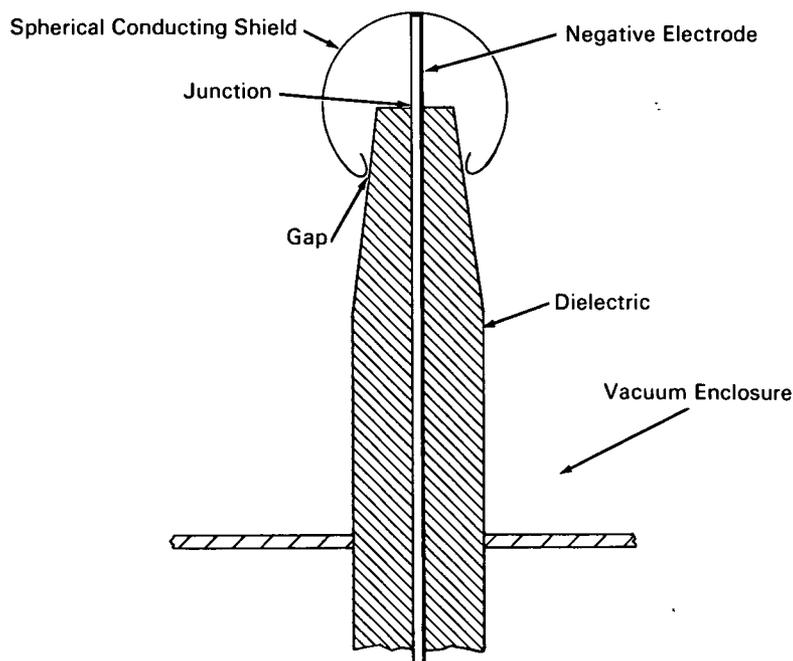


# NASA TECH BRIEF



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## Spherical Electrode Eliminates High-Voltage Breakdown



**The problem:** Insulation breakdown and electrical leakage at the negative electrode-dielectric junction in high-voltage vacuum feedthroughs and insulators. Designs in which the electrode is cast into the dielectric or in which a current leakage path is used to equalize stress must be large in size to handle high voltages, or they may also suffer from inherent power losses.

**The solution:** The use of a spherical electrode (conducting shield) to surround the negative electrode-dielectric junction.

**How it's done:** The spherical electrode is positioned so that the junction of the electrode and the dielectric is at an appropriate point in the sphere

where the electrostatic potential and stresses are near zero. The gap between the spherical electrode and the dielectric must be of optimum size for proper operation. Too large a gap may not provide adequate junction shielding, whereas a small gap can result in hazardous radiation at high voltages.

### Notes:

1. With appropriate modification, this electrode should be suitable as a high-voltage feedthrough between various liquid and gaseous media, as well as in high-vacuum environments.

(continued overleaf)

2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
Lewis Research Center  
21000 Brookpark Road  
Cleveland, Ohio, 44135  
Reference: B65-10139

**Patent status:** NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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(Lewis-155)