

# **ANTENNAS AM - FM - TV**

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# Pylon FM Antenna

## Features

- Single element, self-supporting structure.
- Easy to install.
- High gain. Broadband.
- High power handling capacity.
- Sectionalized to facilitate erection.
- Mechanically strong and needs no guying.
- Heavy duty types will support RCA Super Turnstile
- One feed point per section.
- Icing problem negligible.
- Easy to maintain.

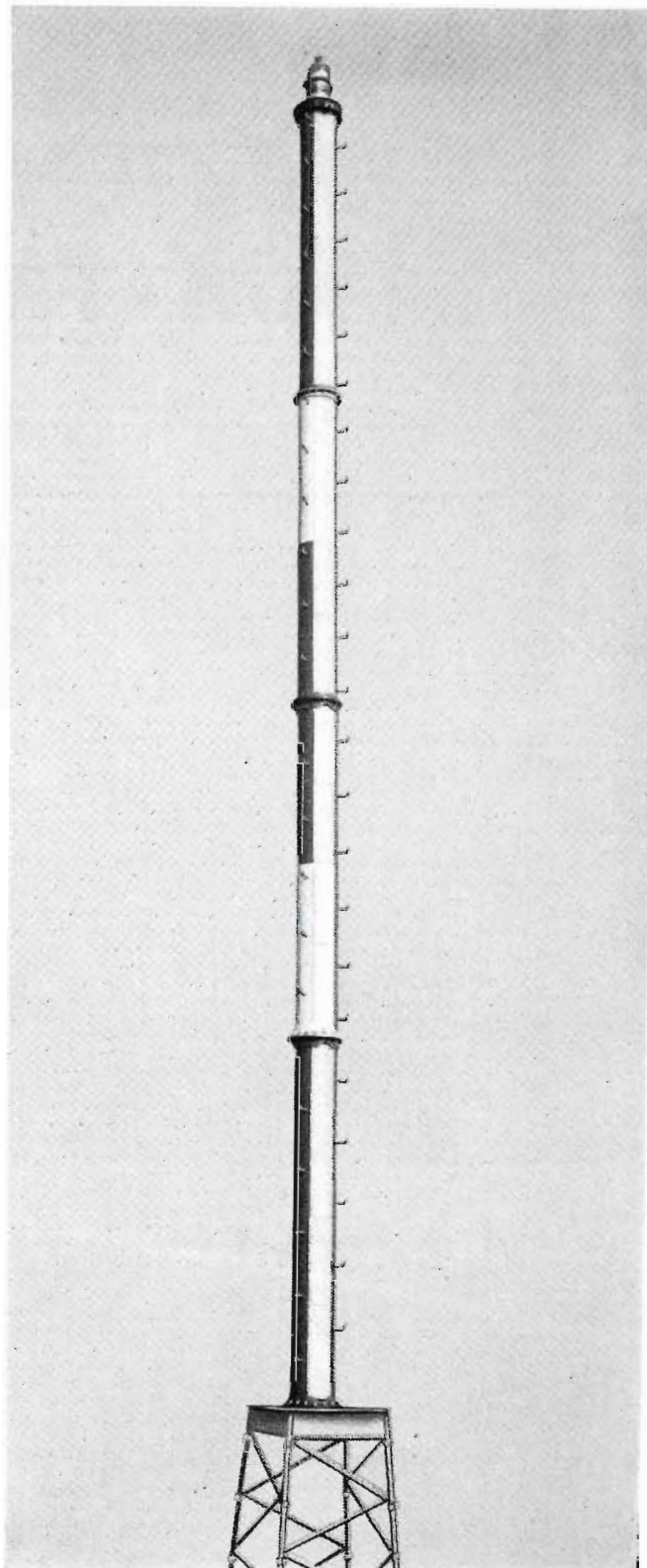
## Description

The new RCA Pylon Antenna is a radically new design of antenna for the FM broadcast band. This antenna is simpler in design, poses fewer installation problems, and provides higher gain (height for height) than any other type of FM antenna.

The Pylon is essentially a cylinder of sheet metal, mounted in a vertical position, with a narrow slot running from top to bottom. This cylindrical structure itself is the radiator. The operation may be best understood by considering the edges of the slot as an open wire transmission line, and the cylinder as an infinite number of horizontal loops. The cylinder is approximately a wave length long and a half wave length in circumference. When properly excited, at the midpoint, there is a voltage distribution along the slot similar to that along any full wave transmission line shorted at both ends. This voltage excites the cylindrical portion, and results in horizontally polarized radiation. The Pylon has an essentially circular radiation pattern. Its gain depends upon the number of stacked sections. The basic cylindrical section is approximately thirteen and one-half feet high and twenty inches in diameter. The sections may be stacked, one on top of the other, with the gain increasing in a direct linear proportion. For example, at 98 megacycles, a single section will have a gain of one and a half, two sections will have a gain of three, four sections a gain of six, and eight sections a gain of twelve. For a given number of sections, there is a model of the Pylon designed to operate in either the lower or upper half of the FM broadcast band.

The Pylon can be safely mounted almost anywhere. Its low weight places a minimum of load and stress on any building or tower on which it might be mounted, and it is entirely self-supporting in its mounting. There are no appendages or protruding elements which high winds would cause to loosen or fall, or which would require bracing against the possibility of ice loading. Icing is a negligible problem with the Pylon because the transmission lines are inside the cylinder where ice formation is unlikely. The formation of ice on the outside will add only a negligible amount to the total weight and loading. De-icing equipment is not considered necessary.

The Pylon presents extremely simple installation problems. One feed point per section is all that is required. One-, two- and four-section Pylons can be completely assembled on the ground and raised to position as a unit. Therefore, only one transmission line connection need be made "in the air." For the four section antenna, only two connections "in the air" are required. Maintenance problems for this antenna are reduced by the extreme simplicity of the feed line arrangements, the small number of end seals, and the fact that the lines are enclosed within the cylinder. Provision is made for mounting a standard 300 mm. code beacon on the top of the antenna. Wiring to this lamp may run outside the cylinder. Steps on the cylinder provide a means of servicing the lamp or inspect-



ing the slot. The slot is normally covered with a strip of polyethylene for the purpose of excluding water, ice and other foreign matter. If it should ever become necessary to service the transmission line harness within the Pylon, the securing bolts, which are accessible at the slot, may be removed, and the harness lowered to the ground. Shackles are provided at the top of the Pylon, both inside and out, to permit the rigging of a boatswain's chair and for the purpose of facilitating the lowering and raising of the harness.

## There Is A Pylon For Every Application

In order to meet the requirements of the many different sets of circumstances under which an FM antenna may be installed, the Pylon has been made available under several different classifications, each of which serves the needs of a particular application. The three basic types of Pylons are designated as: The Standard Pylon, the Heavy Duty Pylon, and the Low Power Pylon. The 8-section Pylon is a combination of the Standard and the Heavy Duty types.

### Standard Pylon

The Standard Pylon is designed to meet the requirements of the average FM installation. It meets all of the RMA specifications, and will safely handle the output of any FM transmitter —up to 50 kw. This Pylon is constructed of aluminum and is designed to combine the maximum of strength and rigidity with the minimum of weight. It meets the RMA recommended wind loading capability equivalent to a wind velocity of 87 mph, assuming the structure to be covered with a half inch layer of ice.

### Heavy Duty Pylon

The Heavy Duty Pylon is designed primarily to support the RCA Super Turnstile Television Antenna and to form the lower half of the 8-section Pylon. Used either way the combination meets the RMA recommended wind loading capacity of at least 87 miles per hour. Like the Standard Pylons, these units are capable of handling any power up to 50 kw. The Heavy Duty Pylons used alone are especially applicable where high winds of hurricane intensity can be expected. When not supporting TV antennas, they will withstand wind velocities in excess of 160 miles per hour.

### Low Power Pylon

The Low Power Pylon is an ideal FM antenna for low power FM stations not requiring exceptionally high gain. It also can be used as a standby antenna for stations normally operating at higher power. Made of sheet steel, hot-dip galvanized, it will handle a power of 3 kw, and will withstand a wind velocity of 87 mph. The Low Power Pylon provides a low cost installation, and has the same gain as the other single section Pylons.

### Eight-Section Pylon

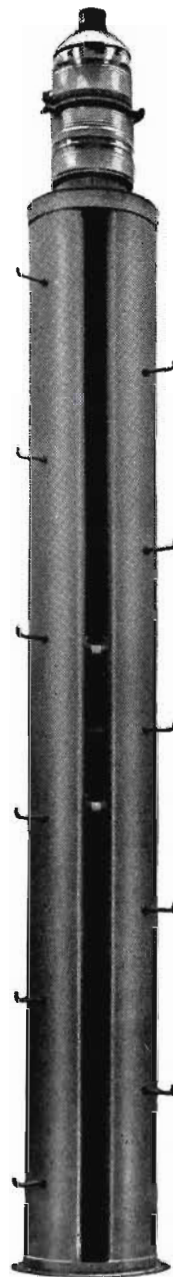
The Eight-Section Pylon combines features which cannot be found in any other type of FM Antenna. To the broadcaster desiring high power handling capability at high gain, it gives a gain of 12 with power input up to 100 kw. Particularly advantageous use can be made of this power rating where dual operation by separate stations operating with a combined output of over 50 kw is contemplated. (The whole gain of 12 is, of course, applied to both stations in such a case.) The easily adjusted deflectable beam directs maximum signal at or below the horizon, as desired. Optimum beyond-the-horizon

coverage is thus assured for any set of terrain conditions, or increased local signal made possible where necessary. Application of Sectionalizing equipment makes possible the operation of either the top or bottom four sections by themselves or of all eight together.

The Eight-Section Pylon is a combination of a Standard four-section and a Heavy Duty four-section unit with suitable phasing equipment. It is designed to meet RMA recommendations of wind loading capacity of at least 87 mph with  $\frac{1}{2}$ " of ice loading.

### Dual Operation

All Pylons lend themselves to common use by two separate broadcasting stations, thus affecting great economy in tower and antenna equipment. Employment of one of the line of RCA Notch Filter Units assures freedom from objectionable cross-modulation with a maximum power transfer to the antenna.



*Low Power Pylon*

# Engineering Data For Pylon Antennas

## STANDARD PYLONS

Type No.	Sec-tions	Fre-quency Range (Mcs.)	Nom-inal Power Gain	R (lbs.)	h <sub>1</sub> (ft.)	h <sub>2</sub> (ft.)	D <sub>1</sub> (in.)	D <sub>2</sub> (in.)	W (lbs.)	Stock Identifi-cation
BF-11A	1	88-97.4	1.5	501	7.5	13.5	19.5	22 <sup>5</sup> / <sub>8</sub>	350	MI-28221-A
BF-11B	1	96.4-108	1.5	501	7.5	13.5	19.5	22 <sup>5</sup> / <sub>8</sub>	350	MI-28221-B
BF-12A	2	88-96.5	3.0	950	14	27	19.5	22 <sup>5</sup> / <sub>8</sub>	700	MI-28222-A
BF-12B	2	94.5-108	3.0	950	14	27	19.5	22 <sup>5</sup> / <sub>8</sub>	700	MI-28222-B
BF-14A1	4	88-98	6.0	1868	27.5	54	19.5	22 <sup>5</sup> / <sub>8</sub>	2000	MI-28224-XY
BF-14B1	4	97.6-108	6.0	1868	27.5	54	19.5	22 <sup>5</sup> / <sub>8</sub>	2000	MI-28224-XY
BF-18A	8	88-97	12.0	3746	55.4	109.7	20.0	27	13434	MI-28228-A
BF-18B	8	97-108	12.0	3746	55.4	109.7	20.0	27	13434	MI-28228-B

## HEAVY DUTY PYLONS

BF-12E	2	88-96	3.0	1028	14.7	27.8	20.0	25	4802	MI-28222-E
BF-12F	2	94-108	3.0	1028	14.7	27.8	20.0	25	4802	MI-28222-F
BF-14J	4	88-96	6.0	1974	28.6	55.7	20.0	27	11500	MI-28224-J
BF-14K	4	96-108	6.0	1974	28.6	55.7	20.0	27	11500	MI-28224-K

## LOW POWER PYLONS

BF-21A	1	92-95	1.5	515	7.75	13.5	19.8	22	376	MI-28231-A
BF-21D	1	94-108	1.5	419	5.9	11.8	17.8	20	312	MI-28231-D

### LEGEND—

R Wind force. Equivalent to 87 mph wind, RMA Standard.

h<sub>1</sub> Height of center of wind force.

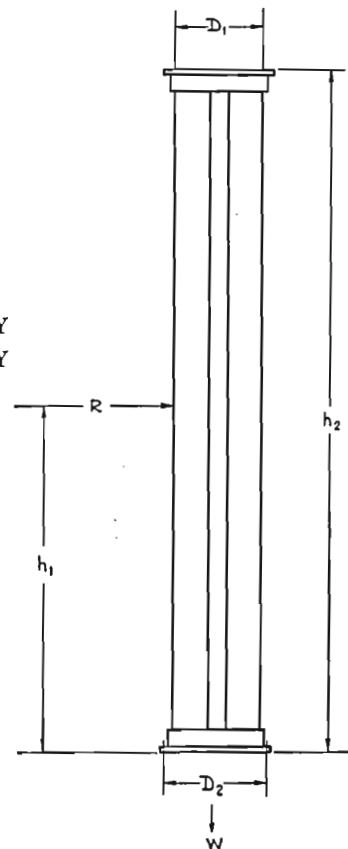
h<sub>2</sub> Height of antenna. Does not include beacon (3 feet).

D<sub>1</sub> Diameter of cylinder.

D<sub>2</sub> Diameter of flange bolt circle.

W Total weight including beacon lamp.

The Pylon is furnished complete with transmission line harness, fittings, mounting flanges, and all hardware. The harnesses of all Pylons except low power types terminate in 51.5 ohm, 3<sup>1</sup>/<sub>8</sub>" flanged line at the base of the antenna. Low power harnesses terminate in 51.5 ohm <sup>7</sup>/<sub>8</sub>" flange. The standing wave ratio is, in all cases, less than 1.5. Connectors are available to couple the antenna to a <sup>7</sup>/<sub>8</sub>", 1<sup>5</sup>/<sub>8</sub>", 3<sup>1</sup>/<sub>8</sub>", or 6<sup>1</sup>/<sub>8</sub>" plain or flanged transmission line. Where requested, RCA will also be glad to quote on tower and installation.



### Accessory Equipment

Supporting Structures and Fittings \_\_\_\_\_ On application

Coaxial Transmission Line for use from Antenna to Transmitter \_\_\_\_\_ On application

FM-AM Isolation Unit Type BAF-14A \_\_\_\_\_ MI-28227A/B

Sectionalizing Kit for Eight-Section Pylon \_\_\_\_\_ On application

Notch Filter \_\_\_\_\_ On application

# Engineering Data For Pylon Super Turnstile Combination

The combined antenna structures are designed to withstand a maximum wind velocity of 85 mph when coated with 1/2" radial ice. Maximum unit stress = 20,000 lbs. per square inch. Reaction "R" shown is for estimating purposes only and is calculated on the basis of 20 lbs. per square foot (equivalent to 30 P.S.I. for flats) of projected area without ice. All sections are rounds. "W" = total dead weight, including pole, 300 mm code beacon, pole steps, special connection between FM pylon and TV pole, transmission lines, Pylon, and miscellaneous hardware.

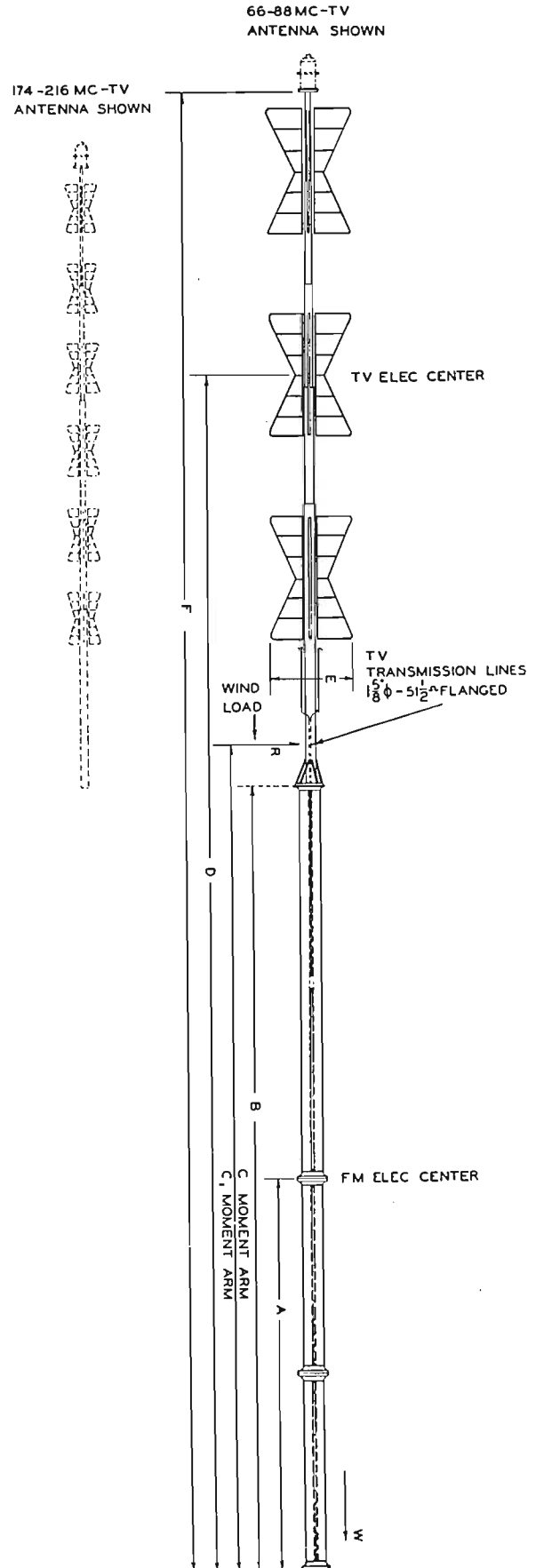
TABLE OF ORDERING INFORMATION\*

Item	TV Channels	TV Freq. Band	TV Sections	TV MI-	FM Sections	FM Freq. Band	FM MI- Separate Sections	FM MI- Combined Sections	FM Pylon Type No.	TV Sales Type No.
1	7-13	174-216 mc	6	19013-A	2	88-96 mc 94-108 mc	28222J 28222K	28222E 28222F	BF-12E BF-12F	TF-6B
2	7-13	174-216 mc	6	19013-A	4	88-96 mc 95-108 mc	28224G 28224H	28224J 28224K	BF-14J BF-14K	TF-6B
3	4,5,6	66-88 mc	3	19012-D	2	88-96 mc 94-108 mc	28222J 28222K	28222E 28222F	BF-12E BF-12F	TF-3B
4	4,5,6	66-88 mc	3	19012-D	4	88-96 mc 96-108 mc	28224G 28224H	28224J 28224K	BF-14J BF-14K	TF-3B
5	2,3	54-66 mc	3	19012-C	2	88-96 mc 94-108 mc	28222J 28222K	28222E 28222F	BF-12E BF-12F	TF-3B
6	2,3	54-66 mc	3	19012-C	4	88-96 mc 96-108 mc	28224G 28224H	28224J 28224K	BF-14J BF-14K	TF-3B
7	4,5,6	66-88 mc	4	19017-D	2	88-96 mc 94-108 mc	28222J 28222K	28222E 28222F	BF-12E BF-12F	TF-4A
8	4,5,6	66-88 mc	4	19017-D	4	88-96 mc 94-108 mc	28224G 28224H	28224J 28224K	BF-14J BF-14K	TF-4A

\* PLUS 300 MM CODE BEACON.

TABLE OF SPECIFICATIONS

ITEM	1	2	3	4	5	6	7	8
FREQ MC	74-216	74-216	66-88	66-88	54-66	54-66	66-88	66-88
TV NO OF SECTIONS	6	6	3	3	3	3	4	4
APPROX. PWR GAIN	6.9	6.9	3.8	3.8	3.6	3.6	5.0	5.0
FM NO OF SECTIONS	2	4	2	4	2	4	2	4
FM APPROX. PWR GAIN	3	6	3	6	3	6	3	6
A	13' 11"	27' 10"	13' 11"	27' 10"	13' 11"	27' 10"	13' 11"	27' 10"
B	27' 10"	55' 8"	27' 10"	55' 8"	27' 10"	55' 8"	27' 10"	55' 8"
C	33' 2"	46' 2"	35' 8"	4' 9"	40' 3"	54' 2"	41' 5"	55'
D	54' 6 7/16"	82' 4 7/16"	56' 3 1/2"	84' 1 1/2"	60' 1 1/2"	87' 11 1/2"	61' 5 1/2"	89' 3 1/2"
E	3' 2"	3' 2"	6' 11"	6' 11"	8' 11"	8' 11"	6' 11"	6' 11"
F FT	72' 6 1/2"	100' 4 1/2"	75' 11 1/2"	103' 9 1/2"	84' 1"	111' 11"	88' 2"	116' 0"
R LBS	2100	3050	2300	3250	2730	3670	2780	3720
W LBS WITH COMBINED SECTIONS	6982	13,660	8487	15,185	9893	16,591	10,620	17,318
W LBS WITH SEPARATE SECTIONS	7282	13,980	8787	15,485	10,193	16,891	10,920	17,618
AREA SQUARE FT WITHOUT ICE	105	157	119	171	141	193	141	193
AREA SQUARE FT WITH 1/2" RADIAL ICE	135	190	150	204	181	235	183	237
MOMENT IN FOOT POUNDS NO ICE AT TOWER TOP	69,720	140,910	82,340	159,250	110,020	198,920	115,370	204,600
C' WITH 1/2" RADIAL ICE	34.7'	48'	38.5'	50.4'	44'	58.8'	45'	59.8'
R LBS WITH 1/2" RADIAL ICE	2310	3300	2600	3590	3550	4550	3590	4580
MOMENT IN FOOT POUNDS WITH 1/2" RADIAL ICE AT TOWER TOP	80,160	158,400	100,100	180,930	156,200	269,600	161,550	273,880



# AM-FM Isolation Unit, Type BAF-14A



## Features

- Accommodates up to 5 kw FM power.
- Isolates for AM power up to 50 kw.
- No tuning adjustments required.
- FM power transfer approximately 99% efficient.
- Maintains low standing wave ratio on any FM channel (SWR less than 1.15 any channel).
- Equipped with swivel transmission line flanges.
- Lightweight, compact—easy to install.
- Inserts directly in FM transmission line—no additional support required.
- Rugged design includes heavily reinforced lid and bottom channel . . . and oversize ceramic insulators.

## Uses

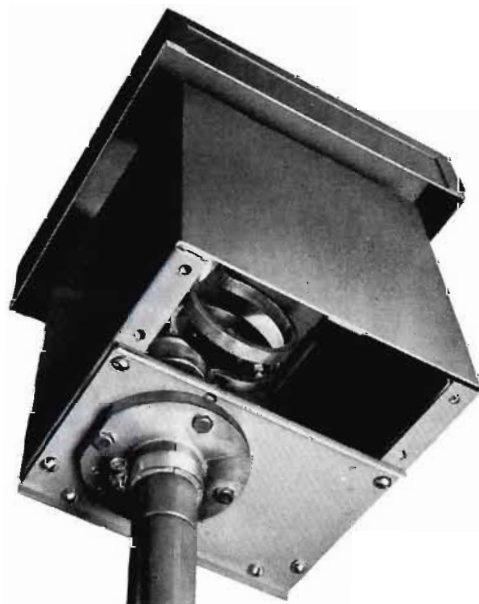
The RCA Type BAF-14A FM-AM Isolation Unit is a device for transferring FM power across the insulating zone of an AM antenna tower to feed an FM antenna mounted atop the tower. It is designed to provide complete isolation of FM and AM signals and efficient operation over the entire FM frequency range.

## Description

The circuit of the FM-AM Isolation Unit consists of two series resonant circuits coupled together to such a degree as to provide excellent band-pass characteristics over a range of frequencies from 88 to 108 megacycles. The inductors consist of solid copper loops, and the capacitors consist of built-in concentric line reactances which are concentric with the input and output inner conductors. The input assembly is insulated from the output assembly and there remains a stray capacitance of approximately 65 mmfd. across the insulator. The effect of this capacitance in shunt with the AM input impedance is negligible.

Equipped with *Swivel flanges* at both the input and output, the BAF-14A may be easily, and economically installed without any special expensive coaxial fittings. Suggested mountings of the isolation unit for towers with and without guys are shown in sketches below. The flanges connect to standard 1 $\frac{5}{8}$ " 51.5 ohm flanged line which extends from top and bottom of the BAF-14A unit. The swivel feature permits perfect line-up of *flange mounting holes* of the BAF-14A with those of the line entering the top of the unit from the antenna and those of the line entering the bottom of the unit from the transmitter.

The isolation unit is housed in a sturdy, yet compact and lightweight metal box and is self-supporting, when mounted directly in the transmission line. The finish of the BAF-14A housing consists of a heavy electro-galvanized plating plus a weatherproof, baked enamel coating capable of withstanding long periods of exposure. All FM and AM insulation material is fully protected. Access to the interior of the housing for inspection or maintenance is made by means of a removable screen panel on the bottom. Provision is made for carrying the gas pressure across the unit with a high-pressure composition hose.



Closeup of BAF-14A with bottom shield removed

**Specifications**

Frequency Range \_\_\_\_\_ 88-108 mcs  
 Transmission Line Impedance \_\_\_\_\_ 51.5 ohms  
 Input Impedance \_\_\_\_\_ 51.5 ohms with less than 1.15 VSWR  
 Maximum FM Power \_\_\_\_\_ 5 kw  
 Maximum AM Base Voltages \_\_\_\_\_ Base insulator voltage should not exceed 14,000 volts peak at 100% modulation  
 FM Efficiency \_\_\_\_\_ Approximately 99%

Weight (net) \_\_\_\_\_ 29.5 lbs.  
 Stock Identification:  
 88 to 92 mc \_\_\_\_\_ MI-28227-1  
 92 to 108 mc \_\_\_\_\_ MI-28227-2

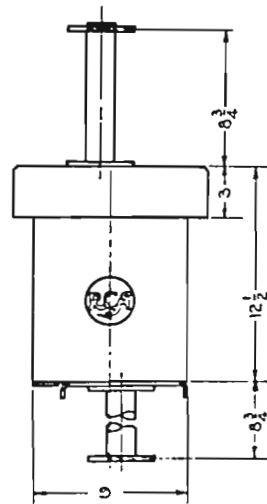
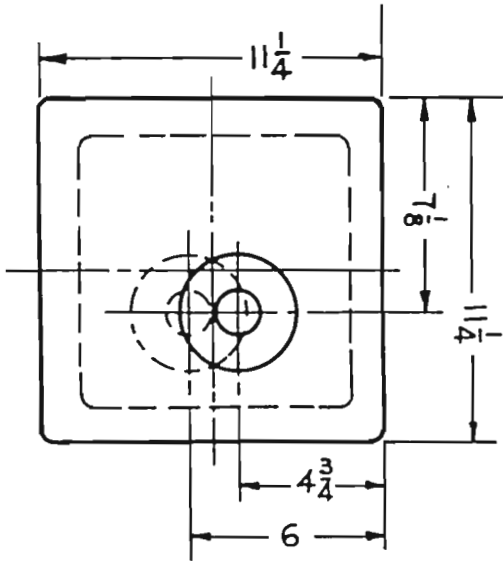
**Dimensions:**

Height (Housing) \_\_\_\_\_ 12 1/4"  
 Height (Overall, including line extensions) \_\_\_\_\_ 30"  
 Width \_\_\_\_\_ 9"  
 Depth \_\_\_\_\_ 11 1/4"

**Accessories**

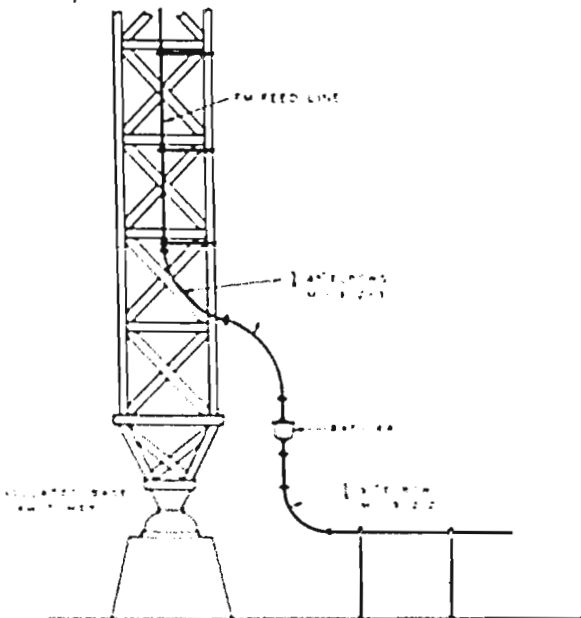
3/8" to 1/8" Flange-to-flange Reducer \_\_\_\_\_ MI-19112-6  
 1 5/8" to 7/8" Flange-to-flange Reducer \_\_\_\_\_ MI-19309-6  
 These adapters are necessary only if an FM feed line other than 1 5/8" diameter is used.

