

# EMI/RFI Shielded Cable Tray

Chalfant began supplying industry cable tray in 1948 and designed and developed the first RF Tray for NASA in 1960 when it became imperative to protect instrument and control cabling from EMI fields during missile launching. Over the past 40 years, Chalfant has developed both a **Premium** and an **Ultra** class RF Tray.

The gasketed **Ultra** RF Tray has been successfully used at Sandia Labs, Los Alamos, as well as, military and other sensitive government facilities. Industrial and utility companies have found Chalfant's **Premium** RF Tray to be suitable because of the lower (long wave) EMI frequencies present in most of these applications.

- Field proven and tested
- Premium and Ultra class
- Designs to 78 dB attenuation @1,000 MHz



# Maximum EMI/RFI Protection

## RF Tray and Electromagnetic Compatibility

EMC is the technology of minimizing the electromagnetic interference caused by electromagnetic fields that are radiated or propagated along a conducting medium and reducing the susceptibility of these fields on electrical or electronic devices or systems. EMC is a coordinated systems design approach costing of:

1. Reducing interference at the source.
2. Isolating the offending circuits by filtering, grounding or shielding cable in RF cable tray.
3. Increasing the immunity of susceptible circuits by distance or rerouting away from radiation sources such as power equipment or high voltage sources.

## RF Tray Often the Answer

EMC cable tray has become the solution when source radiation or rerouting of cables is difficult or impossible. They have saved industrial plants many man-hours of tracking and correcting offending circuits during plant or process start-up and shakedown.

In addition, properly grounded and shielded RF tray not only reduces the radiated EMI fields a sensitive circuit sees but also provides an isolated ground reference which effectively reduces internal and circuit part coupling and overall mode coupling.

## Chalfant's Answer to Glitches and Bad Effects of EMI/RFI

The consequences of inadequate shielding of critical cable runs can include:

1. Computer "glitches" (introduction and transmission of erroneous data).
2. Radio and television interference.
3. System malfunctions due to voltage variations. The longer the control cable run the more susceptible it is to EMI. Also, the lower the control voltage, the higher the impedance and its susceptibility to induced interference. Typical operating voltages and current for process elements range between 100mV to 5V and 1mA to 50 mA.
4. Stolen information through "listening in" on unprotected, unsecured data lines.

## 7-2 Chalfant Cable Trays

Chalfant's tested RF tray design plus Chalfant's proven field experience can minimize or reduce the "bad" effects of EMI/RFI.

## RF Cable Tray Design Considerations

RF Trays are designed to either contain or exclude EMI/RFI. A perfect design would be a one-piece tray and seam welded covers. However, this design is impractical as easy access to cables is necessary. Straight sections, covers and fittings must also be designed for easy installation in the field.

## Premium RF Tray

Low frequency magnetic fields are best attenuated by mass of material. Chalfant's **Premium** RF Tray has the capability to efficiently attenuate H fields in the 150 KHz-10 MHz range from 70 to 83 dB.

E fields are effectively attenuated >114 to 90dB and 1 MHz to 30 MHz. **E fields below 1 MHz are attenuated over 100dB.** (see performance graphs.)

## Ultra RF Tray

Chalfant's unique **Ultra** RF Tray has been designed with special cover clamps, splice plates, gaskets and foil. These features are essential for sealing and attenuating the plane wave frequencies 100 MHz through 1GHz.

Special adjustable tension cover straps compress the cover seam gaskets for optimum shielding efficiency.

## Chalfant RF Cable Tray—Easy to Install

Pre-galvanized steel (ASTM A653, G90 Coating) has proven to be the most cost effective tray material. It's flat, smooth surface is formable, weldable and conductive. It has excellent corrosion

resistance. Coating or painted surfaces are not conductive and work against shielding effectiveness.

Surprisingly the overall shielding effectiveness of RF Tray is determined more from the elimination of seams or gaps than from the mass or thickness of the material used.

Chalfant builds its RF Tray to close tolerances so surfaces are flat and mate tightly.

