HELIAX®
Elliptical Waveguide

Elliptical waveguide is supplied pressurized in bulk quantities and when furnished with factory attached connectors. An air inlet valve is included with each pressurized length. Gaskets, silicone grease, connecting hardware, and assembly instructions are packed with unattached connectors.

Read instructions thoroughly before assembly.
See cautionary notice on last page.

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Elliptical waveguide type numbers	Dimensions over jacket in inches (millimeters)	Volume per 100 ft (30 m) in cubic ft (liters)	Radius–minimum bend inches (millimeters) E plane	H plane	Recommended twist limit degrees per foot (meters)	Waveguide weight lb/ft (kg/m)
EW17	5.68 x 3.05 (144.0 x 77.5)	7.10 (201.1)	28 (710)	81 (2060)	0.25 (0.75)	2.73 (4.00)
EW20	5.02 x 2.83 (127.5 x 71.9)	6.05 (171.3)	26 (660)	71 (1800)	0.25 (0.75)	2.02 (3.01)
EW28	3.64 x 2.33 (92.5 x 59.2)	3.60 (102.0)	22 (560)	52 (1320)	0.25 (0.75)	1.50 (3.23)
EW34	3.33 x 1.90 (84.6 x 48.3)	2.76 (78.1)	17 (430)	47 (1195)	0.5 (1.5)	1.08 (1.61)
EW37	2.90 x 1.86 (73.7 x 47.2)	2.11 (59.8)	17 (430)	41 (1040)	0.5 (1.5)	1.01 (1.50)
EW43	2.81 x 1.60 (71.0 x 41.0)	1.82 (51.54)	15 (381)	35 (889)	0.5 (1.5)	0.81 (1.2)
EW52	2.25 x 1.31 (57.2 x 33.3)	1.13 (32.0)	12 (305)	32 (810)	1.0 (3.0)	0.62 (0.92)
EW63	2.01 x 1.16 (51.1 x 29.5)	0.92 (26.1)	10 (260)	29 (740)	1.0 (3.0)	0.51 (0.76)
EW64	1.91 x 1.12 (48.5 x 28.4)	0.78 (22.1)	10 (260)	27 (685)	1.0 (3.0)	0.52 (0.78)
EW77	1.72 x 1.00 (43.6 x 25.4)	0.63 (17.8)	9 (230)	25 (635)	1.0 (3.0)	0.45 (0.67)
EW85	1.32 x 0.90 (33.5 x 22.9)	0.42 (11.9)	8 (200)	19 (480)	1.0 (3.0)	0.36 (0.54)
EW90	1.32 x 0.80 (33.5 x 20.3)	0.36 (10.2)	7 (180)	19 (480)	2.0 (6.0)	0.33 (0.50)
EW127	1.14 x 0.69 (29.0 x 17.5)	0.24 (6.1)	6 (150)	15 (380)	2.0 (6.0)	0.29 (0.43)
EW132	0.96 x 0.61 (24.4 x 15.5)	0.18 (5.1)	5 (130)	14 (360)	2.0 (6.0)	0.26 (0.39)
EW180	0.81 x 0.50 (20.6 x 12.7)	0.13 (3.7)	6 (150)	11 (280)	2.0 (6.0)	0.19 (0.28)
EW220	0.69 x 0.44 (17.5 x 11.2)	0.08 (2.3)	4 (100)	9 (230)	2.0 (6.0)	0.15 (0.22)
EW240	0.60 x 0.38 (15.2 x 9.65)	0.05 (1.4)	4 (120)	9 (230)	2.0 (6.0)	0.11 (0.16)

1: INSPECTING THE WAVEGUIDE

Inspect the waveguide for possible shipping damage.

Andrew pressure-tests all elliptical waveguide and connector assemblies at the factory; however you should check them for possible pressure loss before installing them. Use a tire gauge to check the pressure at the cable end. Connector assemblies are factory-pressurized with dry air to 10 lb/in^2.

The maximum allowable pressure drop for an assembly over 20 ft (6.1 m) is 1 lb/in^2 (7 kPa) in 24 hours from an initial pressure of 10 lb/in^2 (70 kPa). If the pressure drop is greater than the maximum allowable, check all joints for possible leaks, especially at the pipe threads. Refer to the **Pressurization** section of this bulletin for pressure information. If you cannot correct the leaky condition, contact the Andrew Customer Service Center for assistance.

