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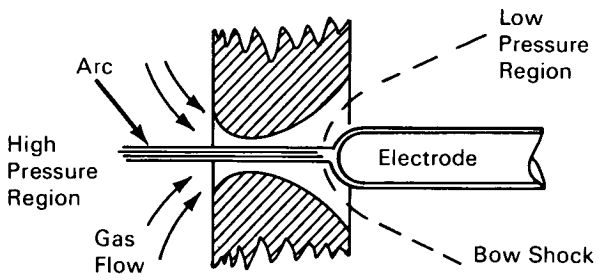
Brief 70-10329

NASA TECH BRIEF

Low Pressure Arc Electrode



The problem:

To minimize local heating rates, prevent ablation, and increase the efficiency of coaxial gas-flow arcs.

The solution:

Reduce the pressure in the vicinity of the arc attachment point by allowing the gas to flow through a supersonic nozzle.

How it's done:

The electrode is placed behind an electrically floating orifice which is shaped in the form of a supersonic nozzle. Gas from the high pressure region in which the main arc is operating flows through the nozzle into a low pressure region. The expanding gas flow creates a region of very low pressure; an electrode of blunt shape is positioned in the flow so that the bow shock produces a significant decrease in stagnation pressure at the arc attachment point. The reduction of pressure in the vicinity of the arc attachment point reduces local heating rates and ablation; because lower power inputs are possible, the overall efficiency of the element as a radiation source is improved. Typical values for argon gas with such an element are arc operating pressure, 25 atm; static pressure in the low pressure region, 1.5 atm; ratio of area in the plane of the blunt electrode to the nozzle throat area, 2.14; Mach number, 2.5; and stagnation pressure at the blunt electrode, 14.4 atm.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Ames Research Center
Moffett Field, California 94035
Reference: B70-10329

Patent status:

No patent action is contemplated by NASA.

Source: P.D. Lenn and R. Richter of
Electro-Optical Systems, Inc.
under contract to
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Category 01