

National Bureau of Standards

Certificate of Analysis

Standard Reference Material C1152

Stainless Steel, 18Cr-11Ni

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

This standard 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 optical emission and x-ray spectrometric methods of analysis.

Element	Certified Value, ¹ % by wt.	Estimated Uncertainty ²
Carbon	0.148	0.004
Manganese	.96	.03
Phosphorus	.021	.002
Sulfur	.0064	.0006
Silicon	.80	.02
Copper	.102	.002
Nickel	10.88	.06
Chromium	17.81	.12
Vanadium	0.030	.002
Molybdenum	.43	.01
Cobalt	.22	.01
Lead	.0047	.0001

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 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
January 31, 1980

George A. Uriano, Chief
Office of Standard Reference Materials

(over)

NBS Standard Reference Materials
Stainless Steel Series
December 20, 1979

R. E. Michaelis, NBS Office of Standard Reference Materials
and
J. I. Shultz, ASTM Research Associate

The following table gives the values for four chill-cast stainless steel SRM's that are available in the form of disks approximately 32 mm (1 1/4 in) in diameter and 19 mm (3/4 in) thick for use in optical emission and x-ray spectrometric methods of analysis. They are being issued as a culmination of a major Industry-SFSA-ASTM-NBS cooperative program.

SRM No. Designation	C1151 23Cr-7Ni	C1152 18Cr-11Ni	C1153 17Cr-9Ni	C1154 19Cr-13Ni
Element	Percent by Weight			
Carbon	0.039	0.148	0.264	0.086
Manganese	2.50	0.96	0.50	1.42
Phosphorus	0.017	0.021	0.030	0.06
Sulfur	0.038	0.0064	0.018	0.053
Silicon	0.38	0.80	1.07	0.50
Copper	0.418	0.102	0.23	0.40
Nickel	7.29	10.88	8.77	12.92
Chromium	22.70	17.81	16.69	19.06
Vanadium	0.037	0.030	0.18	0.135
Molybdenum	0.80	0.43	0.24	0.07
Cobalt	0.032	0.22	0.127	0.38
Lead	0.0039	0.0047	0.0054	0.0178
Aluminum	(0.004) ^a	(0.004) ^a	(0.003) ^a	(0.004) ^a
Antimony	(0.005)	(0.015)	(0.0030)	(0.023)
Arsenic	(0.010)	(0.016)	(0.007)	(0.030)
Bismuth	(<0.00005)	(<0.0001)	(<0.0005)	(<0.001)
Boron	(0.0012)	(0.004)	(0.0012)	(0.0018)
Niobium	(0.014)	(0.16)	(0.50)	(0.23)
Nitrogen	(0.23)	(0.055)	(0.135)	(0.084)
Selenium	(0.0021)	(0.024)	(0.00029)	(0.0078)
Silver	(0.0001)	(<0.0001)	(0.0010)	(0.0025)
Tantalum	(0.006)	(0.001)	(0.032)	(0.075)
Tellurium	(0.0020)	(0.0091)	(0.00026)	(0.015)
Thallium	(0.00001)	(0.00005)	(0.00003)	(0.0007)
Titanium	(0.006)	(0.011)	(0.014)	(0.004)
Tin	(0.004)	(0.013)	(0.014)	(0.024)
Zinc	(<0.01)	(<0.01)	(0.004)	(0.011)
Zirconium	(0.005)	(0.004)	(0.003)	(0.004)
Iron, by diff.	(65.4)	(68.3)	(71.2)	(64.3)

^aValues in parentheses are not certified.

The value listed for a certified constituent is the *present best estimate* of the "true" value based on the results of the analytical program for certification. The individual certificates of analysis list the "estimated uncertainties" associated with the certified values.

Inquiries regarding the chill-cast stainless steel SRM's C1151-C1154 should be directed to the Office of Standard Reference Materials, Chemistry Building, B311, National Bureau of Standards, Washington, D.C. 20234. (301) 921-2045.

George A. Uriano, Chief
Office of Standard Reference Materials

ADDITIONAL INFORMATION ON THE COMPOSITION: Certification is made only for the elements indicated. This standard, however, contains additional elements as indicated below. These are *not certified*, but are provided for information only.

<u>Element</u>	<u>Non-Certified Value</u> <u>% by wt.</u>
Aluminum	(0.004)
Antimony	(0.015)
Arsenic	(0.016)
Bismuth	(<0.0001)
Boron	(0.004)
Niobium	(0.16)
Nitrogen	(0.055)
Selenium	(0.024)
Silver	(<0.0001)
Tantalum	(0.001)
Tellurium	(0.0091)
Thallium	(0.00005)
Titanium	(0.011)
Tin	(0.013)
Zinc	(<0.01)
Zirconium	(0.004)
Iron, by diff.	(68.3)

CAUTIONS:

1. Analyses made on other than the chill-cast surface and within the portion certified are not recommended because of the unidirectional solidification structure.
2. This stainless steel standard is designed for calibration in the analysis of samples prepared in the same manner; samples prepared by other casting techniques or having other than a chill-cast structure may exhibit systematic errors in the analytical results.

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