**OUTLINE DRAWINGS**

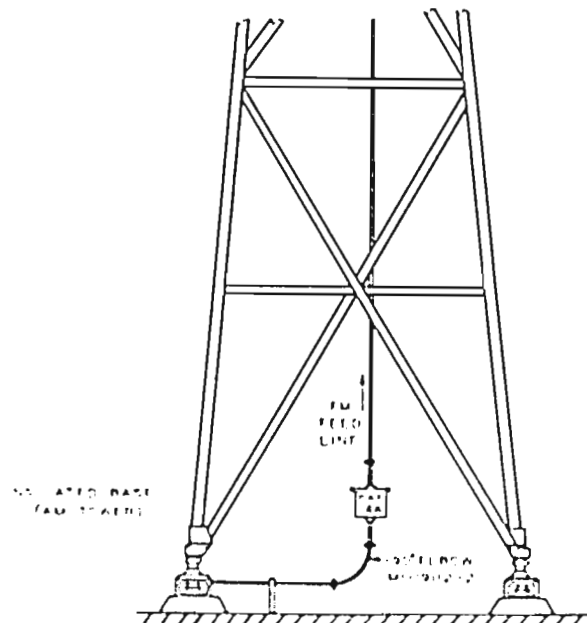


**SUGGESTED BAF-14A MOUNTINGS**

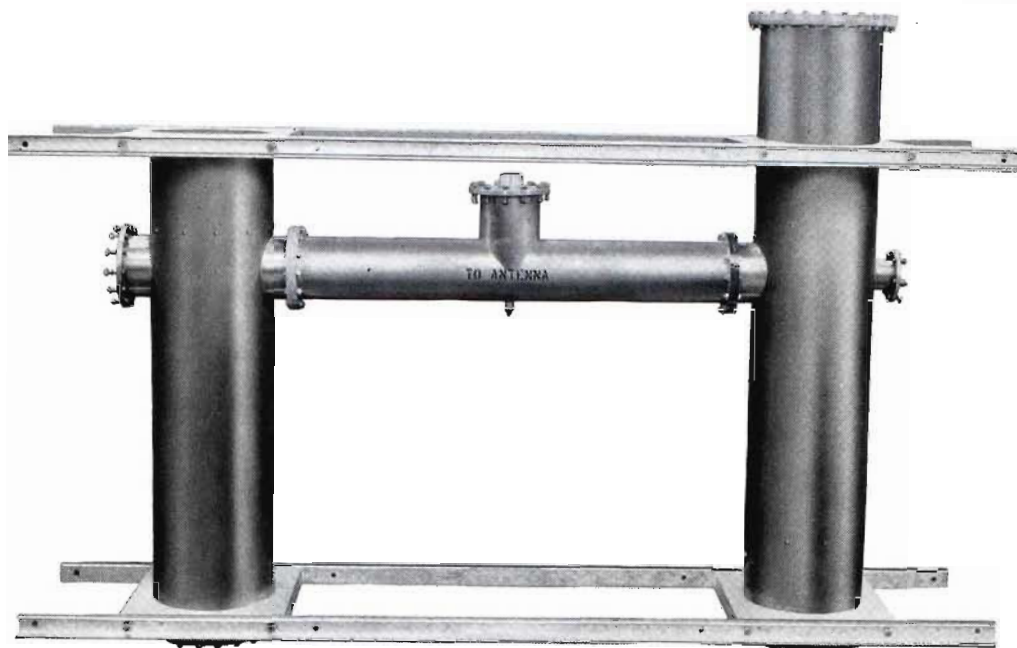
FOR GUINED TYPE TOWER



FOR SELF-SUPPORTING TYPE TOWER



# FM Notch Filters, Types MI-28051, MI-28052



## Features

- Permits dual FM operation with single antenna.
- Economical of space.
- Pretuned at factory.

## Use

The RCA FM Notch Filter is a coaxial-type filter designed to permit the feeding of two separate FM signals into a single transmission line and thence to a single FM antenna. The filters are applicable where two FM stations desire to use the same antenna, thus effecting savings in transmission line, antennas, towers and perhaps transmitter buildings. Two units are available with power ratings of 50 kw (Type MI-28051) and 10 kw (Type MI-28052). These power ratings are ap-

plicable to one input of the dual input filter. Thus a 10 kw filter can accommodate a maximum power of 20 kw, 10 kw on each input, and a 50 kw can handle a total input of 100 kw. Any power up to the rating can be used on either input of the filter.

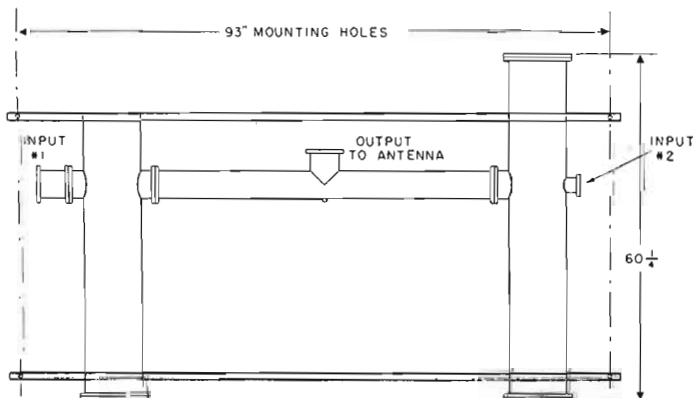
## Description

Sturdily built, compact, weatherproof and gas tight, the FM Notch Filters can be mounted indoors at either one of the stations, or at some outdoor location convenient to both stations. FM notch filters can be obtained for any frequency spacing, within the FM band, down to a minimum of two megacycles. The exact efficiency of the filter depends upon the spacing used, but even at two megacycles the efficiency is practically 100%.

Accessories required, such as gas stops, pressure interlocks and appropriate connectors to standard 51.5 ohm line depend on the size line in use. These items are described in full under "Transmission Line Equipment" pages.

## Specifications

Frequency Range \_\_\_\_\_ (Specified) between 88-108 mc  
 Input and Output Impedance \_\_\_\_\_ 51.5 ohms  
 Minimum Carrier Separation \_\_\_\_\_ 2 mc





# TV Super Turnstile Antennas

## Features

- Radiates over wide band with good efficiency and high gain.
- Rugged mechanical construction assures long life.
- Radiators attached directly to steel pole at top and bottom—no weight supported by insulators.
- Grounded for lightning protection.
- No coupling networks required at tower top.
- Low wind resistance.

## Description

The RCA Super Turnstile is a television transmitting antenna designed for television channels 2-13. The Super Turnstile radiates equally well in all directions and also provides a substantial power gain. Because of its high gain, circular coverage, and rugged construction, the Super Turnstile has become the standard antenna of the television broadcast industry.

Increased gain is accomplished by concentrating the radiation at a low vertical angle. This gain increases with the number of sections or layers used in the antenna. Single-section, two-section, three-section, four-section, five-section, and six-section Super Turnstiles are available. An antenna with six layers provides a power gain of approximately 7. (For television antennas with greater gain, see "Super Gain" antenna on another page of this catalog.)

Each section of the Super Turnstile antenna consists of four radiators, mounted at 90 degrees around the pole. Sections are mounted approximately a wavelength above each other, center to center. Electrical feed is by means of coaxial transmission lines. The line feeds the center of the radiator, so that only the central part is subject to impedance change due to ice formation. Such ice formation can be alleviated by the use of sleet melting resistors which are available as accessories.

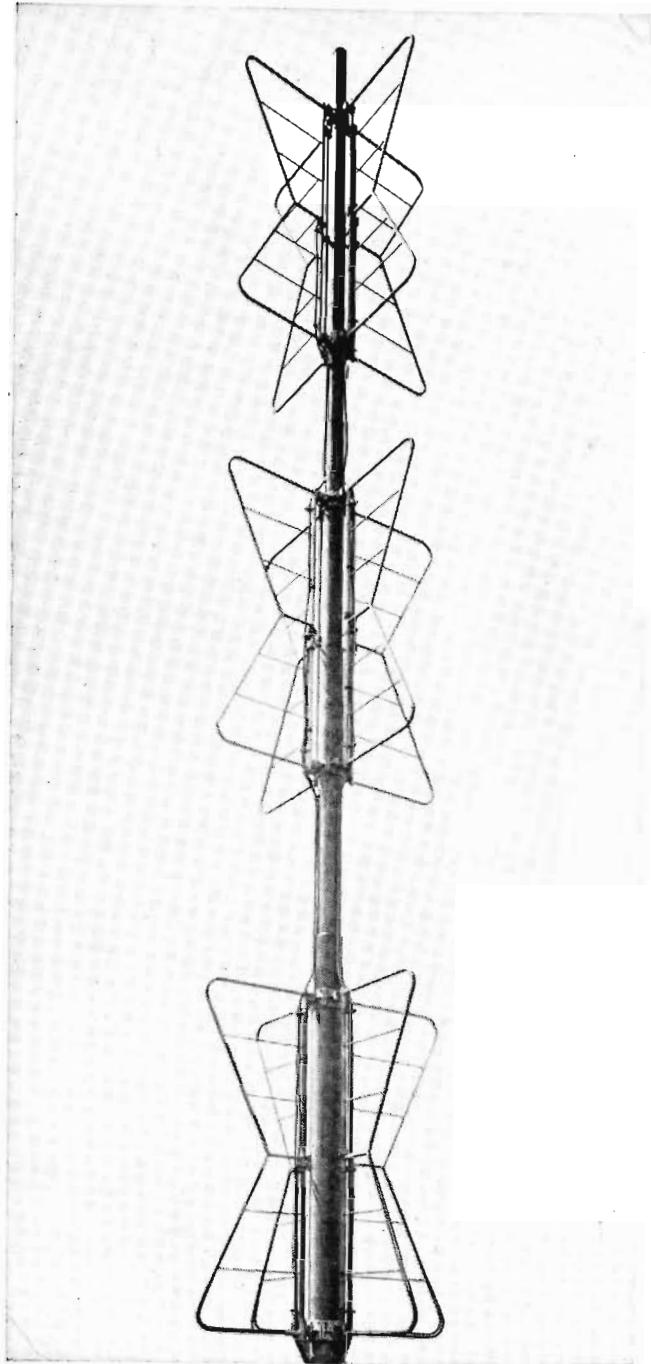
## Specifications

Super Turnstile antennas are designed to withstand a maximum wind velocity of 85 miles per hour when coated with  $\frac{1}{2}$ " radial ice and a maximum wind velocity of 95 miles per hour when there is no ice. The antennas are designed for total transmitter power of 20 kw.

### SINGLE-SECTION ANTENNA

(Dimensions shown on diagram)

Type Number	TF-1A	TF-1C
Stock Identification	MI-19015-3	MI-19015-2
Number of Sections	1	1
Channels	4, 5, & 6	2 & 3
Frequency Band	66-88 Mc.	54-66 Mc.
W** Llbs.	625	937
H <sub>2</sub> Feet	13' 0"	15' 0"
H <sub>3</sub> Feet	8' 4"	9' 3½"



*Three Section Super Turnstile. The pole is self-supporting and may be mounted on top of a suitable building, mountain or tower.*

# Super Turnstile Antennas (Continued)

## TWO-SECTION ANTENNA

Type Number	TF-2A
Stock Identification	MI-19002
No. of Sections	2
Channels	7 to 13
Frequency Bands	174-216 Mc.
W** Lbs.	1960
H <sub>2</sub> Feet	37' 3"
H <sub>3</sub> Feet (Elec. Center)	31' 2 $\frac{1}{8}$ "

## THREE-SECTION ANTENNAS

Type Number	TF-3A/B*	TF-3A/B*
Stock Identification	MI-19012-A & MI-19012-C	MI-19012-B & MI-19012-D
No. of Sections	3	3
Channels	2 & 3	4, 5, & 6
Frequency Bands	54-66 Mc.	66-88 Mc.
W** Lbs.	5121	3527
H <sub>2</sub> Feet	49' 0"	40' 0"
H <sub>3</sub> Feet (Electric Center)	25' 0"	20' 4"

## FOUR-SECTION AND FIVE-SECTION ANTENNAS

Type Number	TF-4A	TF-5A	TF-5B
Stock Identification	MI-19017-A	MI-19018-A	MI-19029
No. of Sections	4	5	5
Channels	4, 5, & 6	4, 5, & 6	2 & 3
Frequency Bands	66-88 Mc.	66-88 Mc.	54-66 Mc.
W** Lbs.	4423	5963	11709
H <sub>2</sub> Feet	54' 8"	68' 9"	83'
H <sub>3</sub> Feet (Elec. Center)	27' 11 $\frac{1}{2}$ "	35' 0"	42'

## SIX-SECTION ANTENNAS

Type Number	TF-6A/B*
Stock Identification	MI-19013 & MI-19013-A
No. of Sections	6
Channels	7 to 13
Frequency Bands	174-216 Mc.
W** Lbs.	2108
H <sub>2</sub> Feet	37' 3"
H <sub>3</sub> Feet (Elec. Center)	19' 2 $\frac{1}{8}$ "

Chart Showing Mid-Channel Gain of Various Super Turnstile Antennas

Channel	2	3	4	5	6	7	8	9	10	11	12	13
TF-1A			1.2	1.2	1.2							
TF-1C	1.2	1.2										
TF-2A						2.4	2.4	2.4	2.4	2.4	2.4	2.4
TF-3A/B*	3.4	3.7										
TF-3A/B*			3.3	3.6	4.2							
TF-4A			4.5	5.1	5.5							
TF-5A			5.5	6.2	6.8							
TF-5B	5.8	6.2										
TF-6A/B*						6.4	6.5	6.7	6.8	6.9	7.0	7.2

\* A indicates tower mounting type; B, Pylon mounting.

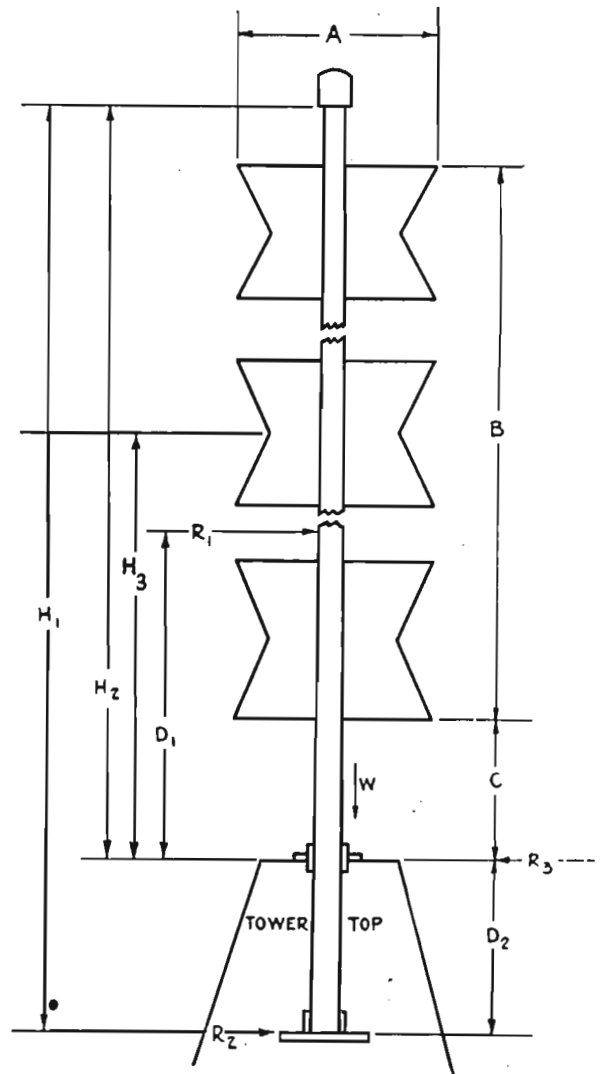
## Accessories Available

### SLEET-MELTING EQUIPMENT, MI-19009

MI Number	Description	Rating of One Heater Element
MI-19009-B	54-66 Mc., TV Antenna	115 v., 6.5 amps., 750 watts
MI-19009-C	66-88 Mc., TV Antenna	115 v., 4.4 amps., 500 watts
MI-19009-D	174-216 Mc., TV Antenna	115 v., 2.2 amps., 250 watts

The MI-19009 kit contains four enclosed heater elements, together with the necessary connector material, for a single section of a Super Turnstile antenna. (Thus, three MI kits are required for a 3-section antenna.)

For information not included on these pages, write for Specifications AS5979-C.



\* Type number followed by A indicates tower mountings, and followed by B indicates Pylon mounting.  
 \*\* W = total weight, including pole, guide flange, pole socket, 300 mm beacon, pole steps and miscellaneous hardware.

# Television Diplexer, Type TX-2A

## (Bridge Type)



### Features

- Permits feeding both aural and visual signals to one transmitting antenna.
- Compact, saves floor space—can be mounted overhead with transmission line.
- Easy to install.
- Enclosure keeps out dust.
- Furnished precut to channel—no adjustment required.

### Uses

The Diplexer is a device constructed of transmission line sections which permit feeding both the aural and visual counterparts of the television signal to the same Super Turnstile antenna without detrimental crosstalk. This makes it possible to use one antenna for radiating both the aural and visual signals.

### Description

The Diplexer is of the split-balun type, in which a single coaxial line-section constitutes two arms of a Wheatstone

bridge and also serves as the inner conductor of the aural input. The schematic diagram shows the elements of the bridge circuit. As can be seen, the antenna has two inputs: one to the E-W radiators and the other to the N-S radiators. Thus, these two loads are the two resistance loads in the Wheatstone bridge. The two arms of the split-balun provide the reactance arms on the left side of the bridge circuit, and also constitute the aural input circuit.

### Specifications

Frequency	_____54-216 mc (cut to specified channel)
Power Rating	_____5 kw
R F Efficiency	_____99%
Input and Output Impedance	_____51½ ohms
Dimensions	_____(See drawing and accompanying table below)
Weight	_____12-30 lbs. (depending on channel)
Stock Identification	_____MI-19028

# Television Notch Diplexer

### Use

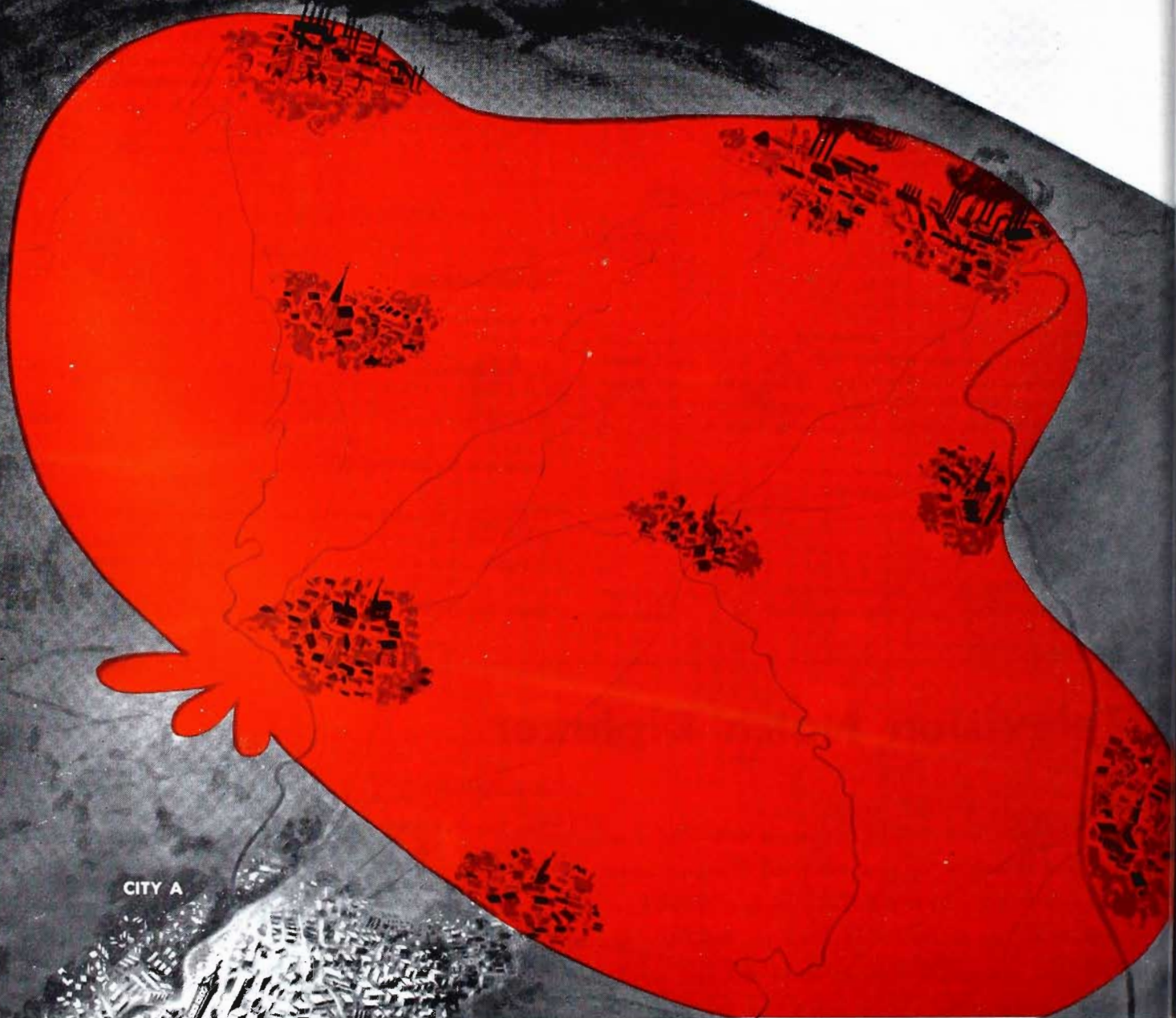
The Television Notch Diplexer is a custom made filter of the type used to combine the aural and visual transmitter output into a single transmission line. The diplexer is designed particularly for use in transmission lines for Super-Gain and directional antennas; however, it can be used with any TV antenna which utilizes a single transmission line.

### Description

The Notch Diplexer consists of coaxial line sections arranged to "notch-in" the sound transmitter without detrimental feedback into the visual transmitter. The design provides the broadband required for the visual output without crosstalk into the aural transmitter.

The diplexer is designed for mounting to the ceiling at the rear of the television transmitter. Dimensions of the diplexer depend upon the frequency band used.

**Now—** *Tailored* **—with RCA's**



CITY A

# TV Coverage Patterns

## New Super-Gain TV Antenna

● To give your radiated TV signals the right pattern for the area you want to cover, RCA's custom-built Super-Gain antenna is the answer.

This antenna can be set up to radiate in one or more directions—or in all directions. It can be arranged to lay down a stronger signal in the service area most vital to you. And, if you wish, it can be arranged in such a way as to reduce your signal in other areas.

RCA's Super-Gain TV antenna is made up of pre-tuned dipoles—each backed by a reflecting screen. The units are stacked one above the other—on one or more sides of a rectangular or triangular tower. A stack of four dipoles can deliver gains of 4 to 5—and the bigger the stack the higher

the gain. (For example, a stack of twelve dipoles and screens on four sides of a tower *will deliver a power gain of 12 in all directions.*) In many cases, existing towers which have uniform cross-section can be used for mounting the antenna.

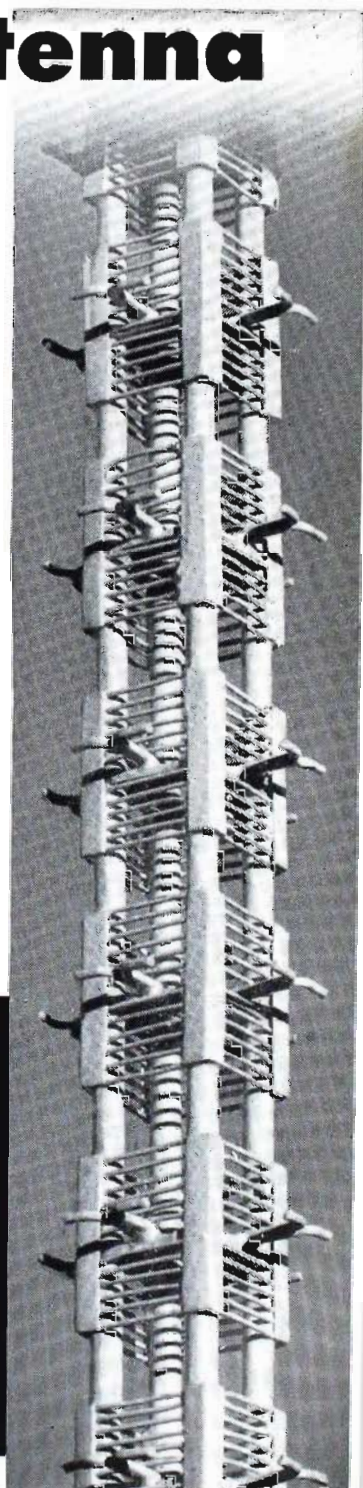
The new RCA Super-Gain TV antenna will find application for TV stations having specific coverage or interference problems. It does not, of course, *take the place of the general-coverage Super-Turnstile.*

• • •

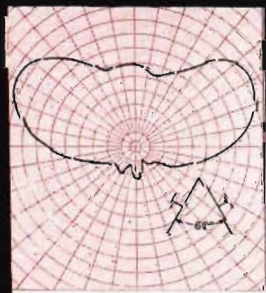
It will pay you to consider the new Super-Gain antenna when you review the coverage possibilities of your new TV station. Ask your RCA Broadcast Sales Engineer for complete data. Or write Dept. 19FA, RCA Engineering Products, Camden, N. J.

### THE NEW RCA SUPER-GAIN TV ANTENNA

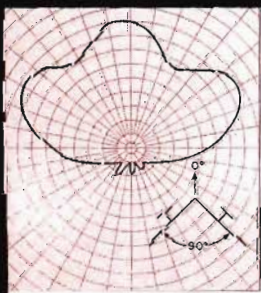
A stacked array of 6 dipoles (per side) delivers a power gain of 6 to 8. The tower for the Super-Gain Antenna might be used to support an FM Pylon or a Super-Turnstile—or both!



