

MICROWAVE ANTENNAS
KS-15676 HORN-REFLECTOR AND WAVEGUIDE SYSTEM
INSTALLATION
RECTANGULAR WAVEGUIDE, RIGID AND FLEXIBLE

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1. GENERAL

- 1.01** This section pertains to the installation of the outdoor portion of rectangular waveguide and the waveguide building entrances used with the 4-, 6-, and 11-GHz radio relay systems.
- 1.02** This section is reissued to update installation instructions. Since this is a general revision, change arrows ordinarily used are omitted.
- 1.03** Extreme care shall be taken during installation and use to prevent damage to components and waveguide systems. Dents and other deformations of the waveguide will impair transmission.
- 1.04** Care should be taken to ensure that no foreign material is introduced into or remains inside the waveguide system when the installation is completed as serious transmission problems may result.

2. INSTALLATION

A. General

- 2.01** The rectangular waveguide installation is similar for all types of towers but differs as to lengths of waveguide, number of restrainers used, etc. This difference also applies to individual waveguide runs.
- 2.02** The multiple restrainers must be attached to the tower mounting angles before the vertical waveguide can be installed. The multiple restrainers are installed along with the combining networks as described in Section 402-421-204.
- 2.03** The waveguide in the horizontal runs should be oriented with the broad dimension of the waveguide in the vertical plane.
- 2.04** The installation procedures assume the use of cross polarization at each frequency range. If single polarization is desired it should be done by substituting the appropriate passive network for the combining network until the other polarization is installed. The procedure is given for one polarization at each frequency range. The other polarization is installed the same as the first except for restraining points.
- 2.05** Attach the required hanger plates to the multiple restrainers as shown in Fig. 1, using the bolts, washers, nuts, and palnuts supplied with the hanger plates. The hanger plate for any of the three systems may be installed in any one of eight positions. In the case of 4- and 6-GHz systems, the hanger plate should be located as close as possible to the zone in which the network tap has been positioned. For the 11-GHz system, the hanger plates should be installed in the available positions which have not been used for the 4- and 6-GHz waveguides.

