

National Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE 32c

NICKEL-CHROMIUM STEEL

ANALYST*	C	Mn		P		S			Si	COPPER H ₂ S-CuS-CuO	Ni	Cr	VANADIUM	MOLYBDENUM Colorimetric	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 (1-1) ZnS-Iodine (theoretical sulfur titre) ^b	Combustion	Sulfuric acid dehydration		Weighted as nickel dimethylglyoxime	FeSO ₄ -KMnO ₄ titration			
1	0.429	0.752	0.753	0.008	0.009	0.018	0.018	0.017	0.283	0.104	1.20	0.656	0.002	0.063	0.006
2	.434		.763		.013	.019	.018		.279		1.20	.654		.066	
3	.427		.756		.012		.018	.017	.274	.100	1.21	.656		.063	
4	.431	im. 75			.012	.015	.015		.294	.104	1.20	.650	.003	.061	
	.436	0.740			.018	.017	.017		.284	.100	1.19	.656		.058	
	.436	im. 742			.012		.018	.017	.280	.102	1.21	.654		.064	
7	.431	.754		.009	.010	.017	.017		.277	.096	1.19	.654	.003	.062	
8	.429	em. 749			.010		.018		.273	.097	1.17	.655		.063	
9	.422		.747		.012	.017	.018		.286	.102	1.21	.653	.003	.058	
10	.419	.758	.752	.011	.012		.018		.282	.093	1.22	.649		.067	
Averages	0.429	0.749	0.754	0.009	0.012	0.017	0.018	0.017	0.281	0.099	1.20	0.654	0.003	0.063	0.006
Recommended values	0.429	0.752		0.010		0.018			0.281	0.099	1.20	0.654	0.003	0.063	0.006

* 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 21:18.
^c Chromium removed by precipitation with ZnO.
^d Colorimetric method. See J. Research NBS 26, 405 (1941) RP1386.
^e Double dehydration.
^f Persulfate oxidation and potentiometric titration

with ferrous ammonium sulfate solution standardized with recrystallized potassium dichromate.
^a Nitric acid oxidation and potentiometric titration with ferrous ammonium sulfate solution standardized with recrystallized potassium dichromate.
^b Determination made by M. Marie Cron, by the vacuum-fusion method. See BS J. Research 7, 375 (1931) RP346.
^c Titrating solution standardized by use of a standard steel
^d Perchloric acid dehydration.
^e Perchloric acid oxidation.

¹ Finished by electrolysis.
² Titration with sodium arsenite.
³ Meinelke method.
⁴ Chromium removed by precipitation with NaHCO₃.
⁵ Nitric-sulfuric acid dehydration.
⁶ Evolution with diluted HCl (2:1).
⁷ Spectrographic method.
⁸ Ignited and weighed as NiO.
⁹ Chromium volatilized as CrO₂Cl₂.
¹⁰ Glyoxime precipitate titrated with KON solution.
¹¹ KI-Na₂S₂O₈ titration.

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The steel for the preparation of this standard was furnished by the Bethlehem Steel Co..