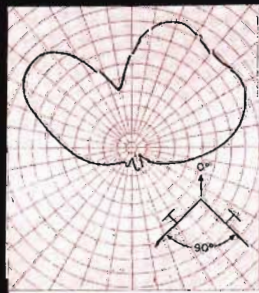
### Typical tailored coverage patterns possible with the RCA TV Super-Gain Antenna



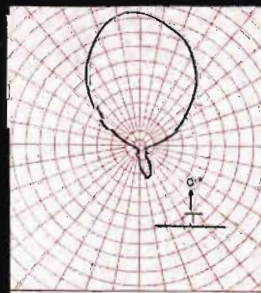
60° angle between dipoles  
0° phasing between dipoles



90° angle between dipoles  
0° phasing between dipoles



90° angle between dipoles  
90° phasing between dipoles



Single dipole radiator

# TV Super-Gain Antenna

## Features

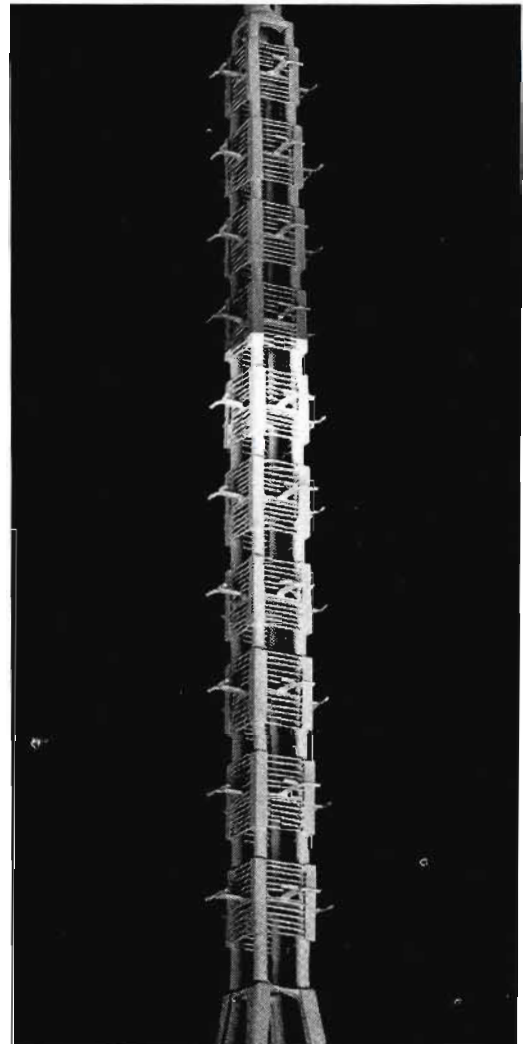
- Adaptable to most rectangular or triangular straight-sided towers.
- Provides omnidirectional power gains up to 22.
- Radiates omnidirectionally, unidirectionally or polydirectionally, as required.
- Can support other antennas such as FM Pylons and TV Super Turnstiles.
- Handles high input power and delivers output power with enormous ERP.
- Economical where unusual gain or a directional radiation pattern is required.

## Uses

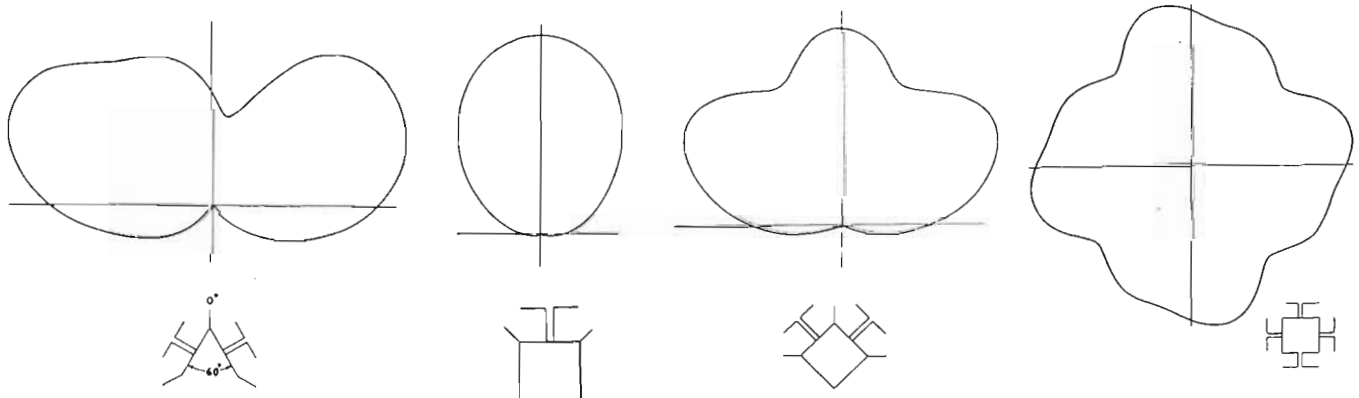
The Super-Gain TV Antenna is a special television transmitting antenna designed for TV stations which require an antenna system either with unusually high gain, or one with a directional radiation pattern. The Super Gain Antenna provides power gains as high as 22 for the type TFS-22A. Power is normally radiated omnidirectionally, thus providing essentially circular coverage; however, the Super-Gain can be constructed to radiate in one or more desired directions to obtain maximum useful coverage. This may be an important consideration for stations located in coastal regions.

## Description

The Super Gain consists fundamentally of a vertically-stacked array of horizontal dipoles each backed by a reflecting screen. Four dipoles, backed by reflecting screens and oriented at 90-degree intervals around the tower, provide an essentially non-directional pattern. Due to the backing screens, the per-



## Special Radiation Patterns Produced by the Super-Gain Antenna



formance of the Super-Gain antenna is independent of the supporting tower construction. The cross-section of the tower is determined by the operating frequency; however, the tower can be either rectangular or triangular in shape.

Gain is determined by the number of stacked layers. The type TFS-11A consists of 12 layers and provides a power gain of 11.5. The type TFS-22A consists of 24 layers and provides a power gain of 22. Directional patterns, providing much higher values of gain in the favored directions, can be obtained by placing the elements in various respective locations in the horizontal plane. A few of the many radiation patterns obtainable with the Super-Gain antenna are shown by the diagrams.

The radiators are vertically spaced a nominal 0.9 wavelength apart, providing, as close as possible, uniform current distribution throughout the height of the antenna. The Super Gain is fed by a single transmission line running up the inside of the tower. A notch-type diplexer to put both aural and visual signals on the one line is used at the transmitter. A power equalizer incorporated in the antenna tends to make all dipoles take equal power. A diagram of the feed system is shown. The feed line used is standard 51.5-ohm coaxial line, the size depending on the power to be handled.

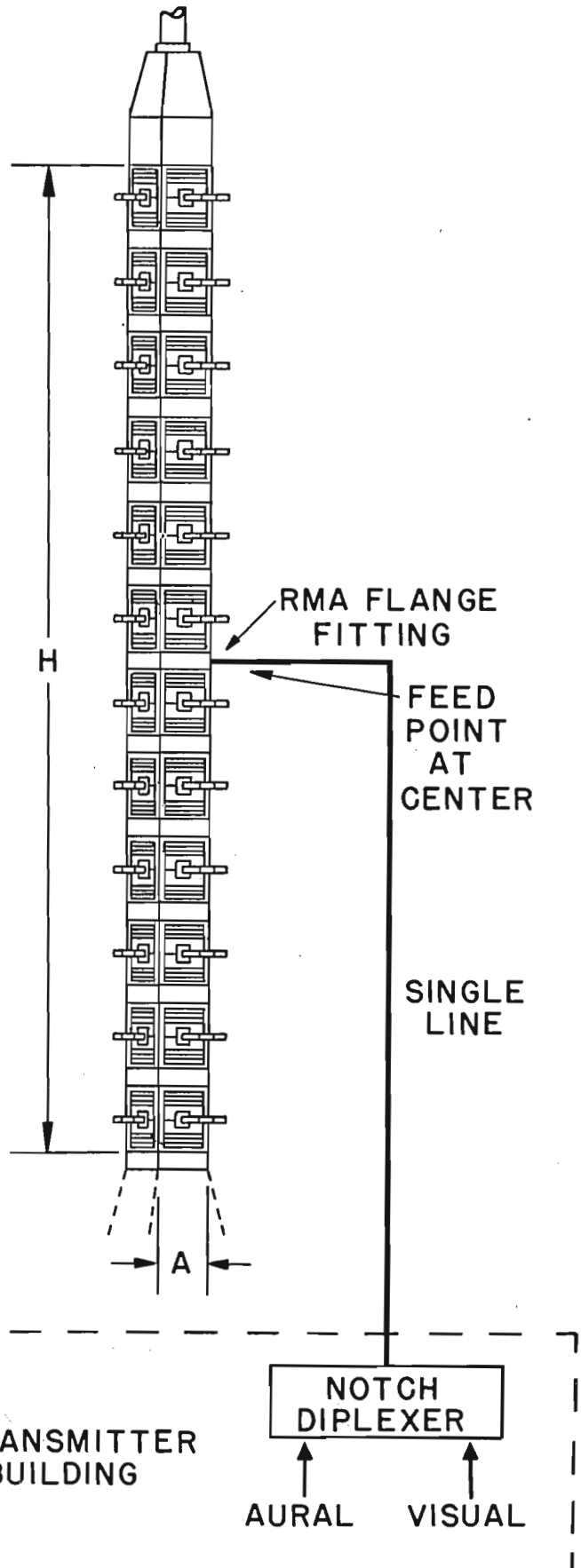
**Specifications**

Power Rating \_\_\_\_\_ 20 kw

Wind Load \_\_\_\_\_ Composite calculation by tower manufacture of RCA screens and dipoles, plus tower structure

Power Gain \_\_\_\_\_ 11.5 (12-section); 22 (24-section)

Channel	H. for Gain of 11.5	H. for Gain of 22	A
2	174 ft.	348	8.8 ft.
3	159 ft.	318	8.0 ft.
4	145 ft.	290	7.3 ft.
5	127 ft.	254	6.4 ft.
6	118 ft.	236	5.9 ft.
7 to 9	58 ft.	116	2.7 ft.
10 to 13	53 ft.	106	2.5 ft.



# Television Triplexer, MI-19023

## Features

- Permits use of one Super Turnstile antenna for both FM and TV services.
- Styled to match other transmitting equipment.
- Simple, compact design.
- Requires no elaborate accessory items.
- Small floor space requirement.

## Uses

The RCA Triplexer is designed to permit feeding three independent signals to the proper Super Turnstile Antenna from where they can be radiated with good efficiency. The need for such a system might be found by the broadcaster planning television plus FM service. In this case all three, FM signals in the 88-108 mc band, the TV picture signal and the TV sound signal can be fed through the Triplexer to one Super Turnstile Antenna, saving the broadcaster the expense of separate antennas. The broadband characteristics of the Super Turnstile make such a system very practicable.

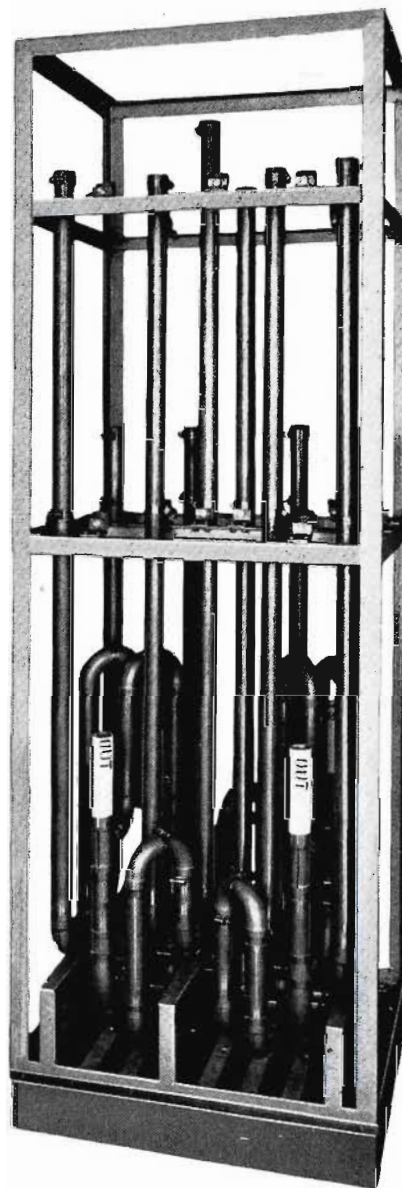
## Description

The Triplexer consists of a number of rigid coaxial line segments tuned to the frequencies of the three signals fed into it. These tuned segments act as wave traps to prevent any one of the three signals from feeding back into the feed lines of the other two.

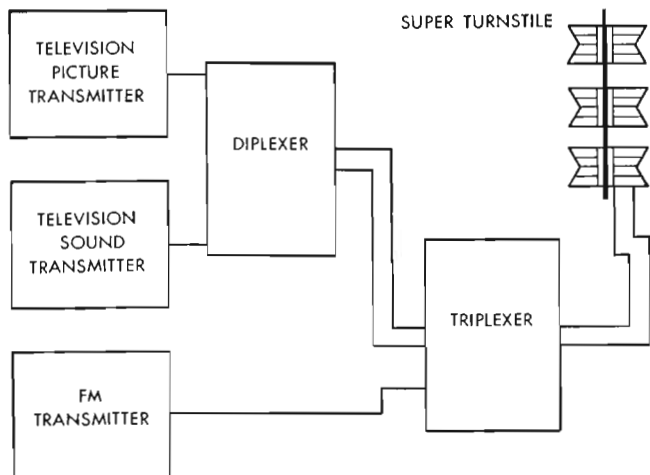
The usual arrangement is to have the TV picture and sound transmitters feed through a Diplexer to the Triplexer. The FM signal is fed directly to the Triplexer as shown in the diagram.

The FM power that can be handled by this system is limited by the standing wave ratios appearing on the lines. This is, of course, determined by the operating frequencies used. Channels 4-6 can be used with an FM input up to 10 kw.

The coaxial line assembly of the Triplexer is contained in a completely enclosed steel cabinet the same size as the standard low-frequency Diplexer unit. The Triplexer, which is installed adjacent to the Diplexer, is finished in umber-gray to match the other television units.



*Triplexer with all covers removed to show system of tunable coaxial lines. Two output connections are made near the bottom, as shown. The two input lines are at the rear and are not visible.*



## Specifications

Input and Output Impedances	51½ ohms
Height	84"
Width	22 <sup>5</sup> / <sub>8</sub> "
Depth	28 <sup>1</sup> / <sub>8</sub> "
Weight	475 lbs.



# RF Load and Wattmeter, MI-19024A

## Features

- Combines dummy TV antenna and RF power-measurement functions.
- Easily installed—occupies little space.
- Power indications given directly in watts.
- Meets FCC standards.

## Uses

The RF Load and Wattmeter, MI-19024A, is designed for use in measuring the power output of the aural and visual sections of 5 kw television transmitters. The load, which is designed for frequencies between 44 mc and 216 mc, properly terminates the output of either the visual or aural transmitter and gives a measurement of the average RF power as required by FCC standards. It is also used as a dummy antenna for transmitter tuning.

## Description

The RF Load and Wattmeter consists of a water-cooled resistor element and a current indicating meter. A small RF voltage fed from a pickup probe within the load is fed to an internal crystal rectifier. Output from the rectifier is in turn coupled through a time-constant filter network to the external meter which is calibrated to indicate average power directly in watts. The time constant of the filter is such that meter indications are accurate within  $\pm 5\%$ .

The instrument is designed for direct connection to  $1\frac{1}{8}$ " diameter 51.5-ohm coaxial transmission line. For connection to  $3\frac{1}{8}$ " 51.5-ohm, an MI-19112-6 (MI-19113-6) adapter should be ordered. An MI-19111-10 matching transformer ( $1\frac{1}{8}$ "") is supplied if the transmitter output is 72 ohms. Channel number must be specified when ordering. The power indicating meter and ten feet of connecting cable are also supplied with the unit. An ordinary tap water supply and drain can be connected to input and output water connections on the RF Load and Wattmeter.



## Specifications

Frequency Range	44-216 mc
Power Rating	5 kw
RF Input Line	$1\frac{1}{8}$ " dia., 51.5-ohm
Water Connection	$\frac{1}{2}$ " I.P.S. union
Dimensions:	
Length	33"
Diameter	5" (approx.)
Weight	46 lbs.
Type Mounting	Vertical surface
Stock Identification	MI-19024A

## Available Accessories

$1\frac{1}{8}$ " to  $3\frac{1}{8}$ ", 51.5 to 51.5 Adapter—MI-19112-6 (MI-19113-6)

# Everything for TV-

## complete antenna systems



● Up there, 737 feet above the sidewalks, is a 6-section Super Turnstile—RCA complete from transmission line to beacon light. More than sixty RCA TV antennas of this bat-wing type have been shipped to television's top stations. Many are now in use.

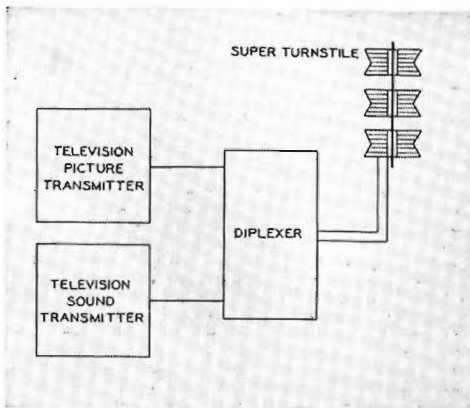
Each RCA Super Turnstile is complete—with everything needed to transmit high-quality sound-and-picture signals. A complete system includes a Diplexer for handling sound and picture signals simultaneously, transmission lines, de-icing equipment, 300-mm beacon, and all miscellaneous hardware. The system can also include a Triplexer (optional) for operating your present FM transmitter and your new television sound-and-picture transmitter . . . *simultaneously on the one antenna.*

Why are RCA Super Turnstiles the choice of nearly 90 per cent of the TV stations?

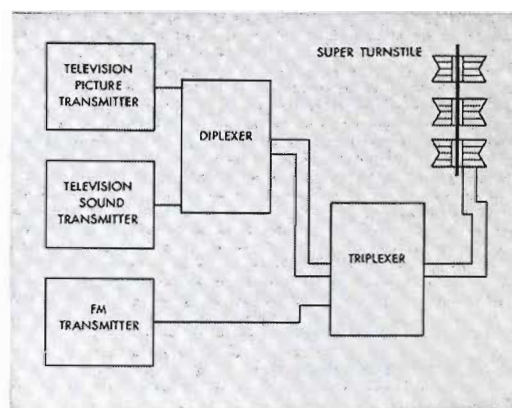
Because RCA Super Turnstiles produce a horizontal radiation pattern that is virtually circular. They provide power gains of 3.5 to 7.1, depending on the TV channel used. (For example, Type TF-3A antenna delivers an effective radiated power of over 20 kilowatts with a 5-kw transmitter on channel 6.) RCA Super Turnstiles are lightweight, have low wind resistance, are effectively grounded for lightning protection, and are easy to erect.

Get the proper start in planning your antenna system . . . and your station . . . by calling in your RCA Television Specialist. Or write Department 19LE, RCA Engineering Products, Camden, New Jersey.

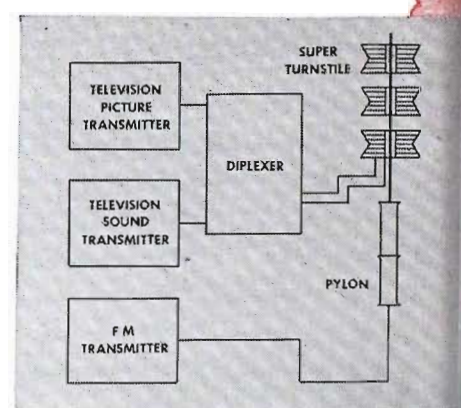
**Six-section RCA TV Super Turnstile Antenna, Type TF-6.** This single unit can be mounted on building or tower. Total weight, only 2,300 lbs. Height, 46 feet, 3 inches. Power gain, 6.4-7.1 on channels 7 to 13.



**For the Separate TV Station**



**For the Combination TV-FM Station**  
(Certain powers and channels only)



**For the Combination TV-FM Station**  
(All powers and channels not covered by 2)

**for instance**

WCAU-TV Philadelphia, on channel ten, uses an RCA 6-section TV Super Turnstile atop an RCA FM Heavy-Duty Pylon antenna. Here you see two antennas on a single self-supporting tower.

# RCA Transmission Line Equipment

## General

RCA coaxial transmission line provides an efficient means for transferring RF power to AM, FM and TV antennas. It is manufactured in various sizes and types to accommodate many different power and installation requirements.

RCA transmission line equipment features the high efficiency with which it transmits RF energy, plus the time that can be saved in its installation. Ease of installation is due to the RCA-developed flanged line which is now used in all types of radio and television installations. This line is supplied in convenient lengths with flanges silver soldered to the ends. Thus, line sections can be quickly and easily bolted together. A specially designed connector which compensates for line expansion and contraction is used for joining the inner conductors. No special tools, no torches or soldering are necessary. Mating flanges are automatically sealed for pressure by insertion of a neoprene O-ring gasket before assembly. With the gasket in place, the line will withstand gas or air pressure without leaking at temperatures ranging from  $-40^{\circ}$  F. to  $155^{\circ}$  F. The gas fittings are specially designed to work as efficiently as the line.

## Choice of Transmission Line

Each of the several types of transmission line is designed for a particular application. The choice of line for an installation will depend principally upon the frequency in use and the power to be handled, as indicated in the data given below. Selection of the proper line will provide the most economical and efficient installation.

For broadcast installations, the line selected should have a power rating which equals or exceeds the power output of the transmitter. Except, if any power increases are contemplated, it will be economical to install larger line than required thus saving the cost of a new installation at a later time.

Choice between the use of soft line and hard line will be determined by the installation. Hard, flanged-type line is the preferred type for most cases because of its ease of installation and immunity to damage and consequent failure. It is also easier to replace in sections than is soft line. On the other



hand, soft, solder-type line readily lends itself to bending around obstructions thus eliminating the need for elbows.

All RCA Transmission Line items are packaged at the factory and are identified by the RCA label and stock number. The following pages describe in detail the various lines and their fittings.

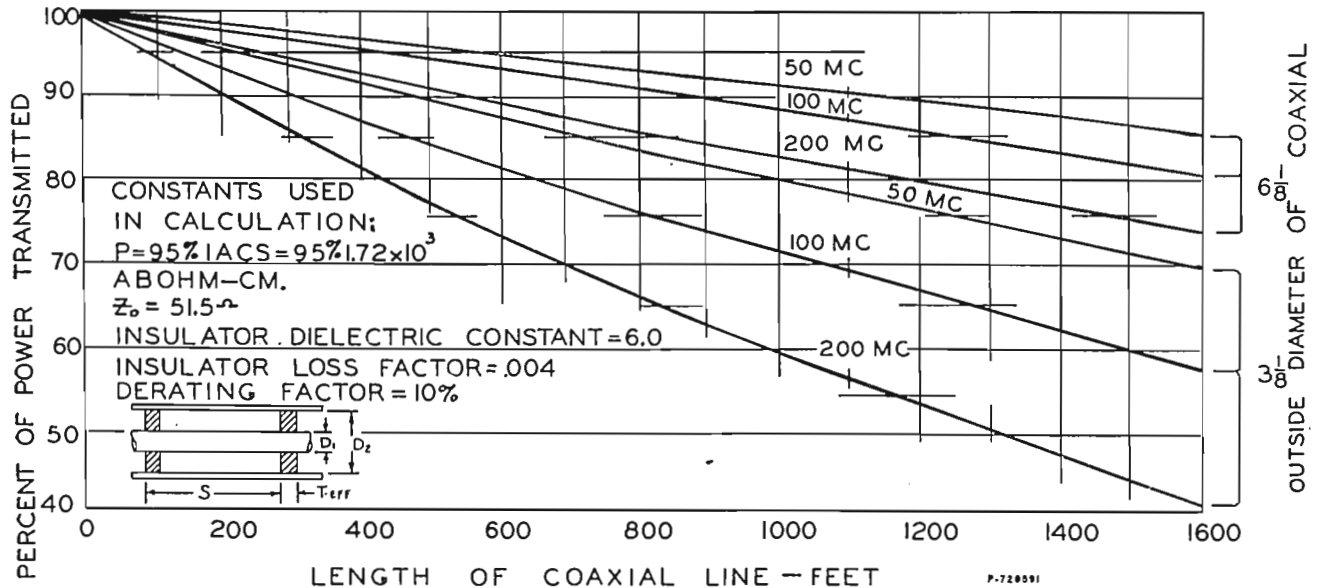
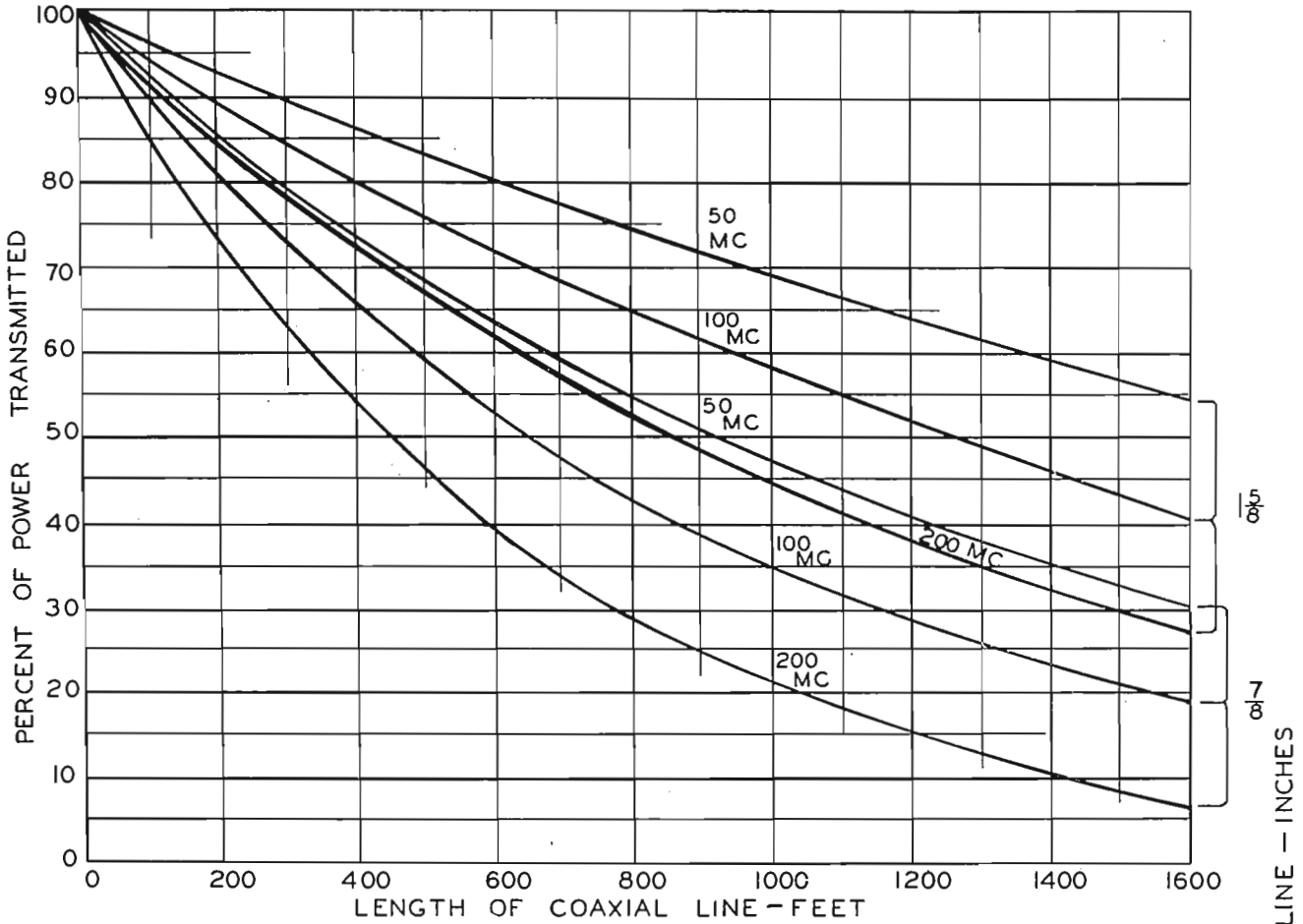
## MECHANICAL AND ELECTRICAL PROPERTIES OF RCA TRANSMISSION LINES