SECTION 402-421-205

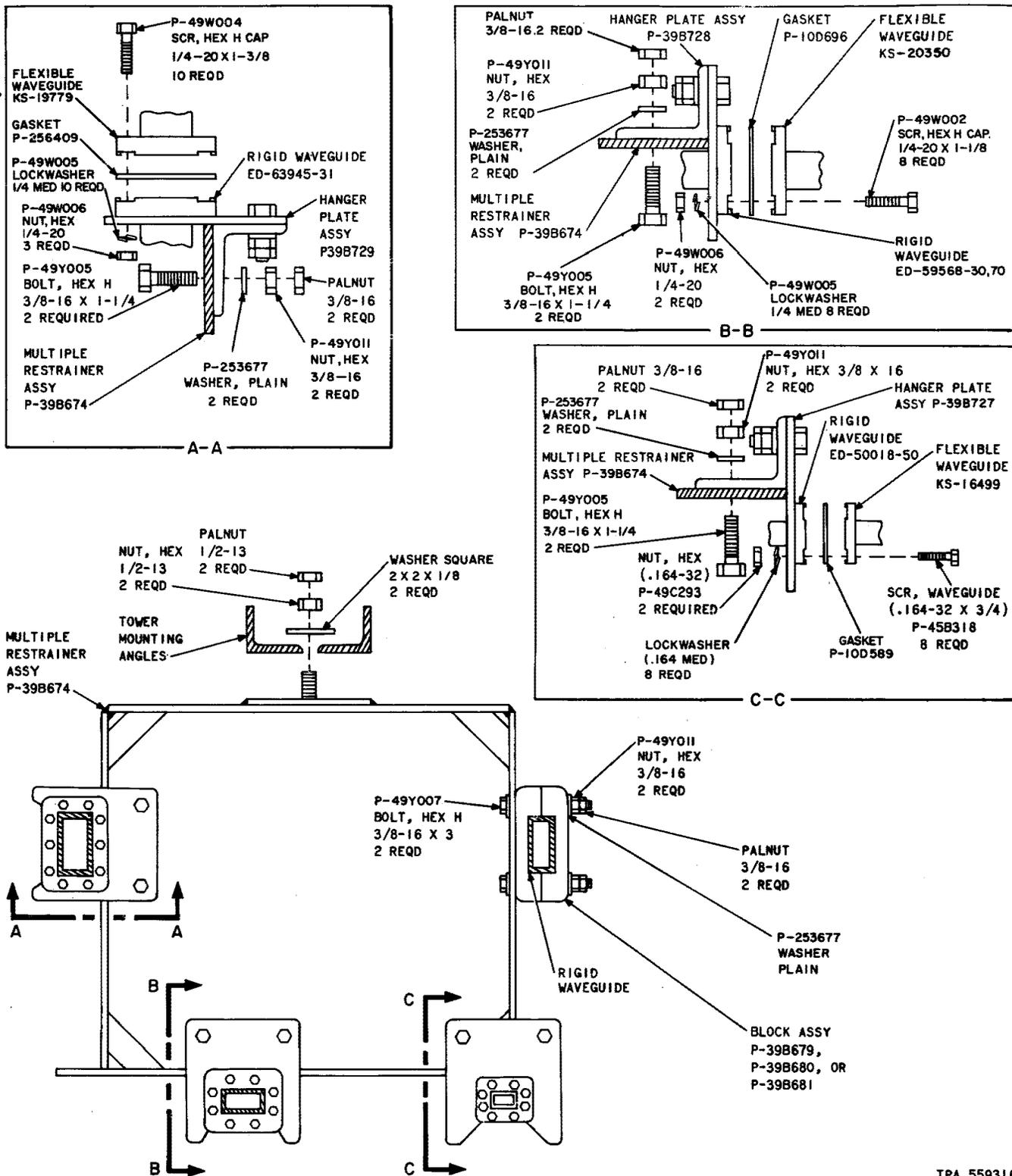


Fig. 1—Installation of Multiple Restrainer

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B. Rectangular Waveguide

4-GHz Vertical Run

2.06 Attach the top flange of the 1313A filter to the bottom flange of the rigid waveguide (ED-63945-31) previously attached to the hanger plate. Attach the bottom flange of the 1313A filter to the next vertical waveguide section required, as shown in Fig. 2. Use the gaskets, waveguide screws, and lockwashers supplied with the filter.

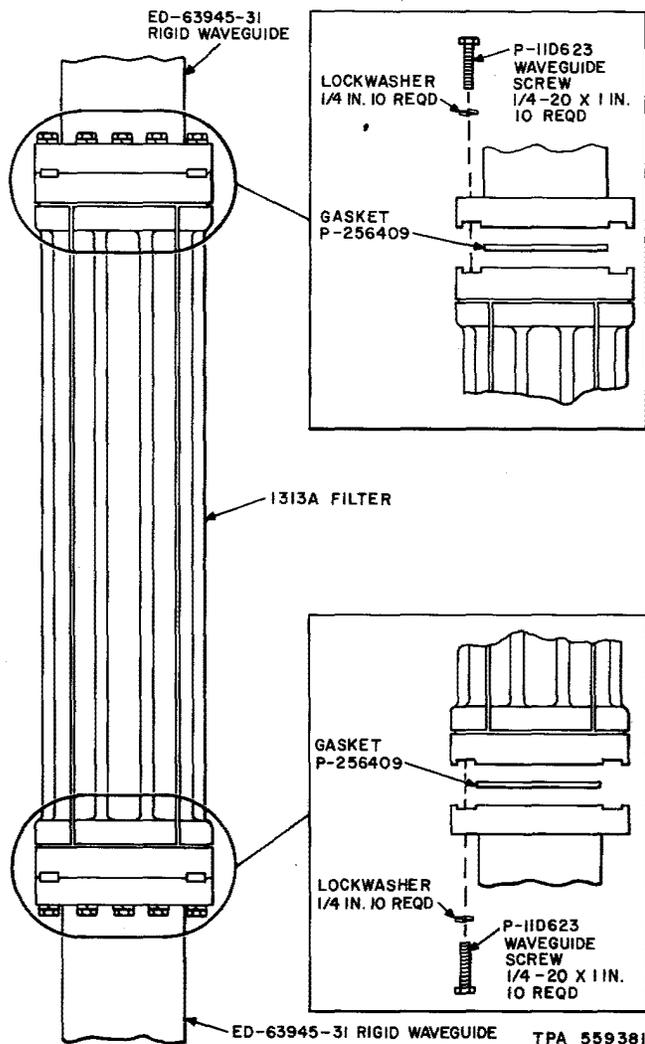


Fig. 2—Installation of 1313A Filter

2.07 Restrain the filter and waveguide assembly to a multiple restrainer using the block assemblies as shown in Fig. 1. Use the bolts,

washers, nuts, and palnuts supplied with the block assemblies.

Note: A restrainer shall be applied within 12 inches of the junction of the rigid rectangular waveguide and the 1313A filter.

2.08 Attach the WR229 flexible waveguide to the network tap, as shown in Fig. 3, using the bolts, lockwashers, gasket, and nuts supplied with the network and the waveguide.

2.09 After forming a smooth S shape with the flexible waveguide, mate the bottom flange of the flexible waveguide with the top flange of the rigid rectangular waveguide. Attach both flanges to the hanger plate, as shown in Fig. 1, using the bolts, lockwashers, and nuts supplied with the waveguide.

6-GHz Vertical Run

2.10 Attach the KS-20148 filter to the 18A (1406A network) or 36A (1428A network) transducer as shown in Fig. 4, using the waveguide screws, gasket, and lockwashers provided.

2.11 Attach the ED-59568-30 rigid waveguide to the KS-20148 filter as shown in Fig. 4, using the waveguide screws, gasket, and lockwashers provided.

11-GHz Vertical Run

2.12 Attach the ED-50023-50, G6 60 degree H plane bend to the 1424A network as shown in Fig. 5, using the bolts, gasket, lockwashers, and nuts provided.

