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The US ITER Project Office is responsible for providing the ITER Electron Cyclotron Heating (ECH) transmission lines. The transmission lines consist of long sections of evacuated 63.5 mm diameter internally corrugated aluminum waveguide. Each line is designed to transmit 170 GHz millimeter wave power at up to 2 MW per line. A total of 24 input lines can be switched to 56 output lines, which feed power launchers at the boundary of the ITER vacuum vessel. The lines are made up of long straight sections with miter bend elbows and include several specialized components providing unique functions. Prototypes of these components have been procured and assembled with metal seal joints into a prototypical line. Two waveguide tee pump-out designs have been built and their performance evacuating the prototype line has been compared. In the ITER design, at each of the 24 line inputs, a microwave transparent diamond window isolates the line volume from the 170 GHz gyrotron source vacuum. At each of the 56 line outputs, a diamond window isolates the line from the ITER vacuum vessel volume, which will operate with deuterium/tritium fuel. The diamond window provides a primary barrier for tritium and the waveguide components provide a second barrier. The design considerations to meet the power, vacuum and confinement requirements will be discussed.