Power ratings for 51.5 ohm lines are based on RMA ratings at unity SWR

Size	Stock Ident.	Type	Impedance	Power	Dia. of Inner Cond. (in.)	Flashover Insulator Spacing (in.)	Voltage RMS 60 cy.	Use	
3/8"	MI-19306	Solder fittings pressurized or unpressurized	72 ohm	250 w. nominal 1 kw max.	.081	1 3/4	2,500	Mobile, aircraft, phase sampling and frequency checking in AM broadcast systems	
7/8"	MI-19307	Solder fittings pressurized	72 ohm	1 kw nominal 5 kw max.	.250	4	7,000	AM Broadcast lines, phase sampling	
7/8"	MI-19308	Flanged fittings no solder—pressurized	72 ohm	1 kw nominal 5 kw max.	.250	6	7,000	AM Broadcast lines, phase sampling	
7/8"	MI-19309	Flanged fittings no solder—pressurized	51.5 ohm	4.5 kw max. 3 kw max. 2 kw max.	50 mc 100 mc 200 mc	.312	6	5,000	AM and FM Broadcast lines, phase sampling
1 5/8"	MI-19310	Flanged fittings no solder—pressurized	72 ohm	10 kw max.	.375	12	12,000	AM Broadcast lines	
1 3/8"	MI-19112	Flanged fittings pressurized, no solder	51.5 ohm	16 kw max. 10 kw max. 7 kw max.	50 mc 100 mc 200 mc	.625	12	11,000	Designed for FM and TV lines (up to 220 mc), AM lines
3 3/8"	MI-19113	Flanged fittings no solder—pressurized	51.5 ohm	64 kw max. 42 kw max. 27 kw max.	50 mc 100 mc 200 mc	1.200	12	18,000	Designed for FM and TV lines (up to 220 mc), AM lines
6 1/8"	MI-19314	Flanged fittings no solder—pressurized	51.5 ohm	235 kw max. 166 kw max. 118 kw max.	50 mc 100 mc 200 mc	2 500	18	30,000	Designed for AM, FM and TV lines. For high power, high efficiency and exceptionally long runs

# Performance Data on RCA Transmission Lines

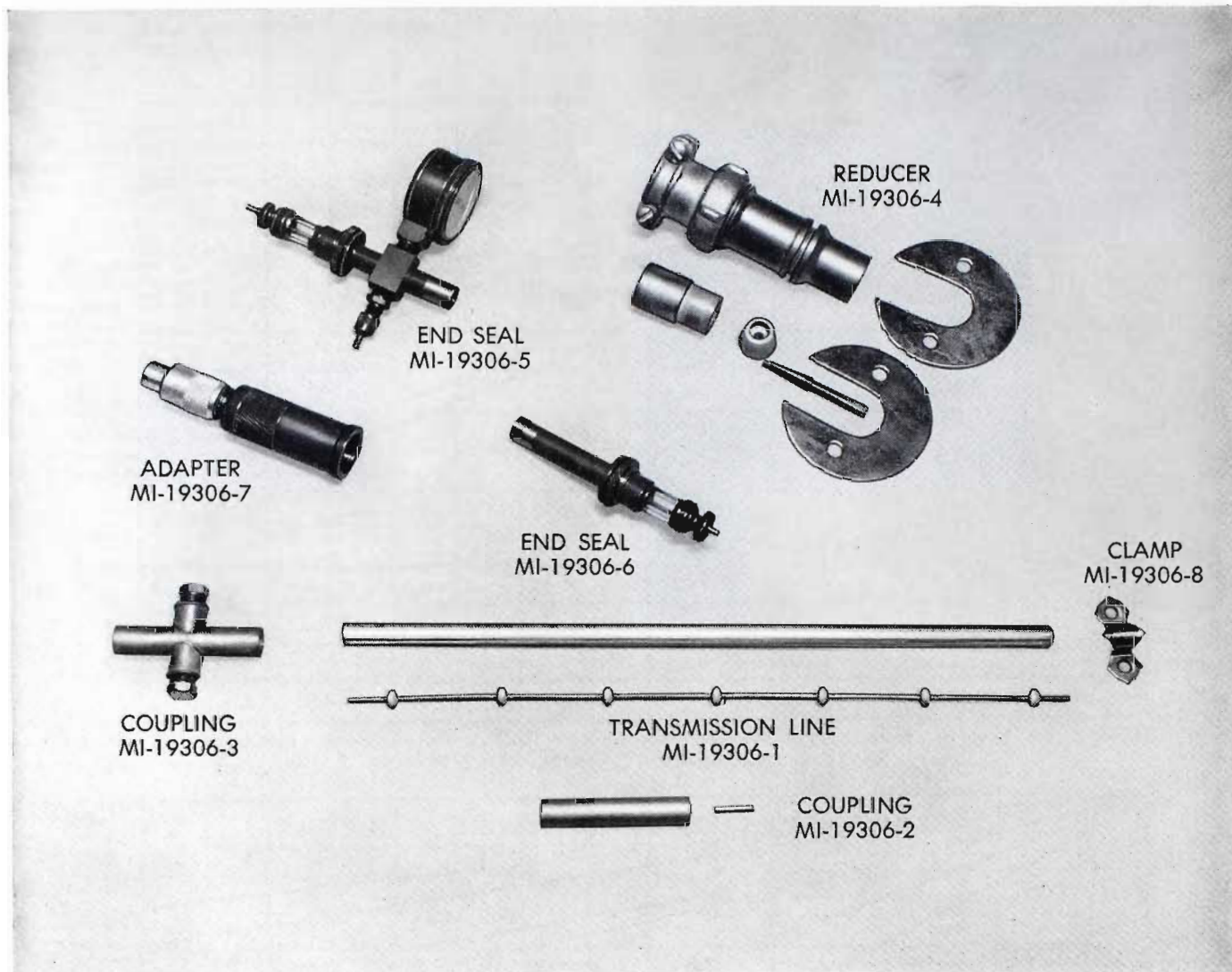
## COAXIAL LINE EFFICIENCY



SIZE IN.	$D_1$ IN.	$D_2$ IN.	$S$ IN.	$T_{err}$ IN.	DB PER 100 FEET		
					50MC	100MC	200MC
1/8	.3125	.785	.6	.187	.318	.460	.673
3/8	.625	1.527	1.2	.193	.161	.234	.346
6/8	1.200	3.027	1.2	.375	.096	.145	.230
IN.	2.500	5.981	IN.	IN.	.039	.056	.081

Above charts show relative efficiency of 1/8", 3/8", 6/8" line at VHF frequencies

# 3/8" 72-Ohm Soft Copper Line and Fittings, MI-19306



**Description**

RCA 3/8" Transmission Line, Type MI-19306, is a soft copper 72-ohm coaxial line designed for uses where the power and frequency to be handled are relatively low, and where line efficiency is not too important a factor. This type line is widely used to carry phase sampling voltages for directional AM arrays, to feed frequency measuring equipment, etc. It is also used in mobile and aircraft communication installations.

This solder-type, soft line is available with a complete complement of couplings, adapters, end seals, clamps, and reducers. The line lends itself readily to bending around obstructions and therefore requires no elbows.

**MI-19306-1 Transmission Line**

This line is furnished to specified length on 36"-diameter reels which contain up to 250 feet, or on larger returnable reels which contain up to 5000 feet. The coils are hermetically sealed. Orders should specify which is desired. Insulators are spaced 1 3/4" apart allowing a bending radius of 8" without shorting or loss of concentricity. Capable of handling 250 w. nominal and 1 kw maximum power.

**MI-19306-2 Straight Coupling**

This item includes solder type inner and outer conductors.

**MI-19306-3 Coupling (Straight Gas Servicing)**

Outer conductor has two 1/8" IPS ports for gas admission with pipe plugs. Item includes solder type inner conductor.

**MI-19306-4 Reducer Coupling**

Used for reducing 7/8" diameter MI-19309 hard drawn transmission line to 3/8" diameter soft line for soldering. Includes 2 steel locking plates for mounting to flat surface.

**MI-19306-5 End Seal**

Solder type including two 1/8" IPS ports for gas admission with pipe plugs. Furnished with nut for clamping to mounting surface.

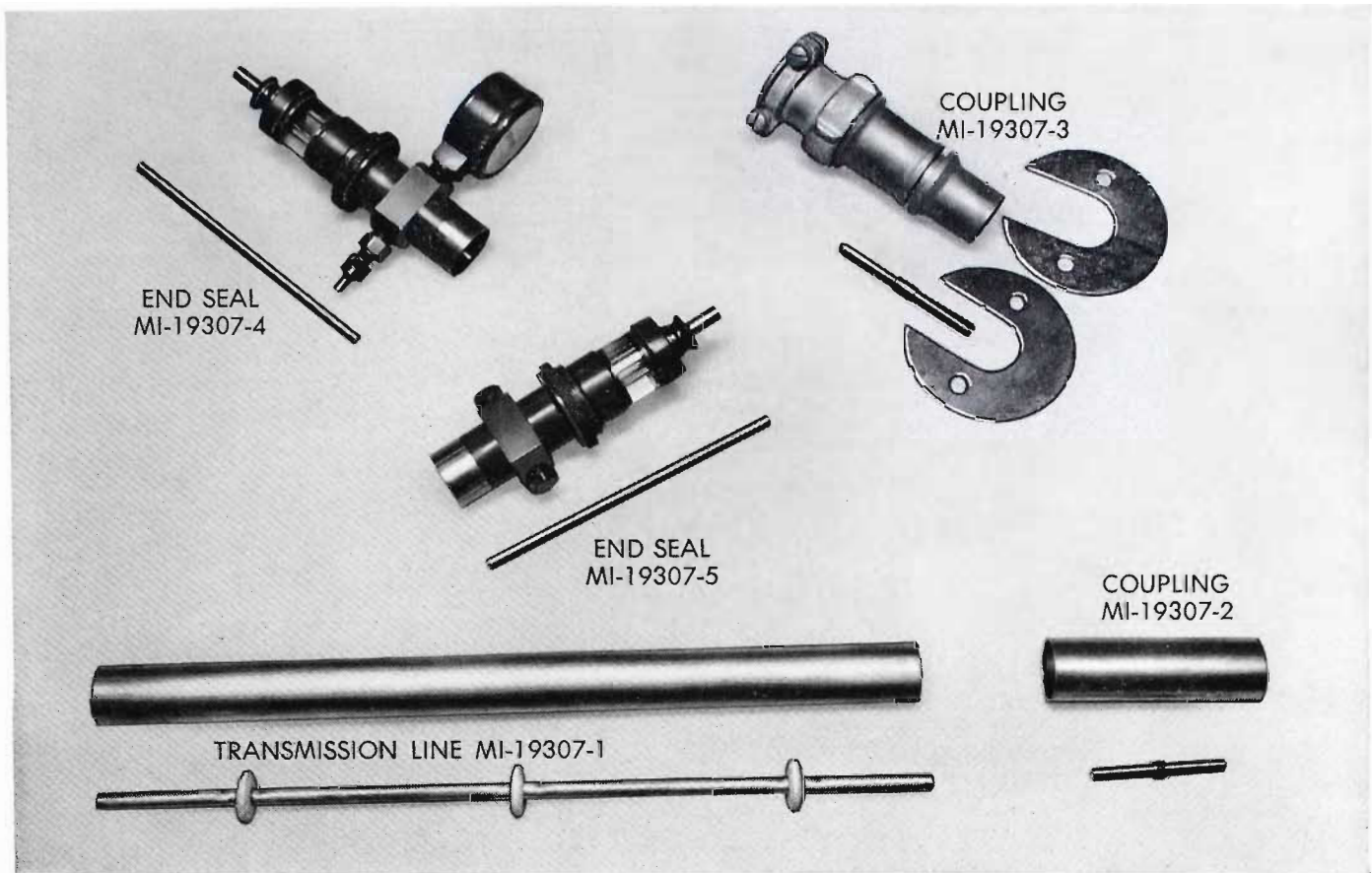
**MI-19306-7 Adapter**

Used for coupling RG 11/U Cable to End Seals MI-19306-5 or MI-19306-6.

**MI-19306-8 Clamp**

Used for clamping 3/8" diameter line. Has 2 holes for number 10 screws. Mount one clamp approximately every 4 feet.

# 7/8" Soft Copper Line and Fittings MI-19307 (72-ohm), MI-19305 (51.5-ohm)



**Description**

RCA 7/8" Transmission Line, MI-19307, is a soft-tempered copper coaxial line with a nominal impedance of 72 ohms. This line is also supplied with an impedance of 51.5 ohms. The 51.5-ohm soft line is identified by MI-19305. List of accessory items and dimensions for MI-19305 are identical to MI-19307 except O.D. of the inner conductor.

**MI-19307-1 (MI-19305-1) Transmission Line**

Furnished in 48" diameter coils hermetically sealed. Insulators are spaced 4" apart allowing a bending radius of 30" without shorting or loss of concentricity. The 51.5 ohm line is rated at 45 kw input at 50 mc with a 92% efficiency for 100 feet. Weight is 60 pounds per 100 feet.

**MI-19307-2 (MI-19305-2) Straight Coupling**

Includes solder type inner and outer conductors.

**MI-19307-3 (MI-19305-3) Straight Coupling**

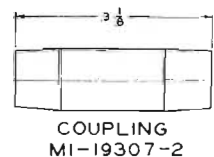
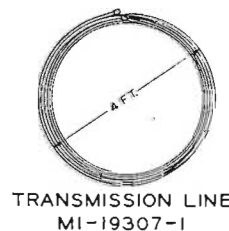
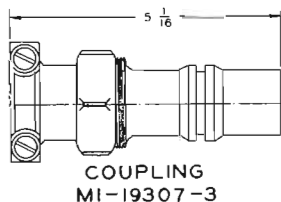
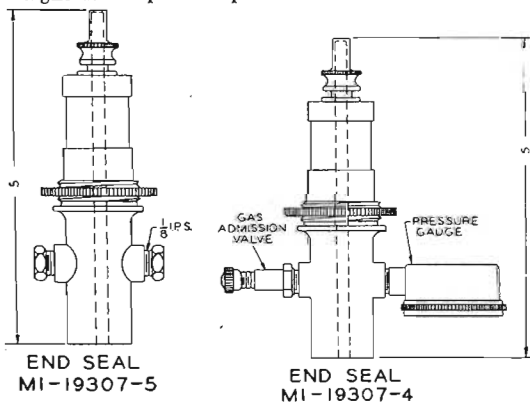
Used for connecting 7/8" diameter (MI-19309) hard drawn transmission line to 7/8" diameter soft solder-type line. Includes two steel locking plates for mounting to flat surface. Inner connector is solderless type.

**MI-19307-4 (MI-19305-4) End Seal**

Solder-type fitting with two ports. Includes 30-pound pressure gauge and gas admission valve. End Seal is furnished with nut for clamping to mounting surface.

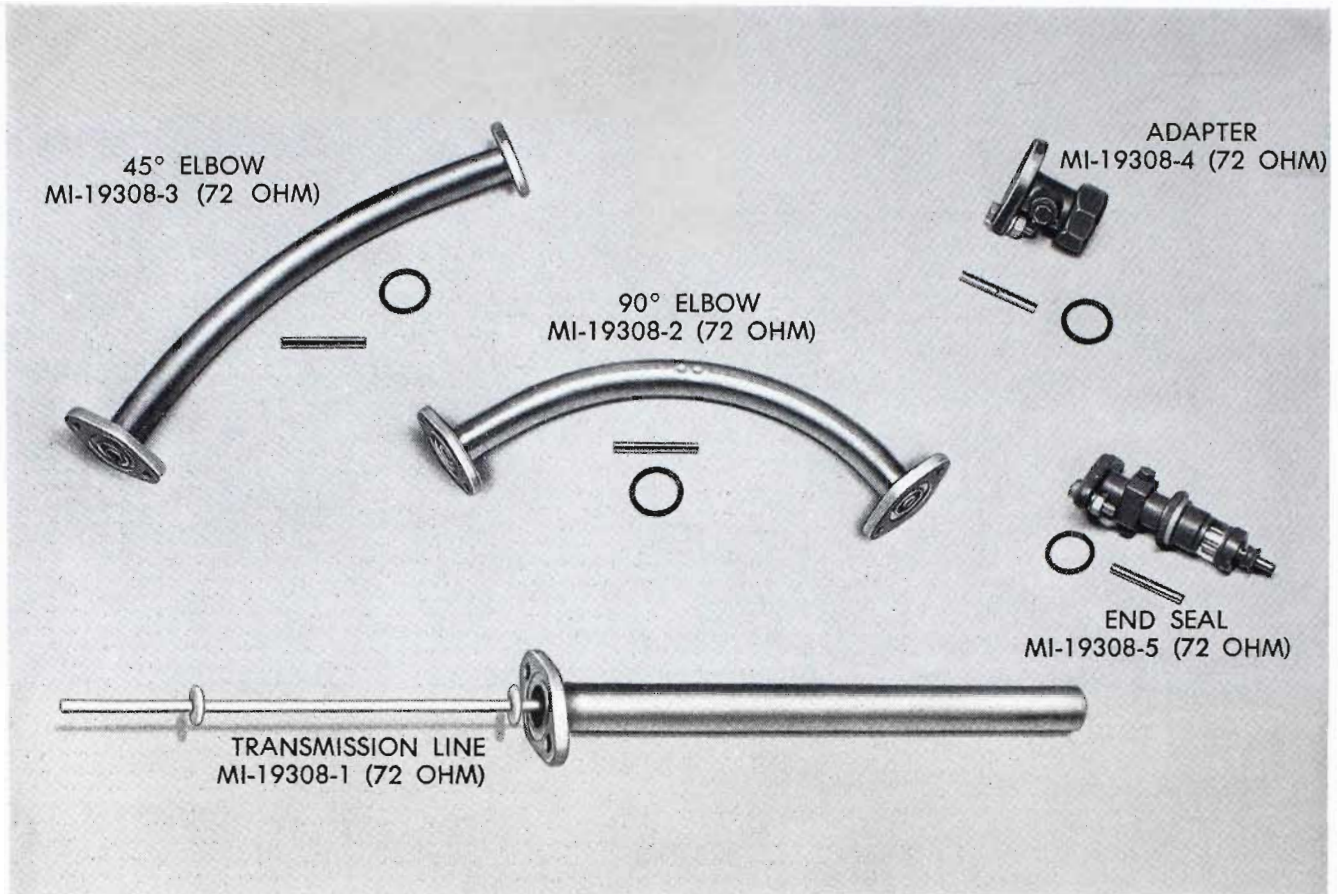
**MI-19307-5 (MI-19305-5) End Seal**

Solder-type fitting with two 1/8" IPS gas admission ports and pipe plugs. Furnished with nut for clamping to mounting surface.



*Dimensions for 7/8" Soft Line and Fittings*

# 7/8" 72-Ohm Hard Copper Line and Fittings, MI-19308



**Description**

RCA 7/8" Transmission Line, Type MI-19308, is a hard-tempered coaxial line with a nominal impedance of 72 ohms. This line operates with good efficiency on the low, medium and high frequencies, and is widely used for AM installations of 5 kw and less. Hangers for this line are shown on another page of this catalog.

**MI-19308-1 Transmission Line**

This line is supplied in 20-foot length with a flange silver soldered to each end. The inner conductor is 1/4" diameter with steatite insulators spaced 6" apart. The outer conductor is designed to allow for removing inner conductor for inspection. Power rating is 1 kw nominal with 90% efficiency for 100 feet. Line includes solderless inner connector, O-ring gasket and silicon copper hardware.

**MI-19308-1-F Transmission Line**

Same as MI-19308-1 except one flange is omitted.

**MI-19308-1-NF Transmission Line**

Same as MI-19308-1 except both flanges are omitted.

**MI-19308-2 Coupling (90° Elbow)**

This elbow has one flange silver soldered. Opposite flange swivels to take care of any angle. Inner conductor is supported by 3 steatite insulators held in place. The elbow is furnished with solderless inner conductor, O-ring gasket and hardware.

**MI-19308-2-F Coupling (90° Elbow)**

Same as MI-19308-2 except the fixed flange is omitted.

**MI-19308-2-NF Coupling (90° Elbow)**

Same as MI-19308-2 except both flanges are omitted.

**MI-19308-3 Coupling (45° Elbow)**

Same as MI-19308-2 except 45°.

**MI-19308-3-F Coupling (45° Elbow)**

Same as MI-19308-3 except the fixed flange is omitted.

**MI-19308-3-NF Coupling (45° Elbow)**

Same as MI-19308-3 except both flanges are omitted.

**MI-19308-4 Adapter Coupling**

Used for coupling a 7/8" 72-ohm flanged line to a 7/8" 72-ohm unflanged line. A 1 1/2" wrench is required for clamping the special gland nut on the unflanged line. Furnished with solderless inner connector, O-ring gasket and hardware.

**MI-19308-5 End Seal**

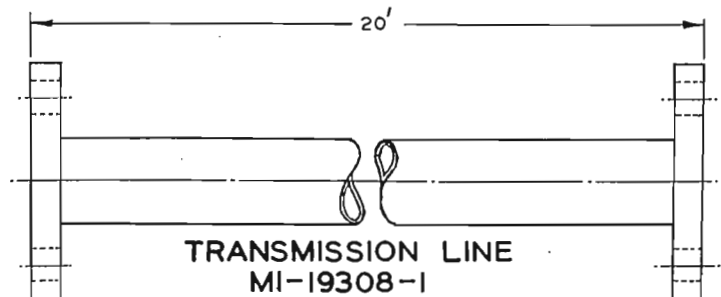
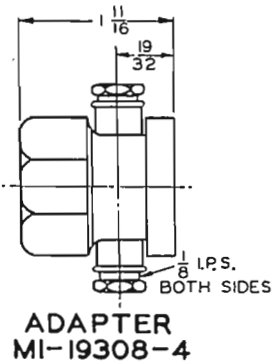
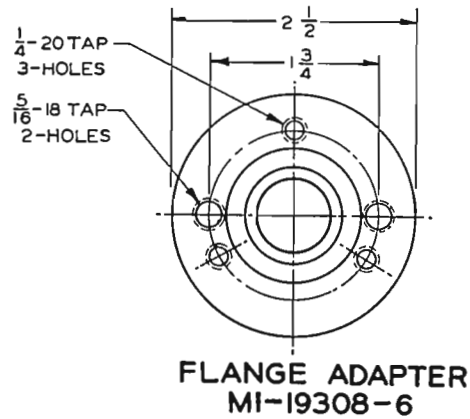
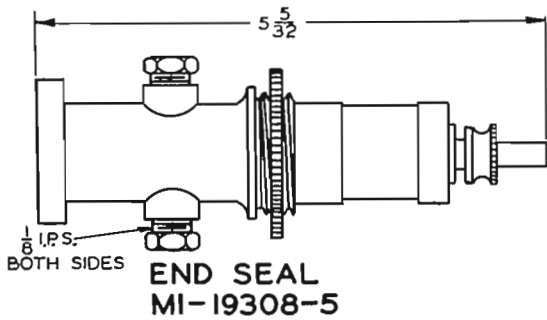
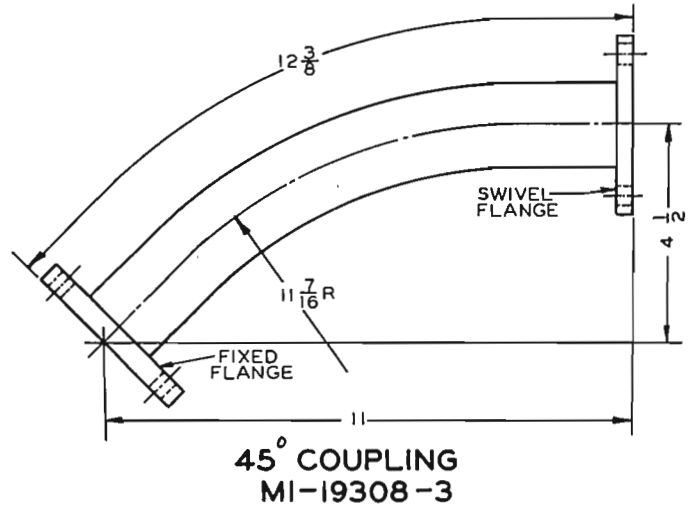
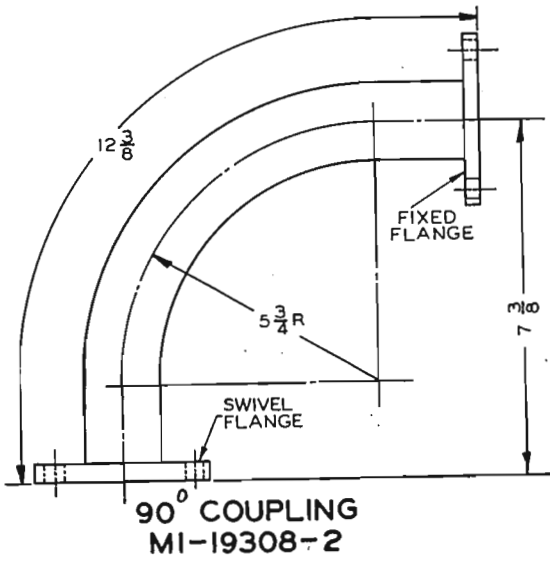
This sturdy end seal uses Pyrex as an insulator. It is fitted with two 1/8" IPS ports and brass plugs for gas admission or bleeding the line. A clamp nut is supplied for mounting. A screw terminal with locking nut is used for the termination of inner conductor. No soldering is necessary for installing. Furnished with O-ring gasket and solderless inner connector.

**MI-19308-6 Adapter**

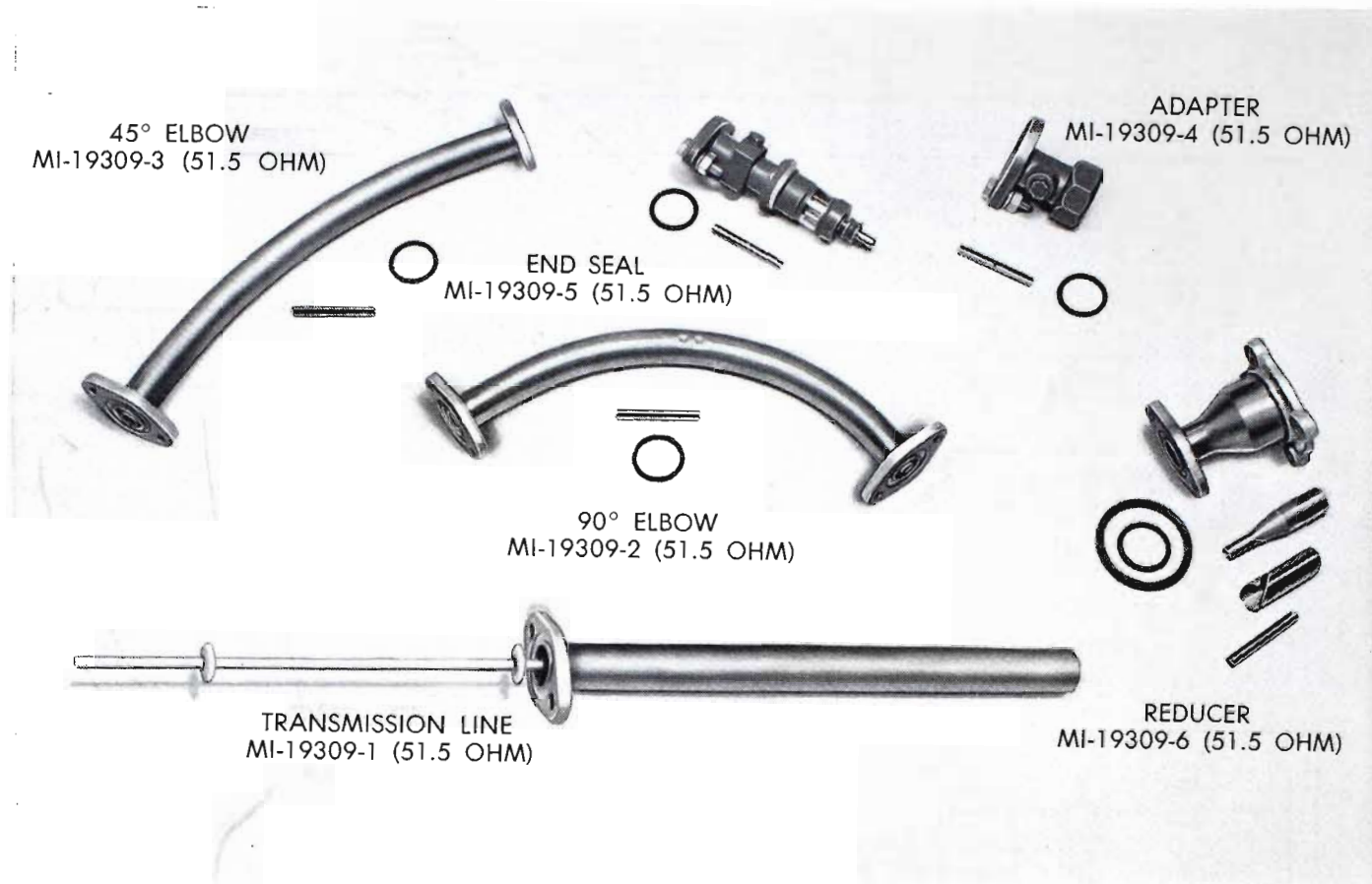
Adapts a flange using two bolts on 1 3/4"-bolt circle to a flange using three bolts on same bolt circle. Furnished complete with solderless inner conductor and O-ring gaskets.