Horizontal Runs

2.13 After the waveguide truss is installed (Part C) in the horizontal raceway install the sections of 4-, 6-, and 11-GHz rectangular waveguide. Use the bolts, lockwashers, nuts, and gaskets supplied with the waveguide. A typical connection of two sections of rectangular waveguide is shown in Fig. 6.

2.14 Install the proper length of 4-, 6-, or 11-GHz flexible waveguide from the bottom of the vertical rectangular run or 60°H plane bend to the rectangular waveguide run in the horizontal raceway. Use the bolts, lockwashers, nuts, and gaskets

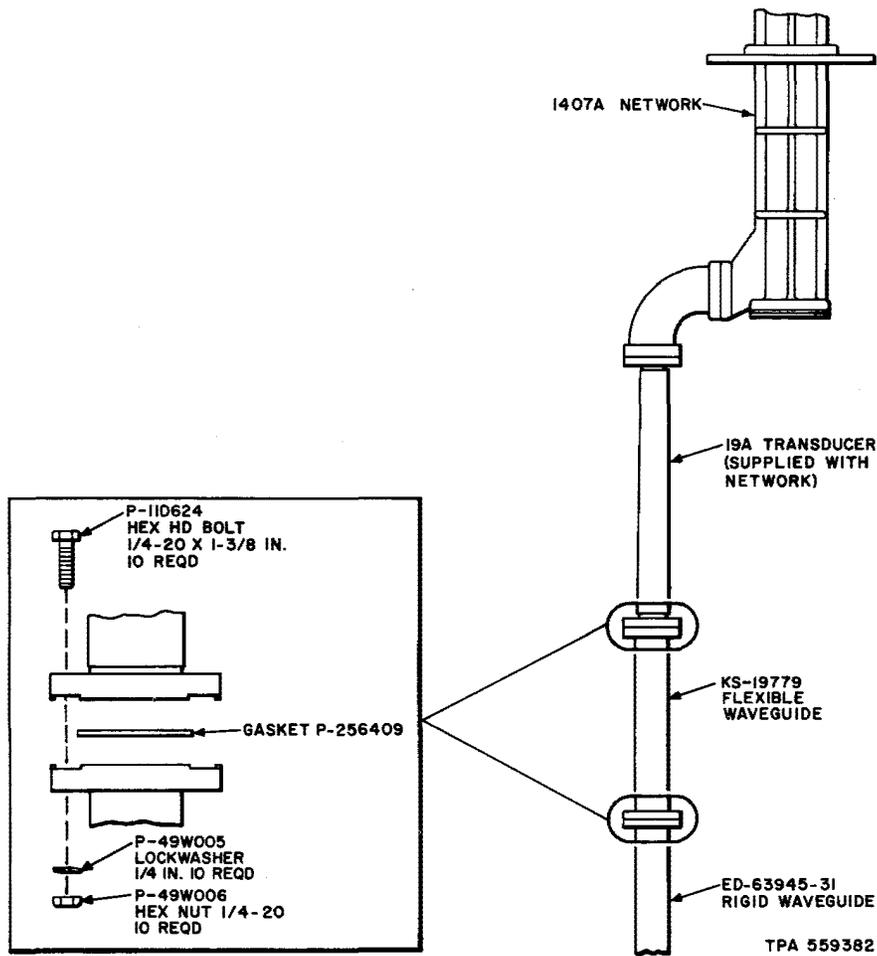


Fig. 3—Installation of WR-229 Flexible and ED-63945-31 Rigid Waveguide

supplied with the waveguide. Parallel the flexible waveguide with copper wire as shown in Fig. 7.

Note 2: A restrainer shall be applied within 12 inches of the junction of flexible and rigid waveguide.