- **Tray** is one-piece construction without seams (18 gauge to 18" widths, 16 gauge @24" width).
- **Covers** are designed to overlap at 90 degree angles (18 gauge to 18" widths, 16 gauge @24" width).
- **Fittings** have long 3" tangents for tight fit with overlapped splice plates when joined with straight sections.
- **Splice plates** are wraparound with joint cover plates and special offset along with pressure bolted construction and 3" overlap over all seams.
- **Gaskets and Foil** are made of exclusive conductive coated metal materials with pressure sensitive adhesive backing for easy field installation.
- **Cover latches** are wraparound, snap-latch type with adjustable tension to 200 lbs. to assure positive pressure to compress cover gaskets.

Flatness, overlapping surfaces, tight tolerance and gasketing are the keys to Chalfant's proven RF Tray design.

## Certified for use in Canada

CSA Load Class C22.2	Max. Load Kg/m	@ Support Span	Widths (in.)
A	37	3M	6, 12, & 18
C <sub>1</sub>	7	3M	24

Note: EMI/RFI Tray is a version of Chalfant's Series 6 Tray with a solid bottom and non-radius fittings. Locate Series 6 information (Section Three) for load and deflection data for spans not shown in this section.

# Laboratory Tested to MIL STD 285

Chalfant retained the services of a major Radiation Testing Lab (widely recognized for Tempest Certification) to certify the performance and shielding effectiveness of Chalfant's *Premium* and *Ultra* RF Cable Tray.

A complete series of tests were conducted to MIL STD 285 using a production run RF Tray with the following components: two 12" wide straight sections, one 12" radius horizontal fitting with gas-

ketted bottom, one blind end, two wraparound splice plates, one panel adapter, covers, cover gaskets, foil tape and adjustable cover straps. The results of these tests are shown below.

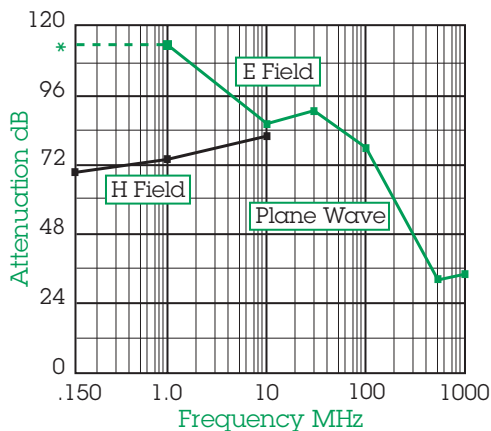
Chalfant also tested a large Navy project to 60 dB at 1,000 MHz. Over six test set-ups were required. This on-site testing was done to MIL STD 285 by another highly respected testing company. Slight modifications were made to

Chalfant's original design to eliminate variables of controlled laboratory conditions and small sample size to the actual conditions encountered on the job-site. The new improvements were incorporated and retested at 400 and 1,000 MHz.

Chalfant encourages comparison and believes we are the only tray company that offers a proven, tested system with attenuation levels far above any competitor.