**Dimensions For 7/8" 72-Ohm Hard Copper Line and Fittings**



# 7/8" 51.5-Ohm Hard Copper Line and Fittings, MI-19309



**Description**

RCA 7/8" Transmission Line, Type MI-19309, is a hard tempered coaxial line with a nominal impedance of 51.5 ohms. This line operates with good efficiency on low, medium and high frequencies.

**MI-19309-1 Transmission Line**

This line is supplied in 20-foot lengths with a flange silver soldered to each end. The inner conductor is 5/16" diameter with steatite insulators spaced 6" apart. The outer conductor is designed to allow for removing inner conductor for inspection. Power rating is 3 kw at 100 mc with 90% efficiency for 100 feet. Line includes solderless inner connector, O-ring gasket and silicon copper hardware. Hangers for this line are shown on another page of this catalog.

**MI-19309-1-F Transmission Line**

Same as MI-19309-1 except one flange is omitted.

**MI-19309-1-NF Transmission Line**

Same as MI-19309-1 except both flanges are omitted.

**MI-19309-2 Coupling (90° Elbow)**

This elbow has one flange silver soldered to outer conductor. Opposite flange swivels to take care of any angle. Inner conductor is supported by 3 steatite insulators held in place. The elbow is furnished with solderless inner conductor, O-ring gasket and hardware.

**MI-19309-2-F Coupling (90° Elbow)**

Same as MI-19309-2 except the fixed flange is omitted.

**MI-19309-2-NF Coupling (90° Elbow)**

Same as MI-19309-2 except both flanges are omitted.

**MI-19309-3 Coupling (45° Elbow)**

Same as MI-19309-2, except 45°.

**MI-19309-3-F Coupling (45° Elbow)**

Same as MI-19309-3 except the fixed flange is omitted.

**MI-19309-3-NF Coupling (45° Elbow)**

Same as MI-19309-3 except both flanges are omitted.

**MI-19309-4 Adapter Coupling**

Used for coupling a 7/8" 51.5-ohm flanged line to a 7/8" 51.5-ohm unflanged line. A 1 1/2" wrench is required for clamping the special gland nut on the unflanged line. Furnished with solderless inner connector, O-ring gasket and hardware.

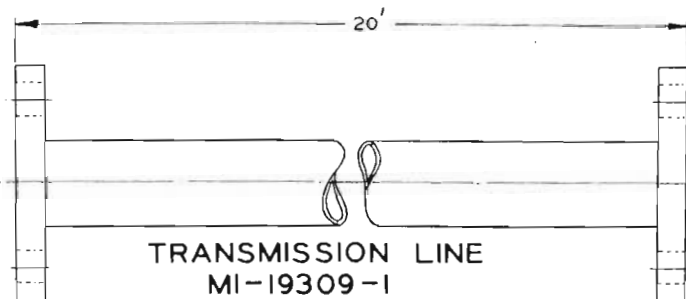
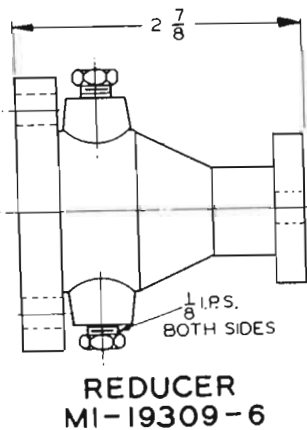
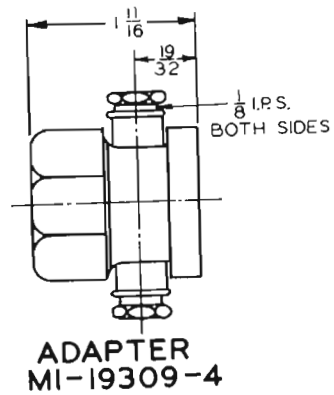
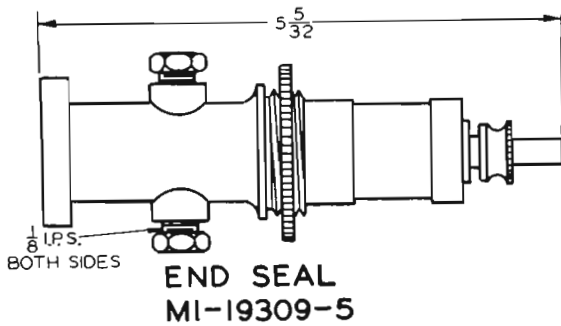
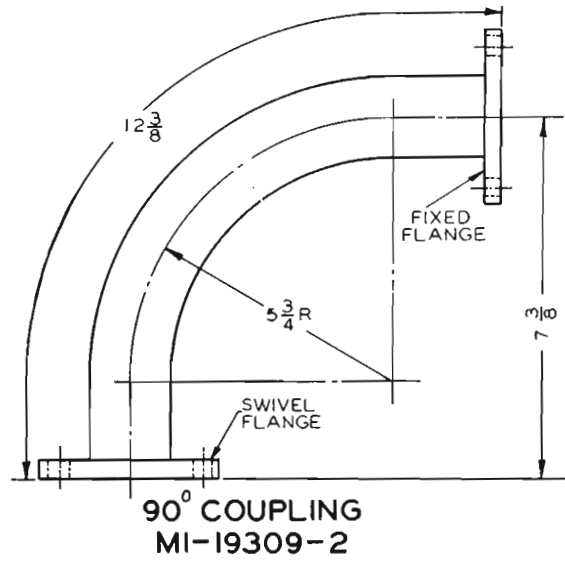
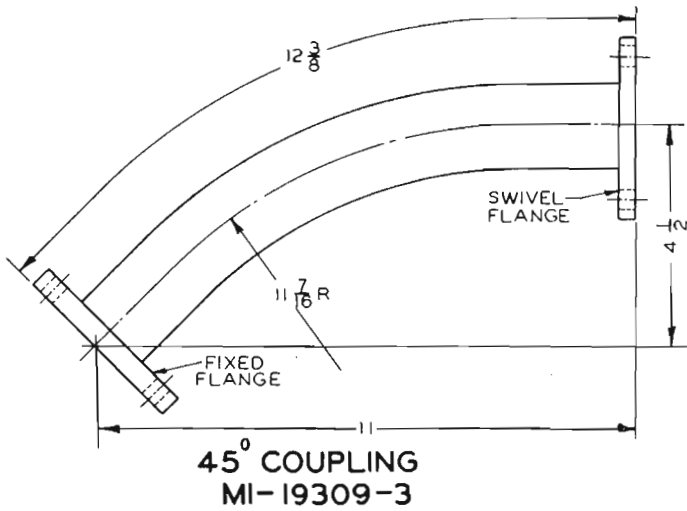
**MI-19309-5 End Seal**

This sturdy end seal uses Pyrex as an insulator. It is fitted with two 1/8" IPS ports and brass plugs for gas admission or bleeding the line. A clamp nut is supplied for mounting. A screw terminal with locking nut is used for the termination of inner conductor. No soldering is necessary for installing. Furnished with O-ring gasket and solderless inner connector.

**MI-19309-6 Reducer Coupling**

Used for reducing from 1 5/8" 51.5-ohm to 7/8" 51.5-ohm gassed line. Complete with outer and inner conductor, inner connectors, O-ring gaskets and hardware.

**Dimensions for 7/8" 51.5-Ohm Hard Line and Fittings**



# 1 5/8" 51.5-Ohm Hard Copper Line and Fittings, MI-19112

**Description**

RCA 1 5/8" Transmission Line, Type MI-19112, is a hard-tempered copper line with a nominal impedance of 51.5 ohms. Because of its low impedance and good efficiency at VHF frequencies, this type line is widely used in FM and TV installations. Hangers for this size line are shown on another page of this catalog.

**MI-19112-1 Transmission Line**

This line is supplied in 20-foot length\* with flanges silver-soldered to ends. The outer conductor is 1 5/8" diameter with an inner conductor of 3/8" diameter using special low loss insulators spaced 12" apart. The outer conductor is designed to allow for removing inner conductor for inspection. Maximum power rating is 10 kw at 100 mc with standing wave ratio of 1. Line includes solderless inner connector, O-ring gasket, and silicon copper hardware.

**MI-19112-1-F Transmission Line**

Same as MI-19112-1 except one flange is omitted.

**MI-19112-1-NF Transmission Line**

Same as MI-19112-1 except both flanges are omitted.

**MI-19112-2 Coupling (90° Elbow)**

Elbow with one fixed flange and opposite flange that swivels to take care of any angle. Inner conductor is supported by insulators spaced 12" apart. There is also a support for the inner conductor in the center of the elbow. Furnished with inner connector, O-ring gasket and silicon copper hardware.

**MI-19112-2-F Coupling (90° Elbow)**

Same as MI-19112-2 except the fixed flange is omitted.

**MI-19112-2-NF Coupling (90° Elbow)**

Same as MI-19112-2 except both flanges are omitted.

**MI-19112-3 Coupling (45° Elbow)**

Same as MI-19112-2 except 45°.

**MI-19112-3-F Coupling (45° Elbow)**

Same as MI-19112-3 except the fixed flange is omitted.

**MI-19112-3-NF Coupling (45° Elbow)**

Same as MI-19112-3 except both flanges are omitted.

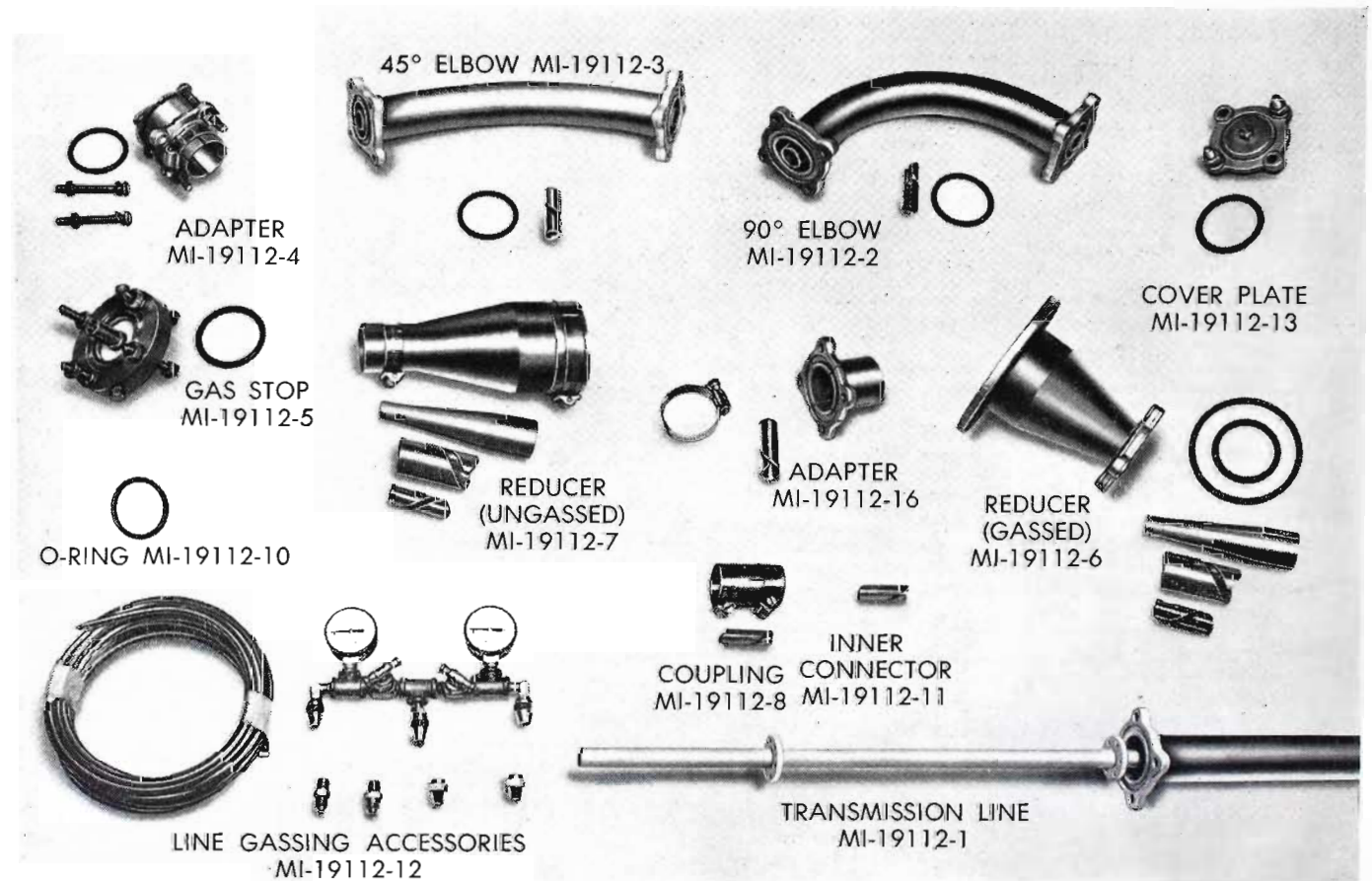
**MI-19112-4 Adapter**

Used for adapting a flange type line to an unflanged line. The only tools necessary are wrenches for the flange hardware and screwdriver for tightening clamp. Furnished with inner connector, O-ring gasket and hardware.

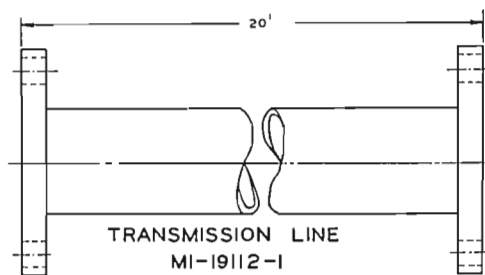
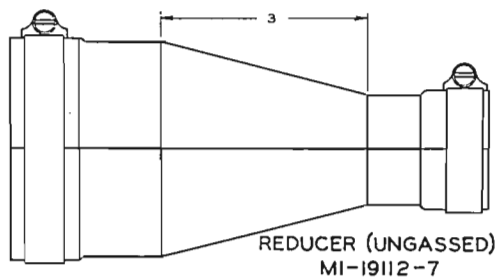
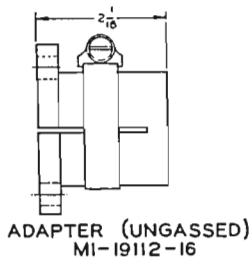
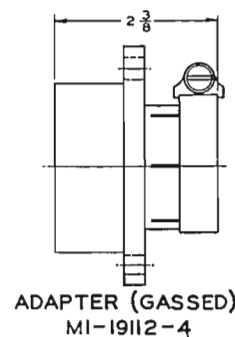
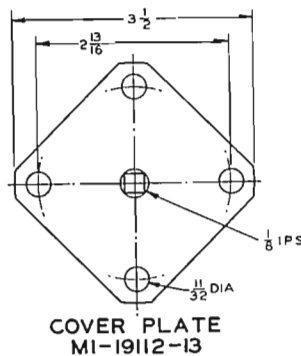
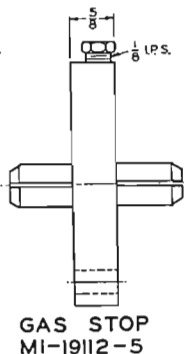
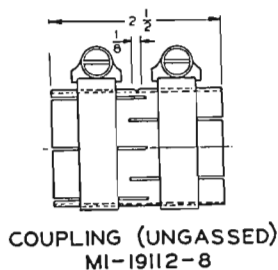
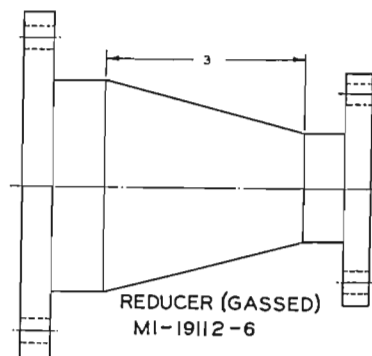
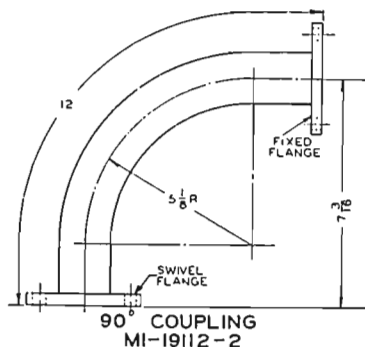
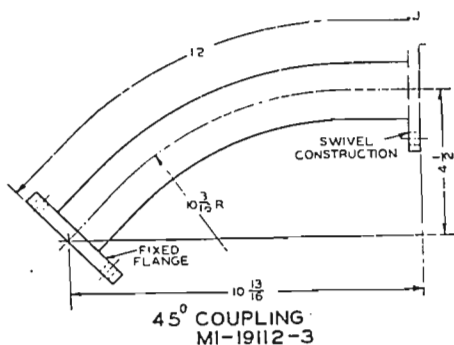
**MI-19112-5 Gas Stop**

To be inserted between two flanged sections of line to seal a gassed section from an ungassed section of line. (Usually located before input to antenna.)

\* May be ordered in lengths less than 20 feet. When line is to be used for television, it should be in multiples of feet. If length is not in multiples of feet, it is necessary to make up the difference by using .647 diameter conductor MI-19112-9. When ordering specify the MI-number and length required.



# Dimensions for 1 5/8" 51.5-Ohm Hard Line & Fittings



## MI-19112-6 Reducer Coupling

Flanged coupling used for reducing from 3 1/8" 51.5-ohm to 1 5/8" 51.5-ohm gassed line. Complete with outer and inner conductor and connectors, O-ring gaskets and hardware.

## MI-19112-7 Reducer Coupling

Used for reducing from 3 1/8" 51.5-ohm to 1 5/8" 51.5-ohm un-gassed line. Outer conductor is split in two pieces, providing a very convenient assembly. Complete with outer and inner conductor and connectors and stainless steel clamps.

## MI-19112-8 Straight Coupling

Used for coupling two sections of 1 5/8" 51.5-ohm unflanged lines. (Not to be used for gassed line.) Consists of outer and inner connectors with stainless steel clamps.

## MI-19112-9 Special Inner Conductor

Used for splicing lengths of line which are cut at points between the supporting insulators (these are spaced 12"). Inner conductor as supplied is .645 O.D. x .569 I.D. x 12 feet long. The special inner conductor will fit inner conductor MI-19112-11.

## MI-19112-10 O-Ring Gasket

A long-life synthetic rubber gasket for use between the flanges to make flanged joints pressure tight.

## MI-19112-11 Inner Connector

A specially designed solderless inner connector for joining inner conductors of 1 5/8" 51.5-ohm line.

## MI-19112-12 Line Gassing Accessories

Consists of indicators, couplings, 25 feet of 1/4" O.D. copper tubing and fittings. Used for indicating line pressure.

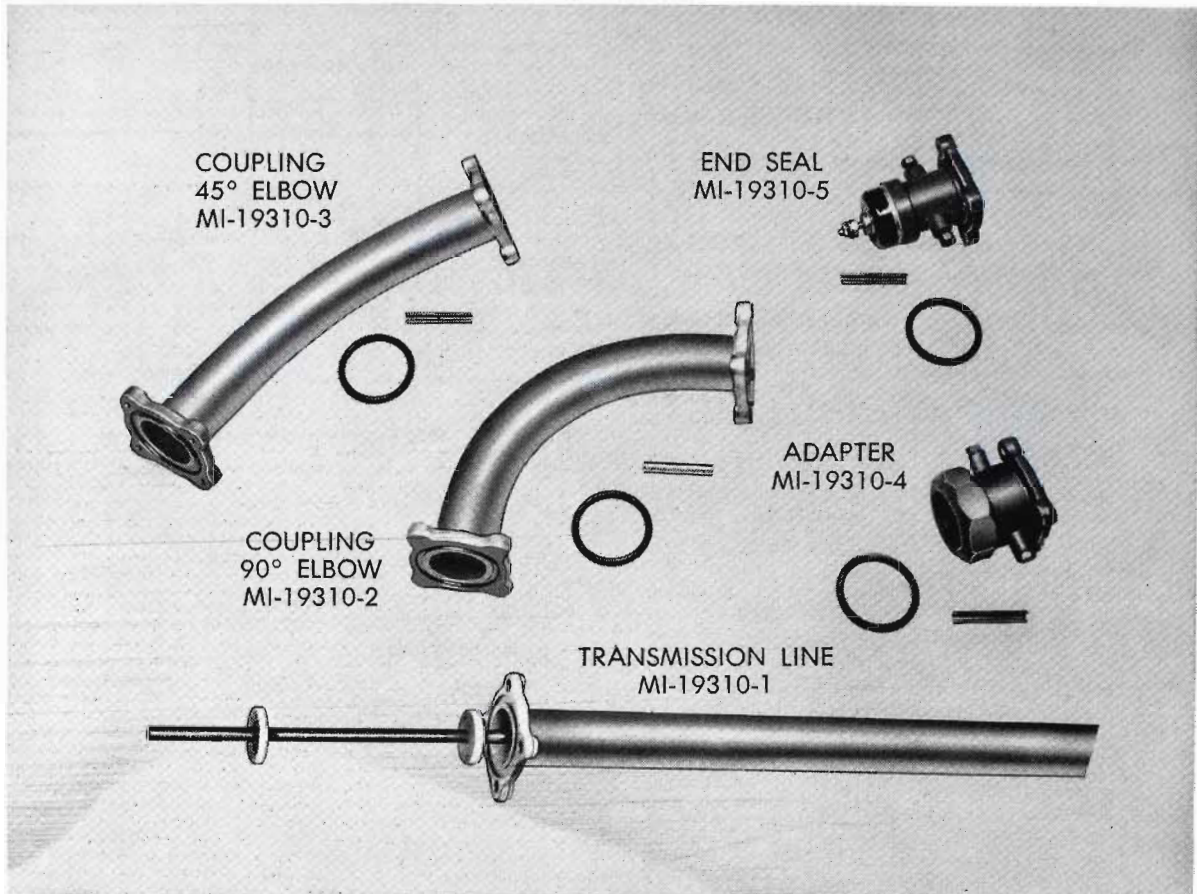
## MI-19112-13 Emergency Cover Plate

Used to cap the end of 1 5/8" line to keep moisture out during installation, or for other temporary capping of the line.

## MI-19112-16 Adapter

An adapter (ungassed) to couple a flanged to an unflanged line. Furnished complete with inner connector, hardware and clamp.

# 1 5/8" 72-Ohm Hard Copper Line and Fittings, MI-19310



**Description**

RCA 1 5/8" Transmission Line, Type MI-19310, is a hard-tempered coaxial line designed for installation where medium power is to be handled, and where the frequency to be used dictates use of a line with good efficiency. This line operates with good efficiency in the VHF bands, and is used in FM and TV installations where the runs to be made are not exceptionally long. Hangers for this line are shown on another page of this catalog.

**MI-19310-1 Transmission Line**

This line is supplied in 20-foot lengths with flanges silver soldered to ends. The outer conductor is 1 5/8" diameter with an inner conductor of 3/8" diameter using steatite insulators spaced 12" apart. The outer conductor is designed to allow for removing inner conductor for inspection. Power rating is 10 kw maximum with 95% efficiency for 100 feet. Line includes solderless inner connector, O-ring gasket and silicon copper hardware.

**MI-19310-1-F Transmission Line**

Same as MI-19310-1 except one flange is omitted.

**MI-19310-1-NF Transmission Line**

Same as MI-19310-1 except both flanges are omitted.

**MI-19310-2 Coupling (90° Elbow)**

This elbow has one flange silver soldered. Opposite flange swivels to take care of any angle. Inner conductor is supported by 3 steatite insulators held in place. The elbow is furnished with solderless inner conductor, O-ring gasket and hardware.

**MI-19310-2-F Coupling (90° Elbow)**

Same as MI-19310-2 except the solid flange is omitted.

**MI-19310-2-NF Coupling (90° Elbow)**

Same as MI-19310-2 except both flanges are omitted.

**MI-19310-3 Coupling (45° Elbow)**

Same as MI-19310-2 except 45°.

**MI-19310-3-F Coupling (45° Elbow)**

Same as MI-19310-3 except the solid flange is omitted.

**MI-19310-3-NF Coupling (45° Elbow)**

Same as MI-19310-3 except both flanges are omitted.

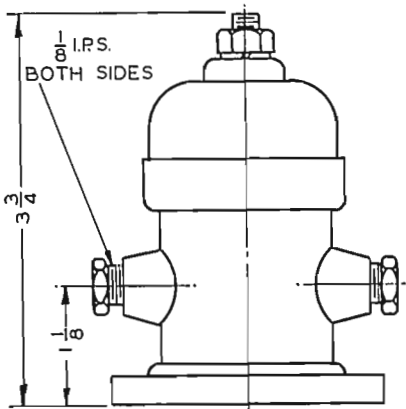
**MI-19310-4 Adapter Coupling**

Used for coupling a 1 5/8" 72-ohm flanged line to a 1 5/8" 72-ohm unflanged line. A 2" wrench is required for clamping the special gland nut for the unflanged line. Furnished with solderless inner connector, O-ring gasket and hardware.

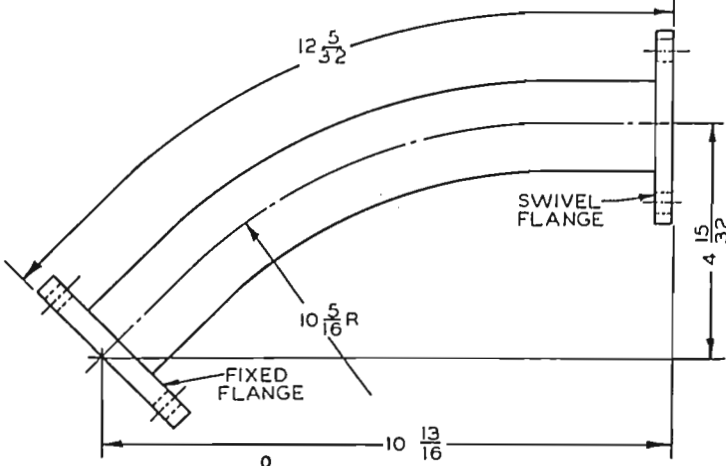
**MI-19310-5 End Seal**

This end seal uses steatite as an insulator. Constructed with two 1/8" IPS parts and brass plugs for gas admission or bleeding the line. A screw terminal with lockwasher and nut is used for termination of center conductor. Furnished with solderless inner conductor, O-ring gasket and hardware.

