

U. S. DEPARTMENT OF COMMERCE

National Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE 36

CHROMIUM-MOLYBDENUM STEEL

ANALYST*	C	Mn		P		S			Si	COPPER H ₂ S-CuS-CuO	NICKEL Weighed as nickel dimethylglyoxime	Cr		Mo		NITROGEN
	Direct combustion	Bismuthate (FeSO ₄ -KMnO ₄)	Persulfate-Arsenite	Gravimetric (weighed as Mg ₂ P ₂ O ₇ 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)	Combustion	Sulfuric acid dehydration			FeSO ₄ -KMnO ₄ titration	VANADIUM	Gravimetric	Colorimetric	
1	0.122	0.389	0.394	0.017	0.017	0.022	0.015		0.308	0.113	0.127	2.31	0.007	1.01		0.013
2	.13	0.388			0.018			0.025	.32	.109	.124	2.29	0.005		1.01	
3	.127		0.388		0.017	0.025	0.016	0.025	.310	0.109	0.131	2.33	0.005	1.03		
4	.123		0.386		0.017	0.019	0.016		0.298	0.114	0.125	2.34	0.006	1.00		
	.130		0.398		0.019	0.019	0.017		0.310	0.116	0.128	2.29		1.00	1.01	
	.130	0.397	0.389		0.020	0.023		0.023	0.302	0.114	0.126	2.32	0.006	1.03	1.01	
7	.130		0.384	0.019	0.019	0.021		0.021	0.310	0.116	0.128	2.32	0.005	1.00		
8	.129		0.388	0.019	0.020	0.021		0.021	0.308	0.113	0.130	2.33	0.007	1.00		
9	.130				0.017	0.017	0.016			0.111	0.122				1.02	
10			0.392	0.016				0.022	0.302							
11	.134	0.389		0.019	0.017	0.018			0.318	0.10	0.14	2.27	0.008	1.03	1.03	
Averages...	0.129	0.391	0.390	0.018	0.018	0.020	0.016	0.023	0.309	0.112	0.128	2.31	0.006	1.01	1.02	0.013
Recommended values	0.129	0.390		0.018		0.021			0.309	0.112	0.128	2.31	0.006	1.01		0.013

* 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 23 NaOH:1 P.
^b Value obtained by standardizing the titrating solution by means of sodium oxalate through KMnO₄ and Na₂S₂O₈.
^c Chromium separated by precipitation with NaHCO₃.
^d Chromium separated by precipitation with ZnO.
^e Perchloric acid dehydration.
^f Finished by electrolysis.

^g Potentiometric titration.
^h α-benzoinoxime method. See BS J. Research 9, 1 (1932) RP453.
ⁱ Determination made by Vernon C. Holm, by the vacuum-fusion method. See BS J. Research 7, 375 (1931) RP346.
^j Titrating solution standardized by use of a standard steel.
^k Meiske method.
^l Evolution with diluted hydrochloric acid.
^m Colorimetric.

ⁿ Weighed as PbMoO₄.
^o KI-Na₂S₂O₈ titration.
^p Ignited and weighed as NiO.
^q Chromium volatilized as CrO₂Cl₂.
^r Molybdenum precipitated with H₂S. Molybdenum sulfide ignited to MoO₃ and corrected for impurities.
^s Glyoxime precipitate titrated with standard cyanide solution.
^t Potentiometric titration with standard mercurous nitrate solution.

* LIST OF ANALYSTS

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The steel for the preparation of this standard was furnished by The Timken Roller Bearing Co.

LYMAN J. BRIGGS, *Director.*