

Example Antenna Types

Horn Antennas

Developed by Kathryn L. Smith, PhD





Sources

The material presented herein is from the following sources:

“Elements of Electromagnetics,” by Matthew N.O Sadiku, 5th ed. (2010)

“Engineering Electromagnetics,” by Nathan Ida, 3rd ed. (2015)

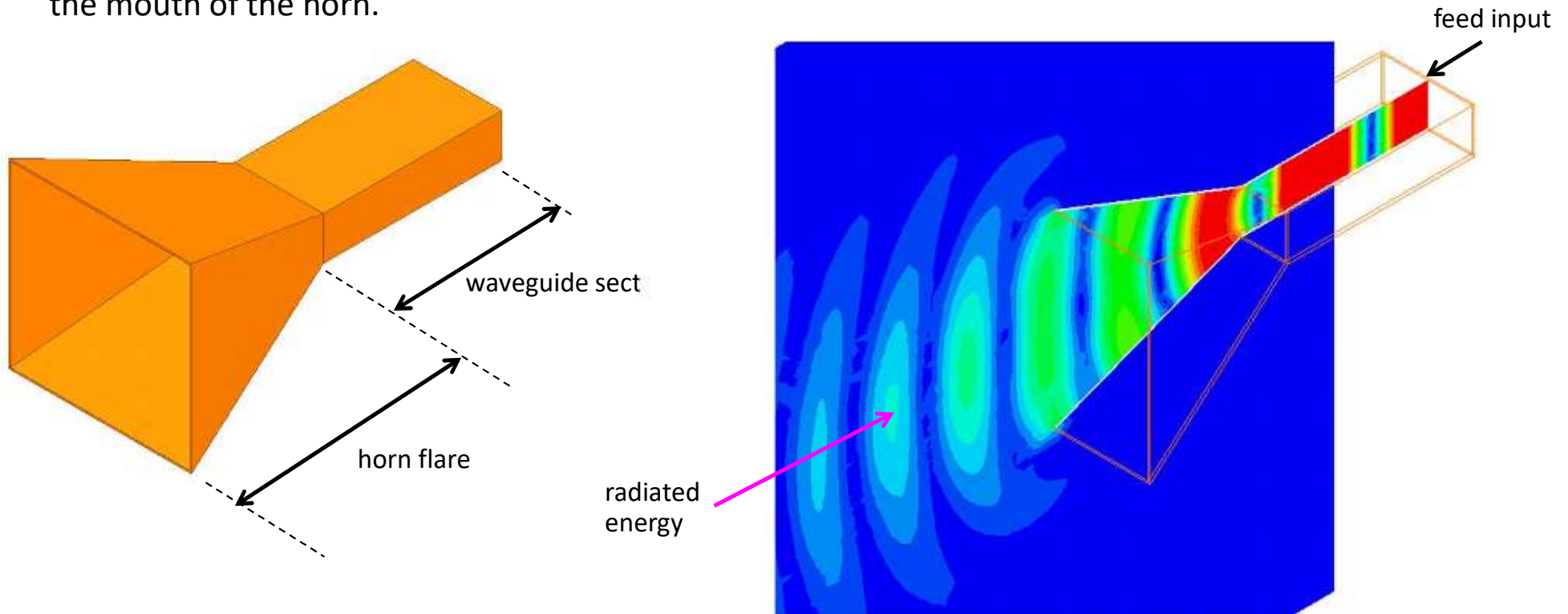
“Microwave Engineering,” by David Pozar, 4th ed. (2012)

“Antenna Theory,” by Constantine A. Balanis, 4th ed. (2016)

“Antenna Engineering Handbook,” by John L. Volakis, 4th ed. (2007)

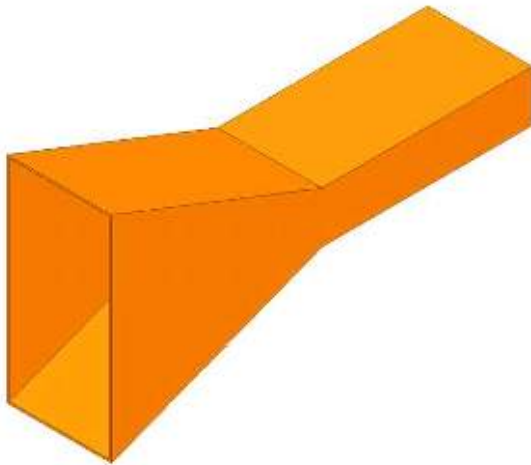
Horn Antennas

A horn antenna consists of a section of rectangular waveguide, which flares outward at the end and terminates in an open aperture. The transmitted wave is excited in the waveguide section, and radiates out the mouth of the horn.

