U. S. Department of Commerce
Malcolm Baldrige
Secretary

National Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards

Certificate of Analysis

Standard Reference Material C1285

Low Alloy Steel (A242 Mod.)

(In cooperation with the American Society for Testing and Materials)

This Standard Reference Material is in the form of disks approximately 32 mm (1 1/4 in) in diameter and 19 mm (3/4 in) thick, intended for use in the x-ray spectrometric method of analysis. Caution should be exercised in using other techniques because of sample porosity.

Constituent	Certified Value,[1] Percent by Weight	Estimated Uncertainty[2]
Carbon	0.058	0.003
Manganese	.332	.005
Phosphorus	.072	.005
Sulfur	.020	.001
Silicon	.36	.01
Copper	.37	.01
Nickel	1.17	.02
Chromium	0.80	.01
Vanadium	.150	.004
Molybdenum	.164	.004
Cobalt	.036	.003
Cerium	.021[3]	.003
Tin	.035	.002

[1] The certified value listed for a constituent is the *present best estimate* of the "true" value based on the results of the cooperative program for certification.

[2] The estimated uncertainty listed for a constituent is based on judgement and represents an evaluation of the combined effects of method imprecision, possible systematic errors among methods, and material variability. (No attempt was made to derive exact statistical measures of imprecision because several methods were involved in the determination of most constituents.)

[3] Cerium appears to be heterogeneously distributed. The certified value and uncertainty listed were obtained by analyzing the entire surface.

Metallurgical Condition: The specimens were chill cast by a rapid unidirectional solidification technique.

Certified Portion: The certified portion for each specimen is that extending upward 16 mm (5/8 in) from the chill cast or test surface (the largest surface opposite the numbered surface). This portion only was analyzed in the cooperative program for certification.

The overall coordination of the technical measurements leading to certification was performed under the direction of J.I. Shultz, Research Associate, ASTM-NBS Research Associate Program.

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

Washington, D.C., 20234
June 8, 1982

George A. Uriano, Chief
Office of Standard Reference Materials

(over)

PLANNING, PREPARATION, TESTING, ANALYSIS:

The material for this SRM was melted and cast at Esco Corporation, Portland, Oregon (L.E. Finch). A water-cooled copper-plate mold assembly made by Esco for the Steel Founders' Society of America was used in the preparation of the chill castings. The preparation and plan for homogeneity testing was similar to that described in NBS Misc. Publ. 260-1, Standard Reference Materials: Preparation of NBS White Cast Iron Spectrochemical Standards, R.E. Michaelis and L.L. Wyman, June 19, 1964.

Extensive homogeneity testing was carried out at NBS by metallographic studies, C.H. Brady; by optical emission analysis, J.A. Norris; by x-ray fluorescence analysis, P.A. Pella and J.R. Sieber; by combustion C/S determinations, B.I. Diamondstone; and by chemical analysis, R.K. Bell, ASTM-NBS Research Associate Program. Composite samples for chemical analyses were prepared in the form of millings cut from the certified portion of representative specimens of the lot of chill castings.

Cooperative analyses for certification were performed in the following laboratories:

Allegheny Ludlum Steel Corporation, Research Center, Brackenridge, Pa.; M.A. McMahon.

Allegheny Ludlum Steel Corporation, Flat Rolled Products Division, Brackenridge, Pa.; A.I. Fulton and C.W. Hartig.

Armco Steel Corporation, Research Center, Middletown, Ohio; R.L. Leroy, J.W. Leeker, G. Smith, K. Strom, T. Robinson, R.L. Swigert, O. Brezny, J.D. Holland, D. Bigelow, and T.F. Terrell.

National Bureau of Standards, Inorganic Analytical Research Division, B.I. Diamondstone, and R.K. Bell, ASTM-NBS Research Associate Program.

Elements other than those certified are present in this material as indicated below. These are *not certified,* but are given as additional information on the composition.

Element	Non-Certified Value, Percent by Weight
Arsenic	(0.022)
Tungsten	(.03)
Zirconium	(.02)
Aluminum	(.12)
Antimony	(.04)