

Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE No. 72

CHROME-MOLYBDENUM STEEL

ANALYST*	C	Mn		P		S		Si	COPPER H ₂ S-Cu ₂ S-CuO	NICKEL Weighed as nickel dimethyl- glyoximate	Cr	VANADIUM	Mo	ARSENIC
	CARBON Direct combustion	MANGANESE 1. Bismuthate (FeSO ₄ - KMnO ₄)	2. Other methods	PHOSPHORUS 1. Alkali-Molybdate ^a	2. Gravimetric (Weighed as Mg ₂ P ₂ O ₇ after removal of arsenic)	1. SULPHUR Gravimetric (Direct oxidation and final precipitation in re- duced solution)	2. SULPHUR Evolution with HCl (1:1) ZnS-Iodine (theoretical sulphur titre ^b)	SILICON Sulphuric acid dehydra- tion			CHROMIUM FeSO ₄ -KMnO ₄ titration		MOLYBDENUM	
1	0.291	0.653 ^c	0.656 ^d	0.014	0.014	0.021	0.017	0.143	0.067	0.287	0.915 ^d	0.013 ^d	0.145 ^e	0.010 ^f
2		.659 ^c									.920		.150 ^e	
3	.287		.649 ^h	.016	.015	.024	.023 ⁱ	.140	.079	.293	.90	.012	.145 ^g	.013
4	.286	.65		.018		.022		.139	.051	.27	.907		.160 ^e	
5	.302		.650 ⁱ	.017			.018	.14	.069	.28	.920	.01	.15 ^e	
6	.302		.65	.014			.021	.131	.076 ^k	.299	.92		.147 ^e	
	.29		.65 ⁱ	.018		.021		.14		.29	.90		.153	
8	.296	.652	.644 ^l	.018		.019		.138	.075 ^k	.285	.905		.132 ^m	
9	.291		.65	.016		.022	.018	.136	.051 ⁿ	.29	.90	.010	.159 ^e	
10	.28	.655 ^c		.018			.020 ^o	.13	.05		.905		.153 ^m	
11	.310	.650		.018		.021 ^q	.018	.137	.065 ^k	.290	.914		.14 ^p	
12	.304	.651 ^c				.021 ^r		.134	.057	.298	.926	.013	.157 ^m	
AVERAGES	.294	.653	.650	.017	.015	.021	.019	.137	.064	.288	.911	.012	.149	.012
General														
Averages	.294	.651		.016		.021 ^s	.019	.137	.064	.288	.911	.012	.149	.012

^a Precipitated at 40° C., washed with a 1 per cent solution of KNO₃ and titrated with alkali standardized by means of B. S. benzoic acid and the 23:1 ratio.
^b Value obtained by standardization of titrating solution against sodium oxalate through KMnO₄ and Na₂S₂O₄.
^c Chromium and vanadium removed before the bismuthate oxidation.
^d Electrometric titration.

^e Precipitated with H₂S, purified and ignited to MoO₃.
^f Distilled as AsCl₃, precipitated as As₂S₃, converted to arsenate, precipitated as Ag₃AsO₄, dissolved in HNO₃ and titrated with KSCN.
^g Precipitated with H₂S, purified, the sulphide converted to molybdate, passed through the Jones reductor, and titrated with permanganate.
^h Bismuthate-arsenite method.
ⁱ Used 3:1 hydrochloric acid.
^j Volhard's method.

^k Finished by electrolysis.
^l Persulphate-arsenite method.
^m Precipitated and weighed as lead molybdate.
ⁿ Titrated with thiosulphate.
^o Used concentrated hydrochloric acid (sp. gr. 1.19).
^p Colorimetric method.
^q Precipitated in FeCl₃ solution.
^r Meineke's method.
^s Recommended value.

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This standard is not recommended for colorimetric carbon determinations, because of uncertainty as to the condition of the carbon.

Washington, D. C.

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George K. Burgess
 Director.