

## SCALAR AND CONICAL HORN ANTENNAS



Millitech series SFH scalar horn antennas are both physically and electromagnetically symmetrical, and lend themselves to either multiple polarizations or polarization-independent (scalar) operation. The suppression of E-plane wall currents provides a nearly symmetrical radiation pattern. Thus, SFH scalar horns have nearly identical beamwidths in both E- and H-planes, as well as specially-designed low sidelobes. Scalar horns are particularly suited to generating higher order modes for use in very efficient monopulse applications.

Typical radiation characteristics are shown on the following page. The on-axis cross-polarized response is low, typically -30 dB relative to the co-polarized level. The standard designs cover 26 to 325 GHz, with approximately 25° beamwidth. Custom horns can be provided with half-power (-3 dB) beamwidths from 60° to below 10° for narrow beamwidth feeds or horn-reflector

### FEATURES:

- Symmetric radiation pattern
- Wide range of beamwidths
- Low sidelobes
- Polarization options
- Low cross-polarization

### APPLICATIONS:

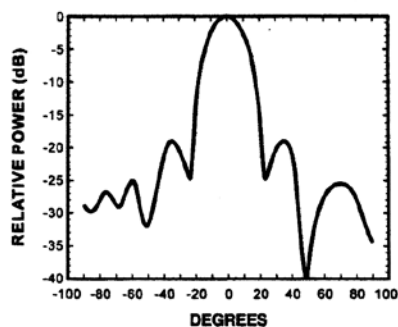
- Feeds for Cassegrain antennas
- Gaussian optics systems
- Illumination, instrumentation
- EW/ELINT
- Radar systems

antenna combinations. Multiple polarization options are available, as are full waveguide band models with single linear polarization.

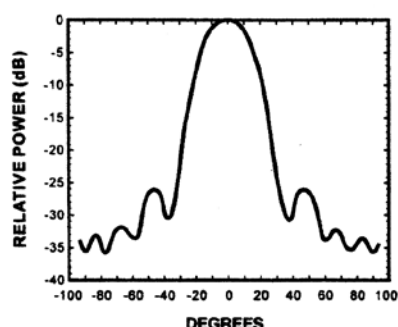
Series CHA conical horn antennas are a cost-effective alternative to the scalar feedhorns, with beamwidths ranging from 10° to 60°. They have lower sidelobe levels than pyramidal horns (such as series SGH standard gain horns), because the  $TE_{11}$  mode electric field distribution is tapered in both dimensions of the horn aperture. However, the beam is asymmetric in the two planes, and the sidelobes are higher than for series SFH antennas.

Standard products for both types of horn antennas have circular waveguide outputs for a given diameter. However, a rectangular waveguide output is offered using either an integral built-in step transition or a removable circular-to-rectangular transition (see series WAC).

## TYPICAL RADIATION PATTERNS

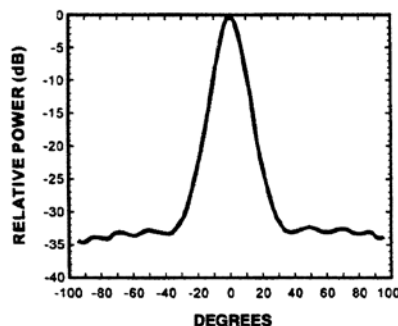


**E-PLANE**

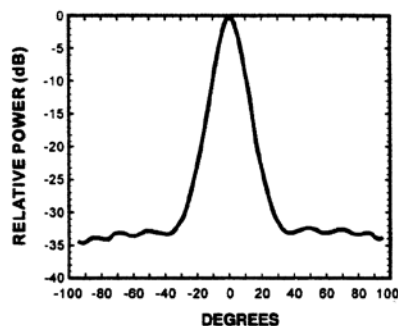


**H-PLANE**

### Series CHA



**E-PLANE**



**H-PLANE**

### Series SFH

## HOW TO ORDER

<b>Specify Model Number</b>	
<b>SFH-XX-ABBBCC</b> (scalar horns) <b>CHA-XX-ABBBCC</b> (conical horns)	
<b>XX</b> = Waveguide Band	<b>WR</b> – number
<b>A</b> = Flange Type	<b>R</b> – round (not available in WR-42) <b>S</b> – square (WR-42 and WR-28 only) <b>A</b> – Precision Flange per Millitech IS000131, flat option (WR-08 through WR-05 only)
<b>BBB</b> = Circular Waveguide Diameter (in inches)	<b>See Waveguide Sizes Table</b> (next page) Specify $\emptyset\emptyset\emptyset$ for rectangular waveguide output using an integral step transition
<b>CC</b> = Beamwidth Degrees	$\emptyset\emptyset$ – 25° beamwidth (SFH), 30° (CHA) $1\emptyset$ – 10° beamwidth (SFH)

**XXN** – nonstandard, specify XX as HPBW, degrees

## CIRCULAR WAVEGUIDE SIZES

Rectangular Waveguide Band	Circular Diameter Size	Frequency Range (GHz)*	Circular Waveguide Diameter (in/mm)	Specify When Ordering
<b>K</b>	Large	17.5-20.5	0.455/11.56	<b>455</b>
	Medium	20.0-24.5	0.396/10.06	<b>396</b>
	Small	24.0-26.5	0.328/8.33	<b>328</b>
<b>Ka</b>	Large	26.5-33.0	0.315/8.00	<b>315</b>
	Medium	33.0-38.5	0.250/6.35	<b>250</b>
	Small	38.5-40.0	0.219/5.56	<b>219</b>
<b>Q</b>	Large	33.0-38.5	0.250/6.35	<b>250</b>
	Medium	38.5-43.0	0.219/5.56	<b>219</b>
	Small	43.0-50.0	0.188/4.78	<b>188</b>
<b>U</b>	Large	40.0-43.0	0.210/5.33	<b>210</b>
	Medium	43.0-50.0	0.188/4.78	<b>188</b>
	Small	50.0-60.0	0.165/4.19	<b>165</b>
<b>V</b>	Large	50.0-58.0	0.165/4.19	<b>165</b>
	Medium	58.0-68.0	0.141/3.58	<b>141</b>
	Small	68.0-75.0	0.125/3.18	<b>125</b>
<b>E</b>	Large	60.0-66.0	0.136/3.45	<b>136</b>
	Medium	66.0-82.0	0.125/3.18	<b>125</b>
	Small	82.0-90.0	0.094/2.39	<b>094</b>
<b>W</b>	Large	75.0-88.0	0.112/2.84	<b>112</b>
	Small	88.0-110.0	0.094/2.39	<b>094</b>
<b>F</b>	Large	90.0-115.0	0.089/2.26	<b>089</b>
	Small	115.0-140.0	0.075/1.91	<b>075</b>
<b>D</b>	Large	110.0-140.0	0.073/1.85	<b>073</b>
	Small	140.0-160.0	0.059/1.50	<b>059</b>
<b>G</b>	Large	140.0-180.0	0.058/1.47	<b>058</b>
	Small	180.0-220.0	0.045/1.14	<b>045</b>
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\*If the required frequencies fall within two waveguide diameter sizes, the larger one should be selected.