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**EFFECT OF DIELECTRIC FILLING ON THE RESONANT PROPERTIES OF A RECTANGULAR WAVEGUIDE**

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The study of the properties of dielectrics by microwave methods is of great practical interest because it allows one to get information on such properties of theirs that can hardly be studied using other methods. In measurements with the use of lengths of rectangular waveguide lines, the dielectric properties are assessed based on the determination of the reflection or transmission coefficient in a rectangular waveguide resonator. This paper considers resonant phenomena in a rectangular waveguide length with dielectric filling in the form of a cylinder situated on the central axis of the waveguide length. The aim of the paper is to obtain the resonant properties of a rectangular waveguide length as a function of the length of an insert with a rectangular waveguide window and the diameter and dielectric properties of a specimen in the form of circular cylinder situated at the center of the insert. Using computer models, these resonant properties were studied as a function of the width of the rectangular waveguide window and the diameter and dielectric properties of the cylindrical specimen at the center of the window. It was found that increasing the length of the waveguide insert and the permittivity of the cylinder increases the quality factor of the resonant system considered; at a fixed specimen diameter, increasing the insert length decreases the frequency-dependent sensitivity and increases the nonlinearity of the resonance frequency vs. specimen permittivity relationship. It was shown that the maximum value of the permittivity at which the H<sub>10</sub> wave in the waveguide length is subcritical depends on the diameter of the dielectric cylinder with the other dimensions of the waveguide window fixed. In practice, the results of this work may be used in the design of dielectric parameter meters and microwave filters.

**Keywords:** *rectangular waveguide, dielectric, reflection coefficient, waveguide insert, cylindrical specimen.*

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