

National Bureau of Standards
Certificate of Analysis
Standard Reference Materials
1110 1111
C1109 C1110 C1111
Red Brass Standards

NBS No.	C1109	1110 C1110	1111 C1111
<u>Element</u>		<u>Percent</u>	
Cu	82.2 ₂	84.5 ₉	87.1 ₄
Zn	17.4 ₃	15.2 ₀	12.8 ₁
Pb	0.075	0.033	0.013
Fe	.053	.033	.010
Sn	.10	.051	.019
Ni	.10	.053	.022
P	-- ²	--	--

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.

¹Size and metallurgical condition: 1100 series are wrought samples 1 1/4 in in diameter, 3/4 in thick. C1100 series are chill-cast samples 1 1/4 in square, 3/4 in thick.

²Dashes indicate elements present but not 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.)

The material for the wrought samples was obtained after removal of the chill-cast material and discard of about 3/4 in thickness from the slab top. Strips of this material were forged, fully annealed, and finished to samples 1 1/4 in in diameter, 3/4 in thick.

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.

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(Revision of Certificate
dated 8/20/62)

George A. Uriano, Chief
Office of Standard Reference Materials

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Samples for chemical analysis were prepared in the form of millings taken from the cross section of the finished samples for both the chill-cast and wrought material. Chemical analyses were made by R.K. Bell and E.E. Maczkowske, Standard Reference Materials Section, National Bureau of Standards, Washington, D.C.; O.P. Case and Mrs. Kathleen M. O'Brien, Anaconda American Brass Co., Waterbury, Conn.; A.E. LaRochelle, E.M. Penner, C.H. McMaster, and W.R. Inman, Department of Mines and Technical Surveys, Mines Branch, Ottawa, Ontario, Canada; and S.C. Richards, Ray Stevens, and Albert Stuever, Mueller Brass Company, Port Huron, Mich.

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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