NASA TECH BRIEF

Simple, Nondestructive Test Identifies Metals

The problem:

To devise a rapid, nondestructive test for identifying metals. Conventional methods of identification generally require the destruction of a small sample of the metal and are relatively slow, complex, and expensive.

The solution:

Measure the characteristic potential difference produced by galvanic reaction between a reference electrode and the test metal, using a drop of water as an electrolyte.

How it's done:

Connect two copper leads to an X–Y recorder or a voltmeter having an input impedance between 5×10^5 and 5×10^6 ohms. One of the leads is connected to a reference electrode (made of platinum, silver, or other suitable metal), which is then dipped into a drop of water (resistivity less than 10^4 ohms/cc) on a clean surface of the metal to be identified. This electrode must not contact the test surface. The other lead is placed in contact with a point on the clean test surface near the drop of water. The voltage magnitude, polarity, and decay characteristics read from the measuring instrument are then recorded and compared with the corresponding values obtained when a metal of known composition is substituted for the test metal and measured under the same conditions. If the two sets of values are equal, the composition of the test metal is identical to that of the standard.

Notes:

1. The test can readily be made on components mounted in an assembly.
2. This method would be most useful as a go, no-go test in establishing whether a specified metal has been used in a component.
3. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   Manned Spacecraft Center
   Houston, Texas 77058
   Reference: B66-10305

Patent status:

No patent action is contemplated by NASA.

Source: Danford J. Dodds
of North American Aviation, Inc.
under contract to
Manned Spacecraft Center
(MSC-525)

Category 03