 V	60 Hz	375
ZA132	220 V	50 Hz	375
ZA141	120 V	60 Hz	800
ZA142	220 V	50 Hz	800
ZA151	120 V	60 Hz	960
ZA152	220 V	50 Hz	960

Hatch opening: 26 in. x 26 in. (66 cm x 66 cm)
Vent area: 256 in^2 (1,587.2 cm^2)

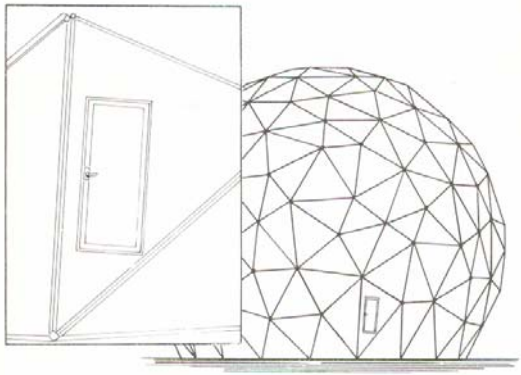
Power to open vent on electrical models: 27W
Power to hold vent open on electrical models: 8.5W

For Space Frame Radomes

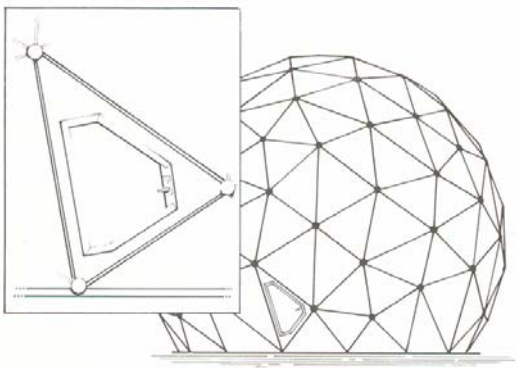
▼ Personnel Access Hatch
(Model DH10)

Constructed of non-corrosive aluminum, the DH10 is available for larger radomes. It comes installed in a base-level panel, and opens inward. It is equipped with a quick-opening latch operable from both sides, and it can be padlocked from the outside. Consult ESSCO for the exact radome geometries for which this door is available.

DIMENSIONS:
Overall: 30 in. W x 52 in. H (76.2 cm x 132.1 cm)
Opening: 24.7 in. W x 47 in. H (62.7 cm x 119.4 cm)



Personnel Access Hatch (Model DH10)

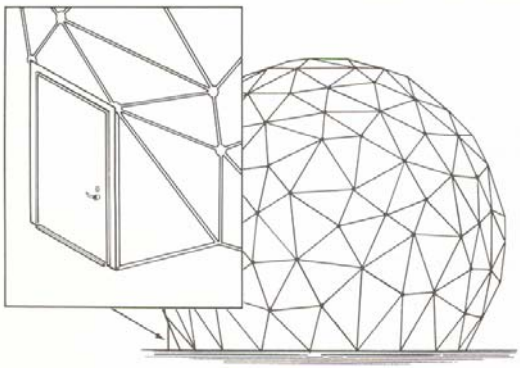


Personnel Access Hatch (Model DH20)

▼ Personnel Access Hatch
(Model DH20)

The DH20 is designed for use on smaller radomes where the DH10 model cannot be used. It is installed in one base level panel except in the smallest radomes, where two panels are combined into one hatch assembly. It is constructed of a non-corrosive aluminum frame with the surface of the same membrane material as the radome itself. It opens inward, comes equipped with a quick-opening latch operable from both sides, and can be padlocked from the outside.

DIMENSIONS:
The exact size and shape of the DH20 depends on the radome model; it is optimized in each radome for ease of access.



Vertical Door (Model DH30)

▼ Vertical Door
(Model DH30)

The DH30 is available for most radomes. Radomes ordered with this accessory are supplied with special base panels that form an entry alcove outside the base diameter of the radome. The door is hinged and opens inward; it comes pre-hung in a wooden frame complete with threshold, weatherstripping, lever-style latch, and deadbolt. It is a flush wooden door, with solid-core construction supplied painted to match the radome color.

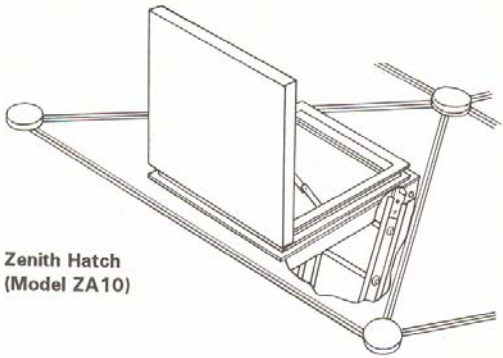
DIMENSIONS:
Overall: 44 in. W x 85.5 in. H (111.8 cm x 217.2 cm)
Opening: 36 in. W x 80 in. H (91.4 cm x 203.2 cm)

▼ Zenith Hatch
(Models ZA10 and ZA20)

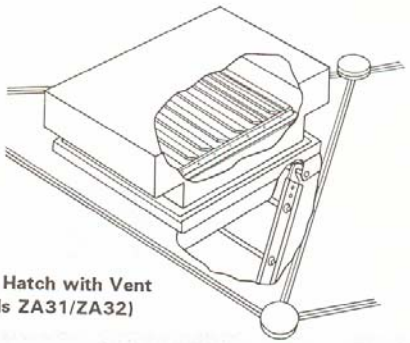
The ZA10 zenith hatch is available for all radomes 35 feet in diameter and larger. Depending on radome geometry, it can be used in radomes as small as 11 feet in diameter. Its framework is fabricated from high-grade, non-corrosive aluminum with a fiberglass cover finished in polyurethane paint to match the color of the radome. It is supplied with an integral combination hand-hold/ladder support bar that can be used to secure an extension ladder. Also included are two quick-opening latches operated from inside the radome and a door-stay that holds the assembly in an open position.

The ZA20 zenith hatch is available for radomes from 10 feet to 28 feet in diameter depending on radome geometry. Construction and features are the same as the ZA10, the only differences are in size and shape.

Model	Hatch Opening
ZA10	24 in. x 24 in. (61 cm x 61 cm)
ZA20	20 in. x 16 in. (50.8 cm x 40.6 cm)



Zenith Hatch
(Model ZA10)



Zenith Hatch with Vent
(Models ZA31/ZA32)

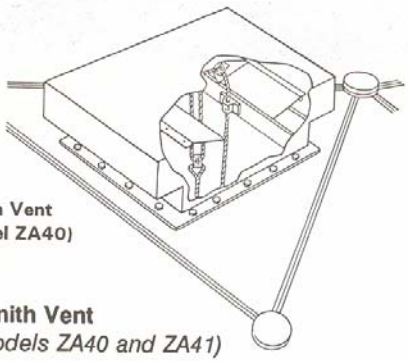
▼ Zenith Hatch with Vent Models
(Models ZA31 and ZA32)

The ZA31 and ZA32 units, available for most radomes 28 feet in diameter and larger, combine a zenith hatch with a remotely operated exhaust vent. The electrically operated louvers in the zenith vent are available in two operating voltages, and are opened or closed with a simple switch that can be installed at the base of the radome. Also included are the power cable which connects the louver to the control switch, the switch, and mounting brackets and clips for clamping the cable to the radome beams.

These units are constructed with a fiberglass hood and also feature a combination hand-hold/ladder support bar and two internal quick-opening latches similar to the ZA10 zenith hatch.

Hatch opening: 24 in. x 24 in. (61 cm x 61 cm)
Vent area: 246 in^2 (1587 cm^2)

	Operating		Power	
Model	Voltage	Frequency	Opening	Holding
ZA31	120 V	60 Hz	27 W	8.5 W
ZA32	220 V	50 Hz	27 W	8.5 W



Zenith Vent
(Model ZA40)

▼ Zenith Vent
(Models ZA40 and ZA41)

The ZA40 manually operated exhaust vent is designed for use with radomes 10 feet to 30 feet in diameter depending on radome geometry. The ZA40 is installed in two panels which are combined to allow accessory installation. For larger radomes, the ZA41 model which is installed in a single panel is used. Constructed entirely of non-corrosive aluminum, this vent is available with either manual or electrical louver control.

