

U. S. DEPARTMENT OF COMMERCE

National Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE 72c

CHROMIUM-MOLYBDENUM STEEL

ANALYST*	C	Mn		P		S			Si	Cr	Mo	
	Direct combustion	Bismuthate (FeSO ₄ -KMnO ₄)	Persulfate-Arsenite	Gravimetric (weighed as Mn ₂ P ₂ O ₇ after removal of arsenic)	Alkali-Molybdate ^a	Gravimetric (direct oxidation and final precipitation after reduction of iron)	Evolution with HCl (Sp Gr 1.18) ZnS-feldine (theoretical sulfur titre) ^b	Combustion	Perchloric acid dehydration	Persulfate oxidation, FeSO ₄ -KMnO ₄ titration	Gravimetric	Colorimetric
1.....	0. 327	^c 0. 536	0. 536	0. 014	^d 0. 015	0. 018	0. 019		^e 0. 290	^g 0. 969	^h 0. 213	0. 217
2.....	. 328		. 530	. 013	. 014	. 018	. 017		. 285	. 966		. 218
3.....	. 334	ⁱ . 546	. 547		. 016		^j ^k 0. 019	^l 0. 019	^f . 284	. 975	^b . 217	. 217
4.....	. 332		. 542		^k 0. 016		^m ^k 0. 016	. 017	. 285	. 964	ⁿ . 219	
5.....	. 330		. 53		^k 0. 013	. 020		^l 0. 019	. 281	^o . 963		. 21
6.....	^p . 324		. 537		^k 0. 016			^q 0. 018	. 288	^o . 966		. 214
Averages.....	0. 329	0. 541	0. 537	0. 014	0. 015	0. 019	0. 018	0. 018	0. 286	0. 967	0. 216	0. 215
General average.....	0. 329	0. 539		0. 015		0. 018			0. 286	0. 967	0. 216	

^a Precipitated at 40° C, washed with a 1-percent solution of KNO₃ and titrated with alkali standardized by the use of National Bureau of Standards acid potassium phthalate and the ratio 23NaOH:1P.
^b Value obtained by standardizing the titrating solution by means of sodium oxalate through KMnO₄ and Na₂S₂O₃ and the use of the ratio 2I:1S.
^c Chromium removed by precipitation with ZnO.
^d Molybdenum-blue photometric method. See J. Research NBS 26, 405 (1941) RP1336.

^e Sulfuric acid dehydration.
^f Double dehydration.
^g Potentiometric titration with ferrous ammonium sulfate solution standardized with potassium dichromate.
^h α-benzoinoxime method. See BS J. Research 37, 1 (1932) KP453.
ⁱ Titrated with sodium arsenite.
^j Absorbed in cadmium chloride solution.
^k Titrating solution standardized with a standard steel.
^l Sulfur gases absorbed in 0.01 N NaOH contain-

ing H₂O₂. Excess NaOH titrated with H₂SO₄. NaOH standardized with a standard steel.
^m Dissolved in HCl (2:1).
ⁿ Molybdenum separated by precipitation with α-benzoinoxime and ultimately weighed as lead molybdate.
^o Ferriochloric acid oxidation.
^p Finished by measurement of volume of evolved carbon dioxide.
^q Sulfur gases absorbed in acidified starch iodine solution, and titrated with KIO₃ solution standardized with standard steels.

* LIST OF ANALYSTS

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The steel for the preparation of this standard was furnished by the Climax Molybdenum Co.

WASHINGTON, October 31, 1944.

LYMAN J. BRIGGS, Director.