C. Waveguide Truss

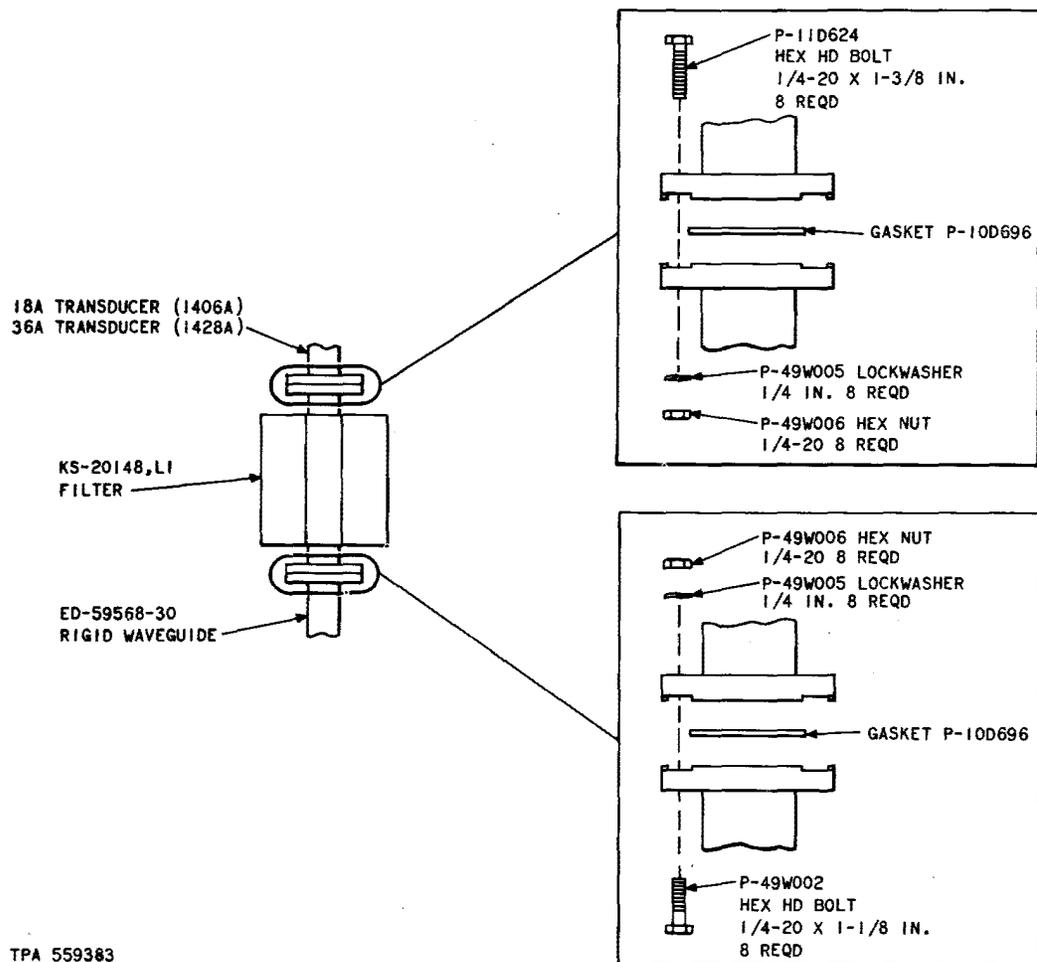
2.15 Attach the angle assemblies to the vertical members of the horizontal raceway as shown in Fig. 8. Use the bolts, lockwashers, and nuts supplied. Note that each angle assembly in the vertical plane is rotated 180 degrees from the preceding angle assembly to facilitate the installation of the cruciform restrainer.

Note 1: The waveguide in the horizontal run should be restrained at intervals not exceeding a maximum of 10 feet.

2.16 Attach one-half the cruciform restrainer to the angle assembly as shown in Fig. 8. Use the bolts, washers, nuts, and palnuts supplied with the restrainer. The nuts should be screwed only onto several threads of the bolts as they must be removed when the second half of the cruciform restrainer is installed.

D. Weather Seal and Pressure Windows

2.17 Install the weather seal panel in the opening provided in the building. Apply KS-14424 polysulfide putty or building weather proofing sealer such as, Dow Corning Silastic, Dow Corning



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Fig. 4—Installation of KS-20148, L1 Filter

780 Building Sealer, or General Electric, GE RTV 102 between the panel and building angles before clamping. After clamping with the bolts, lockwashers, and nuts provided, as shown in Fig. 9, wipe off excess polysulfide putty.

Additions to Existing Installations

2.18 Attach the 4-, 6-, or 11-GHz flexible waveguide to the last section of rigid waveguide in the horizontal raceway using the bolts, lockwashers, nuts, and gaskets supplied with the waveguide (Fig. 6).

2.19 Slide the building entrance sealing flange over the opposite end of the flexible waveguide approximately 12 inches past the waveguide flange. Stretch the rubber seal over the waveguide flange

(the 6- and 11-GHz rubber seals are slit and therefore do not have to pass over the waveguide flange), and move the seal approximately 6 inches onto the waveguide. The slit in the 6- and 11-GHz boots shall be positioned downward.

2.20 Guide the flange of the waveguide through the opening in the wall panel and place into the slot opening in the lower mounting plate. Install the upper mounting plate with the studs and 3/8-16 nuts provided. Adjust the spacing of the mounting plate so that it is the same as the lower mounting plate. The studs permit longitudinal adjustment of the position of the waveguide flange with respect to the radio bays.