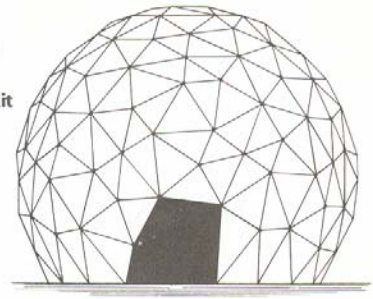
Vent area: 160 in^2 (1032 cm^2)

▼ Panel Removal Kit

Available for all radomes, these kits allow a cluster of panels near the base to be removed to provide occasional access for large equipment. Each kit includes precut, predrilled aluminum angle to reinforce the opening, replacement sealing caps, panel sealant, and detailed instructions. Panel removal kits should not be used during severe weather conditions.

Size and shape of the opening provided varies with radome.

Typical Opening Provided by Panel Removal Kit



For Sandwich and Space Frame Radomes

●,▼ Adjustable Boresight Window
(Model BW10)

The boresight window allows antenna alignment to be made without removing a radome panel. The window is installed in the field in any radome panel in line with the antenna boresight target. Consideration should be given to flange or panel frame interference in selecting window location.

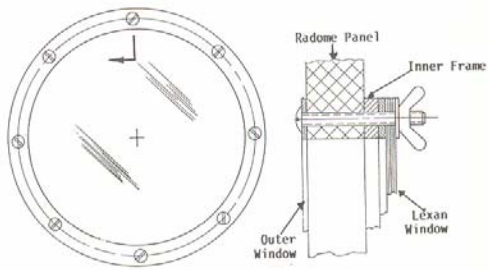
The BW10 boresight window uses a high quality optical glass mounted in an adjustable molded fiberglass frame. After installation, the window is adjusted normal to the boresight axis and locked into place. When used in severe environments, such as the presence of wind-blown sand, the glass can be protected by using an external cover which is supplied.

SPECIFICATIONS:	
Viewing Area:	12 in. (30.5 cm) diameter
Thickness:	0.50 in. (.27 cm)
Flatness:	1 Wavelength of Sodium-D Light
Surface Treatment:	Magnesium Fluoride Anti-Reflection Coating
Parallelism:	0.001 in. (.025 mm) maximum

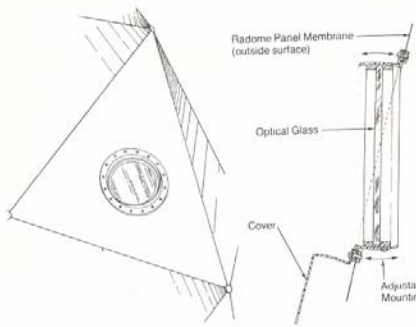
●,▼ Removable Boresight Window
(Model BW30)

The economical BW30 boresight window allows routine measurements to be made through a clear Lexan® window, which is mounted in an aluminum frame. For more critical antenna boresighting, the Lexan® window can be removed from the inside of the radome by loosening the wing nuts that hold the window to the frame.

SPECIFICATIONS:	
Viewing Area:	8 in. (20.3 cm) diameter
Thickness	.187 in. (4.75 mm)



Removable Boresight Window (Model BW30)



Adjustable Boresight Window (Model BW10)

Exterior Accessories

Exterior accessories include aircraft warning lights and lightning protection systems. The need for aircraft warning lights is determined by the radome size and location. Lightning protection is typically used on all sandwich and dielectric space frame radomes.

For Sandwich Radomes

- **Aircraft Warning Light Assembly**
  (Model EA150)

The aircraft warning light/lightning rod assembly is located at the zenith and includes aircraft warning lights, a single lightning rod, and two anchor points for attaching work and safety lines. This two-lamp assembly complies with FAA AC 150/5345-43:L-810 and has steady-burning red lights, illuminated simultaneously. The assembly consists of a cast aluminum base housing with red fresnel globes; medium screw sockets and long-life lamps; a circuit breaker; a photosensor control which is usually located at the exterior base of the radome; power cable which connects the light to the photo-sensor control and circuit breaker; and clips for securing the cable to the radome. For radomes equipped with a zenith hatch, the aircraft warning light is raised above the vent. Aircraft warning lights are available for either 120V or 220V power.

Aircraft Warning Light Assembly with Lightning Rod

- **Lightning Protection Kit**
  (Model EA200)

This kit includes a lightning rod, two down conductor cables, and clips to secure the cables to the inside of the radome. The single rod lightning systems provide a 60° cone of protection. Rod length varies with radome diameter.

Multiple rod lightning protection systems which comply with FAA STD-019b are also available.

All lightning protection systems must be attached to an appropriate grounding system. Grounding kit (see below) can be ordered separately if grounding attachments are not already incorporated into the radome foundation.

Typical Lightning Protection Complying with FAA STD-019b

- **Grounding Kit**
  (Model IA120)

The radome grounding kit includes two 8 foot copper clad steel rods that are driven fully into the ground equidistant from the radome. The two rods come with connectors and two 20 foot copper conductors for connection to the radome lightning protection system. Local soil conditions must be checked for grounding resistivity.

For Space Frame Radomes

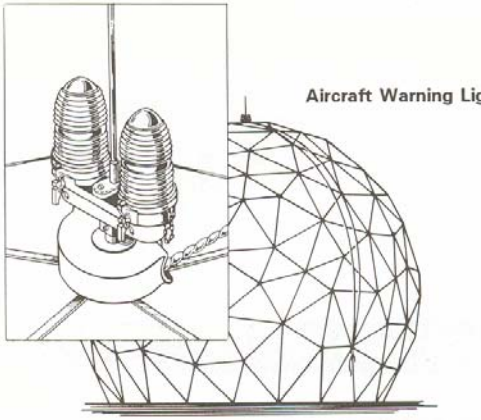
▼ Aircraft Warning Light

The aircraft warning light marks the radome in order to meet air navigation requirements. The two lamp assembly complies with FAA AC 150/5345-43: L-810. This high quality industrial fixture has two steady burning red lights, a cast aluminum housing with red fresnel globes, medium screw sockets and long-life lamps; a circuit breaker; a photosensor control which is usually located at the exterior base of the radome; power cable which connects the light to the photo-sensor control and circuit breaker; and clips for clamping the cable to the radome beams. To protect the light, a lightning rod is included as a standard and integral part of the assembly. The lightning rod is connected to the radome framework at the top of the radome. The aluminum framework of ESSCO metal space frame radomes provides multiple uninterrupted conductive paths for lightning strikes between the lightning rod and the radome base. Thus, the radome itself does not require additional protection from lightning other than properly grounding the base.

Use the table below to select the model required:

Model Number	Maximum Radome Diameter	Power Requirements[1]
EA11-1	22′	232 W @ 120 V
EA11-2	41′	232 W @ 120 V
EA11-3	68′	232 W @ 120 V
EA11-4	110′	232 W @ 120 V
EA11-5	150′	232 W @ 120 V
EA12-1	22′	200 W @ 220 V
EA12-2	41′	200 W @ 220 V
EA12-3	68′	200 W @ 220 V
EA12-4	110′	200 W @ 220 V
EA12-5	150′	200 W @ 220 V

[1] Total for both lamps.



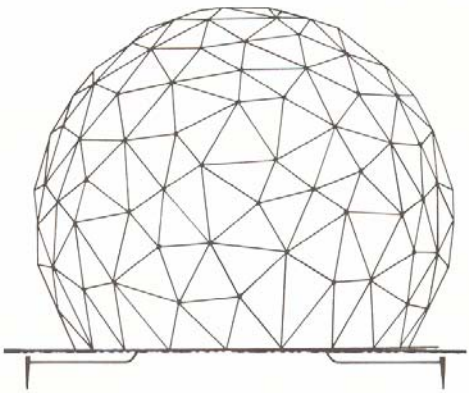
Aircraft Warning Lig

▼ Grounding Kit

(Model IA20)

The ESSCO metal space frame radome forms complete electrostatic shield around the enclosed antenna. The aluminum framework o the radome provides multiple, uninterrupted, conductive paths for lightning strikes. The IA2 radome grounding kit provides all the materia necessary to connect the radome to earth ground, thereby completing the lightning protection system. A lightning rod is not required unless the optional aircraft warning lights are ordered, in which case the lightning rod is supplied as an integral part of the light unit.