IMPORTANT: Do not install waveguide if the pressure loss exceeds 1 lb/in2 (7 kPa) in 24 hours

Factory Attached Connectors. Factory attached flange connectors have a blank flange attached to maintain pressure during shipment. **Do not remove this flange until after you install the waveguide.**

Bulk Waveguide. Attach the connector at the antenna end of the waveguide before hoisting. Use the Installation Instructions provided with the connector to complete the installation.

2: HOISTING THE WAVEGUIDE

Hoist Line. Use a hoist line that supports the total weight of the waveguide. Refer to the table above for weights per foot (meter).

Pulley. Use a pulley high enough on the tower to allow the waveguide to be raised sufficiently to make the antenna connection. A winch is recommended for hoisting.

A winch is recommended for lifting several hundred feet of larger waveguides.

Waveguide Reel. Support the waveguide reel on an axle to permit free rotation as the waveguide is hoisted. The method illustrated (waveguide pays off top) is safest for heavily loaded reels. For lighter loads, less than 1000 lb (450 kg) gross weight which can be braked by hand, the reel can be positioned 180 degrees opposite so the waveguide pays off from the bottom of the reel. Uncoil the short lengths not on reels along the ground away from the tower.

Hoisting. Place protective covering over the connector to prevent damage during hoisting.

Attach a rope sling or cable grip near the end of the waveguide allowing sufficient length to reach the antenna input from the hoisted waveguide position. Tie the end of waveguide to the hoist line to keep it from dangling. A rope sling may be used in lieu of a cable grip for very short lengths of waveguide. Use the cable grips as detailed in the instructions provided. When installing lengths more than 200 ft (61 m), additional cable grips at 150 to 200 ft (46 to 61 m) intervals are required.

Additional tying is done above and below the cable grips to keep weight on the hoist line and not on the waveguide. Make certain to allow slack in the waveguide when tying and maintain that slack during hoisting. Tying is accomplished with strong fiber-reinforced tape or similar material applied generously at 15 or 20 ft (4.6 or 6.1 m) intervals as the waveguide is raised.

Hoist the waveguide slowly and carefully. Prevent kinking by slowing the rotation of the reel to control the uncoiling of the waveguide. Avoid snags when hoisting or routing the waveguide through and around tower members. Careless handling of the waveguide can cause kinks, dents, and scrapes.

Waveguide may be bent in both E and H planes. Do not make bends smaller than the minimum bending radius shown in the table. Note that the H plane minimum bending radius is considerably larger than the E plane radius. Bends can be made safely with Andrew Elliptical Waveguide Bending Tool Kit for E and H Plane Bends. It is essential that a bending tool be used. Waveguide can be seriously damaged if formed by hand. An improvised mandrel that will provide a curved forming surface of equivalent radius may be used. When bends of smaller radius are required, an elbow or flex-twist section should be used. Waveguide may be twisted slightly for flange alignment. Refer to the table on page one.

