U. S. Department of Commerce
Maurice H. Stans
Secretary

National Bureau of Standards
A. V. Astin, Director

Certificate of Analysis

STANDARD REFERENCE MATERIAL 1094

Oxygen in Maraging Steel

This standard is intended primarily for application by vacuum and inert gas fusion methods for the determination of oxygen. The low value of oxygen at 4 ppm in the maraging steel material makes the determination by neutron activation analysis difficult.

SRM No.	Description	Oxygen, ppm (by wt)
1094	Maraging Steel	4.5[a]

[a] Results determined by vacuum fusion techniques on 1-gram samples. The value given is the grand mean based on 109 determinations on 32 samples. The values found ranged from 2.5 to 7.5 ppm. Determinations made over a period of several months indicate the existence of systemic errors of the order of 2 ppm. Examination of the data indicates that the material is homogeneous relative to the magnitude of the systematic errors in the method.

This standard is supplied in rods ¼ in (0.6 mm) in diameter and 4 in (8.2 cm) long.

The material for this standard was furnished to NBS by the Applied Research Laboratory of the U. S. Steel Corp., Pittsburgh, Pennsylvania.

Analyses were performed by J. T. Sterling, J. F. Martin, and O. Menis.

The overall direction and coordination of technical measurements leading to the certification were under the chairmanship of P. D. LaFleur.

The technical and support aspects concerning the preparation, certification and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by R. E. Michaelis.

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March 4, 1969
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W. Wayne Meinke, Chief
Office of Standard Reference Materials

CAUTION: Oxygen determinations should be made on thoroughly and freshly cleaned samples that represent the full cross section of the rods.

(over)

SUPPLEMENTAL INFORMATION

OTHER ELEMENTS: Nitrogen, at 71 ppm, was determined by a pressure bomb-distillation-indophenol-photometric method. The nitrogen value obtained by vacuum fusion was 61 ppm. Work is now underway at NBS to discover and resolve systematic biases existing in either or both of these methods.

PREPARATION FOR THE DETERMINATION OF OXYGEN:

1. Samples should be cut from the original rod in such a manner as to minimize heating of the sample; i.e., by a hand hacksaw.
2. All surfaces of the cut sample should be thoroughly cleaned with a fine file.
3. Samples should be washed with C. P. ether, acetone, or other suitable solvent, dried in a stream of warm clean air and then handled only with clean forceps.
4. Analyses should be made as soon as possible after cleaning the sample.

CONDITIONS FOR ANALYSIS AT NBS:

Method	Vacuum fusion
Furnace temperature	1675 °C
Furnace pressure	$<10^{-5}$ torr
Collection time	4 min
Bath material	High-purity nickel
Carbon monoxide determination	Infrared absorption