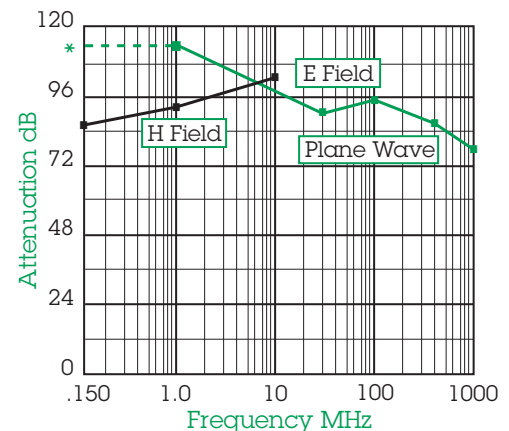
## Unmatched Shielding Effectiveness

**Premium RF Tray (No cover Gaskets)**



\*EMI Attenuation from 0-150 KHz exceeds 100 dB

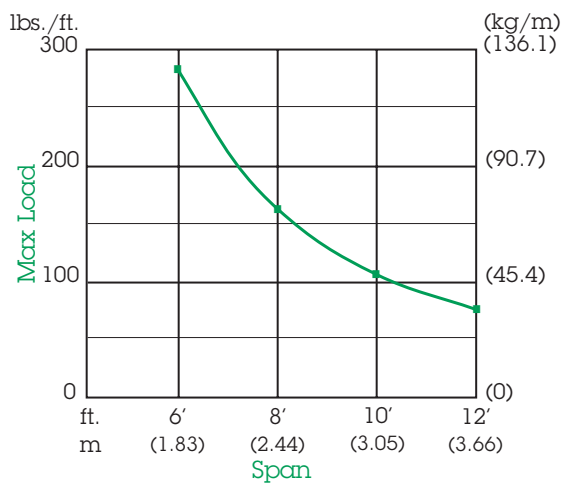
**Ultra RF Tray (Fully Gasketed)**



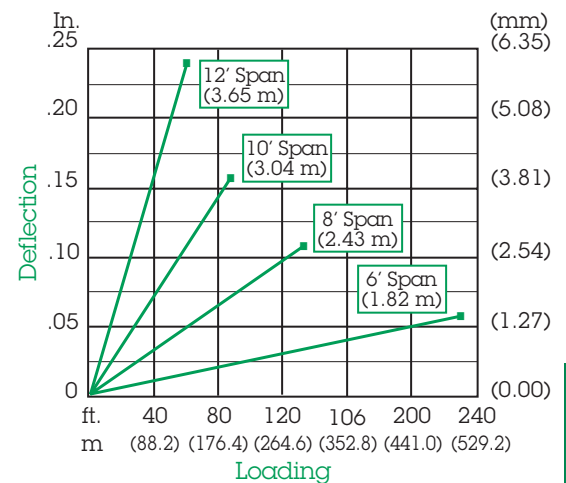
Caution: The foregoing test results can only be assured if the product is properly installed. Proper installation includes: providing a level of supports, tightly butted joints, proper cleaning of contact surfaces, proper taping and/or installation of gaskets and proper adjustment of cover straps, all of which are the sole responsibility of others. If properly installed, the product will test as shown.

## RF Tray Can be Supported to 12-foot Spans

**Maximum Cable Loading (At various spans)**



**Maximum Deflection (At various spans/loads)**



Note: Loading and deflection data is based on NEMA VE-1 testing of 24" (610 mm) wide, 4" (102 mm) load depth RF Tray. Simple beam test Safety Factor= 1.3

# Straight Sections and Fittings

## How to Order

When using the part number listed, you will receive: *Premium Tray* section or fitting, cover, wraparound splice plate with joint cover strap, nuts and bolts and cover screws.

*Ultra Tray* section or fitting, cover, wraparound splice plate with joint cover strap, nuts and bolts, foil tape, gasket material and adjustable cover straps (5 per straight section, 1 per fitting).

Blind ends, panel adapters, Z-hold downs, special accessories and support material must be ordered separately for either type of tray.

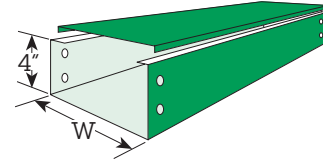
Tape and gasket material are furnished, taking into consideration some waste. Chalfant cannot be responsible for indiscriminate waste by installers.

**Chalfant's Standard RF Design is 4" load depth, 12" radius fittings and supplied with covers.**

Note:

- Add suffix -G to straight and fitting part numbers if Ultra RF Design is required; ie: RFS12-144-G or RFS12-90HB12-G. Three inch and 6' load depths and 24" radius are available as specials.
- 30° and 60° Horizontal and Vertical fittings are available—identical pricing to 45° and 90° respectively.
- See Chalfant's Ladder Style Cable Tray section (Section One) for metric conversions and dimensions on fittings and 24" radii not featured in this section.
- Also available in aluminum 5052H32

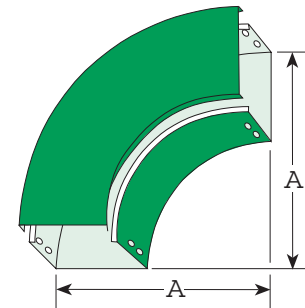
## Straight Sections



Load Depth	Tray Width	NEC Equipment Ground Area In <sup>2</sup>	NEC Equipment Ground Amps	Part Number
4"	6 (152)	0.8	200	RFS06-144
	12 (305)	1.1	400	RFS12-144
	18 (457)	1.4	400	RFS18-144
	24 (610)	2.1	600	RFS24-144

