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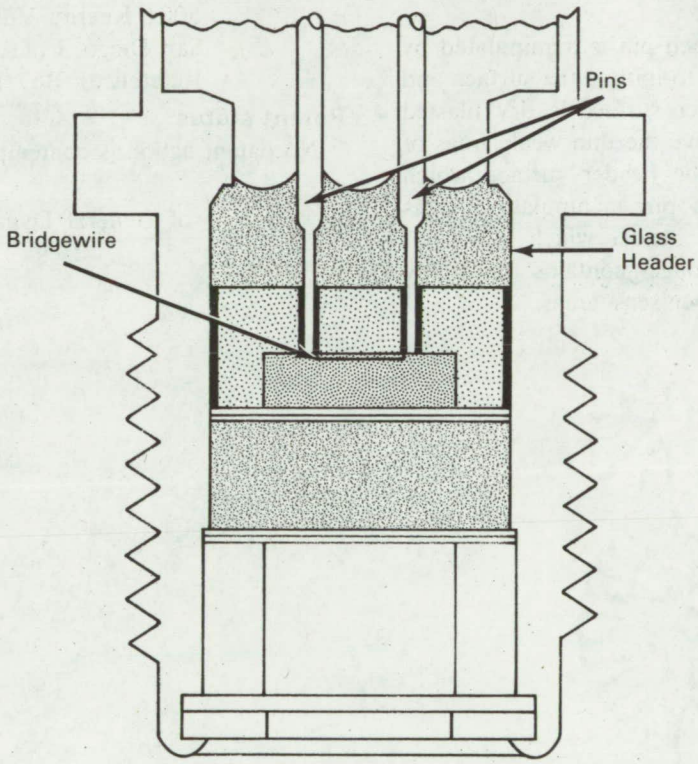
NASA TECH BRIEF

Cracks in Glass Electrical Connector Headers Removed by Dry Blasting with Fine Abrasive



The problem:

Explosive cartridges that have two or four pin bridgewire connections, designed to mate with female connectors, contain a glass header which insulates the pins from the case. These connectors typically exhibit cracking of the glass around the pins. If left alone, these cracks can propagate through the glass header causing a pressure leakage failure of the insulator. Failure analyses have shown that most of these cracks, with few exceptions, are superficial and do not affect the integrity of the glass header. However, no satisfactory inspection criteria have been available to nondestructively distinguish between these and serious cracking. The only previous solution was to accept no cracks.

(continued overleaf)

The solution:

Manipulate each pin, following the fusing operation, to initiate the surface and meniscus cracks. Then dry blast the header surface with a fine abrasive, such as a household cleanser.

How it's done:

The major source of the cracking is the relatively minor flexing of the electrical pins after the header is fused. Slight pin movement, which occurs during operations such as cleaning, attachment of mating connectors for electrical tests, and installation of shorting devices, easily chips and cracks the thin glass meniscus around the pin. The cracks produced in these areas propagate for various distances away from the pins through the relatively high stressed surface area. Surface cracking or spalling may also occur independently of meniscus cracking due to the stress level on the surface.

To remove the cracks, each pin is manipulated by hand with a cylindrical tool to initiate the surface and meniscus cracks. The header surface is dry blasted with a fine abrasive to remove the thin weak areas of the meniscus cracks and the header surface which have been loosened by the pin manipulation. This treatment results in a glass header which is free of superficial cracks, and no longer contains the highly stressed surface or weak meniscus areas.

Notes:

1. Similar cracking of the header has been observed in cases where hard epoxies have been used as a header seal. Although no tests have been conducted to date, a similar solution should be applicable.
2. Inquiries concerning this innovation may be directed to:

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   or to:

   New Technology Representative
   General Dynamics/Convair Division
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   Reference: B67-10148

Patent status:

No patent action is contemplated by NASA.

Source: R. W. Eckert
of General Dynamics/Convair Division
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(Lewis-381)