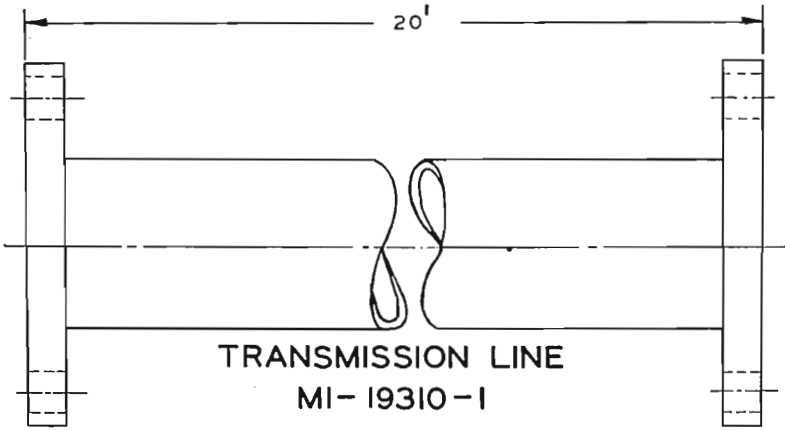
**Dimensions for 1 5/8" 72-Ohm Hard Line and Fittings**



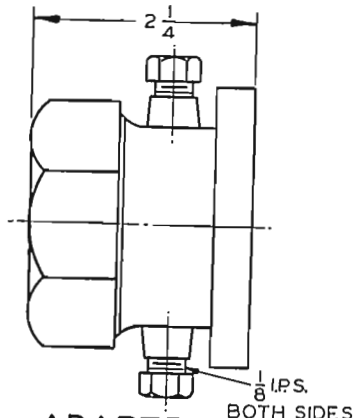
**END SEAL  
MI-19310-5**



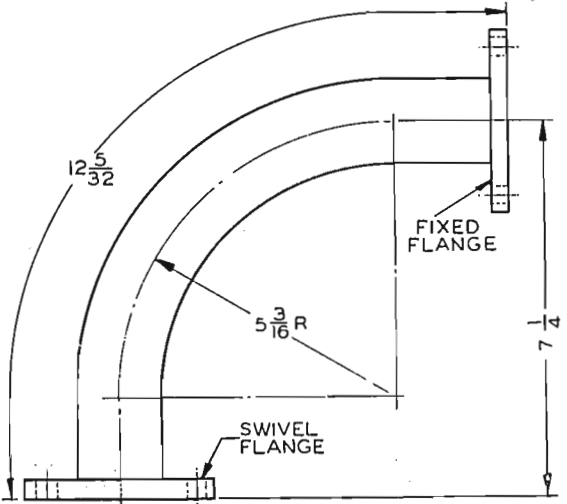
**45° COUPLING  
MI-19310-3**



**TRANSMISSION LINE  
MI-19310-1**

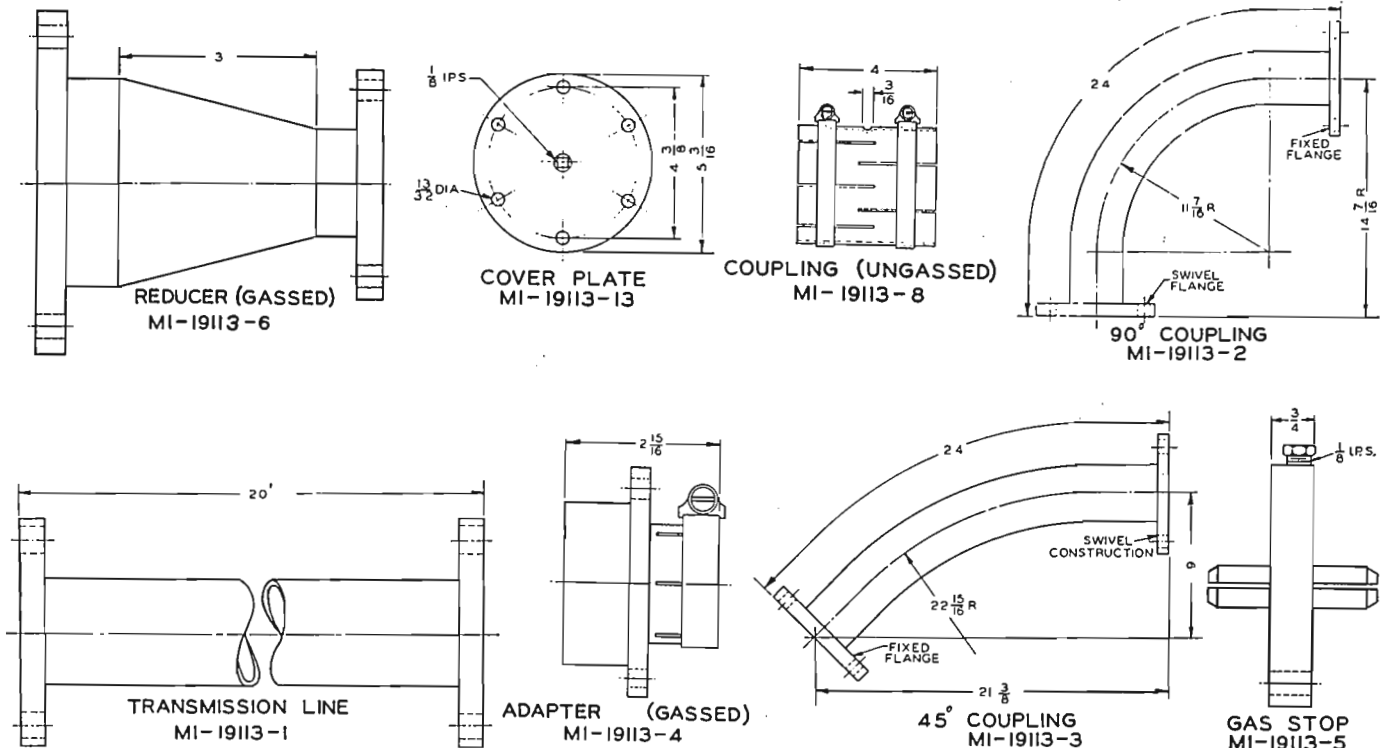


**ADAPTER  
MI-19310-4**



**90° COUPLING  
MI-19310-2**

# 3 1/8" 51.5-Ohm Hard Copper Line and Fittings, MI-19113



**Description**

RCA 3 1/8" Transmission Line, Type MI-19113, is a hard-tempered copper line designed for use in AM, FM and TV installations where high power is to be handled or long transmission line runs are required. This type line operates very efficiently at VHF frequencies. Hangers for this line are shown on another page of this catalog.

**MI-19113-1 Transmission Line**

This line is supplied in 20-foot lengths\* with flanges silver-soldered to ends. The outer conductor is 3 1/8" O.D. with an inner conductor of 1.200 diameter using special low loss insulators spaced 12" apart. The outer conductor is designed to allow for removing inner conductor for inspection. Maximum power rating is 42 kw at 100 mc with standing wave ratio of 1. Line includes solderless inner connector, O-ring gasket, and silicon copper hardware.

**MI-19113-1-F Transmission Line**

Same as MI-19113-1 except one flange is omitted.

**MI-19113-1-NF Transmission Line**

Same as MI-19113-1 except both flanges are omitted.

**MI-19113-2 Coupling (90° Elbow)**

Elbow with one fixed flange and opposite flange that swivels to take care of any angle. Inner conductor is supported by insulators spaced 12" apart. There is also a teflon insulator for support in the center of the elbow. Furnished with inner connector, O-ring gasket and silicon copper hardware.

**MI-19113-2-F Coupling (90° Elbow)**

Same as MI-19113-2 except the solid flange is omitted.

**MI-19113-2-NF Coupling (90° Elbow)**

Same as MI-19113-2 except both flanges are omitted.

**MI-19113-3 Coupling (45° Elbow)**

Same as MI-19113-2 except 45°.

**MI-19113-3-F Coupling (45° Elbow)**

Same as MI-19113-3 except the solid flange is omitted.

**MI-19113-3-NF Coupling (45° Elbow)**

Same as MI-19113-3 except both flanges are omitted.

**MI-19113-4 Adapter**

Used for adapting a flange type line to an unflanged line. The only tools necessary are wrenches for the flange hardware and screwdriver for tightening clamp. Furnished with inner connector, O-ring gasket and hardware.

**MI-19113-5 Gas Stop**

To be inserted between two flanged sections of line to seal a gassed section from an un-gassed section of line. (Usually located before input to antenna.)

**MI-19113-6 Reducer Coupling**

Flanged coupling used for reducing from 3 1/8" 51.5-ohm to conductor and connectors, O-ring gaskets and hardware. Dimensions same as MI-19112-6.

**MI-19113-7 Reducer Coupling**

Used for reducing from 3 1/8" 51.5-ohm to 1 5/8" 51.5-ohm un-gassed line. Outer conductor is split in two pieces, providing a very convenient assembly. Complete with outer and inner conductor and connectors and stainless steel clamps. Dimensions same as MI-19112-7.

**MI-19113-8 Straight Coupling**

Used for coupling two sections of 3 1/8" 51.5-ohm unflanged lines. (Not to be used for gassed line.) Consists of outer and inner connectors with stainless steel clamps.

\* May be ordered less than 20 feet. For television installations line sections should be in multiples of 1 foot whenever possible. Otherwise, the Special Conductor MI-19113-9 should be used to join these sections. When ordering transmission line, specify the MI-number and the length required.



**MI-19113-9 Special Inner Conductor**

Used for splicing lengths of line which are cut at points between the supporting insulators (these are spaced 12"). Inner conductor as supplied is 1.282 O.D. x 1.136 I.D. x 12 feet long. The special inner conductor will fit inner conductor MI-19113-11.

**MI-19113-10 O-Ring Gasket**

A long-life synthetic rubber gasket for use between the flanges to make flanged joints pressure tight.

**MI-19113-11 Inner Connector**

A specially designed solderless inner connector for joining inner conductors of 3 1/8" 51.5-ohm line.

**MI-19113-13 Emergency Cover Plate**

Used to cap the end of 3 1/8" line to keep moisture out during installation, or for other temporary capping of the line.



45° ELBOW  
MI-19113-3

ADAPTER  
MI-19113-4

90° ELBOW  
MI-19113-2

REDUCER (UNGASSED)  
MI-19113-7

COVER PLATE  
MI-19113-13

COUPLING  
MI-19113-8

GAS STOP  
MI-19113-5

REDUCER (GASSED)  
MI-19113-6

O-RING  
MI-19113-10

INNER CONNECTOR  
MI-19113-11

TRANS. LINE  
MI-19113-1

# 6 1/8" 51.5-Ohm Hard Copper Line and Fittings, MI-19314

**Description**

RCA 6 1/8" Transmission Line, Type MI-19314, is a hard-tempered copper line with an impedance of 51.5 ohms. (See photo on opposite page.) The large size and low impedance of this type line adapts it to very high power AM, FM and TV installations or for use with medium power FM installations where the transmission line runs are exceptionally long. Hangers for this line are shown on another page of this catalog.

**MI-19314-1 Transmission Line**

This line is supplied in 20-foot lengths with 2 1/2" diameter inner conductor and special pin insulators spaced every 12". Maximum power 166 kw at 100 mc with 90% efficiency. Attenuation 0.056 db maximum per 100 feet at 100 mc. Due to the size and weight, the outer conductor is shipped in a separate container than the inner conductor with the pin insulators packaged separately to avoid breakage. MI-19314-1 includes one solderless inner connector, O-ring gasket, hardware with instruction sheet.

**MI-19314-2 Coupling (90° Elbow)**

A specially designed long sweep elbow with fixed flange on one end and swivel flange on the other end. Uses special pin insulators spaced every 12". Furnished with inner conductor, O-ring gasket and hardware.

**MI-19314-3 Coupling (45° Elbow)**

Same as MI-19314-2 except 45°.

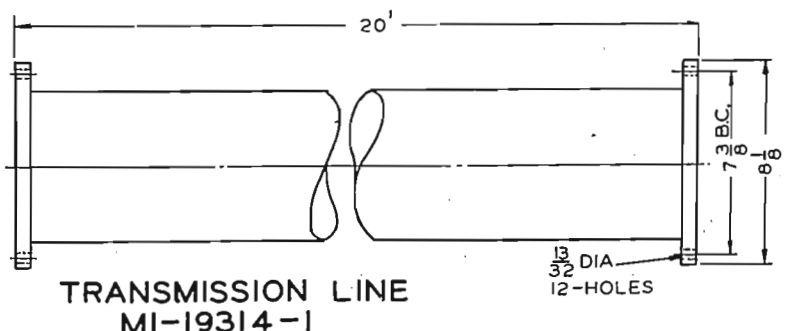
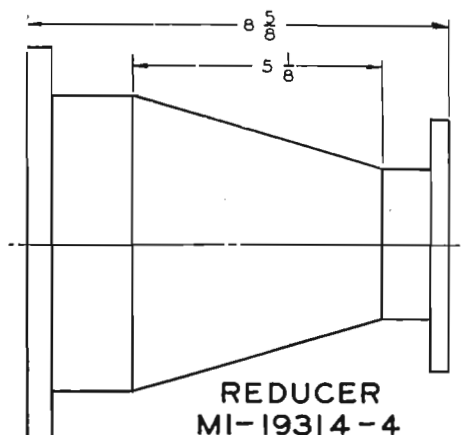
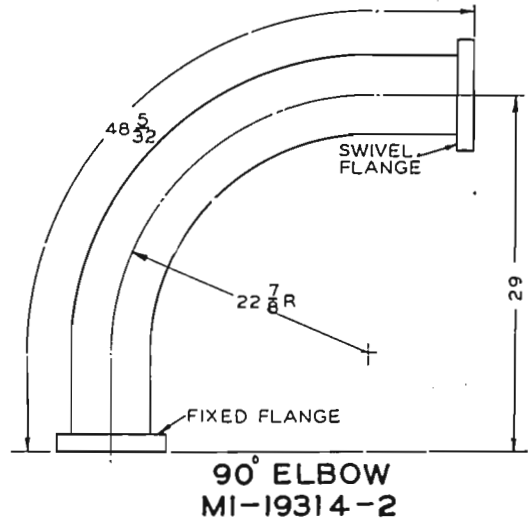
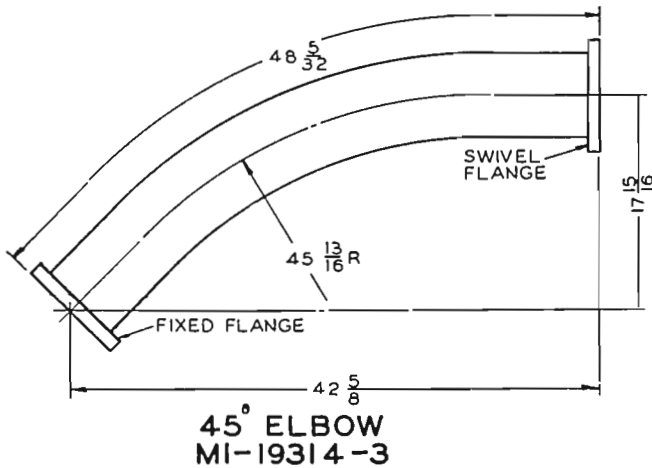
**MI-19314-4 Reducer**

For connecting 6 1/8" diameter line to 3 1/8" diameter line. Flange type complete with inner conductor, O-ring gasket and hardware.

**MI-19314-5 Inner Connector**

A connector to couple the 2 1/2" diameter inner conductors of 6 1/8" line.

**Dimensions For 6 1/8" 51.5-Ohm Line and Fittings**



# 6 1/8" 51.5 Ohm Hard Copper Line and Fittings



45° ELBOW  
MI-19314-3



90° ELBOW  
MI-19314-2



REDUCER  
MI-19314-4



TRANSMISSION LINE  
MI-19314-1

# RCA Transmission Line Hangers and Accessories

## Types and Uses

RCA has a complete line of hangers designed for  $\frac{7}{8}$ "-,  $1\frac{1}{8}$ "- and  $3\frac{1}{8}$ " diameter transmission lines. There are hangers for mounting both single and dual lines either vertically or horizontally to flat members, pipes, or angular members. These hangers consist of several general types, i.e., spring suspended expansion hangers (which permit differential thermal expansion of the line and tower), swivel hangers which provide for either horizontal or vertical mounting of the line, and lateral braces and direct mounting anchors. Of these there are short hangers for close mounting, long hangers to provide additional

clearance, and insulated as well as noninsulated types. The direct mounting type of hanger requires drilling of a hole in the mounting surface, but no drilling is required for the other types.

The instructions supplied with each spring-suspension hanger should be closely followed for proper installation. The practice is to space the hangers at approximate 10-foot intervals. The line section at the tower top is firmly secured by two fixed hangers, and the lower sections are suspended by spring hangers to allow for differential thermal expansion.

*Spring-Suspended Hangers for Supporting Single Lines to Flat Members*



MI-19309-20 ( $\frac{7}{8}$  LINE)  
MI-19312-20 ( $1\frac{1}{8}$  LINE)  
MI-19313-20 ( $3\frac{1}{8}$  LINE)



MI-19309-21 ( $\frac{7}{8}$  LINE)  
MI-19312-21 ( $1\frac{1}{8}$  LINE)  
MI-19313-21 ( $3\frac{1}{8}$  LINE)



MI-19309-22 ( $\frac{7}{8}$  LINE)  
MI-19312-22 ( $1\frac{1}{8}$  LINE)  
MI-19313-22 ( $3\frac{1}{8}$  LINE)

## Expansion Hangers for Supporting Single Lines

### Description

	Hanger Stock No.	
$\frac{7}{8}$ " Line	$1\frac{1}{8}$ " Line	$3\frac{1}{8}$ " Line
MI-19309-20	MI-19312-20	MI-19313-20
MI-19309-21	MI-19312-21	MI-19313-21
MI-19309-22	MI-19312-22	MI-19313-22

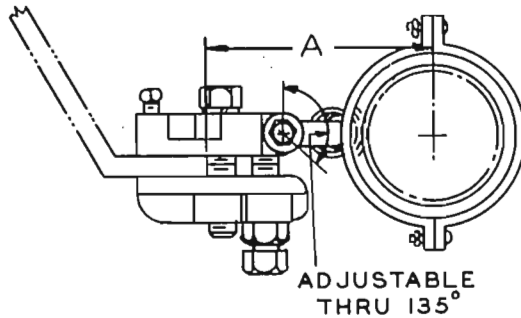
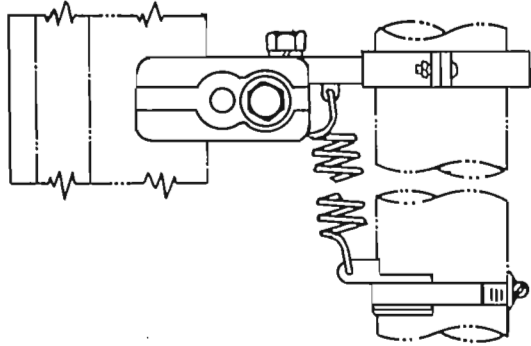
### Description of Hanger

An expansion hanger of the spring-suspended type for supporting a single line to any flat member. By use of a wrench, the hanger can be clamped to a tower member. An adjustable arm allows the line support to swing in an arc of  $135^\circ$  for alignment of line. After the spring is pulled to a length given in a chart with the instruction sheet, and the adjustable clamp is tightened, the hanger will automatically adjust itself for any expansion of the line.

Same as above except support arm is longer. This hanger provides additional clearance of line from tower.

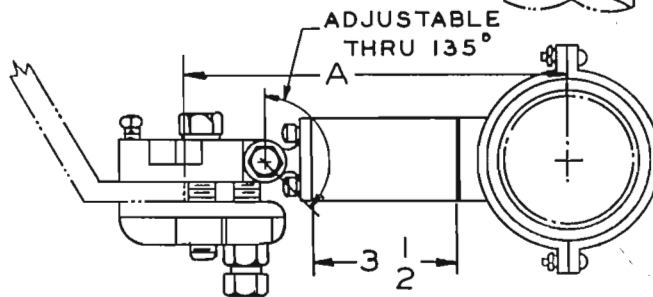
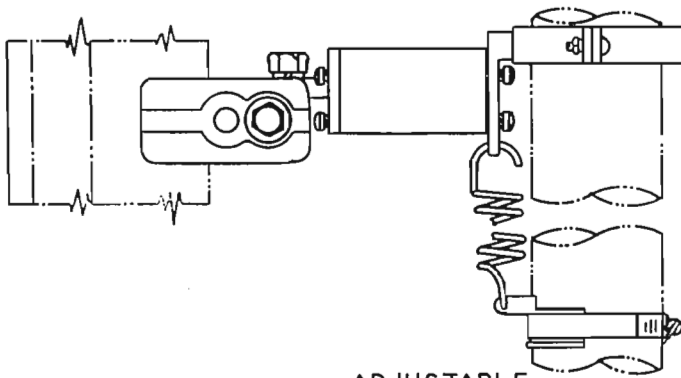
A spring-suspended hanger with an insulated support arm. This hanger provides isolation of tower from transmission line.

# Dimensions for Single Line Expansion Hangers



HANGER  
GROUNDED  
FLAT MEMBER

LINE	MI NO	"A"
$\frac{7}{8}$	19309-20	$3 \frac{15}{16}$
$\frac{7}{8}$	19309-21	$7 \frac{11}{16}$
$1 \frac{5}{8}$	19312-20	$4 \frac{9}{16}$
$1 \frac{5}{8}$	19312-21	$8 \frac{1}{16}$
$3 \frac{1}{8}$	19313-20	$5 \frac{5}{16}$
$3 \frac{1}{8}$	19313-21	$8 \frac{7}{8}$



HANGER  
INSULATED  
FLAT MEMBER

LINE	MI NO	"A"
$\frac{7}{8}$	19309-22	$7 \frac{11}{16}$
$1 \frac{5}{8}$	19312-22	$8 \frac{1}{16}$
$3 \frac{1}{8}$	19313-22	$8 \frac{7}{8}$

## Expansion Hangers for Supporting Single Lines

### HANGERS FOR MOUNTING TO ROUND MEMBERS



MI-19309-23 (7/8 LINE)  
MI-19312-23 (1 5/8 LINE)  
MI-19313-23 (3 1/8 LINE)



MI-19309-24 (7/8 LINE)  
MI-19312-24 (1 5/8 LINE)  
MI-19313-24 (3 1/8 LINE)



MI-19309-25 (7/8 LINE)  
MI-19312-25 (1 5/8 LINE)  
MI-19313-25 (3 1/8 LINE)



MI-19309-26 (7/8 LINE)  
MI-19312-26 (1 5/8 LINE)  
MI-19313-26 (3 1/8 LINE)



MI-19309-27 (7/8 LINE)  
MI-19312-27 (1 5/8 LINE)  
MI-19313-27 (3 1/8 LINE)



MI-19309-28 (7/8 LINE)  
MI-19312-28 (1 5/8 LINE)  
MI-19313-28 (1 5/8 LINE)

### HANGERS FOR DIRECT MOUNTING



MI-19312-32 (1 5/8 LINE)  
MI-19313-32 (3 1/8 LINE)



MI-19312-33 (1 5/8 LINE)  
MI-19313-33 (3 1/8 LINE)



MI-19312-34 (1 5/8 LINE)  
MI-19313-34 (3 1/8 LINE)

The expansion hangers shown above are of the spring-suspended type designed for supporting single 7/8", 1 5/8", and 3 1/8" transmission lines. The direct-mounting type of hanger requires the

drilling of a hole in the tower member. The hangers for mounting to round members are provided with a clamp which can be fastened to pipe-like structures or other rounded members.

7/8" Line	1 5/8" Line	3 1/8" Line
MI-19309-23	MI-19312-23	MI-19313-23
MI-19309-24	MI-19312-24	MI-19313-24
MI-19309-25	MI-19312-25	MI-19313-25
MI-19309-26	MI-19312-26	MI-19313-26

#### Description of Hanger

A spring-suspended hanger for supporting a single line to a round member having a diameter from 1" to 2 1/4". An adjustable clamp supports the hanger to tower member. An adjustable arm allows the line to swing in an arc of 180° for alignment of line. Refer to chart given with instruction sheet for proper stretch of spring at assembly.

Same as above except support arm is longer. This hanger provides additional clearance of line from tower.

Spring-suspended hanger same as -24 except with an insulated support arm. This hanger provides isolation of tower from transmission line.

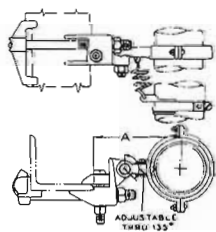
Spring-suspended hanger designed for mounting to round members with diameters from 2 1/4" to 5".

$\frac{7}{8}$ " Line	$1\frac{1}{8}$ " Line	$3\frac{1}{8}$ " Line	Description of Hanger
MI-19309-27	MI-19312-27	MI-19313-27	Same as -26 type except has a longer support arm to provide additional clearance of line from tower.
MI-19309-28	MI-19312-28	MI-19313-28	Same as -27 type except the support arm is insulated.
MI-19309-29	MI-19312-29	MI-19313-29	Spring suspended hanger designed for supporting a single line to an angular member. The hanger support has a vice like mechanism that clamps to the member. An adjustable arm allows the line to swing in an arc of 135°.
MI-19309-30	MI-19312-30	MI-19313-30	Same as -29 except it has a longer support arm.
MI-19309-31	MI-19312-31	MI-19313-31	Same as -29 except insulated from tower.
MI-19309-32	MI-19312-32	MI-19313-32	Direct-mounting hanger for supporting a single line. Requires drilling a hole in the support member for hanging bracket. An adjustable arm allows the line support to swing in an arc of 90° for alignment of line.
MI-19309-33	MI-19312-33	MI-19313-33	Same as -32 type except has a longer support arm to provide additional clearance of line from tower.
MI-19309-34	MI-19312-34	MI-19313-34	Direct-mounting hanger, insulated to provide isolation of tower from transmission line.