The radome grounding kit includes two 8 foot copper clad steel rods that are driven fully int the ground equidistant from the radome. Each rod is connected to the radome base with a 2 foot 2/0 AWG copper wire. Local soil conditio should be checked to assure proper groundin

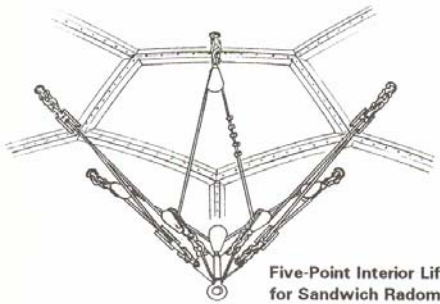


Interior Accessories

For Sandwich Radomes

- **Five-Point Interior Lift Sling**
  (Model HA112)

The five-point sling uses a continuous wire rope reeved through a series of ten pulleys. The arrangement is self-adjusting, and equalizes the load at each attachment regardless of load direction. The five-point sling is installed at the top of the radome with reinforcing plates and eyebolts for mounting. It hangs into the radome approximately 4.5 feet depending on radome diameter. The standard five-point sling lifting capacity is 1500 pounds. Non-standard capacity slings are available upon request.



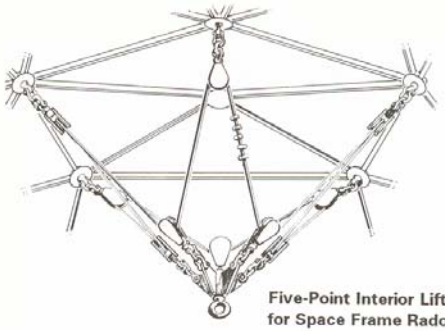
Five-Point Interior Lift Sling
for Sandwich Radomes

For Space Frame Radomes

▾ Three-Point Interior Lift Sling

The three-point sling is installed at the radome zenith and is used in conjunction with a customer supplied power source. Models are available for all radome sizes.

The assembly consists of three adjustable wire rope "legs"; a three-point fixture including a hoist attachment eye; and three modified radome cluster caps that secure the sling to the framework. Unlike the five-point sling, the three-point sling is not self balancing; care must be taken to keep the load properly balanced.



Five-Point Interior Lift Sling
for Space Frame Radomes

▾ Five-Point Interior Lift Sling

Used in conjunction with a power source, five-point slings are available for all radome sizes. The hoisting assembly utilizes a continuous wire rope reeved through a series of ten pulleys. The arrangement is self-adjusting and equalizes the load at each attachment regardless of load direction.

Five radome cluster caps near the radome zenith on a space frame radome are modified to accept eyebolts that secure the sling. With specially modified cluster caps, the sling may be installed around any convenient cluster of panels in order to lift loads off center.

The five-point sling offers the greatest lifting capacity, and is therefore the most versatile interior hoist accessory.

▾ Hoist Attachment Eyebolts

These eyebolts may be mounted at any convenient panel cluster as single-point hoist attachments by drilling the cluster caps. Eyebolt capacity can be up to 3,500 pounds based on radome size and geometry.

Three-Point Interior Lift Sling
for Space Frame Radomes

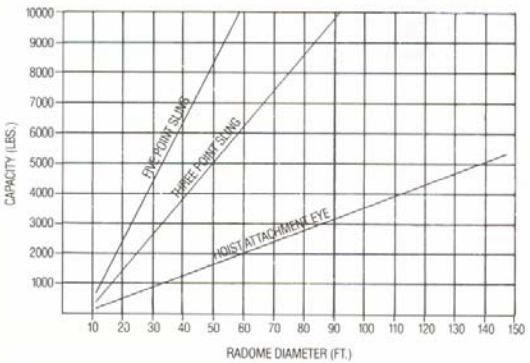
INTERIOR HOIST ACCESSORIES

Model Number	Radome Diameter	Geometry Number	Capacity[1,2]
Five-Point Sling			
HA11	Up to 53′	6000	5,000
HA11	Up to 32′	8000	5,000
HA12	54′ to 59′	6000	10,000
HA12	55′ to 68′	7000	10,000
HA13	55′ to 80′	9000	10,000
HA13	69′ to 125′	7000	10,000
HA13	110′ to 150′	1000	10,000
HA13	140′ to 160′	5000	10,000
Three-Point Sling			
HA21	Up to 53′	6000	3,000
HA21	Up to 32′	8000	3,000
HA22	54′ to 59′	6000	6,000
HA22	55′ to 68′	7000	6,000
HA23	55′ to 80′	9000	6,000
HA23	69′ to 125′	7000	6,000
HA23	110′ to 150′	1000	6,000
HA23	140′ to 160′	5000	6,000
HA33	140′ to 160′	5000	7,200

[1] Capacity based on power source located at the sling. Rating is ½ of the table value if source is located on the ground.

[2] Capacity ratings are for metal space frame radomes. Consult ESSCO for capacities of dielectric space frame radomes.

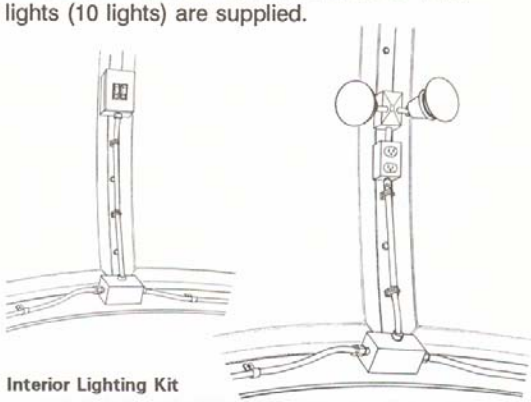
Summary - Radome Lifting Capacities



For Sandwich and Space Frame Radomes

●,▾ Interior Lighting Kit

ESSCO's interior lighting kits provide both interior illumination from floodlamps and power outlets for other electrical equipment inside the radome. All kits include on/off circuit breaker switches mounted in a control panel; one 30-amp circuit for the lights and one 15-amp circuit for the outlets; exterior type light fixtures; floodlamps and 15-amp duplex outlets. Flexible waterproof conduit, wiring, and mounting clips for proper installation are also included. Five fixtures per radome with dual head 300 Watt lights (10 lights) are supplied.



Interior Lighting Kit

Model Number	Radome Diameter	Input Voltage	Light/Outlet Stations
For Sandwich Radomes			
EA142-1	22′ - 27′	120 V	5
EA142-2	28′ - 49′	120 V	5
EA142-3	50′ - 70′	120 V	5
EA142-4	22′ - 27′	220 V	5
EA142-5	28′ - 49′	220 V	5
EA142-6	50′ - 70′	220 V	5
For Space Frame Radomes			
EA41-1	Up to 69′	115 V	5
EA41-2	70′ to 150′	115 V	10
EA42-1	Up to 60′	230 V	5
EA42-2	70′ to 150′	230 V	10

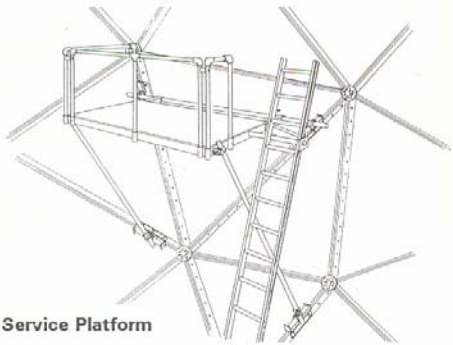
●,▾ Fire Alarm System

While ESSCO radomes are classified as "self-extinguishing" and thus provide no fire hazard, a potential hazard can exist from high power transmitters and other electronic equipment located within the radome.

ESSCO fire alarm systems utilize the highest quality components. These systems include both visual and audible warning devices. Each system provides both heat and smoke sensors and operates at 12VDC, except for input power to the control panel.

Models differ only in input voltage and number of sensors supplied. Use the table below to select the appropriate fire alarm system for your radome.