2.21 Align the flange of the pressure window, as specified in the station indoor waveguide

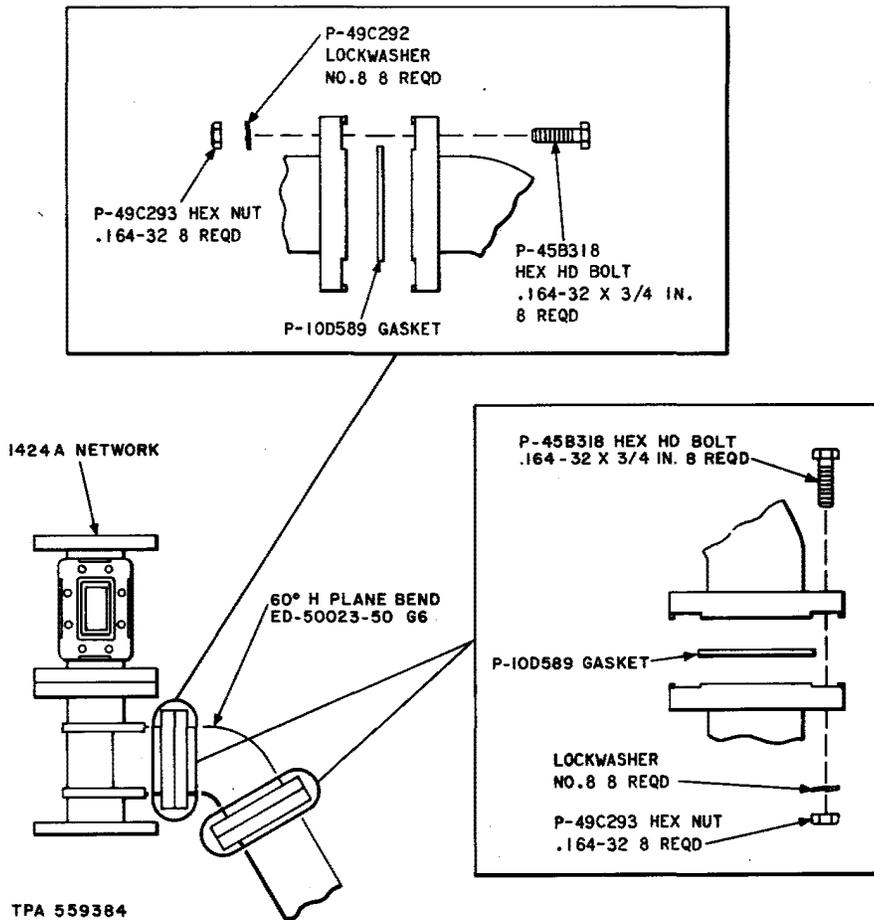


Fig. 5—Installation 60°H Plane Bend and KS-16499 Flexible Waveguide

drawing, to the flange of the flexible waveguide. Attach both flanges to the mounting plates using the bolts, lockwashers, and nuts provided.

2.22 Slide the rubber seal and the building entrance sealing flange up to the panel and fasten into place using the bolts and lockwashers provided. Three layers of Scotch Electrical Tape No. 88, 3/4 inch wide made by the Minnesota Mining and Manufacturing Company, St. Paul, Minnesota or equivalent, shall be placed over the joint between the rubber seal and the flexible waveguide. This should not be applied until the longitudinal adjustment of the waveguide has been completed.

2.23 Install a coverplate on all waveguide openings in the wall panel which are not equipped with waveguide. Apply weather proofing sealer as described in 2.17, between the plate and the

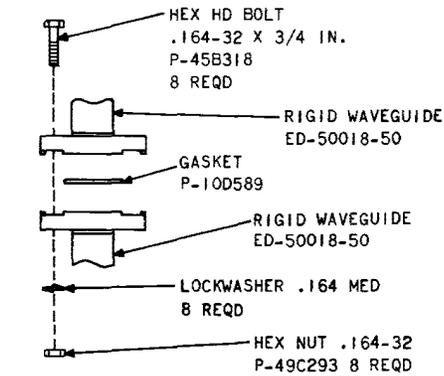
panel before clamping. After clamping with the bolts and lockwashers provided, wipe off excess caulking compound.

New Installations

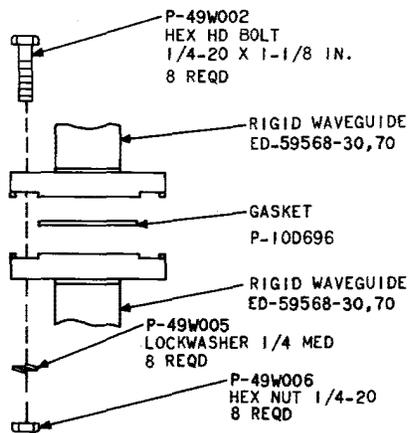
2.24 Attach the 4-, 6-, or 11-GHz flexible waveguide to the last section of rigid waveguide in the horizontal raceway, using the bolts, lockwashers, nuts, and gaskets supplied with the waveguide (Fig. 6).

2.25 Install the pressure windows in the weather seal panel as shown in Fig. 9. Use the bolts, nuts, lockwashers, and gasket supplied with the weather seal panel and pressure window.

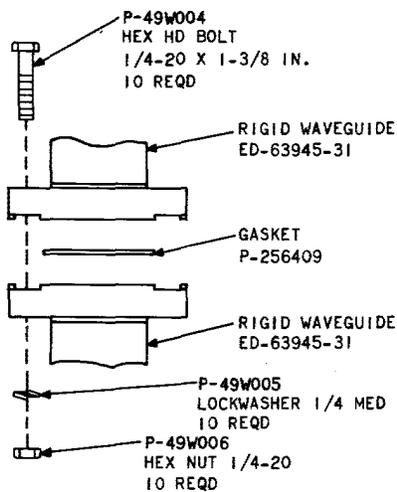
2.26 Install a coverplate on all waveguide openings in the weather seal panel as shown in Fig.



