

# National Bureau of Standards

## Certificate of Analysis

### Standard Reference Material 1269

#### Low Alloy Steel (AISI 1526, Mod.)

#### "Line Pipe Steel"

In cooperation with  
American Society for Testing and Materials  
and  
Steel Founders' Society of America

This SRM is in the form of disks 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.

Element	Certified Value, <sup>1</sup> % by wt.	Estimated Uncertainty <sup>2</sup>
Carbon	0.298	0.004
Manganese	1.35	.02
Phosphorus	0.012	.002
Sulfur	.0061	.0004
Silicon	.189	.008
Copper	.095	.005
Nickel	.108	.005
Chromium	.201	.009
Vanadium	.004	.001
Molybdenum	.036	.003
Lead	.005	.001
Aluminum	.016	.003

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 judgment 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.)

**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-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 11, 1981

George A. Uriano, Chief  
Office of Standard Reference Materials

(over)

PLANNING, PREPARATION, TESTING, ANALYSIS:

The composition of this SRM was chosen for the "line-pipe" steel industry, especially with respect to low sulfur. In addition, this SRM is expected to serve as Supplement No. 2 to the "1200 Series" of irons and steels. The material for this SRM was melted and cast at Esco Corporation, Portland, Ore., (L. E. Finch), under an NBS contract with the Steel Founders' Society of America. A single ingot was fabricated at the Puget Sound Naval Shipyard, Bremerton, Washington, where it was forged and swaged to rods (oversize 32 mm in diameter). The rods were given a sub-critical anneal and then centerless ground to the final size of 32 mm in diameter. Homogeneity testing was performed at NBS by optical emission spectrometric analysis, J. A. Norris; by x-ray fluorescence analysis, P. A. Pella; and chemical analysis by B. I. Diamondstone and by R. K. Bell, Assistant Research Associate, ASTM/NBS Research Associate Program.

Composite samples for chemical analysis were prepared in the form of millings cut from representative specimens of the rods.

Cooperative analyses for certification were performed in the following laboratories:

Bethlehem Steel Corporation, Homer Research Laboratories, Bethlehem, Pa., D. A. Flinchbaugh and J. L. Fernandez.

Ledoux & Company, Teaneck, N.J., S. Kallmann, E. Komarkova, and C. L. Maul.

National Bureau of Standards, Inorganic Analytical Research Division, B. I. Diamondstone, E. R. Deardorff, E. J. Maienthal, S. Hanamura, T. C. Rains, and R. K. Bell, ASTM/NBS Assistant Research Associate.

Republic Steel Corporation, Chicago District, Chicago, Ill., P. P. Blaszak.

Sharon Steel Corporation, Sharon, Pa., N. J. Williams.

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

<u>Element</u>	<u>Concentration</u> <u>% by weight</u>
Antimony	( 0.0014)
Arsenic	( .006 )
Barium	( .0003)
Bismuth	( .0002)
Boron	(<.0001)
Calcium	( .0004)
Cerium	( .004 )
Cobalt	( .014 )
Gold	( .0002)
Hafnium	( .002 )
Magnesium	( .0001)
Niobium	( .0002)
Nitrogen	( .009 )
Oxygen	( .006 )
Selenium	( .0004)
Silver	( .0002)
Strontium	(<.0001)
Tantalum	( .008 )
Tellurium	( .0003)
Thallium	( .0002)
Tin	( .039 )
Titanium	( .009 )
Tungsten	( .001 )
Zinc	----
Zirconium	( .003 )

( )Determined

---- Not added nor determined