For Sandwich Radomes					
Model Number	Radome Diameter	Input Voltage	Sensors Heat	Sensors Smoke	Alarm Stations
EA131-1	22′ - 68′	115 V, 60 Hz	5	1	1
EA131-2	22′ - 68′	230 V, 60 Hz	5	1	1
For Space Frame Radomes					
Model Number	Radome Diameter	Input Voltage	Sensors Heat	Sensors Smoke	Alarm Stations
EA31-1	22′ - 75′	115 V, 60 Hz	5	1	1
EA31-2	76′ - 150′	115 V, 60 Hz	10	3	2
EA32-1	22′ - 75′	230 V, 60 Hz	5	1	1
EA32-2	76′ - 150′	230 V, 60 Hz	10	3	2



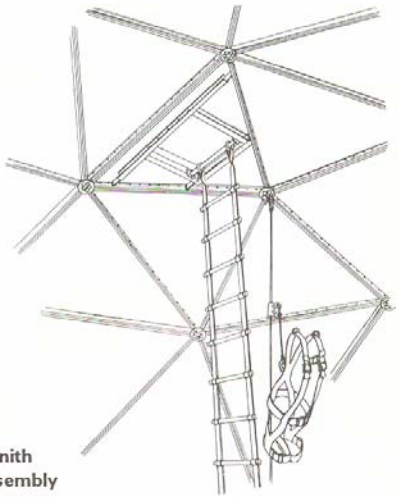
Feed Service Platform

●,▾ Feed Service Platform

The feed service platform is a detachable platform that can be attached to the side of the radome to allow easy access to the antenna feed. The platform size is 36 inches x 60 inches.

●,▾ Internal Zenith Ladder Assembly

The zenith access assembly provides a means of gaining access to the radome exterior, from the interior, via the zenith access hatch. The assembly consists of a nylon web ladder with aluminum rungs connected to the zenith hatch mounting bar, a safety belt with D-ring, and a fixed anchorage line connected to an eyebolt. When using the ladder, a climber must wear a full body harness attached to a self-locking unit on the fixed anchorage line. When not in use, the assembly may be pulled aside with a ladder tie line, which runs through a series of eyebolts along the radome interior wall, to its base. Ladder size is generally selected to span the distance from the upper portion of the antenna to the zenith hatch. The assembly has a safe working load of 600 pounds and is available in the following sizes for sandwich and space frame radomes:



Internal Zenith Ladder Assembly

For Sandwich Radomes	
Model Number	Web Ladder/Length
IL110-1	27′
IL110-2	36′
IL110-3	45′
IL110-4	54′
IL110-5	63′
For Space Frame Radomes	
Model Number	Web Ladder/Length
MA30-1	15′
MA30-2	25′
MA30-3	35′

Installation Accessories

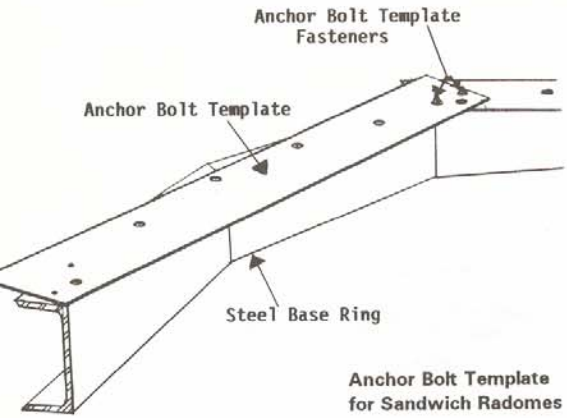
For Sandwich Radomes

• Anchor Bolt Templates

It is most important that the anchor bolts be located within tolerances specified on the foundation interface drawings. To insure the appropriate accuracy of the interface between radome and foundation, ESSCO can furnish anchor bolt templates. These templates can be used to locate anchor bolts, or where form work permits, hold anchor bolts during the concrete pour, or to locate holes in a steel base ring. ESSCO anchor bolt templates can also be used to check the accuracy of existing foundations.

The templates can be supplied in advance of the radome. Each template kit is designed to fit a specific model radome. The template consists of a complete set of pre-drilled flat metal plates that bolt together to simulate the radome base pattern. Instructions for use are included with every template.

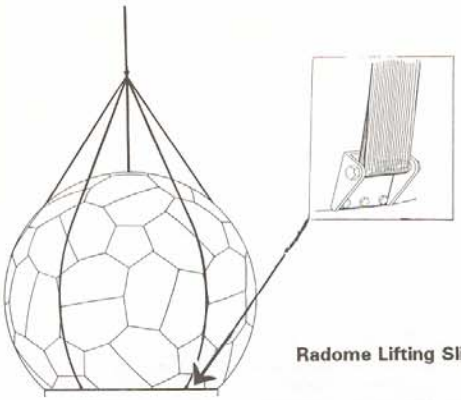
To order an anchor bolt template use CT followed by the radome model number.



Anchor Bolt Template for Sandwich Radomes

• Radome Lifting Slings

ESSCO offers slings to allow a crane to lift the completely assembled radome on or off its foundation. This installation method can reduce antenna downtime and is often desirable when station operation is critical. The sling is connected to lift sling brackets at the radome base. Each sling is sized to match the radome. For radomes over 60 feet in diameter, a base ring stiffener may be required to prevent distortion during the lift.



Radome Lifting Sling

Model Number	Radome Diameter
IA130-1	22′ - 30′
IA130-2	31′ - 40′
IA130-3	41′ - 50′
IA130-4	51′ - 60′
IA130-5	61′ - 70′*

* A base ring stiffener can be provided at an additional cost if required.

• Installation Tool Kits

Installation tool kits provide the tools needed for radome installation. Included are wrenches, sockets, climber's harnesses, hard hats, measuring tapes, marlin spikes, pulleys, and miscellaneous hand tools. The radomes can be installed using only the items in the tool kits plus some nylon rope. Scaffolding should be supplied locally. Power tools are not included in the kit. They are, however, recommended for larger radomes to reduce installation time. ESSCO radomes can be installed using conventional tools; the tool kit is available as a

For Space Frame Radomes

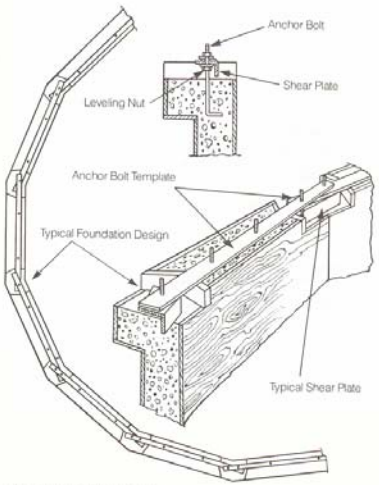
▼ Foundation Anchor Bolt Templates

It is important that the anchor bolts in the customer furnished foundation be located within the tolerances specified on the foundation interface drawing. To insure the appropriate accuracy, ESSCO can furnish anchor bolt templates along with instructions for their use. These templates are used to position and hold the anchor bolts while the concrete foundation is being poured or to locate holes in a steel base ring, eliminating interface problems between radome and foundation.

The templates can be supplied well in advance of the radome and sent out to the site to be used for the foundation construction or to check the accuracy of an existing foundation. In the latter case, adjustments can be made in the radome base mounting holes if necessary. Each template kit is designed to fit a specific model radome.

The template consists of a complete set of pre-drilled flat metal plates and hardware that bolt together to simulate the entire radome base pattern. Complete instructions are included with every template.

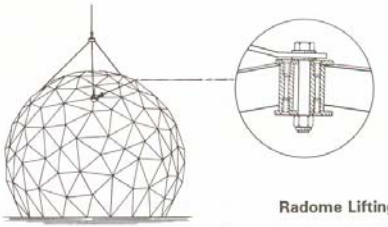
To order an anchor bolt template, substitute "T" for "M" or "D" in the radome model number.



Anchor Bolt Template for Space Frame Radomes

▼ Radome Lifting Slings

ESSCO offers three-point exterior lift slings which, in most applications, allow a crane to lift the completely assembled radome on or off its foundation. This installation method can reduce antenna downtime to a few hours and is often desirable when station operation is critical. Each sling is sized to match your radome and is attached to special adaptor plates on the radome. For radomes less than 28 feet in diameter, eyebolt assemblies are used instead of the special adaptor plates. Use the table below to select the model required.