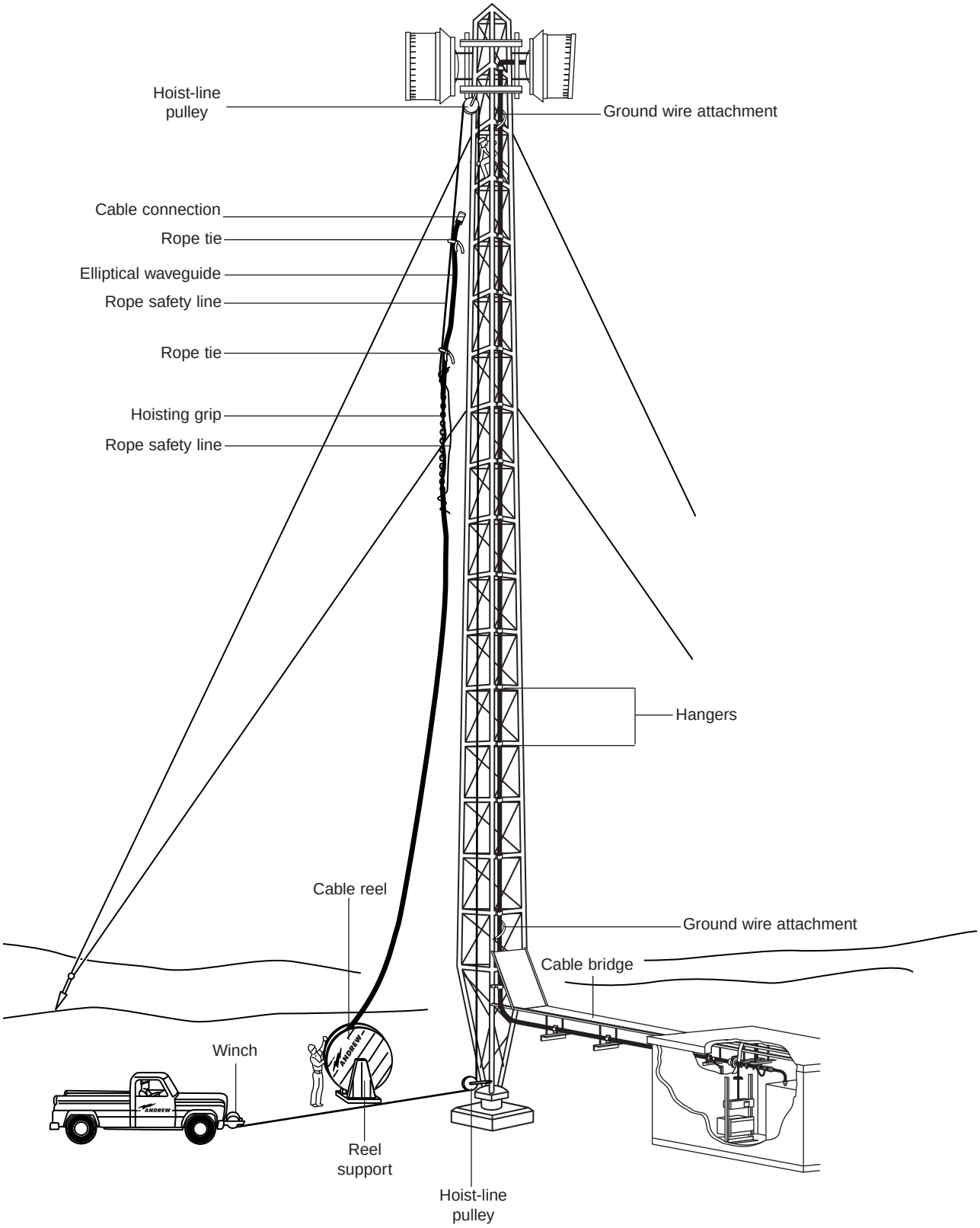
Use a cable grip as a temporary anchor to support waveguide until the connector has been properly mated with the antenna input and the antenna is aligned. Provide sufficient slack to permit easy flange alignment. The plane of the vertical run should be determined at this time. Establish a downward path which would afford the least resistance and minimum amount of bending for making the antenna connection. Do not strain the feed connection. When considerable bending is needed to aim the antenna, a flex-twist section may be required temporarily. After the antenna position has been fixed, the waveguide can generally be routed to connect directly to the feed. Use an elbow or flex-twist section when structural members interfere and routing is confined.

3: ANCHORING

Maintain hoist line tension until anchoring is completed. Attachment to lighting conduit or vertical angle iron runs is recommended in installations where tower members do not provide adequate or convenient hanger support. Waveguide subject to vibration from wind must not be left unsupported.

Space the first three hangers at the top of a vertical run approximately 1 ft (0.3 m) apart and 4 ft (1.2 m) apart thereafter. If the distance from the feed termination to the first hanger is more than 4 ft, the waveguide must be supported. Position hangers to hold the waveguide away from tower members. Rubbing against edges can cause damage. Do not tighten hangers excessively as dents or deformations can cause degradation in electrical performance. Follow installation instructions included with the hangers. If the waveguide jacket has been cut, apply vinyl tape to the damaged area.

The top and bottom of the waveguide should be grounded to the tower by low impedance conductors or to a suitable “down” conductor physically separated from the waveguide if the tower is non-metallic. The antenna input connection cannot serve as top ground. Waveguide itself must be grounded close to the antenna. Waveguide should be grounded at the point where it enters the equipment building, especially for long horizontal run. Some installers ground waveguide every 50 ft (15.2 m) along the entire run. Local building codes should be followed. Grounds planned for 50 ft intervals can be prepared during hoisting operation.