(11 GHZ)



(6-GHZ)

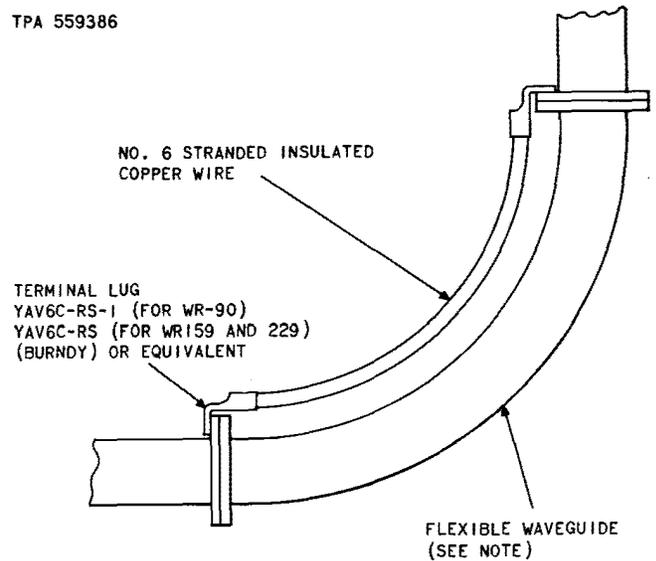


(4-GHZ)

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Fig. 6—Assembling of Rectangular Waveguide Gasketed Flanges

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NOTE:

RECTANGULAR FLEXIBLE WAVEGUIDE USED OUTDOORS SHALL BE PARALLELED WITH A NO. 6 STRANDED COPPER WIRE AT CONNECTIONS AS FOLLOWS:

1. BETWEEN PARABOLIC ANTENNAS AND RIGID WAVEGUIDE.
2. BETWEEN VERTICAL AND HORIZONTAL RIGID WAVEGUIDE SECTIONS.
3. BETWEEN THE HORIZONTAL RIGID WAVEGUIDE SECTIONS AND BUILDING ENTRANCE (WEATHERSEAL) PANEL.
4. REQUIRED TO MAKE INTERMEDIATE BENDS BETWEEN THE BUILDING AND TOWER.

Fig. 7—Flexible Waveguide Bonding

9, which are not equipped with a pressure window. Use the coverplates, bolts, lockwashers, gaskets, and spline nuts provided with the panel.

2.27 Attach the 4-, 6-, and 11-GHz flexible waveguide to the pressure window as shown in Fig. 9. Use the bolts, lockwashers, gaskets and nuts provided.

E. Grounding

2.28 All waveguide runs shall be bonded to the steel supporting structure as shown in Fig. 10. All sections of flexible waveguide except when used between a systems combining network and a multiple restrainer support shall be paralleled with a number 6 copper wire as shown in Fig. 7.

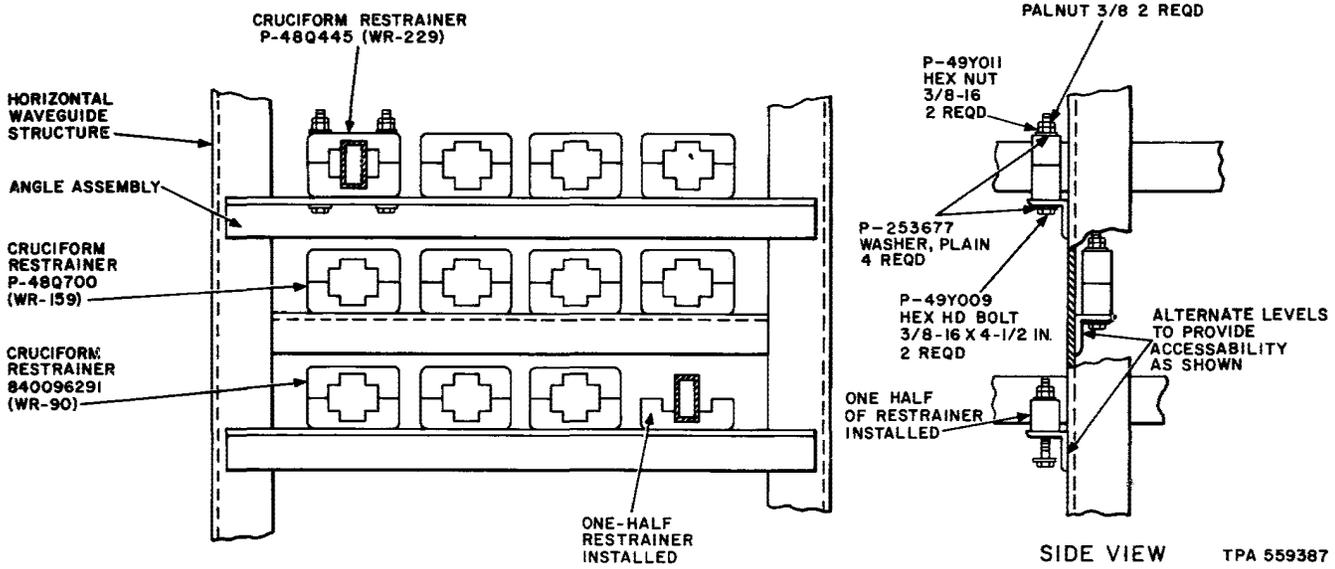


Fig. 8—Installation of Waveguide Truss and Cruciform Restrainer

F. Pressure Testing and Waveguide Protection

2.29 After installation, the completed rectangular waveguide run must be checked to determine that it is pressure tight in accordance with Section 161-371-701.