Radome Lifting Sling

Model Number	Maximum Radome Diameter
IA30	27′
IA31	41′
IA32	55′
IA33	62′
IA34	68′

▼ Installation Tool Kits

Installation tool kits include all the tools needed to install your radome. Included are ratchet wrenches, combination wrenches, sockets, climber's harnesses, hard hats, measuring tapes, marlin spikes, pulleys, and miscellaneous hand tools. The radomes can be installed using only the items provided in the tool kits plus some nylon rope. Scaffolding should be supplied locally. Power tools are not included in the kit. They are, however, recommended for larger radomes to reduce installation time.

Tool kits are available in three models for the installation of small, medium, and large sized radomes.

Model IA60 For Small Radomes
Model IA61 For Medium Radomes
Model IA62 For Large Radomes

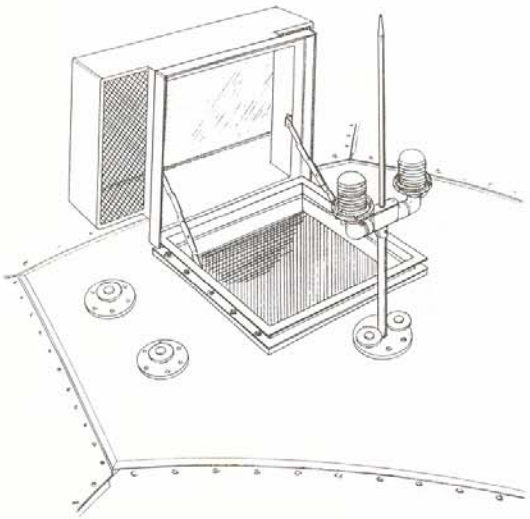
Maintenance Accessories

For Sandwich and Space Frame Radomes

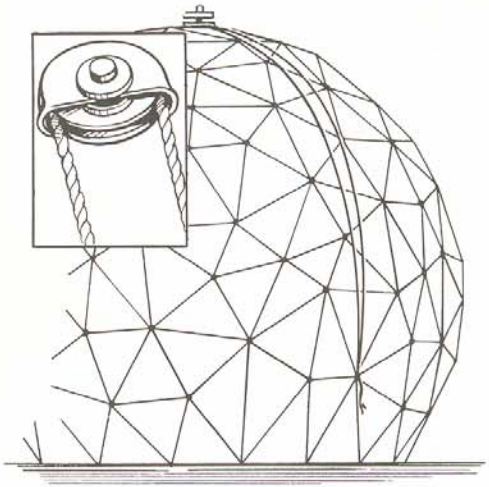
•,▾ Anchor Points

For protection of workers against falls, the U.S. Occupational Safety and Health Act (OSHA) §1926.104 for Safety Belts, Life Lines and Lanyards requires a minimum of two anchor points, one for a work line and one for a life line. The anchor points are installed on the aircraft warning light mounting plate to allow hook-up for the exterior access equipment. Additional anchor points can be provided near the zenith hatch if required. The anchor points can also be used to attach a maintenance or snow rope.

To connect climbing rope and equipment to the anchor points, access to the top of the radome must be available from inside the radome via a zenith hatch or from the outside via an aerial work platform. Ropes used for climbing may not be left in place due to possible deterioration from ultraviolet exposure.



Anchor Points



Maintenance Rope and Pulley Assembly

•,▾ Maintenance Rope and Pulley Assembly

The maintenance rope and pulley assembly is mounted in a radome zenith panel and includes: a pulley that pivots 360°, a length of nylon rope which is reeved through the pulley and extends to the exterior base of the radome, and a cleat used to tie off the rope when not in use. The rope can be used for snow removal, working from the base of the radome. The assembly has a safe working load of 500 lbs. for radomes 20 feet in diameter and larger. Smaller radomes have a 300 lb. rating. To use this assembly for climbing, a safety life line must also be attached to an anchor point.

The various models differ only in the length of rope supplied.

Model Number	Maximum Radome Diameter
MA40-1	22′
MA40-2	41′
MA40-3	68′
MA40-4	110′
MA40-5	150′

●,▾ Climber's Harness
(Model MA20)

The climber's harness consists of a body harness meeting American National Standards Institute (ANSI) Class 3 requirements with waist ring and carabinier for attachment to the descent device, and a back D-ring for connection to the life line lanyard. The web-belt harness with leg straps and safety shoulder straps provides a comfortable and safe support while allowing personnel the free use of both hands.

●,▾ Climber's Kit
(Model MA25)

The climber's kit consists of the following equipment:

* A work line and life line, both rated for a minimum 5400 pound load and provided with snap hooks for attachment to the anchor points.

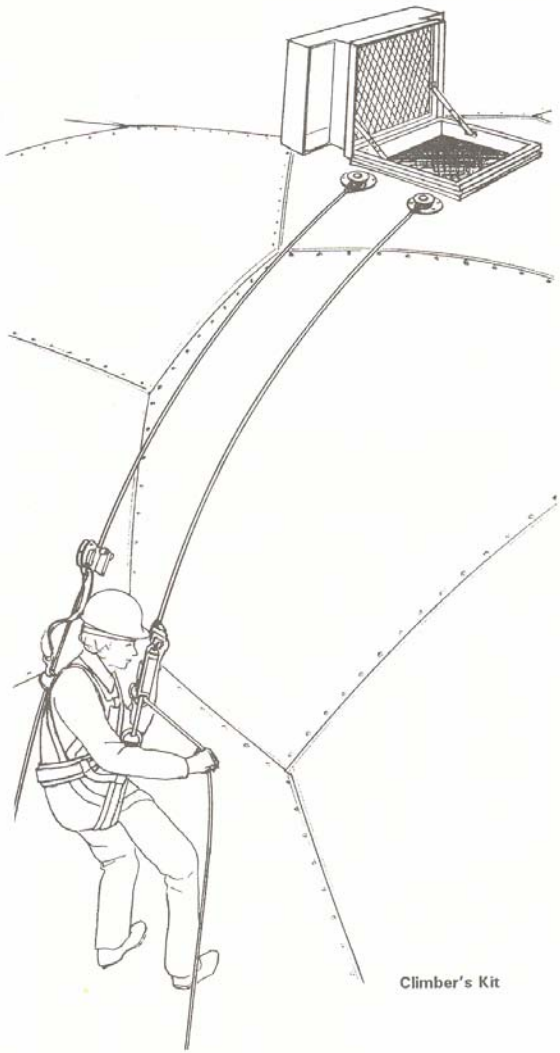
* Descent device for connection to the work line.

* Life line lanyard with rope grab for attachment to the life line and snap hook for attachment to the body harness.

* Body harness meeting ANSI Class 3 requirements with waist ring and carabinier for attachment to the descent device, and a back D-ring for connection to the life line lanyard. The web-belt harness with leg straps and safety shoulder straps provides a comfortable and safe support while allowing personnel the free use of both hands. It can also be ordered separately (Climber's Harness, *Model MA20*).

* Storage bag for the kit.

The climber's kit equipment meets the requirements of the ANSI §A10.14 and OSHA §1926.104.

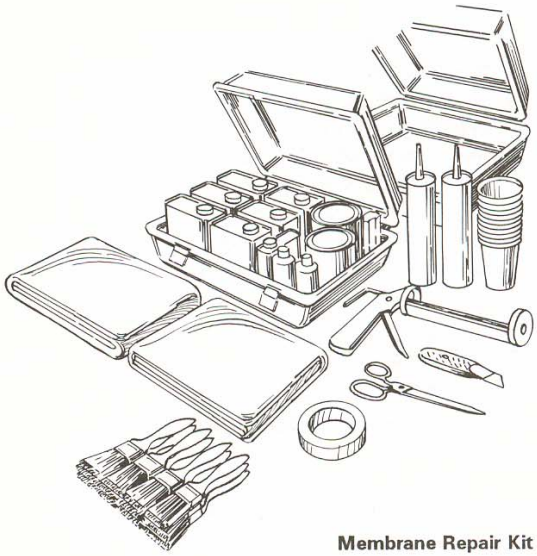


Climber's Kit

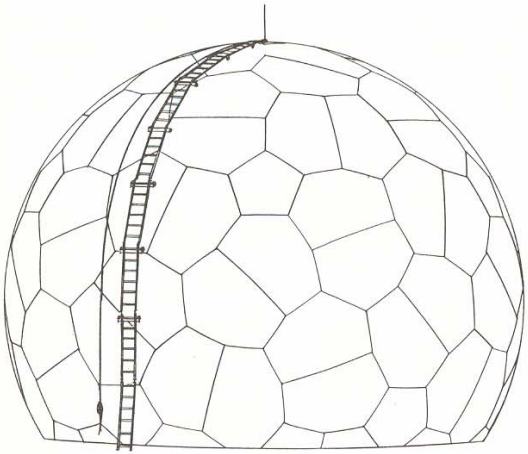
●,▾ External Service Ladder

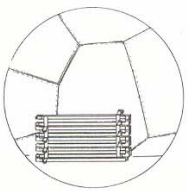
The maintenance rope is used to hoist the outside service ladder. The outside service ladder is a folding aluminum ladder with rubber casters attached to each section. The ladder is positioned at the base of the radome so that the rubber casters will be toward the radome when the top section is lifted. The casters hold the ladder clear of the radome and allow free movement of the ladder.