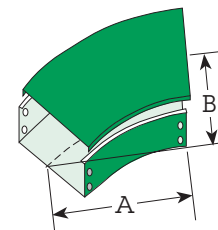
## Fittings

### 90° Horizontal Bend



Radius	Tray Width	Dimension A	Part Number
12"	6 (152)	21 (533)	RFS06-90HB-12
	12 (305)	27 (685)	RFS12-90HB-12
	18 (457)	33 (838)	RFS18-90HB-12
	24 (610)	39 (990)	RFS24-90HB-12

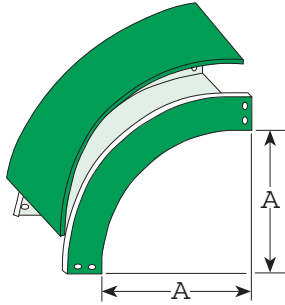
### 45° Horizontal Bend



Radius	Tray Width	Dimensions		Part Number
		A	B	
12"	6 (152)	15.75 (400)	9.5 (241)	RFS06-45HB-12
	12 (305)	17.875 (454)	13.375 (340)	RFS12-45HB-12
	18 (457)	20 (508)	17.25 (438)	RFS18-45HB-12
	24 (610)	22.0625 (560)	21.125 (537)	RFS24-45HB-12

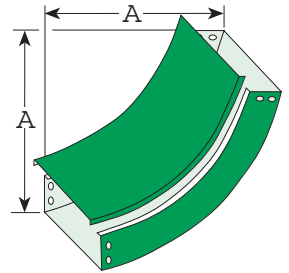
# Fittings

## 90° Outside Vertical Bend



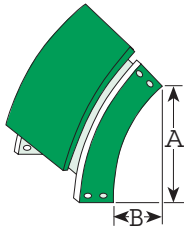
Radius	Tray Width	Dimension A	Part Number
12"	6 (152)	15 (381)	RFS06-90VOB-12
	12 (305)	15 (381)	RFS12-90VOB-12
	18 (457)	15 (381)	RFS18-90VOB-12
	24 (610)	15 (381)	RFS24-90VOB-12

## 90° Inside Vertical Bend



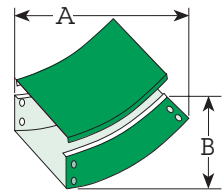
Radius	Tray Width	Dimension A	Part Number
12"	6 (152)	19 (381)	RFS06-90VIB-12
	12 (305)	19 (381)	RFS12-90VIB-12
	18 (457)	19 (381)	RFS18-90VIB-12
	24 (610)	19 (381)	RFS24-90VIB-12

## 45° Outside Vertical Bend



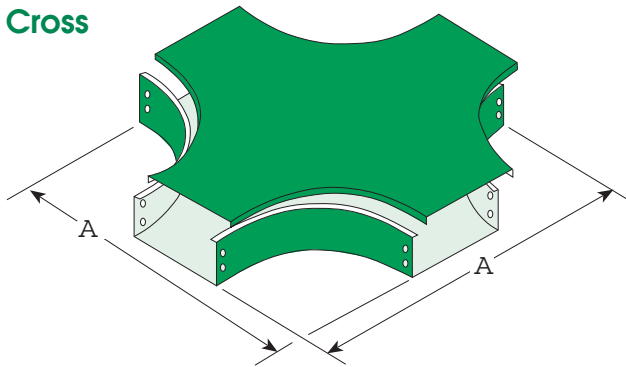
Radius	Tray Width	Dimensions		Part Number
		A	B	
12"	6 (152)	13.625 (346)	5.375 (137)	RFS06-45VOB-12
	12 (305)	13.625 (346)	5.375 (137)	RFS12-45VOB-12
	18 (457)	13.625 (346)	5.375 (137)	RFS18-45VOB-12
	24 (610)	13.625 (346)	5.375 (137)	RFS24-45VOB-12