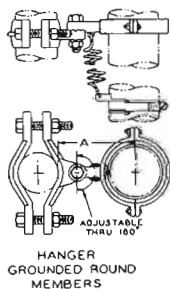


LINE	MI NO.	A'
$\frac{7}{8}$	19309-32	$3\frac{1}{16}$
$\frac{7}{8}$	19309-33	$6\frac{1}{16}$
$1\frac{1}{8}$	19312-32	$3\frac{1}{16}$
$1\frac{1}{8}$	19312-33	$7\frac{1}{16}$
$3\frac{1}{8}$	19313-32	$4\frac{1}{16}$
$3\frac{1}{8}$	19313-33	$8\frac{1}{16}$

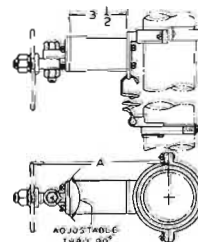
**Dimensions for Single Line Expansion Hangers**



LINE	MI NO.	A'
$\frac{7}{8}$	19309-29	$4\frac{1}{16}$
$\frac{7}{8}$	19309-30	$7\frac{1}{16}$
$1\frac{1}{8}$	19312-29	$4\frac{1}{16}$
$1\frac{1}{8}$	19312-30	$8\frac{1}{16}$
$3\frac{1}{8}$	19313-29	$5\frac{1}{16}$
$3\frac{1}{8}$	19313-30	$9\frac{1}{16}$

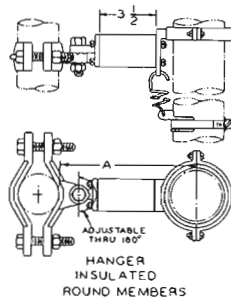


LINE	MI NO.	DIA. MEMBER	A'
$\frac{7}{8}$	19309-23	1 TO 2 $\frac{1}{2}$	$3\frac{1}{4}$
$\frac{7}{8}$	19309-24		7
$1\frac{1}{8}$	19312-23		$3\frac{7}{8}$
$1\frac{1}{8}$	19312-24		$7\frac{3}{8}$
$3\frac{1}{8}$	19313-23		$4\frac{5}{8}$
$3\frac{1}{8}$	19313-24	1 TO 2 $\frac{1}{2}$	$8\frac{1}{16}$
$\frac{7}{8}$	19309-26	2 $\frac{1}{2}$ TO 5	$3\frac{5}{16}$
$\frac{7}{8}$	19309-27		7 $\frac{1}{16}$
$1\frac{1}{8}$	19312-26		$3\frac{15}{16}$
$1\frac{1}{8}$	19312-27		7 $\frac{1}{16}$
$3\frac{1}{8}$	19313-26		$4\frac{11}{16}$
$3\frac{1}{8}$	19313-27	2 $\frac{1}{2}$ TO 5	$8\frac{1}{2}$

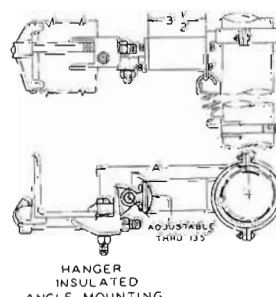


LINE	MI NO.	A'
$\frac{7}{8}$	19309-34	$6\frac{11}{16}$
$1\frac{1}{8}$	19312-34	$7\frac{1}{16}$
$3\frac{1}{8}$	19313-34	$8\frac{1}{16}$

*Hangers for Supporting Single Lines to Angular Members*



LINE	MI NO.	DIA. MEMBER	A'
$\frac{7}{8}$	19309-25	1 TO 2 $\frac{1}{2}$	7
$1\frac{1}{8}$	19312-25	1 TO 2 $\frac{1}{4}$	$7\frac{3}{8}$
$3\frac{1}{8}$	19313-25	1 TO 2 $\frac{1}{4}$	$8\frac{3}{8}$
$\frac{7}{8}$	19309-28	2 $\frac{1}{2}$ TO 5	$7\frac{1}{16}$
$1\frac{1}{8}$	19312-28	2 $\frac{1}{2}$ TO 5	$7\frac{1}{16}$
$3\frac{1}{8}$	19313-28	2 $\frac{1}{2}$ TO 5	$8\frac{1}{16}$



LINE	MI NO.	A'
$\frac{7}{8}$	19309-31	$7\frac{1}{16}$
$1\frac{1}{8}$	19312-31	$8\frac{1}{16}$
$3\frac{1}{8}$	19313-31	$9\frac{1}{16}$

## Expansion Hanger for Supporting Dual Lines

Hanger Stock No.

1 5/8" Line  
MI-19112-14

3 1/8" Line  
MI-19113-14

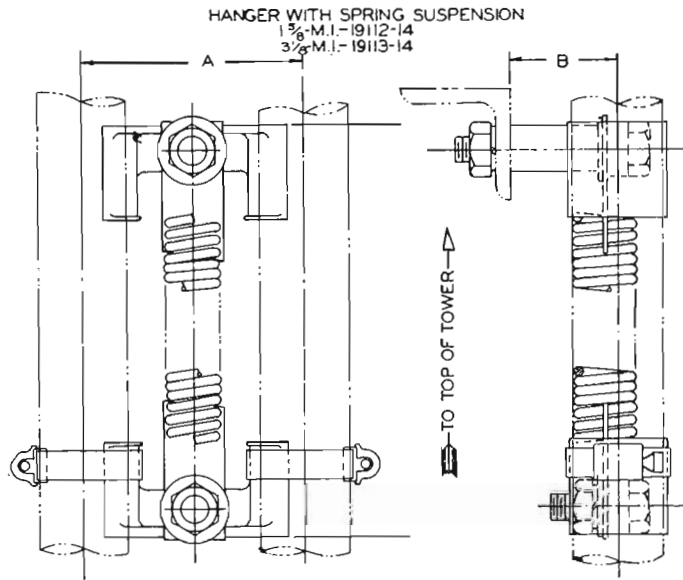
Description of Hanger

Spring-suspended type expansion hanger designed for supporting dual transmission lines. The spring is stainless steel suspended between two bronze castings, one of which fastens to the tower. The hanger will compensate for thermal differential expansion between a steel tower and copper lines up to 1000 feet in length at temperatures between -20°F and 140°F.



DUAL HANGER  
MI-19112-14 (1 5/8")  
MI-19113-14 (3 1/8")

LINE SIZE	A	B APPROX.
5/8	3 3/4	2 1/4
3/8	5 1/2	3 1/8



## Roller Assembly for Horizontal Runs

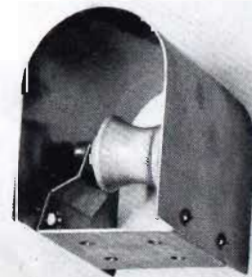
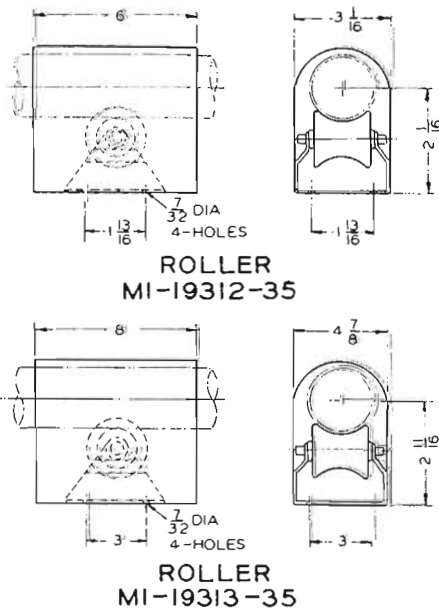
Hanger Stock No.

1 5/8" Line  
MI-19312-35

3 1/8" Line  
MI-19313-35

Description

Roller assembly used for a horizontal run of single line. The roller revolves in a slotted bracket which supports a hood for protection. Mounting holes are provided in base of assembly. Dual lines require installation of two adjacent assemblies.



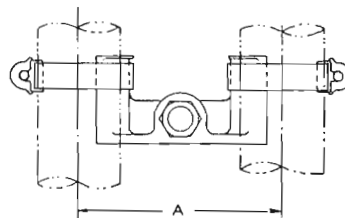
ROLLER ASSEMBLY  
MI-19312-35 (1 5/8" LINE)  
MI-19313-35 (3 1/8" LINE)



## Fixed Hanger for Supporting Dual Lines



**DUAL HANGER**  
MI-19112-15 (1 5/8")  
MI-19113-15 (3 1/8")



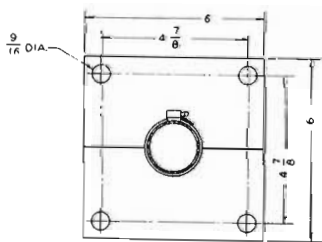
HANGER WITHOUT SPRING SUSPENSION  
1 5/8" --- MI-19112-15  
3 1/8" --- MI-19113-15

Line Size	"A"
1 5/8"	3 3/4"
3 1/8"	5 1/2"

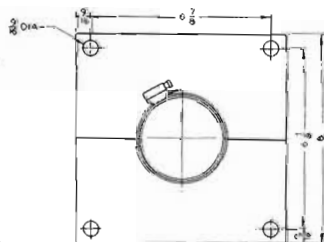
*Hanger Stock No.*  
1 5/8" Line      3 1/8" Line  
MI-19112-15    MI-19113-15

*Description of Hanger*  
A fixed hanger for supporting two parallel transmission lines. Designed for use in clamping lines securely to top of tower, or for other places where an expansion hanger is not required.

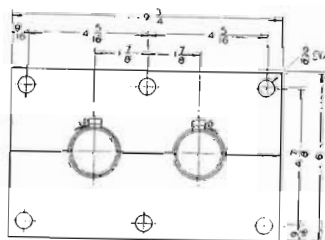
## Horizontal Anchors for Supporting Single and Dual Lines



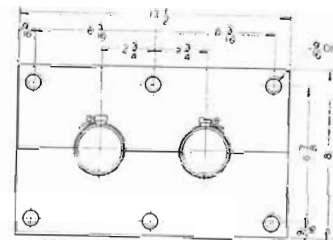
HORIZONTAL ANCHOR  
MI-19312-17



HORIZONTAL ANCHOR  
MI-19313-17



HORIZONTAL ANCHOR  
MI-19312-18

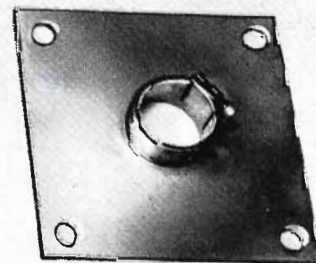


HORIZONTAL ANCHOR  
MI-19313-18

*Anchor Stock No.*  
1 5/8" Line      3 1/8" Line  
MI-19312-17    MI-19313-17

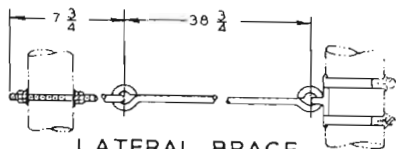
*Description of Anchor*  
Anchor designed to support a single transmission line at point of entry through a wall. Requires 3 1/2" diameter hole. Anchor plate is furnished in two halves which can be centrally located over hole and bolted in place.

MI-19312-18      MI-19313-18  
Same as above anchor except has two openings for dual lines.

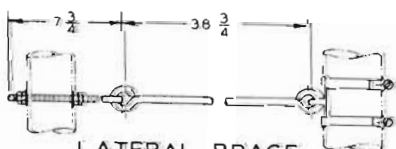


HORIZONTAL ANCHOR  
MI-19312-17 (1 5/8" LINE)  
MI-19313-17 (3 1/8" LINE)

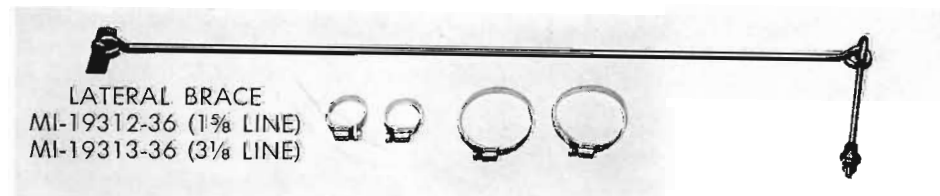
## Lateral Brace for Supporting a Single Line



LATERAL BRACE  
MI-19312-36



LATERAL BRACE  
MI-19313-36

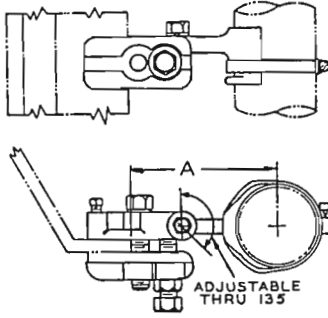


LATERAL BRACE  
MI-19312-36 (1 5/8" LINE)  
MI-19313-36 (3 1/8" LINE)

*Stock No.*  
1 5/8" Line      3 1/8" Line  
MI-19312-36    MI-19313-36

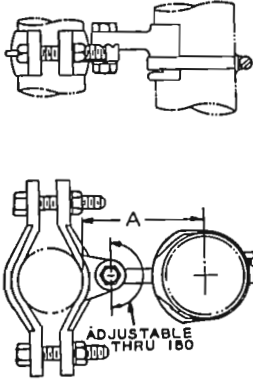
*Description*  
Lateral Brace designed for supporting a single line in any position from tower or building.

# Fixed Hangers for Supporting Single Lines



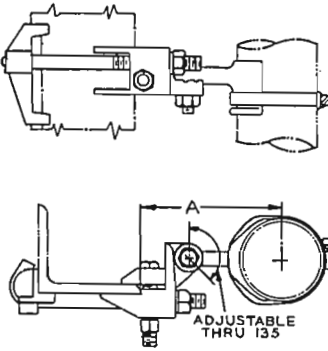
LINE	MI NO	A
1 $\frac{5}{8}$ "	19312-40	4 $\frac{9}{16}$ "
3 $\frac{1}{8}$ "	19313-40	5 $\frac{5}{16}$ "

FIXED HANGER  
FLAT MEMBERS



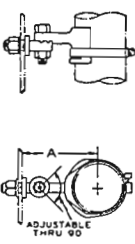
LINE	MI NO	DIA MEMBER	A
1 $\frac{5}{8}$ "	19312-41	1 TO 2 $\frac{1}{4}$ "	3 $\frac{7}{8}$ "
3 $\frac{1}{8}$ "	19313-41	1 TO 2 $\frac{1}{4}$ "	4 $\frac{5}{8}$ "
1 $\frac{5}{8}$ "	19312-42	2 $\frac{1}{4}$ " TO 5"	3 $\frac{15}{16}$ "
3 $\frac{1}{8}$ "	19313-42	2 $\frac{1}{4}$ " TO 5"	4 $\frac{11}{16}$ "

FIXED HANGER  
ROUND MEMBERS



LINE	MI NO	A
1 $\frac{5}{8}$ "	19312-43	4 $\frac{3}{4}$ "
3 $\frac{1}{8}$ "	19313-43	5 $\frac{1}{2}$ "

FIXED HANGER  
ANGLE MOUNTING



LINE	MI NO	A
1 $\frac{5}{8}$ "	19312-44	3 $\frac{13}{16}$ "
3 $\frac{1}{8}$ "	19313-44	4 $\frac{9}{16}$ "

FIXED HANGER  
DIRECT MOUNTING

*Dimensions for Fixed Single Line Hangers*

**Description**

The above hangers are designed for supporting single 1  $\frac{5}{8}$ " and 3  $\frac{1}{8}$ " transmission lines in fixed positions. These hangers

differ principally in the hanger mounting assemblies, which are designed for direct mounting, mounting to angular members, round members and flat members.

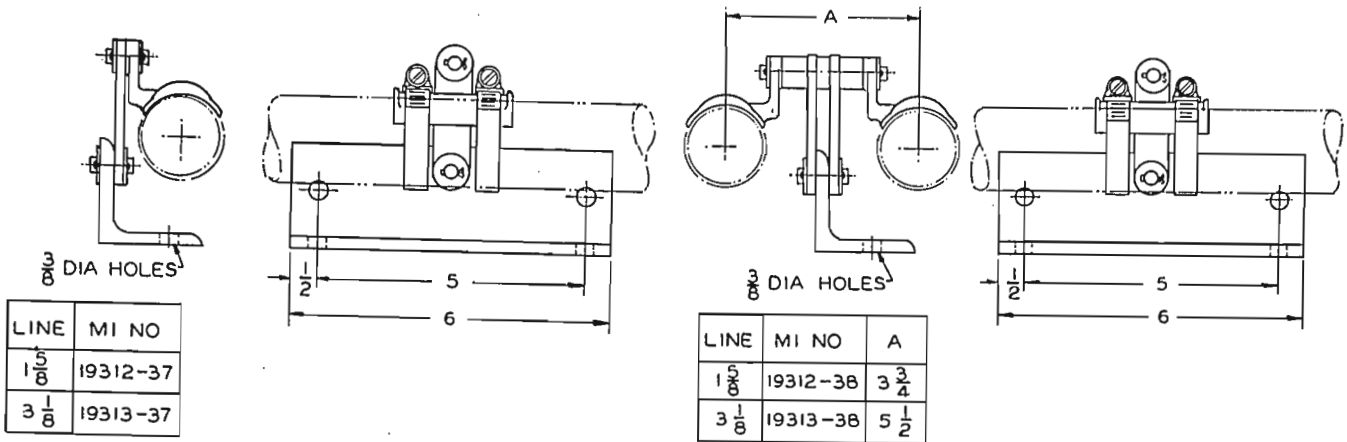
<i>Hanger Stock No.</i>	
<i>1 <math>\frac{5}{8}</math>" Line</i>	<i>3 <math>\frac{1}{8}</math>" Line</i>
MI-19312-40	MI-19313-40

*Description*

Fixed hanger (less suspension spring) commonly used to support the upper end of a vertical transmission line. Visc-like clamp secures hanger to any flat member. An adjustable clamp secures the line to the support arm casting. Pivot bolt allows compensation for misalignment of transmission line up to 135°.

MI-19312-41	MI-19313-41	Same as -40 except is designed for mounting to round members 1"—2 $\frac{1}{4}$ " diameter.
MI-19312-42	MI-19313-42	Same as -41 except designed for round members 2 $\frac{1}{4}$ "—5" diameter.
MI-19312-43	MI-19313-43	Same as -40 except designed for mounting to angular members.
MI-19312-44	MI-19313-44	Same as -40 except designed for direct mounting by drilling hole in members.

## Swivel Hangers for Supporting Single and Dual Lines



Hanger Stock No.	
1 5/8" Line	3 1/8" Line
MI-19312-37	MI-19313-37

*Description*

Hanger with angle support which can be mounted either vertically or horizontally by means of bolts. A link pivots on the support angle by means of a pin. On the other end of the link is a casting which also pivots on a pin. The casting holds line which is fastened with an adjustable stainless steel clamp. The hanger is designed to take care of uneven terrain, also will take care of expansion on a horizontal run of line.

MI-19312-38	MI-19313-38
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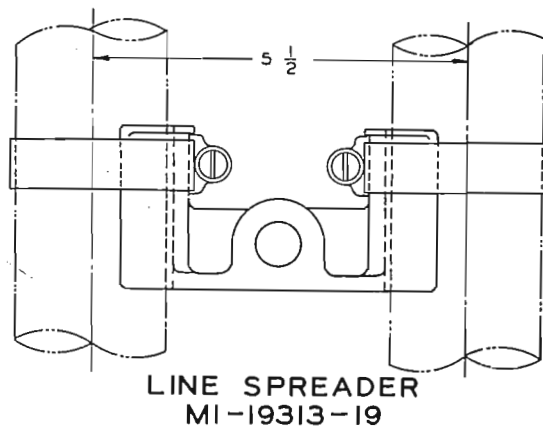
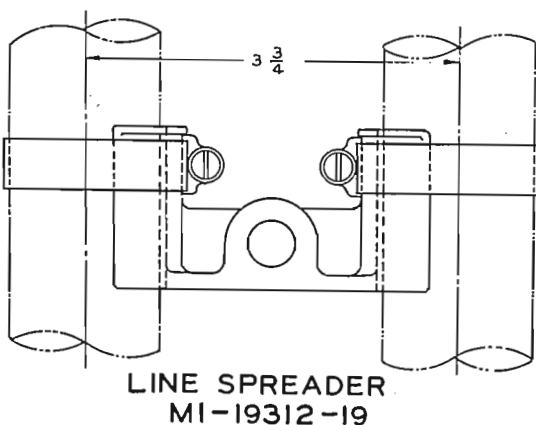
Same as above except designed for two parallel lines.

## Spreader for Supporting Dual Lines

**Description**

The dual line spreader is a special type of fixed hanger designed to maintain spacing between two parallel transmission lines. The spreader, which consists of a casting with asbestos-lined surfaces, holds the lines firmly in place without scoring

them. Two adjustable stainless steel clamps are furnished to clamp the lines to the casting. Spreader MI-19312-19 is available for dual 1 5/8" lines, and spreader MI-19313-19 for dual 3 1/8" lines.



# Coaxial RF Transfer Panel

## Uses

The Coaxial RF Transfer Panel is a custom made item designed to provide a means for manual transfer of TV or FM transmission lines. It provides for transfer of single or dual transmitter lines to an emergency antenna or dummy load. Alternatively, the panel can be connected to provide transfer of the antenna from the main transmitter to an emergency transmitter.

## Description

The panel is designed for overhead mounting in the transmitter room 6½ feet above the floor, preferably behind the transmitter. The location can be selected so that the coaxial lines from the transmitter, diplexers or dummy load can be conveniently routed to the panel.

Switching operations are accomplished by loosening the clamps holding the double elbow assemblies so that the assemblies can be removed and inserted for the desired connection.

The panel is supplied to order, and can be made available for multiple transfer of either single or dual 1½" lines. It is supplied with the necessary elbows, connectors, clamps and hardware for assembly to the underside of the panel.



## Specifications

Line Size and Impedance \_\_\_\_\_ 1½", 51.5 ohms  
 Number of Lines Accommodated \_\_\_\_\_ Custom built for multiple transfer of either single or dual lines  
 Panel Size \_\_\_\_\_ 24" x 24"

# Six Wire Open Transmission Line and Accessories

## Features

- Simplicity.
- Low maintenance cost.
- Open for constant inspection.
- Requires no auxiliary apparatus (dehydrators, gas, etc.).
- High power handling capacity at low cost.

## Uses

The six wire open line is intended for transmission of RF power from the transmitter to the antenna. The six wire line may be used for either phased arrays or non-directional antennas. It is suitable for use at any standard broadcast frequency and is designed for use in all weather conditions.

## Description

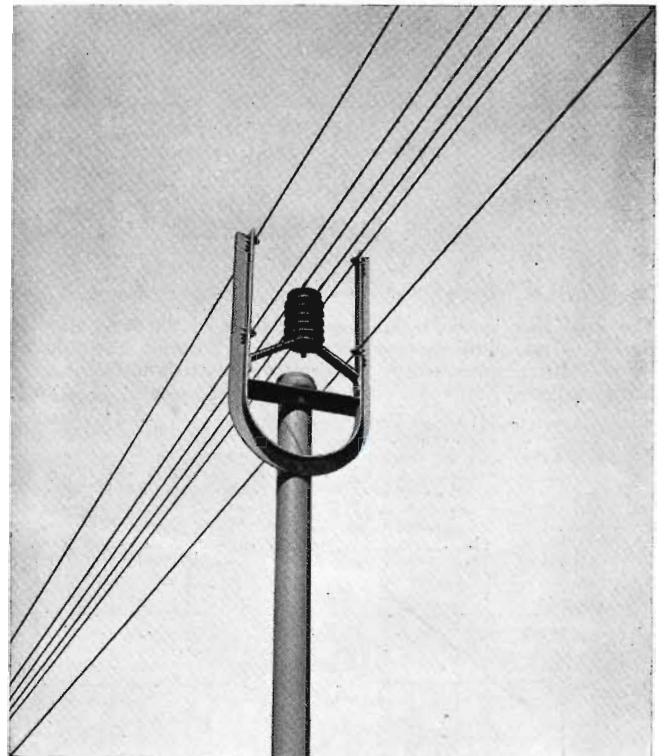
Open wire transmission lines when properly designed and constructed, provide high power handling capabilities at low cost. The open wire line is reliable and may be serviced easily. The various RCA transmission line kits simplify the installation of an efficient line suitable for RF powers up to 50 KW. Radiation is made negligible by using a six wire line consisting of two central power conductors surrounded by four grounded conductors. By use of this line configuration, with appropriate spacing between conductors, a characteristic impedance of 230 ohms is obtained which results in an economy of phasing and terminating equipment.

## Specifications

### TRANSMISSION LINE BAYONET INSULATOR

This kit consists of a bracket designed for mounting station post insulator and also supporting the four ground wires of the 6 wire transmission line. It is designed to be mounted on an MI-28013 or other suitable pole. Included are 1 bayonet bracket, 1 insulator, 4 ground wire connectors.

Stock Identification \_\_\_\_\_ MI-19421



### TRANSMISSION LINE WIRE

Transmission line wire consisting of hard-drawn, stranded, number 6 AWG copper wire may be ordered by the foot in any convenient length.

Stock Identification \_\_\_\_\_ MI-28010

**TRANSMISSION LINE LEAD-IN KIT**

This kit provides lightning protection to transmitter or tuner at the point where the transmission line enters the transmitter or tuner house. Included are horn gap, station post insulator, bracket for mounting insulator, anti-surge inductor, necessary copper tubing for ground and lead-in connections, all necessary hardware.

Stock Identification \_\_\_\_\_MI-28011-A

**TRANSMISSION LINE DEAD-END KIT (USING POLE)**

This kit includes all parts necessary to terminate a 6 wire open line on a 4" steel pole. Wing type ground anchor and guy wire for supporting the pole are also supplied. The pole is not part of this MI. Included are two cross channels, 1 conductor plate, 4 turnbuckles for ground wires, 1 turnbuckle for center conductors, 1 Clevis for eye bolts, 1 insulator, 1 guy wire, 1 wing anchor, necessary clamps, hardware, etc.

Stock Identification \_\_\_\_\_MI-28012-A

**TRANSMISSION LINE DEAD-END KIT (USING BUILDING)**

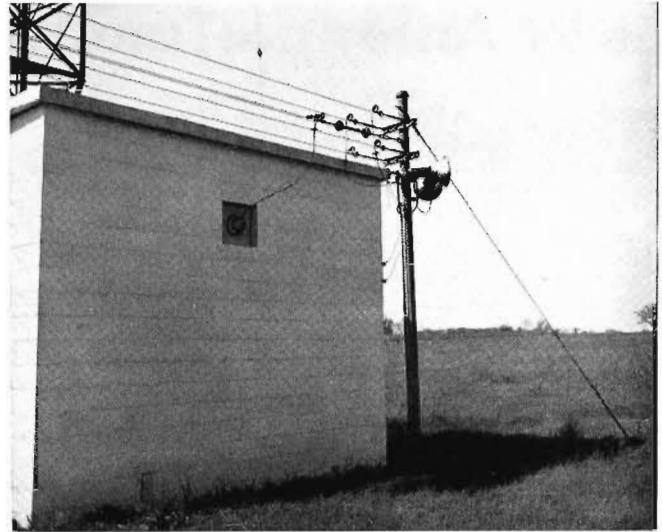
This kit consists of all parts required to terminating open wire line on the wall of the transmitter or tuner house. Included are one connector plate, 4 turnbuckles for ground wires, 1 turnbuckle for center conductors, 1 Clevis, 1 line connector, 6 dead-end clamps, 1 line insulator, 4 servisleaves  $\frac{3}{16}$ " x  $1\frac{1}{4}$ ", 5 shoulder eye bolts.

Stock Identification \_\_\_\_\_MI-28012-B

**TRANSMISSION LINE POLE AND CAP**

The transmission line pole is a 4 inch diameter steel pole 20 feet long. It is supplied complete with cap to close the upper end and is suitably treated to render it corrosion resistant. It may be drilled at installation for use with either the MI-28012-A pole dead-end kit or MI-19421 bayonet and insulator.

Stock Identification \_\_\_\_\_MI-28013



*Typical installation of MI-28012-A Dead-end Kit (using pole)*

**TRANSMISSION LINE BAYONET ACCESSORIES**

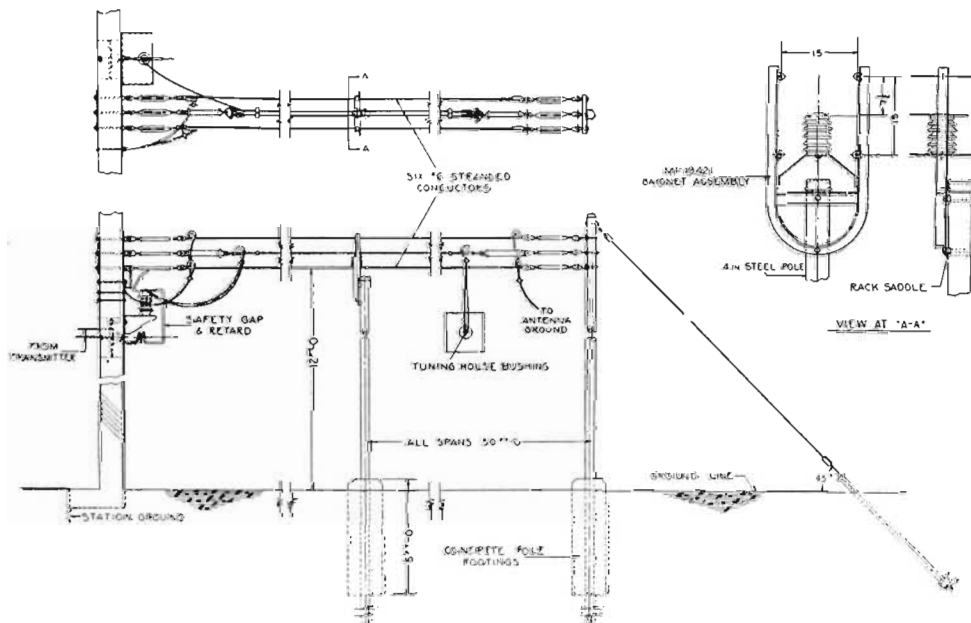
This kit consists of rack saddles and bolts necessary to mounting an MI-19421 bayonet and insulator on an MI-28013 pole. Five feet of 080 diameter copper wire for use in wiring transmission line center conductors to the station post insulator is also supplied.