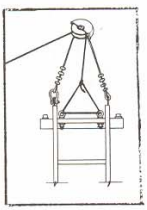
When the ladder is first lifted to a working position on the radome, a life line is attached to the reinforced top rung of the ladder. The climber uses a safety belt attached to a self-locking unit on the life line. When the climber reaches the top of the ladder, he secures the life-line to an anchor point at the zenith.



Membrane Repair Kit







External Service Ladder

●,▾ Membrane Repair Kit/Panel Repair Kit

The membrane repair kit (for space frame radomes) and the panel repair kit (for sandwich radomes) are designed to enable operating and maintenance personnel to make panel repairs quickly and easily in the field. The kit contains all repair materials, chemicals and basic hand tools that are needed. The kits are supplied in weather-resistant carrying cases designed for permanent storage of the repair materials. Instructions for use are included. Note that the kits contain materials with a shelf life of one year. Special packaging is required in order to air ship these kits.

Model MA110 Sandwich Radomes
Model MA10 Space Frame Radomes

●,▾ Spare Panel Kits

A spare panel kit provides additional radome panels so that in the event a panel is damaged during or after installation it can be easily replaced in the field. Special panels containing accessories such as access hatches, boresight windows, etc., are not included in spare panel kits, but can be ordered separately.

Type I spare panel kit consists of one of each major panel type, which represents approximately a 5% spares complement.

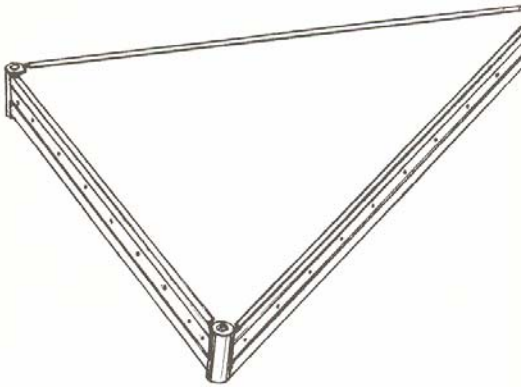
Type II spare panel kit consists of one of each major panel type and one of each base panel type. Type II kits are recommended for installations with unusual conditions where the possibility of damage is high and/or where transportation or site access is limited.

Type III kits include one of each base panel type and two of each main panel type. Type III kits are recommended for installations with the most severe conditions or when availability of spares on site is critical.

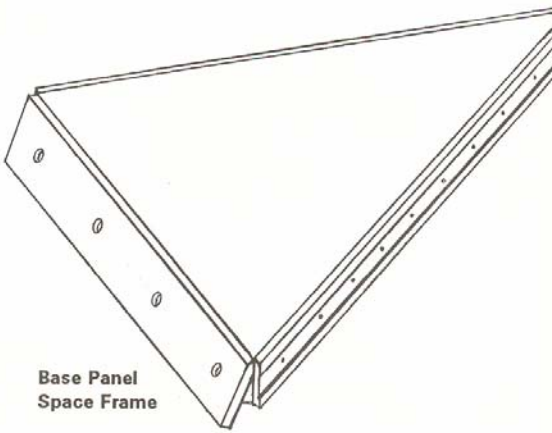
Price and delivery of spare panels is most advantageous when ordered and manufactured at the same time as the radome.

Panels can be packaged separately or in multi-panel arrangements as required by contract.

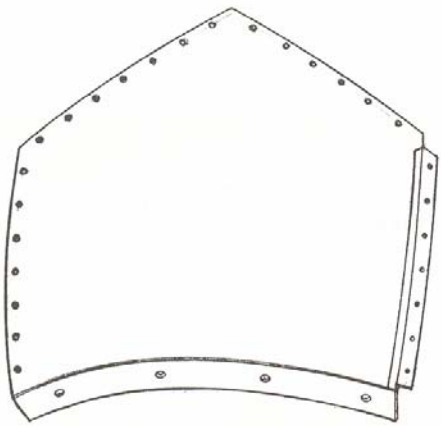
Consult ESSCO for the quantity and types of spare panels recommended for your radome.



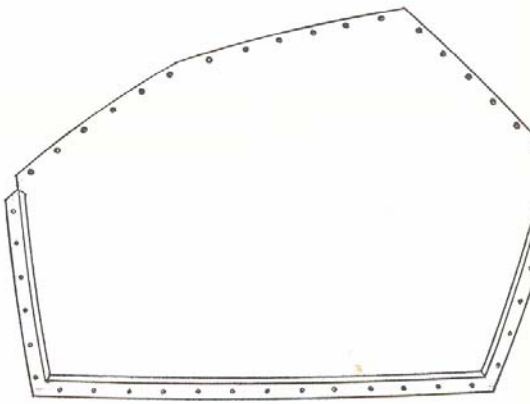
Main Panel Space Frame



Base Panel Space Frame



Base Panel Sandwich



Main Panel Sandwich

Climate Control Equipment

Climate control systems for radomes are generally designed on a site specific basis to provide the type of system needed for each user. The requirements for radome interior climate control are determined by the type and frequency of work being done inside the radome and by other requirements for climate control for the protected antenna equipment. The radome itself does not require any type of climate control, it is a convenience for the personnel working inside the radome.

Climate control can be done in several ways. There are two broad categories: passive and powered. Passive climate control allows ventilation through base vents and a zenith vent. Cooling is accomplished using the chimney or stack effect for ventilation. Electrically operated systems can vary in complexity from a simple ventilation blower to a computer controlled HVAC system.

Tables are provided in this section to sh capacity requirements for both space fr sandwich radomes.

Because the sandwich radome uses a f core as part of the panel construction, t sandwich radome provides good therm insulation. The requirements for sandw radomes will be lower in all categories b of the insulation properties inherent in t sandwich radome. Note that in many ca possible to add insulation to space fram radomes to increase the "R" factor.

Tables in this section are designed as a Exact system capacities can only be ca by using all of the data for the site inclu internal heat loads and the exact radom Consult ESSCO for additional documen and information.

CLIMATIC CONDITION	EQUIPMENT RECOMMENDED FOR SANDWICH RADOMES	EQUIPMENT RECOMMENDED FOR SPACE FRAME RADOMES	COMM
Hot, humid, non-corrosive (no salt)	Ventilation Blower	Ventilation Blower	Add dehumi reduce if desire
Air Stratification in Large Radome	Recirculating blower for active control Passive zenith and base vent to take advantage of chimney effect	Recirculation blower for active control Passive zenith and base vents to take advantage of chimney effect	
Hot, humid, corrosive (salt or chemicals)	Air conditioning	Recirculating blower plus dehumidifier	
Cold	Heater	Heater as needed	Recomm

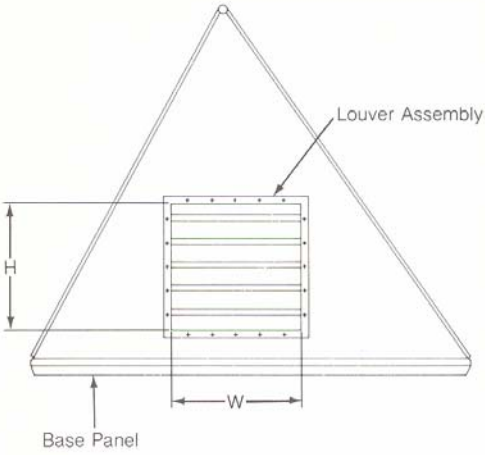
For Sandwich and Space Frame Radomes

●,▾ Base Vent Assembly
(Models BV110-114, BV10-14)

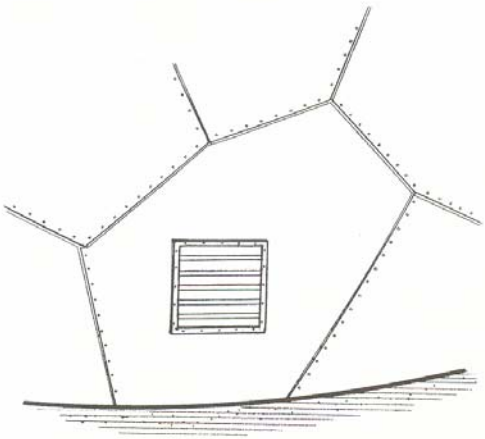
Installed in a base panel, the base vent is manually operated and is adjustable to any position between fully open and fully closed. The base vent is fabricated from aluminum. It is mounted in the radome panel using an aluminum frame. Vents are normally supplied unpainted.

