U. S. Department of Commerce
Malcolm Baldrige
Secretary
National Bureau of Standards
Ernest Ambler, Director

# Certificate of Analysis

# STANDARD REFERENCE MATERIALS

## C1118, C1119, C1120

## Aluminum Brass Standards for Optical Emission and X-Ray Spectroscopic Analysis

| NBS No.[1] | C1118[2] | C1119[2] | C1120[2] |
|---|---|---|---|
| Element[3] | | Percent | |
| Cu | $75.0_7$ | $77.1_2$ | $80.1_4$ |
| Zn | $21.9_1$ | $20.5_3$ | $18.1_0$ |
| Al | 2.80 | 2.14 | 1.46 |
| Fe | $0.06_8$ | $0.03_2$ | $0.01_5$ |
| Pb | .024 | .051 | $.10_5$ |
| P | $.12_5$ | .070 | .018 |

The value listed for a certified element is the *present best estimate* of the "true" value based on the results of the analytical program. The value listed is not expected to deviate from the "true" value by more than ± 1 in the last significant figure reported; for a subscript figure, the deviation is not expected to be more than ± 5. Based on the results of homogeneity testing, maximum variations within and among samples are estimated to be less than the uncertainty figures given above.

[1]Size and metallurgical condition: C1100 series are chill-cast samples 1 1/4 in square, 3/4 in thick.

[2]The wrought material for this standard is covered on a separate certificate.

[3]Ag, As, Sb, and Si also are present in small quantities in the standards, but these elements have not been certified.

The material for each standard was melted and cast at the Naval Research Laboratory, Washington, D. C. High-purity metals were used either directly or in the preparation of master alloys. Approximately 650-pound heats were melted under a charcoal cover in a high-frequency induction furnace and the molten metal cast on a massive water-cooled plate to provide rapid unidirectional solidification. The casting for each standard was about 27 in in diameter and 3 1/2 in thick.

The material for the chill-cast samples was obtained from the area of the casting nearest the chill-cast face. Samples were finished to a size 1 1/4 in square, 3/4 in thick, and each has the NBS number marked on the face opposite to the chill-cast or test surface. (In addition, a specimen serial number has been placed on one side face.)

Washington, D.C. 20234
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George A. Uriano, Chief
Office of Standard Reference Materials

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The homogeneity of the standards material was investigated by metallographic studies and by optical emission and chemical analyses at the National Bureau of Standards; and by optical emission and chemical analyses by Task Group 3, Subcommittee V of ASTM Committee E-2*. The homogeneity was found to be satisfactory.

Samples for chemical analysis were prepared in the form of millings taken from the cross section of the finished samples of the chill-cast material. Chemical analyses were made by R. K. Bell and E. E. Maczkowske, Standard Reference Materials Section, National Bureau of Standards, Washington, D.C.; A. E. LaRochelle, Elsie M. Penner, C. H. McMaster, and W. R. Inman, Department of Mines and Technical Surveys, Mines Branch, Ottawa, Ontario, Canada; Frederick V. Schatz and R. E. Hahn, Metal Physics Department, Revere Copper and Brass Incorporated, Rome, N. Y.; Joseph P. Irwin, Metallurgical Department, Research and Technical Center, Anaconda American Brass Co., Waterbury, Conn.

Caution should be observed in the use of the chill-cast samples in that determinations made on other than the chill-cast or test surface are not recommended because of the unidirectional solidification. Moreover, the chill-cast standards are designed for calibration in the analysis of samples prepared in the same manner. Samples prepared by other casting techniques may result in considerable bias.

*Task Group 3 cooperators:

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