



National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material[®] 1226

Low Alloy Steel (HY 130)

(In Cooperation with ASTM)

This Standard Reference Material (SRM) is in the form of a disk approximately 32 mm (1 1/4 in) in diameter and 19 mm (3/4 in) thick, intended for use in optical emission and x-ray spectrometric methods of analysis. The certified values for 13 elements are listed in Table 1. All values are reported as mass fractions [1].

Table 1. Certified Mass Fractions

Element	(in %)	Element	(in %)
Aluminum (Total)	0.054 ± 0.004	Nickel	5.42 ± 0.04
Carbon	0.085 ± 0.003	Phosphorus	0.0022 ± 0.0004
Chromium	0.467 ± 0.005	Silicon	0.231 ± 0.004
Cobalt	0.029 ± 0.003	Sulfur	0.0044 ± 0.0006
Copper	0.125 ± 0.005	Titanium	0.0021 ± 0.0003
Manganese	0.274 ± 0.005	Vanadium	0.0018 ± 0.0004
Molybdenum	0.446 ± 0.005		

The estimated uncertainties listed above are based on judgement and represent 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.)

Metallurgical Condition: The structure of the specimens is that resulting from hot working, followed by annealing.

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

The technical and support aspects involved in the original certification and issuance of this SRM were coordinated through the Standard Reference Materials Program by R.E. Michaelis.

This Certificate of Analysis has undergone editorial review by C.M. Beck II of the Standard Reference Materials Program to reflect program and organizational changes at NIST and the Department of Commerce. No attempt was made to reevaluate the certificate values or any technical data presented on this certificate.

Gaithersburg, MD 20899
Certificate Issue Date: September 18, 1996
(Revision of certificate dated 12-14-82)

Thomas E. Gills, Chief
Standard Reference Materials Program

PLANNING, PREPARATION, TESTING, ANALYSIS

The material for this SRM was melted and cast into a single ingot at Esco Corporation, Portland, OR (L.E. Finch) under contract with NIST. The single ingot was fabricated at the Puget Sound Naval Shipyard, Bremerton, WA (G. Foltz). The ingot was first forged to a slab; then, portions of suspected inhomogeneity were cut to discard (5 % corresponding to the ingot bottom, 15 % from the top, and 25 % from the center lengthwise). The remaining slab sections were forged and swaged to rods oversize 32 mm in diameter, sub-critical annealed, and centerless ground to the final size of 32 mm diameter.

Extensive homogeneity testing was performed at NIST using optical emission analysis, J.A. Norris; x-ray fluorescence analysis, P.A. Pella; chemical analysis, B.I. Diamondstone and R.K. Bell, ASTM-NIST Research Associate Program.

Composite samples for chemical analyses were prepared in the form of millings, cut from the full cross section of specimens representative of the entire lot of material.

Cooperative analyses for certification, carried out under the auspices of the ASTM-NIST Research Associate Program, were performed in the following laboratories:

E.H. Frank; General Dynamics, Electric Boat Division, Groton, CT.

J.E. Joyce; Inland Steel Co., Indiana Harbor Works, East Chicago, IN.

J.H. Morris, E. Gilbert, S. Forese, and J. Kishel; Lukens Steel Co., Coatesville, PA.

B.I. Diamondstone; NIST, Inorganic Analytical Research Division and R.K. Bell; ASTM-NIST Research Associate Program.

Elements other than those certified are present in this material. The mass fractions in Table 2 are *not certified*, but are given as additional information on the composition.

Table 2. Non-Certified Mass Fractions

Element	(in %)
Lead	0.0001
Niobium	0.005
Tin	0.003
Tungsten	0.005
Zirconium	0.010

REFERENCE

- [1] Taylor, B.N., "Guide for the Use of the International System of Units (SI)," NIST Special Publication 811, 1995 Ed., (April 1995).