A base vent is used in conjunction with a ventilation blower to prevent pressure build-up in the radome. The base vent can also be used in conjunction with a zenith vent as part of a passive ventilation system which utilizes the chimney effect.

●Models BV100, 111, 112, 113, 114 for Sandwich Radomes
▾Models BV10, 11, 12, 13, 14 for Space Frame Radomes



Base Vent Assembly Shown in Space Frame Panel



Base Vent Assembly Shown in Sandwich Radome Panel

Base Vent Dimensions

Model	Height	Width	Vent Area
110/10	12.0 in.	12.0 in.	24.5 in^2
	30.5 cm	30.5 cm	930 cm^2
111/11	16.25 in.	12.0 in.	34.5 in^2
	41.3 cm	30.5 cm	1259 cm^2
112/12	16.25 in.	15.0 in.	69.0 in^2
	41.3 cm	50.2 cm	2073 cm^2
113/13	19.75 in.	20.0 in.	129.6 in^2
	50.2 cm	50.8 cm	2550 cm^2
114/14	23.25 in.	23.0 in.	216 in^2
	59.1 cm	58.4 cm	3415 cm^2

●,▾ Ventilation Blowers

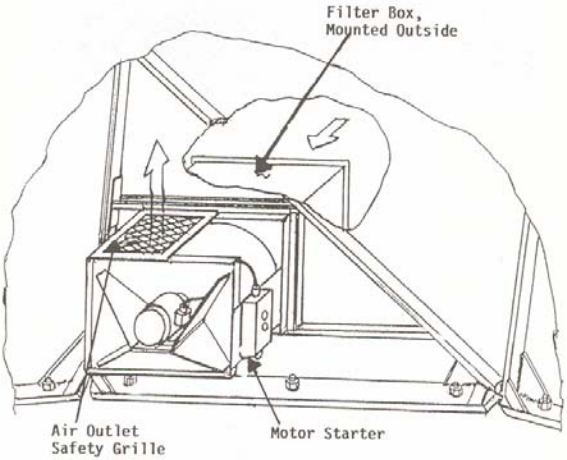
ESSCO ventilation blowers use direct drive fans - there are no pulleys, belts or bearings since the blower wheel is mounted directly on the motor shaft. Fan housings are made of heavy gauge steel in airtight welded construction. High efficiency, dynamically and statically balanced airfoil wheels are used. Washable aluminum filters are housed in an aluminum enclosure attached to the fan housing. Each unit is supplied with five feet of flexible ducting which connects to an aluminum air inlet flange installed in a radome base panel.

An adjustable aluminum exhaust vent located at the zenith or in a radome base panel is required for use with the blower. For space frame radomes, the pressure inside the radome can be set by using the manometer that is supplied to aid in adjusting the exhaust vent.

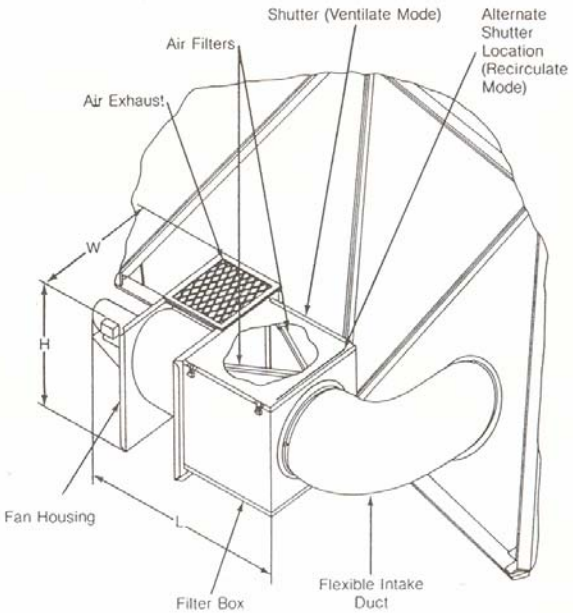
The ventilation blower can be easily converted for use as a recirculating blower by manually moving a baffle in the filter box. Electrical power connections are made at the starter which is mounted on the blower. A remote control switch is provided for use near the radome entrance.

An exhaust vent at either the base or zenith is required with the blower system and must be ordered separately.

Ventilation blowers are normally mounted on the floor. Panel mounted units are available for smaller radomes. Panel mounted units differ from floor mounted units in that they do not have a recirculate mode.



Ventilation Blower
Panel Mounted Unit



Ventilation Blower
Floor Mounted Unit

Ventilation capacity requirements are determined by radome volume, thermal characteristics, and the solar reflectivity of the radome. The system is then sized based on the desired maximum allowable temperature rise compared to the outside ambient.

The graphs show ventilation capacity for a typical 81% truncated white radome, with a maximum allowable internal temperature rise of 10°F above outside ambient. Nonwhite radomes require significantly larger capacities. For further information and applications assistance, contact ESSCO.

50 Hz, 1,460 RPM Models

Basic[1] Model	Capacity[2] (CFM)	Motor Size (H.P)	Exhaust[3] Vent Model
VB50/8.75	170	¼*	110/10
VB50/10.0	406	¼*	111/11
VB50/12.3	1,050	½*	112/12
VB50/13.5	1,547	¾*	112/12
VB50/15.0	2,254	1½*	112/12
VB50/16.5	3,114	2**	113/13
VB50/18.3	4,360	3**	114/14
VB50/20.0	5,873	5**	114/14
VB50/22.3	8,530	5**	114/14

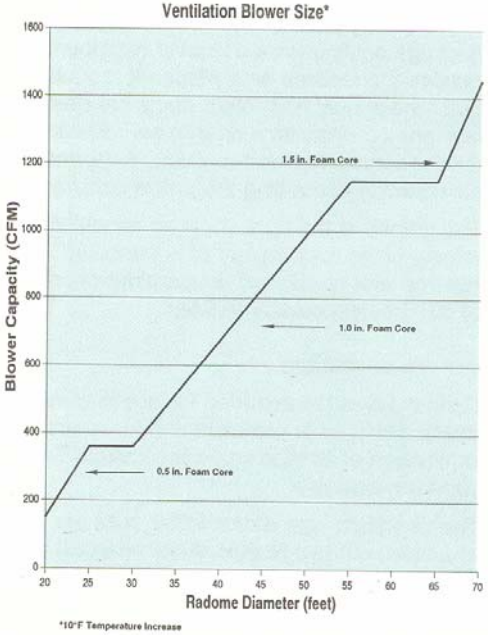
60 Hz, 1,750 RPM Models

Basic[1] Model	Capacity[2] (CFM)	Motor Size (H.P)	Exhaust[3] Vent Model
VB60/8.75	300	¼*	110/10
VB60/10.0	592	¼*	111/11
VB60/12.3	1,498	½*	112/12
VB60/13.5	2,126	¾*	112/12
VB60/15.0	3,044	1½*	112/12
VB60/16.5	4,170	2**	113/13
VB60/18.3	5,780	3**	114/14
VB60/20.0	7,748	5**	114/14
VB60/22.3	10,246	5**	114/14

[1]For panel mounted units, model number EBXX/XX
[2]Capacity is rated in cubic feet per minute (CFM) @ 1 inch H_20 static pressure
[3]See page 19