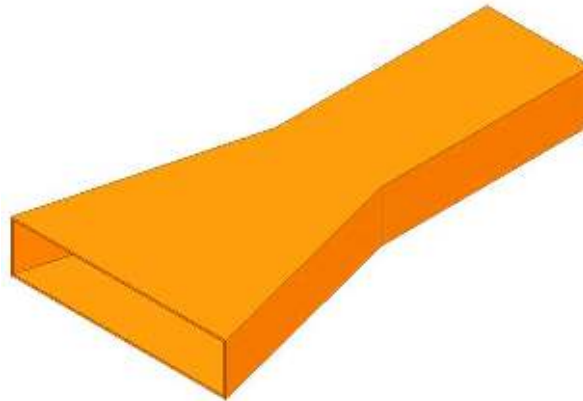


/ Horn Antennas

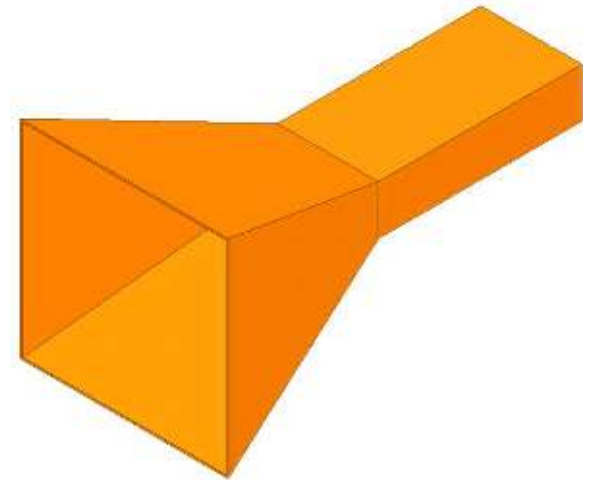
To form the horn of the antenna, horn antennas may be flared only in the direction of the electric field (an E-plane sectoral horn), only in the direction of the magnetic field (an H-plane sectoral horn) or in both directions (a pyramidal horn).



E-plane Sectoral Horn



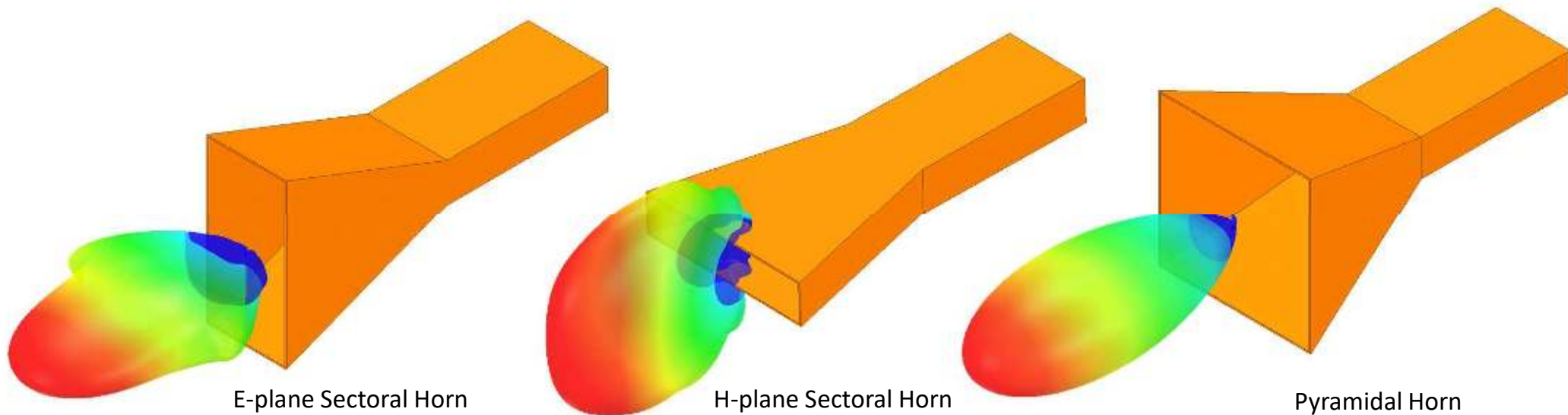
H-plane Sectoral Horn



Pyramidal Horn

/ Horn Antennas

The purpose of the flare is to increase the directivity of the antenna and narrow the beamwidth in the plane of the flare.



Horn Antennas

Horn antennas are typically **very broadband**, operating above the cutoff frequency of the waveguide, and radiate a **linearly polarized** wave, oriented in the same direction as the electric field in the waveguide.

They are often used in applications that need very high directivity.

A special kind of horn antenna called a **standard gain horn**, which has constant gain over a broad bandwidth, is often used in testing environments to measure other antennas, because its behavior is so well known.

 **Ansys**