Hoist-line pulley
Ground wire attachment
Cable connection
Rope tie
Elliptical waveguide
Rope safety line
Rope tie
Hoisting grip
Rope safety line
Hangers
Cable reel
Ground wire attachment
Cable bridge
Winch
Reel support
Hoist-line pulley

4: HORIZONTAL RUNS

Route waveguide from the base of the tower to the station. The waveguide can be buried or supported above ground. Attach above-ground waveguide to horizontal support member using same type hangers and 4 ft intervals as in the vertical run. Exposed horizontal runs must be protected from weight of accumulated ice and damage from falling ice or other objects.

Waveguide can be used in any environment such as salt air, direct burial, or under water. The waveguide jacket eliminates the effects of galvanic and environmental corrosive action. Buried waveguide should be below area frost line and at least 3 ft (0.9 m) deep for protection against damage from heavy vehicles. A 4 in (102 mm) layer of sand under and over buried waveguide is adequate to protect jacket from stones or other sharp objects. Markers should be placed at convenient intervals over buried waveguide.

Use an Andrew feed-thru flange for a waveguide path through the station roof or wall. Install the flange according to the installation instructions provided.

5: ELLIPTICAL WAVEGUIDE CONNECTORS

Attach the waveguide connector directly to the antenna input or to the elbow or flex-twist section if required, to make the necessary alignment with mating flange.

See that the gasket and mating surfaces of the flanges are clean. Use comothene, vythene, or other non-flammable fluid for cleaning. Do not apply silicone grease to the flange gaskets. Join the flanges making certain the gasket is in position.

NOTE: When mating two pressure-cover flanges or a pressure-cover and a choke flange, use two flange gaskets. Add the connecting hardware and fasten the flanges together, tightening the screws evenly.

Repeat the procedure for connecting the transmitter end of the waveguide to the output connection at the equipment rack, making the connection, where possible, directly to the transmitter without any short interconnections. Generally, a pressure barrier is required between the transmitter and the waveguide.

If a factory prepared length of waveguide must be changed, cut the waveguide to the appropriate length and reassemble the connector using new gaskets.

When bulk waveguide is being installed, attach the connector to the waveguide after the required length of run has been determined. Follow the assembly procedure as before. Replace the pressurizing cap and repressurize the remaining bulk waveguide.

6: PRESSURIZATION

After all connections have been completed, pressurize the waveguide. Changes in temperature can cause moisture from outside air that enters waveguide to condense and seriously impair efficiency, so waveguide must be under pressure at all times. If moist air has entered the waveguide, it must be purged. Remove the gas port plug located on the connector at the antenna end of the waveguide, and purge the waveguide continuously until it is dry. (In a dual polarized system using Andrew antennas, purging can be performed from two waveguide connectors at the transmitter end since there is a gas path through the feed from one input to other.) An alternative method is to pressurize to 8 lb/in^2 (55 kPa) and let air escape at the transmitter end of the waveguide after one hour. Repeat the procedure several times allowing an hour each time for air to mix. After purging, replace the gas port plug and pressurize the waveguide.

Pressurization can be accomplished by manual or automatic means depending upon the amount of waveguide in use at the station and whether or not the site is attended. A dry air hand pump is satisfactory for attended sites using a relatively small amount of waveguide. Automatic electric dehydrators are recommended for unattended sites or those where large amounts of waveguide are used. A cylinder of compressed air can also be used.

Gauge pressure of 8 lb/in^2 is adequate for most installations. Excessive pressure, exceeding 10 lb/in^2 (70 kPa), is unnecessary and not recommended because it may damage the feed window. Some feed windows have lower pressure ratings than 8 lb/in^2, and care must be taken to insure that maximum pressure is not exceeded. A regulating tank in the pressurization system can be used to provide low pressure outputs.

NOTE: Elliptical waveguide assemblies are not hermetically sealed and may exhibit a low leakage rate; consequently, waveguide installations not having an automatic air supply must be inspected periodically.

Dry air is normally used for pressurizing. Dry nitrogen may also be used. When pressurizing equipment is connected to a gas port on the waveguide connector, or whenever pipe fittings are reassembled, threads must be covered with sealing tape to ensure leakproof connection.

After installation, check the connections for leaks. Use commercial leak detector or liquid detergent over joints and check for bubbles. Bubbling indicates leakage.

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