Stock Identification \_\_\_\_\_MI-28014

**LEAD-IN AND GROUND ACCESSORY KIT**

This kit includes 1 plate drilled for mounting an MI-19413-1 entering insulator, 4 line termination clamps, 1 ground strap, (sheet copper  $25\frac{1}{2}$ ' x 4' x .032" thick), 2 terminal lugs  $\frac{1}{2}$ " x  $2\frac{1}{8}$ " .

Stock Identification \_\_\_\_\_MI-28015



# 1 KW Antenna Tuning Unit, Type BPA-1A

**Features**

- Designed for carrier powers up to 1 kw.
- Make-before-break switch reduces damage to antenna ammeter from static discharges.
- Self extinguishing horn type gap protects equipment from lightning.
- Reliable operation--conservatively rated capacitors and inductors.
- Equipment housed in weatherproof metal box with hinged door and lock.
- Designed for quick installation of remote metering kit.

**Uses**

The Type BPA-1A Antenna Tuning Unit serves to match broadcast antennas to either concentric or open wire transmission lines and also aids in suppressing carrier harmonics.

**Description**

The BPA-1 consists essentially of line terminating and antenna-tuning elements housed in a weatherproof metal box. Access to the interior and component parts of the tuning unit may be had through the front door which is provided with a lock, keys and two pivoting clamps. An opening is provided in the bottom of the housing for entrance

of a concentric tube transmission line, but the unit may also be used with an open wire type of line by addition of a bowl insulator, MI-19406. Provision has been made for ready installation of Remote Metering Kit (MI-28027/MI-28037-A) which will provide for remote indication of antenna current. Electrically, the unit consists of a low-pass impedance-matching filter using a "T" type network.

When ordering, specify: (1) Transmitter carrier power. (2) Transmitter frequency. (3) Antenna resistance and reactance or type and height. (4) Transmission line impedance.

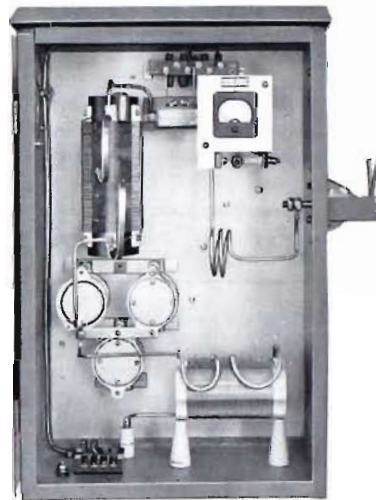


**Specifications**

Input Impedance (unbalanced open wire or concentric line) 20-350 ohms  
 Output Matching—Will match any antenna having a reactance of +j500 to -j500 and a resistance of from 25 to 1000 ohms  
 Lightning Protection—Horn type gap and meter protective switch  
 Dimensions 30" x 22" x 16"  
 Weight (unpacked) 67 lbs.  
 Finish Durable gray  
 Stock Identification MI-28901-A

**Accessories**

Open Wire Line Bowl Insulator MI-19406  
 Remote Metering Kit MI-28027/MI-28037-A



# Remote Metering Kit, BPM-1A

**Description**

The BPM-1A Remote Metering Kit provides a means of observing the antenna current at a remote location (transmitter house). Basically the unit is an electrostatically shielded current transformer with an adjustable loop primary coil and a tapped secondary coil in series with a germanium crystal and loading resistor. The taps provided on the secondary coil and the adjustable coupling between that coil and the primary loop provide coarse and vernier control of the remote meter indication. A wide range of antenna currents can be metered from approximately 1 ampere to 30 amperes depending on the operating frequency. The unit has been designed for installation in antenna tuner housings employed with transmitters of 50 kw or less, depending on the voltage and displacement between the primary circuit and grounded faraday shield.

The kit is intended to be used with MI-28037-A or MI-28037 Remote Ammeter; the "A" series meter is a 3" rectangular cased meter while the latter series is a 4" rectangular cased meter. These meters have a 1 ma d-c movement, and are available in various scale ranges to match the scale of the antenna ammeter. When ordering, specify desired meter scale.

**Specifications**

**REMOTE METERING KIT**

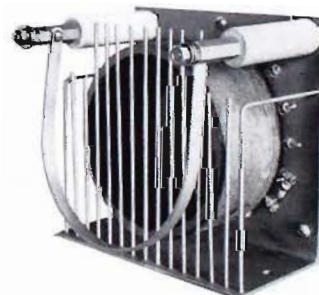
Dimensions 7" high, 7 3/8" wide, 5 3/8" deep

**Sensitivity:**

1-30 Amperes at 1600 kc  
 3-30 Amperes at 540 kc  
 Stock Identification MI-28027

**METER**

Dimensions 3" and 4" rectangular case  
 Scale Ranges 0-2, 0-3, 0-5, 0-8, 0-10, 0-15, 0-20, 0-30 amps.  
 Sensitivity 1 mc. d-c movement  
 Stock Identification 3" MI-28037-A  
 4" MI-28037

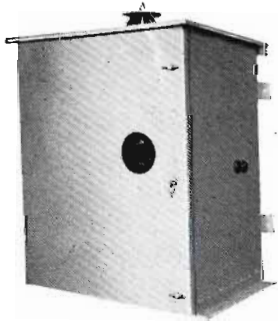


Remote Ammeter MI-7157-D, and Current Transformer

# 5-10 KW Antenna Tuning Unit, BPA-10

## Features

- Designed for carrier powers of 5 and 10 kw.
- Matches open wire or concentric transmission lines to antennas of widely divergent characteristics.
- Built-in monitoring rectifier supplies rectified current for remote antenna meter and furnishes audio voltage for program monitoring and carrier off protection.



## Uses

The Type BPA-10 Antenna Tuning Unit serves the double purpose of matching broadcast antennas of widely divergent characteristics to either concentric or open-wire transmission lines and of suppressing carrier harmonics.

## Description

All parts of this equipment are enclosed in a weatherproof

metal housing equipped at the front with a door affording ready access to the interior. This door is provided with a lock. The unit is designed for mounting on a wooden platform or a steel angle cradle by means of side flanges at the bottom of the housing. Rear mounting strips also are provided to permit mounting the unit on two upright posts. The Antenna ammeter may be read through a circular window in the door. This meter is protected from lightning surges by a double-throw switch, which is operated by means of a knob extending through the side of the housing. Electrically, the unit consists of a low-pass impedance matching filter using a "T" type network.

A monitoring rectifier unit (MI-7488-A) is contained within the housing to furnish, if desired, audio frequency voltage for program monitoring and rectified carrier current for remote antenna current indication and protective relay operation. Signal energy for operation of this rectifier is obtained from a tuned pickup coil which is coupled to the antenna loading inductor. This energy is rectified in a full wave circuit using an RCA 5V4G tube and the output is balanced to ground for excitation of a monitoring amplifier. For applications where the MI-7488-A Monitoring Rectifier unit is not required the Type BPA-10 Antenna Tuner may be purchased less the rectifier by specifying MI-28902-A. Terminals are also provided for connection to a remote antenna ammeter and interlock relay located in the transmitter house.

The antenna lead-in insulator is located on the top of the unit, and provision is made for mounting a similar insulator (MI-19413-1 bowl insulator) on the left hand side of the housing in case an open-wire line is used. A hole is provided in the bottom of the cabinet for bringing in a concentric line. When ordering specify:

1. Transmitter carrier power
2. Frequency
3. Antenna resistance and reactance
4. Transmission line impedance

## Specifications

Operating Limits  
 Carrier Frequency \_\_\_\_\_ 540 to 1700 kc  
 Transmitting Power (maximum) \_\_\_\_\_ .10 kw  
 Input Impedance  
 (unbalanced open wire or concentric line) \_\_\_\_\_ 40-350 ohms  
 Antenna Resistance (approximately) \_\_\_\_\_ 20 to 1100 ohms

Antenna Reactance \_\_\_\_\_ +J500 to -J500  
 (can be extended in a positive direction by the addition of a series capacitor; and in a negative direction if operating from a line of lower impedance than the antenna resistance.)

## Monitoring Rectifier

Output Impedance  
 (Balanced) \_\_\_\_\_ designed to operate into a 500 ohm line  
 Note: Load should be bridging with not less than 20,000 ohms d-c resistance.

Output Level to 500 ohm line

At 5-10 kw Output \_\_\_\_\_ +17 dbm\*

At 1 kw Output \_\_\_\_\_ +11 dbm\*

## Rectified Current

75 ma d-c maximum into a maximum of 1000 ohms

Audio Frequency Characteristic (50 to 10,000 cycles) \_\_\_\_\_ ±2 db

Power Supply (230 volts, 60 cycles) \_\_\_\_\_ approx. 12 watts

Tube Complement (monitoring rectifier) \_\_\_\_\_ 1 RCA 5V4G

Type Antenna Meter (scale range determined at time of installation) \_\_\_\_\_ Weston Model 425

## Dimensions

Height \_\_\_\_\_ 44"

Width \_\_\_\_\_ 34"

Depth \_\_\_\_\_ 23"

Weight (unpacked) \_\_\_\_\_ 330 lbs.

Finish \_\_\_\_\_ Durable grey

## Stock Identification

(with MI-7488-A monitoring rectifier) \_\_\_\_\_ MI-28902-B

(less MI-7488-A monitoring rectifier) \_\_\_\_\_ MI-28902-A

## Accessories

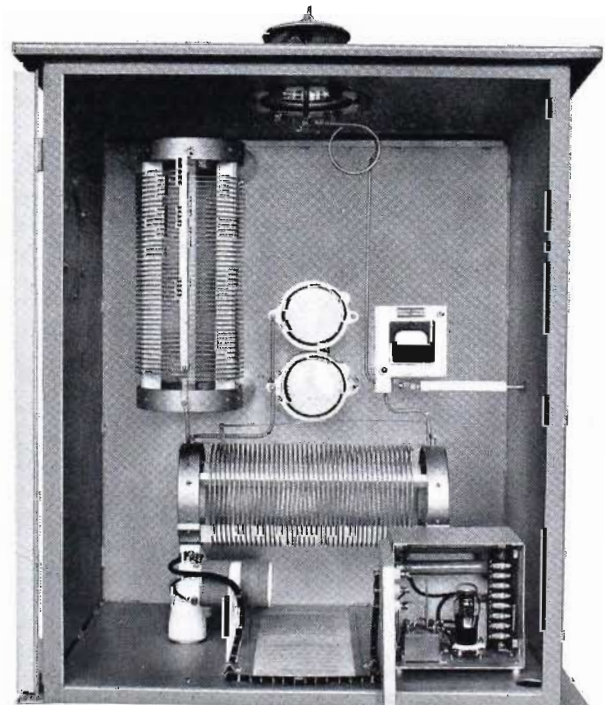
Tube Kit (1 Type 5V4G) \_\_\_\_\_ MI-7321

1 Bowl Insulator (required for open wire lines) \_\_\_\_\_ MI-19413-1

1 Remote Antenna Meter for Console (MI-11616)

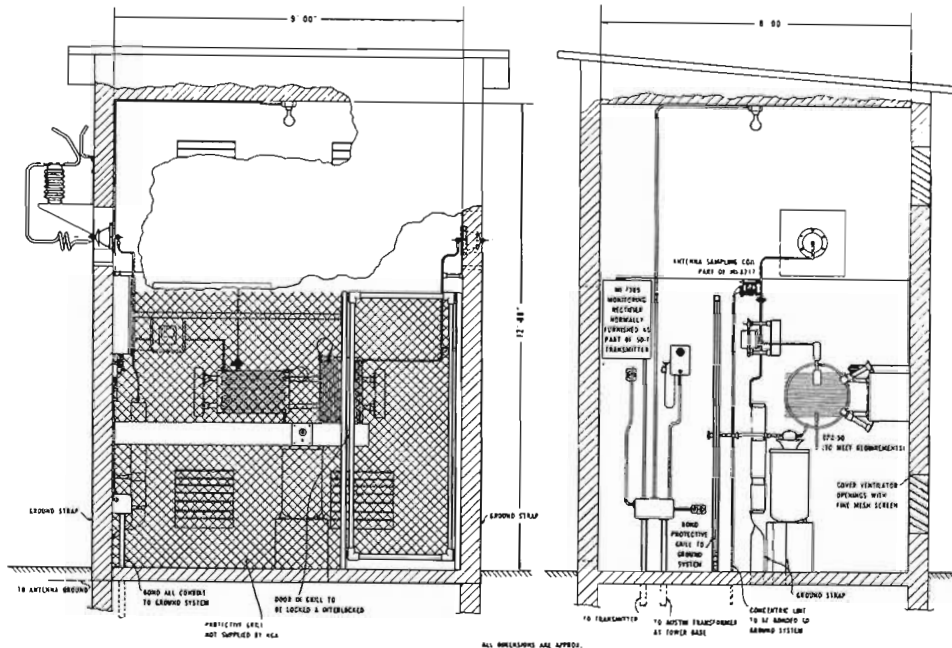
Mounting \_\_\_\_\_ MI-19889

\* dbm = db level above one milliwatt reference when single frequency tone modulation is used.



Interior view of BPA-10 with MI-7488A Monitor Rectifier

# 50 KW Antenna Tuning Equipment, Type BPA-50



**Features**

- Matches open wire or concentric transmission lines to antennas of widely divergent characteristics.
- Self extinguishing horn gap helps protect equipment from lightning surges.
- Oversize capacitors and inductors for reliable operation.
- Static drain choke supplied.

**Uses**

The type BPA-50 antenna tuning equipment serves to match broadcast antennas of widely divergent characteristics to either concentric or open-wire transmission lines at powers up to 50 kw.

**Description**

The type BPA-50 antenna tuning equipment is designed to be mounted in a tuner house at the base of the antenna tower. The tuning equipment does not include the tuner house, but all the necessary electrical components, brackets, wiring material and hardware are supplied. Complete blueprints, diagrams and instructions for assembly of the tuner are also included.

Electrically, the BPA-50 consists of a low-pass impedance-matching filter using a "T" type network. The large series arm coils are made of heavy silver-plated copper tubing, and are conservatively rated. The shunt leg capacitors are normally of the gas or vacuum variety, although mica capacitors are used when very large capacitance values are required.

A monitoring rectifier unit, MI-7488-A, may be purchased separately to furnish audio frequency voltage for program monitoring and rectified carrier current for remote antenna current indication and protective relay operation. A similar monitoring rectifier, MI-7389, is supplied as standard equipment with the RCA type BTA-50F1 transmitter.

The antenna ammeter is protected from lightning surges by a double-throw switch which cuts the meter out of the circuit.

**Specifications**  
**TUNER**

- Operating Limits:**
- Carrier Frequency \_\_\_\_\_ 550-1700 kc
  - Transmitter Power (maximum) \_\_\_\_\_ 50 kw
  - Input Impedance (unbalanced open wire or concentric line) \_\_\_\_\_ 40 to 350 ohms
  - Antenna Resistance (approximately) \_\_\_\_\_ 20 to 1100 ohms
  - Antenna Reactance \_\_\_\_\_ +j500 to -j500  
(Can be extended in a positive direction by the addition of a series capacitor; and in a negative direction if operating from a line of lower impedance than the antenna resistance.)
  - Space Requirements \_\_\_\_\_ Approximately 70 sq. ft. floor area with 10 ft. ceiling
  - Net Weight (approx.) \_\_\_\_\_ 500 lbs.
  - Stock Identification:  
For 230 Ohm Line \_\_\_\_\_ MI-28903-A  
For 70/51.5 Ohm Line \_\_\_\_\_ MI-28903-B

**Accessories**

- Extra Bowl Insulator \_\_\_\_\_ MI-19413-1
- Monitoring Rectifier \_\_\_\_\_ MI-7488-A
- Tube Kit (1 RCA 5V4G) \_\_\_\_\_ MI-7321



# Antenna Towers

RCA is a representative of antenna towers for all prominent manufacturers. A wide selection of towers is available for all applications. These include standard self-supporting and guyed designs as well as custom made designs. Towers are available for use as radiators in directional arrays, and for supporting combinations of FM Pylons and TV Super Turnstiles.

RCA can also furnish tower lighting equipment and tower erections, if desired. This may include erection and installation of FM or TV antennas and associated transmission lines. Complete ground systems can be furnished if required.

Price and delivery quotations for towers and services may be obtained by forwarding essential information to RCA. The following questionnaire is provided as an aid to the station in determining specific requirements.

## Antenna Tower Questionnaire

### LOCATION

City \_\_\_\_\_ State \_\_\_\_\_

### QUOTATIONS TO BE FURNISHED

Tower Guyed \_\_\_\_\_ ( )  
 Self-Supporting \_\_\_\_\_ ( )

#### Tower Erection:

Antenna and Harness Installation: FM \_\_\_\_\_ ( )  
 TV \_\_\_\_\_ ( )

Transmission Line Installation \_\_\_\_\_ ( )

Lighting Equipment \_\_\_\_\_ ( )

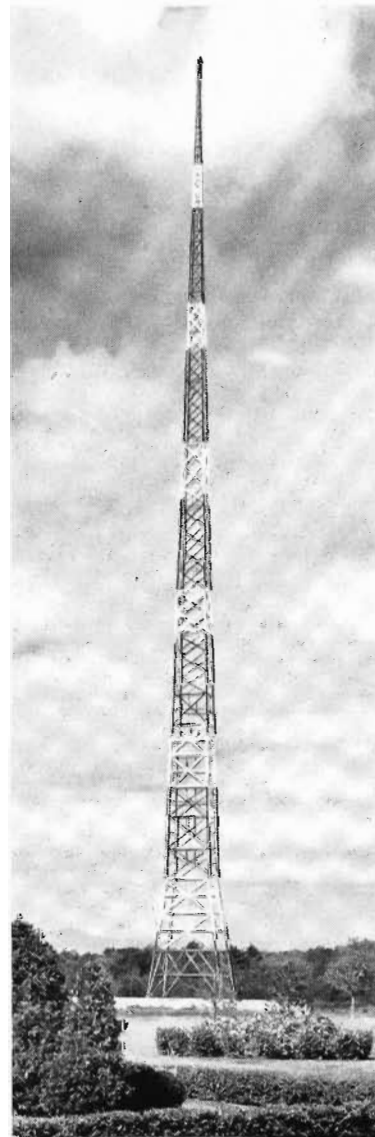
### SPECIFICATIONS

Tower Height: Ground to top of tower \_\_\_\_\_  
 Ground to top of base insulator \_\_\_\_\_

Tower Use: Antenna support \_\_\_\_\_  
 AM Radiator \_\_\_\_\_

AM Power \_\_\_\_\_ KW

Frequency \_\_\_\_\_ kcs.



FM Antenna: Type \_\_\_\_\_  
 Description \_\_\_\_\_

TV Antenna: Type \_\_\_\_\_  
 Description \_\_\_\_\_

Transmission Lines:  
 Size \_\_\_\_\_ Nr. \_\_\_\_\_

Design Load: B-1 Open Country \_\_\_\_\_  
 B-2 Congested Area \_\_\_\_\_

Remarks:  
 (Special requirements, site accessibility, etc.)

# Austin Tower Lighting Transformers

## Features

- Independent of frequency. No tuning adjustments.
- No housing required—eliminates leakage losses.
- Trouble-free operation under all conditions.
- Excellent regulation and efficiency.
- Cost is comparable to other types of tower lighting units.

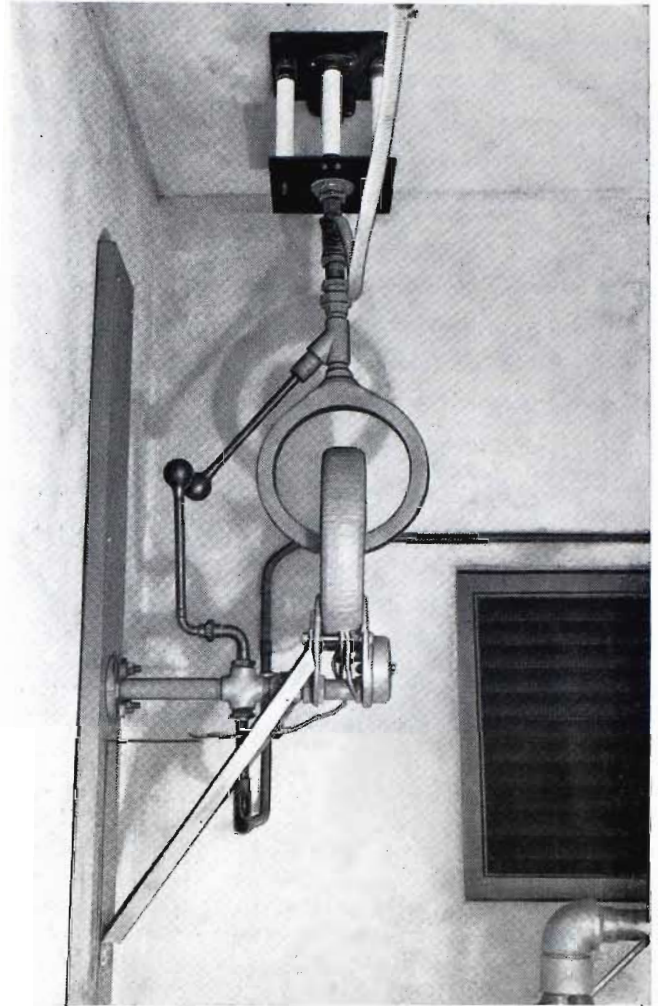
## Uses

The Austin insulating transformer is a device for supplying a-c power to the lighting circuits of an insulated or section-alized radio tower. Being independent of frequency, the same transformer may be used for any radio frequency and for a wide range of transmitting power.

## Description

The Austin insulating transformer provides the radio engineer with a means of supplying current to tower lighting circuits which is more efficient, reliable and easier to install than other types of tower lighting filters. The transformer consists of ring type windings with a clear air gap between primary and secondary rings. This type of construction makes the Austin transformer independent of radio frequency and therefore it requires no tuning or adjustment. Since the windings are fully enclosed, no transformer housing is required, and the air gap between primary and secondary rings eliminates the possibility of surface leakage which may be appreciable in the housing covering other types of tower lighting filters. The total capacity added at the tower insulating zone is of the order of a very few micro-microfarads which produces only a slight effect upon the radio frequency circuit, and is constant under all weather conditions.

Installation is simplified since the Austin transformer requires no housing, chokes or filters. The primary of the transformer is usually attached to the base of the tower insulator or pier supporting the insulator. The secondary is supported by a conduit attached to the top of the insulator or to the tower above the insulator.



*Typical Installation of an Austin Tower Lighting Transformer*

Austin tower lighting transformers are available in sizes ranging from 700 watts to 7 kw. The larger sizes may be used to furnish extra energy for lighting neon or other signs on the tower, or for de-icing.

## Specifications

Type	Primary Voltage	Secondary Voltage	Capacity	Secondary Taps	Net Weight
A-2101	115/230	115	1 to 1.75 kv.	None	85 lbs.
A-1971	115/230	115	2 to 3 kv.	10% over volt.	201 lbs.
A-2815	115/230	115/230	3 to 7 kv.	None	300 lbs.

## Stock Identification:

A-2101	_____	MI-28215-1
A-1971	_____	MI-28215-2
A-2815	_____	MI-28215-3

# Bowl Insulator, MI-19413-1/3



For transmitter carrier powers up to and including 50 kw, this insulator assembly is ideal for taking r-f leads into or out of antenna tuner or phasing equipment.

The insulator comes complete with corona ring, lead in stud, and all mounting hardware.

The same bowl insulator is available with a hollow stud, for

use where it is necessary to carry power lighting wires out of the tuner house on the same insulator which carries the r-f conductor.

### Specifications for Solid Stud Insulator

Dimension:

Flange Diameter	8 3/4"
Bolt Circle Diameter	7 3/4"
No. of Mounting Studs	6 spaced equidistantly
Lead in Stud Size	3/8" diameter, 8 1/2" long
Height (approx.)	6"
Unpacked Weight	11 3/4 lbs.
Stock Identification	MI-19413-1

### Specifications for Hollow Stud Insulator

Dimension:

Same as MI-19413-1 except the stud is made from 3/4" 14 NPSL—4 pipe nipple. This stud is 3" long with a 1" O.D. and .8" I.D.

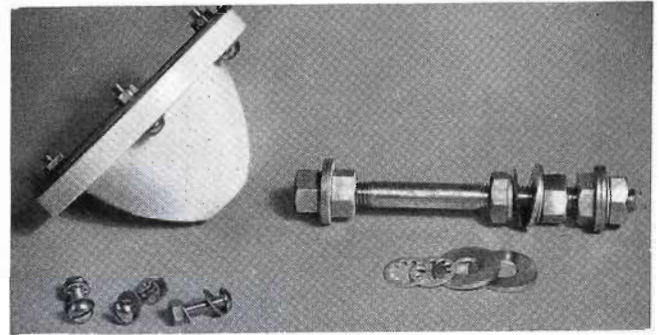
Stock Identification MI-19413-3

# Bowl Insulator, MI-19406

This insulator is recommended for antenna tuner or phasing equipment r-f lead-ins for carrier powers up to and including 1 kw. The insulator comes complete with all mounting hardware and lead-in stud.

### Specifications

Flange Diameter	5 1/4"
Bolt Circle Diameter	4 5/8"
No. of Mounting Studs	6 equally spaced
Lead-in Stud Size	1/2" diameter, 6" long
Unpacked Weight	2 1/8 lbs.
Stock Identification	MI-19406



# Antenna Lighting Choke Coil, Type BPC-1A

### Uses

In broadcast transmitter installations where the tower itself forms the antenna, special transformers or radio frequency choke coils must be employed to feed power to the lighting circuits on the tower. Type BPC-1A antenna lighting choke coil has been designed for this purpose. Its electrical characteristics are such that it presents a low impedance to commercial lighting frequency and a high impedance to the radio frequency in the broadcast range. It, therefore, provides a means for supplying energy to the tower lighting circuits and at the same time prevents any appreciable loss of r-f energy supplied to the tower by the radio transmitter.

Diameter 4"

Stock Identification MI-7112-A

### Accessories:

Capacitors .01 MFD UC3004

### Description

The coil consists of a double winding on a bakelite form. The windings are coated with an insulating varnish which binds the turns together and prevents moisture absorption. This coil, however, must be protected from the weather by installing it within some weatherproof enclosure. Such an enclosure or housing is not provided with the unit. The natural resonant frequency of the coil is well removed from any frequency within the broadcast band. Its characteristics, therefore, are such that it presents a relatively high impedance in the order of several hundred ohms to all broadcast frequencies. All windings that are not directly connected to the tower or ground should be properly bypassed by suitable capacitors as illustrated.



### Specifications

Maximum Continuous Current (50/60 cycles)	15 amperes
D-c Resistance (total both windings)	Approx. .314 ohms
Inductance at 1 mc.	360 microhenries
Length	11 5/8"