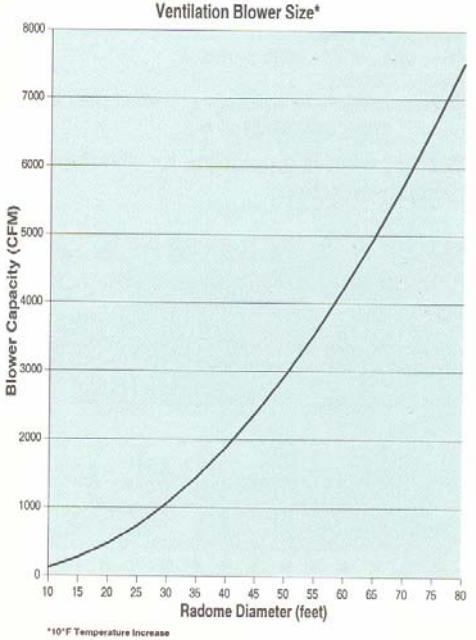
Available motor windings: *115/230V, 1Ø **200V, 3Ø
234/460V, 3Ø 234/460V, 3Ø

SANDWICH RADOME
Ventilation Blower Size*



*10°F Temperature Increase

SPACE FRAME RADOME
Ventilation Blower Size*



*10°F Temperature Increase

●,▾ Air Conditioners

ESSCO supplied air conditioners are single package cooling units designed for mounting outside the radome on a prepared mounting pad. The supply and return ducts are designed into one combination unit with an insulated divider separating the two ducts. A thermostat for remotely controlling the unit is supplied.

The graphs at the right show air conditioning requirements for a typical 81% truncated white radome with an internal temperature decrease of 10°F below outside ambient.

●,▾ Dehumidifiers

Dehumidifiers are provided for use in climates where damp air is prevalent and/or where the elimination of condensation is required. Two sizes are available.

The desiccant type dehumidifier units are floor mounted with two flexible ducts attached to radome base panels to draw and exhaust air.

The unit sizes are as follows:

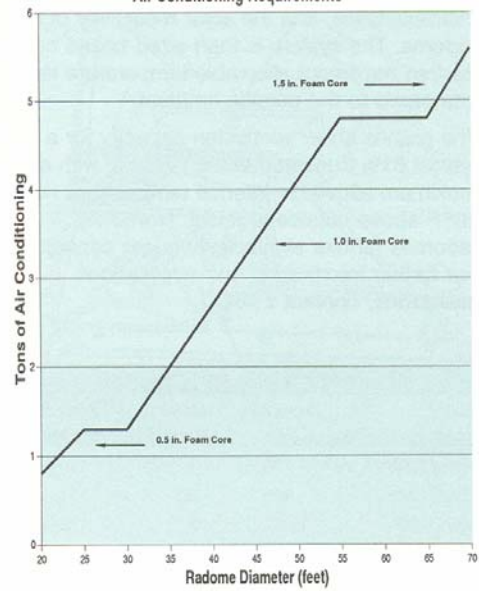
Model DR70:
Size: 17 in. H x 17 in. W x 27 in. L
Weight: 63 lbs
Utilities: 110V/50Hz/single phase; 120V/60Hz/single phase

Model DR150:
Size: 18 in. H x 36 in. W x 50 in. L
Weight: 285 lbs.
Utilities: Available for most power requirements except 110V/120V/single phase.

The following is a guideline for dehumidifier capacity selection:

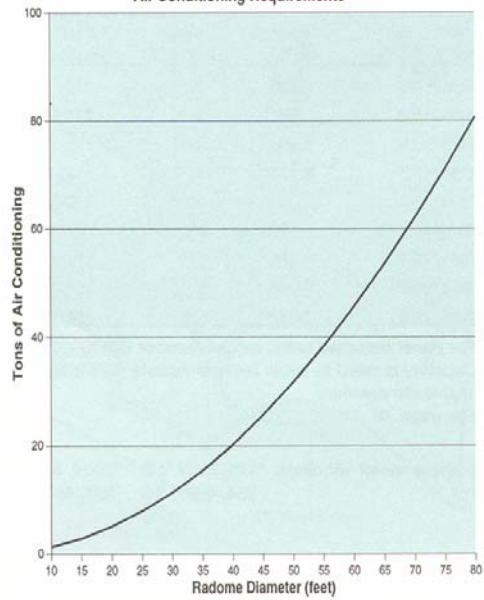
Model Number	Radome Diameter	Number of Units Needed
DR70	24' - 44'	2
	45' - 68'	3
DR150	Up to 50'	1
	51' - 68'	2

SANDWICH RADOME
Air Conditioning Requirements*



*10°F Temperature Decrease

SPACE FRAME RADOME
Air Conditioning Requirements*



*10°F Temperature Decrease

●,▾ Heaters

Forced air space heaters are designed for floor mounting. Included are on/off switch, operating thermostat, automatic and manual high/low limit thermostat, and floor mounting bracket.

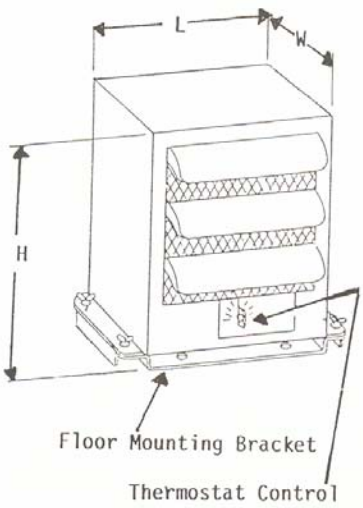
Heater sizes should be determined for each specific application based on temperature rise requirements.

The graphs at the right show heat requirement for a typical 81% truncated white radome with an internal temperature increase of 10°F above outside ambient.

Heater sizes and dimensions are listed below. Model number should be specified as heater size followed by heater rating in kilowatts. Example: model designation HF209-7.5 corresponds to HR209 sized heater rated at 7.5 kW.

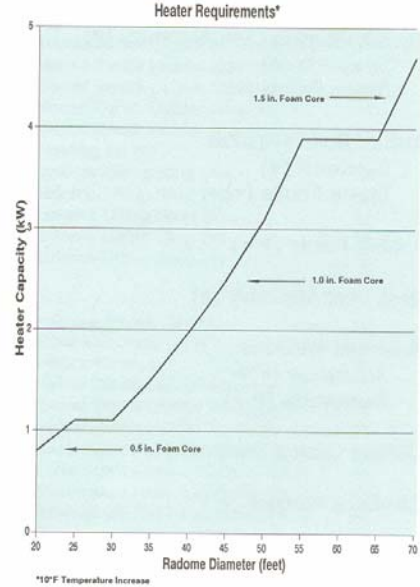
Model Number	kW	Weight (lbs)	Dimensions (inches) H*	W*	L*
HR209	4.0 - 9.3	45	17.0	13.5	14.5
HR210	10.0 - 12.5	60	22.0	13.5	14.5
HR211	15.0 - 20.0	75	22.0	18.0	14.5
HR212	20.0 - 22.0	100	26.0	22.5	15.0
HR213	25.0 - 40.0	150	26.0	22.5	27.0

* H = Height, W = Width, L = Length



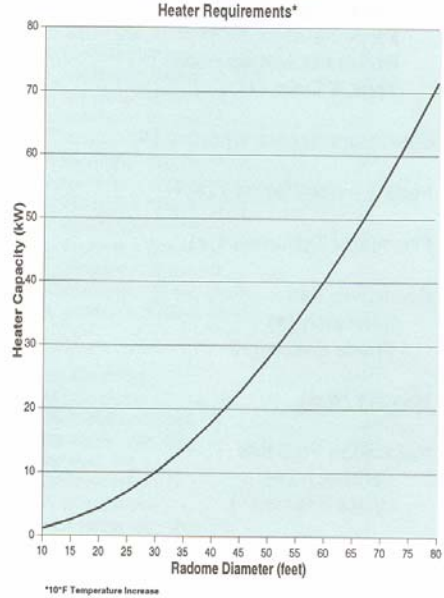
Typical Space Heater

SANDWICH RADOME
Heater Requirements*



*10°F Temperature Increase

SPACE FRAME RADOME
Heater Requirements*



*10°F Temperature Increase

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Index (by Model Number)

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