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NASA TECH BRIEF

Nondestructive Spot Tests Allow Rapid Identification of Metals

An ordered test sequence has been compiled to permit rapid identification of metals and alloys. Presented in flowchart form to permit rapid reduction of the number of possibilities, the sequence makes possible the identification of even complex alloys within about 30 min. It thus provides a reasonable alternative to identification by means of emission spectroscopy.

The tests are performed directly on the metal surface, in spot-plate depressions, or on filter paper, using standard chemical reagents suitable for laboratory or shop use. Identification is made from colors or specific reactions produced by the addition of reagents. All tests are qualitative in nature, but many of the color-producing reactions may be made semiquantitative by comparison with standard alloy specimens. The sequence may be called nondestructive, since the amount of metal destroyed is almost negligible, approximately equivalent to that removed by one stroke of a smooth file.

The procedures cover all common metallurgical elements: aluminum, copper, magnesium, nickel, and titanium alloys; and many high-temperature, stainless, high-and-low-carbon, and tool steels. Detailed instructions concerning the amount of each reagent used, the time to allow for reaction, and the possible results are given in the flowcharts. Also, separate procedures are listed for confirming the presence of individual elements in an alloy. A table given in the appendix lists the nominal compositions of approximately one hundred common alloys.

Note:

Requests for further information may be directed to:
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