U. S. Department of Commerce
Maurice H. Stans
Secretary

National Bureau of Standards
L. M. Branscomb, Director

Certificate of Analysis

Standard Reference Material 20g

AISI 1045 Steel

	C	Mn	P	S	Si	Cu	Ni	Cr	V	Mo	Al
Analyst	Direct Combustion	Peroxydisulfate-Arsenite	Molybdenum-blue Photometric	Combustion-iodate Titration	Perchloric Acid Dehydration	Photometric	Photometric			Photometric	Total
1	0.457[a]	0.667	0.011	0.028[b]	0.308[c]	{0.034[d] .033[e]}	0.034	0.035[f]	0.002[g]	0.007	0.040[e]
2	.461	.662[h]	.011	.025	.306	.035	.034[i]	.036[f,j]	.003[k]	.006	.040[l]
3	.463[m]	.666	.012[n]	.028	.306[c]	.036[o]	.034[p]	.037[q]	.001[r]	.008	.042[s]
4	.466	.665	.012[n]	.030	.300[t]	.034[o]	.033	.037[u]	.001[v]	.010	.040[w]
Average	0.462	0.665	0.012	0.028	0.305	0.034	0.034	0.036	0.002	0.008	0.040

[a] Thermal conductivity.

[b] 1-g sample burned in oxygen at 1450 °C, and sulfur dioxide absorbed in starch-iodide solution. Iodine is liberated from iodide by titration, during the combustion, with standard KIO_3 solution.

[c] Double dehydration with intervening filtration.

[d] Diethyldithiocarbamate photometric method.

[e] Atomic absorption spectrometry.

[f] Chromium separated from the bulk of the iron by hydrolytic precipitation with $NaHCO_3$, oxidized with peroxydisulfate and titrated potentiometrically with ferrous ammonium sulfate solution.

[g] Vanadium separated as in (f), oxidized with HNO_3 and titrated potentiometrically with ferrous ammonium sulfate solution.

[h] Peroxydisulfate photometric method.

[i] Dimethylglyoxime precipitate titrated with NaCN solution.

[j] Same value obtained by atomic absorption spectrometry.

[k] HNO_3 oxidation, potentiometric titration with ferrous ammonium sulfate solution.

[l] Ether-cupferron-NH_4OH-mercury cathode-NH_4OH-Al_2O_3.

[m] Gasometric method.

[n] Alkalimetric method.

[o] Neocuproine photometric method.

[p] Weighed as dimethylglyoxime.

[q] Peroxydisulfate oxidation-$FeSO_4$-$KMnO_4$ titration.

[r] Vanadium separated by electrolysis with a mercury cathode, oxidized and titrated with ferrous ammonium sulfate solution.

[s] Mercury cathode-cupferron-eriochrome cyanine R photometric method.

[t] Sulfuric acid dehydration.

[u] Diphenylcarbazide photometric method.

[v] H_2O_2 photometric method.

[w] Eriochrome cyanine R photometric method.

The overall direction and coordination of the technical measurements leading to certification were performed under the chairmanship of J. I. Shultz and O. Menis.

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.

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J. Paul Cali, Acting Chief
Office of Standard Reference Materials

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List of Analysts

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The material for this standard was produced in a B.O.H. furnace, continuously cast into billets, and hot rolled to rounds by the Bethlehem Steel Corporation, Bethlehem, Pennsylvania.

The material was tested for homogeneity by D. M. Bouchette and J. L. Weber, Jr. and found to be satisfactory.