

WAVEGUIDE DIAMOND VACUUM WINDOWS WITH HELICOFLEX® SEALS*

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Since brazing of diamond can be difficult, time-consuming and expensive, we have designed windows sealed for high vacuum by two Helicoflex® metal seals on opposing faces of a diamond disk. To prevent excessive stress on the diamond, the seals must be well aligned and external forces on the window assembly must not be transmitted to the diamond. We describe the main features of these windows. Calculations of the temperature rises and stresses in the diamond are presented.

Tests with heat sources applied to the diamond indicate that the thermal conduction through the seals is very good. Two windows in 31.75 mm corrugated waveguide with a diamond disk 0.75 mm thick for 84 GHz have been operated with 400 kW 500 ms pulses. The temperature rise measured in thermocouples touching the edges of the diamond disks was very small. Water cooling channels were provided but have not been needed.

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