2.30 As covered in 1.03, waveguide transmission will be impaired by any minor deformations of the waveguide. Therefore, adequate protection shall be provided on any outside installation to avoid damage from falling ice or any other possible source of damage. This applies particularly to horizontal runs.

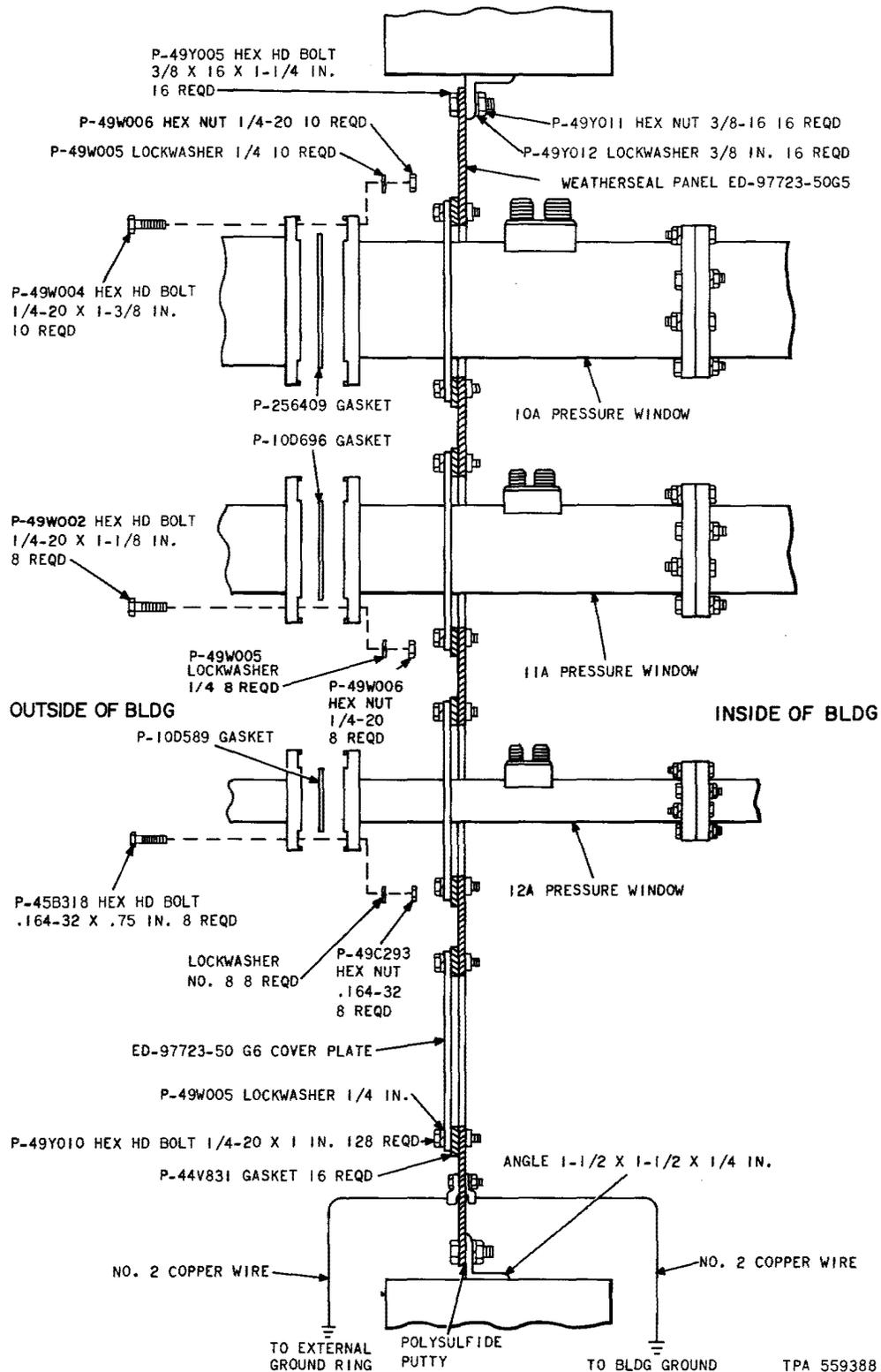
