

National Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE 72B

CHROMIUM-MOLYBDENUM STEEL

ANALYST*	C	Mn		P	S		Si	COPPER H ₂ S-CuS-CuO	NICKEL Weighed as nickel dimethylglyoxime	Cr	VANADIUM	Mo		
	Direct combustion	Bismutate (FeSO ₄ -KMnO ₄)	Persulfate-Arsenite	Gravimetric (weighed as MgF ₂ ·3H ₂ O after removal of arsenic)	Alkali-Molybdate ^a	Gravimetric (direct oxidation and final precipitation in reduced solution)	Evolution with HCl (sp. gr. 1.18) ZnS-Iodine (theoretical sulfur titre) ^v			Sulfuric acid dehydration		FeSO ₄ -KMnO ₄ titration	Gravimetric	Colorimetric
1.....	0. 319	^o 0. 519	0. 522	0. 008	^d 0. 009	0. 015	0. 016	^e 0. 289	0. 098	0. 115	^f 0. 963	^g 0. 002	^b 0. 224	0. 225
2.....	. 321	ⁱ . 525			^j . 008	. 015		^k . 286	. 095	. 117	. 959		^l . 222	. 219
3.....	. 321	ⁱ . 516	^m . 523		. 013	. 013	ⁱ . 013	^e . 280	ⁿ . 099	. 113	. 961	. 004	^b . 228	. 225
4.....	. 323		^m . 53		. 011		^o . 017	^k . 279	ⁿ . 105	. 112	. 962		^b . 222	. 23
5.....	. 324	^e . 510			. 008		^o . 016	^{ek} . 283	ⁿ . 096	. 113	. 969		^b . 225	. 224
	. 329		^j . 520		. 011	^p . 016	^q . 017	. 283	ⁿ . 103	. 120	. 957	^r . 003	^s . 216	
7.....	. 316	ⁱ . 525			. 009		. 017	^{ek} . 285	ⁿ . 096	^r . 110	. 969			. 226
8.....	. 318	. 521		. 010	. 009	. 017	. 017	^e . 291	. 096	^t . 107	. 964		^l . 218	. 225
9.....	. 319		^u . 517	. 009	^j . 009	. 015	^j . 016	^{ek} . 286	. 097	. 109	. 957		^l . 219	
10.....	. 319		. 515	. 011	. 017			. 282	^r . 096	. 12	. 961			. 22
11.....	. 324	ⁱ . 523	^{ei} . 515	. 008	^j . 009	. 016	^o . 016	. 288	. 094	. 111	. 960		^b . 226	. 220
Averages.....	. 321	. 520	. 520	. 009	. 010	. 016	. 016	. 285	. 098	. 113	. 962	. 003	. 222	. 224
General averages	0. 321	0. 520		0. 009		0. 016		0. 285		0. 113			0. 223	

^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 Na₂S₂O₈, and use of the ratio 2I:1S.
^c Chromium separated by precipitation with NaHCO₃.
^d Colorimetric method. See J. Research NBS 26, 405 (1941) RP1336.
^e Double dehydration.
^f Persulfate oxidation, potentiometric titration with

ferrous ammonium sulfate solution standardized with recrystallized potassium dichromate.
^g Nitric acid oxidation, potentiometric titration with ferrous ammonium sulfate solution standardized with recrystallized potassium dichromate.
^h α -benzoinoxime method. See BS J. Research 9, 1 (1932) RP453.
ⁱ Arsenite titration.
^j Titrating solution standardized by use of a standard steel.
^k Perchloric acid dehydration.
^l Molybdenum precipitated with H₂S and weighed as MoO₃.

^m Chromium volatilized as CrO₂Cl₂.
ⁿ Finished by electrolysis.
^o Combustion method.
^p Meinelke method.
^q Solution in diluted HCl (2+1).
^r Colorimetric method.
^s Molybdenum separated with α -benzoinoxime. Precipitate dissolved and molybdenum precipitated and weighed as PbMoO₄.
^t Ignited and weighed as NiO.
^u Chromium separated by precipitation with ZnO.

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