## 45° Inside Vertical Bend



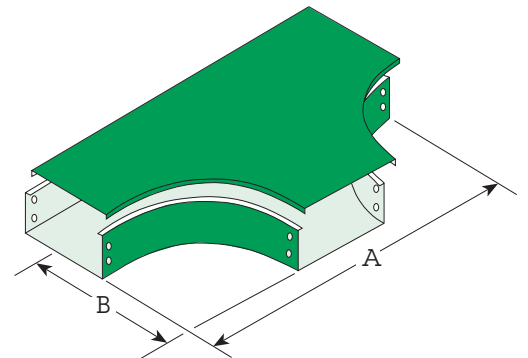
Radius	Tray Width	Dimensions		Part Number
		A	B	
12"	6 (152)	16.4375 (418)	6.8125 (173)	RFS06-45VIB-12
	12 (305)	16.4375 (418)	6.8125 (173)	RFS12-45VIB-12
	18 (457)	16.4375 (418)	6.8125 (173)	RFS18-45VIB-12
	24 (610)	16.4375 (418)	6.8125 (173)	RFS24-45VIB-12

## Cross



Radius	Tray Width	Dimension A	Part Number
12"	6 (152)	36 (914)	RFS06-X-12
	12 (305)	42 (1067)	RFS12-X-12
	18 (457)	48 (1219)	RFS18-X-12
	24 (610)	54 (1372)	RFS24-X-12

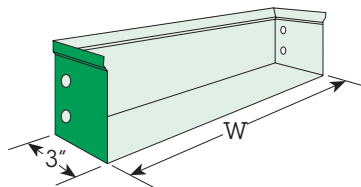
## Tee



Radius	Tray Width	Dimensions		Part Number
		A	B	
12"	6 (152)	36 (914)	21 (522)	RFS06-T-12
	12 (305)	42 (1067)	27 (686)	RFS12-T-12
	18 (457)	48 (1219)	33 (838)	RFS18-T-12
	24 (610)	54 (1372)	39 (991)	RFS24-T-12

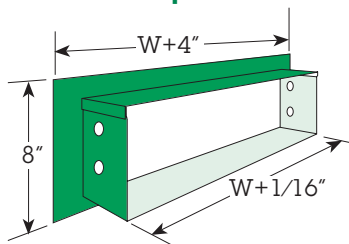
# Accessories

## Blind End



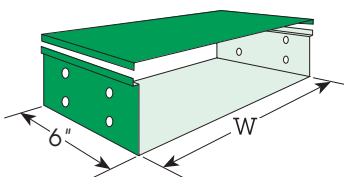
Tray Width	Part Number
6 (152)	RFS06-245
12 (305)	RFS12-245
18 (457)	RFS18-245
24 (610)	RFS24-245

## Panel Adapter

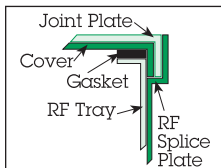


Tray Width	Part Number
6 (152)	RFS06-244
12 (305)	RFS12-244
18 (457)	RFS18-244
24 (610)	RFS24-244

## Splice Plate

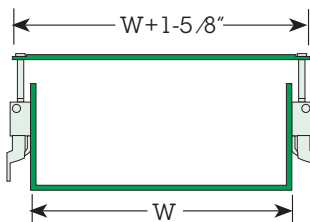


Tray Width	Part Number
6 (152)	RFS06-480
12 (305)	RFS12-480
18 (457)	RFS18-480
24 (610)	RFS24-480



## Cover Strap

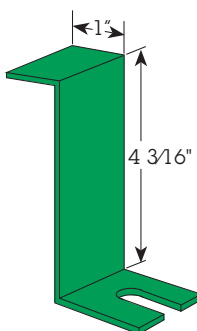
Adjustable Latch



Tray Width	Part Number
6 (152)	R7S06-280
12 (305)	R7S12-280
18 (457)	R7S18-280
24 (610)	R7S24-280

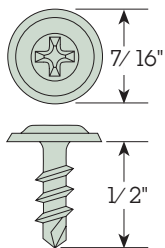
## Hold Down Clasp

Part Number: RSZC-360



## Cover Hold Down Screw

Part Number: 9STK774



Shielded