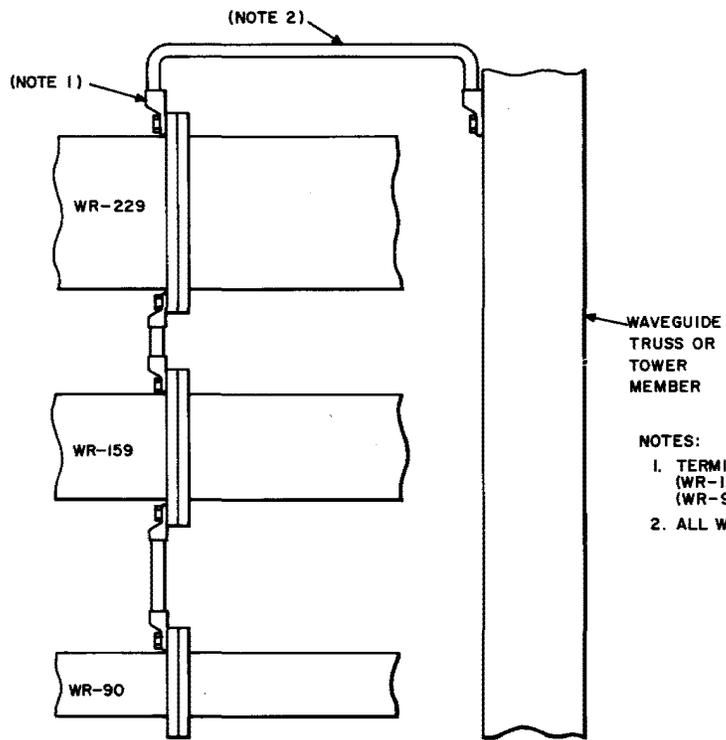
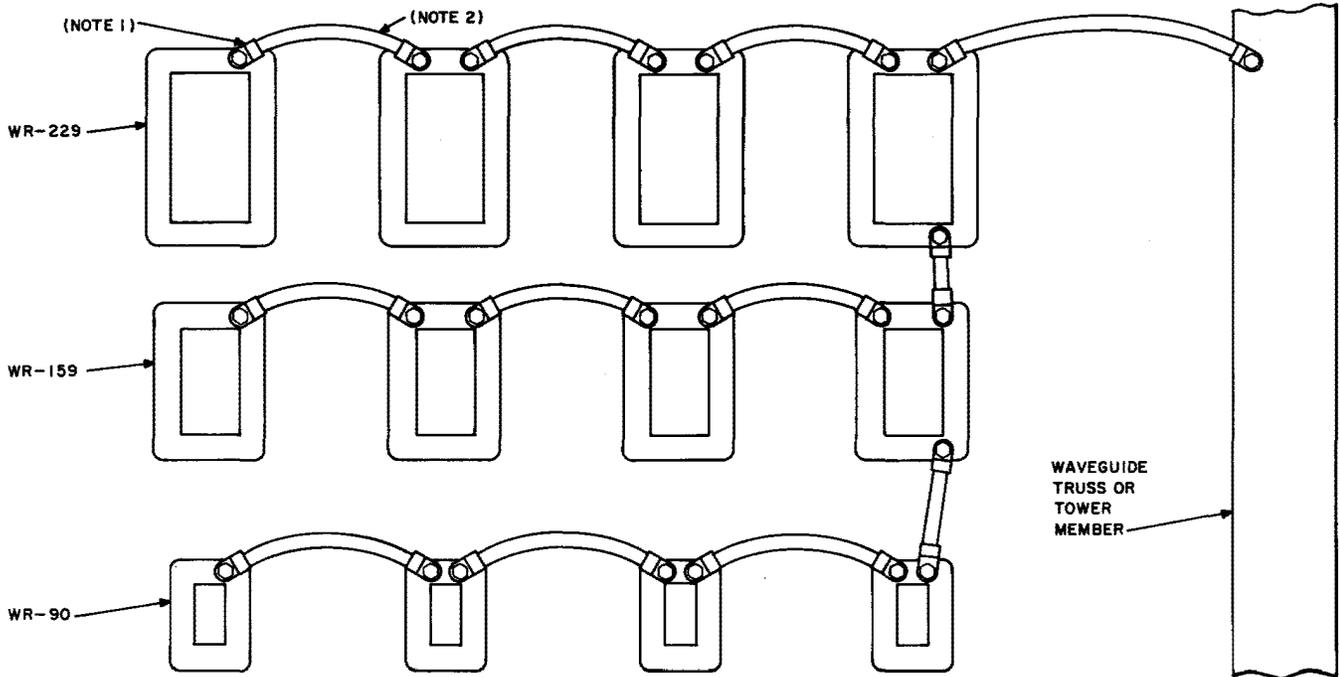


Fig. 9—Installation of Weather Seal and Pressure Windows

SECTION 402-421-205



SIDE VIEW

- NOTES:
1. TERMINAL LUGS ARE YAV6C-L (WR-159, 229) OR YAV6C-L1 (WR-90) (BURNDY) OR EQUIVALENT
 2. ALL WIRE IS NO. 6 COPPER STRANDED

Fig. 10—Grounding

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