U. S. DEPARTMENT OF COMMERCE
JESSE H. JONES, Secretary

NATIONAL BUREAU OF STANDARDS
LYMAN J. BRIGGS, Director

SUPPLEMENT TO NATIONAL BUREAU OF STANDARDS CIRCULAR C398

STANDARD SAMPLES ISSUED OR IN PREPARATION BY THE NATIONAL BUREAU OF STANDARDS

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STANDARD SAMPLES ISSUED OR IN PREPARATION BY THE NATIONAL BUREAU OF STANDARDS

CONTENTS

I. PURCHASE PROCEDURE

1. IDENTIFICATION OF SAMPLES

The samples are listed by groups; the sample numbers represent the order of issuance of the first representative of each kind. Renewals of an analyzed sample are indicated by the original number, with an added letter to denote its intended relation. Thus, 10a is the first, 10b the second, and 10c the third renewal of No. 10 Bessemer 0.4 C steel. In this way a given number will always represent a material of fixed or approximately fixed composition. Numbers missing from the series in the following table represent samples of which the supply has become exhausted and which it is not the present intention to replace.

2. ORDERING

Orders should give both the number and name of the sample wanted. Example: No. 9d, steel, Bessemer, 0.2 C. The list of standard samples, their numbers, prices, and analyses are to be found in the succeeding pages. No samples of smaller size than those listed are distributed.

3. TERMS AND SHIPPING

(a) DOMESTIC

Samples must be paid for in advance with order. The former practice of sending samples c. o d. has been discontinued. No discounts are allowed on any orders.

(b) FOREIGN

Shipments intended for Mexico, Canada, Cuba, and United States possessions will be sent under Government frank. For all other foreign shipments, 50 cent postage must be added for every 300 grams of sample or fraction thereof and, in addition, 25 cents for insurance or registration.

(c) MONEY ORDERS, ETC.

Money orders, etc., should be payable to the National Bureau of Standards. Payment for foreign orders should be by an international money order or by a check payable through the New York Clearing House or a bank in the United States.

II. STANDARD SAMPLES, WITH SCHEDULE OF WEIGHTS AND FEES

1. DESCRIPTIVE LIST

STEELS

Sample number	Name	Constituents determined or intended use	Approximate weight of sample, in grams	Price per sample
8f	Bessemer, 0.1 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, Mo, N)	150	$2.00
9d	Bessemer, 0.2 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, Mo, N)	150	2.00
10d	Bessemer, 0.4 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, N)	150	2.00
22b	Bessemer, 0.6 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, Sn)	150	2.00
15c	B. O. H., 0.1 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, Mo)	150	2.00
11d	B. O. H., 0.2 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, As)	150	2.00
12d	B. O. H., 0.4 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, As)	150	2.00
13d	B. O. H., 0.6 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, Mo)	150	2.00
14c	B. O. H., 0.8 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, Al, Al_2O_3).	150	2.00
16c	B. O. H., 1.0 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
19c	A. O. H., 0.2 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
20d	A. O. H., 0.4 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, Mo)	150	2.00
21c	A. O. H., 0.6 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
34a	A. O. H., 0.8 C	C, Mn, P, S, Si, (Cu, Cr, Mo)	150	2.00
35a	A. O. H., 1.0 C	C, Mn, P, S, Si, (Cu, Cr, Al)	150	2.00
51a	Electric furance, 1.2 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, Sn)	150	2.00
65b	Basic electric	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
100	Medium manganese	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
105	High-sulfur	C	150	2.00
125	High-silicon	C, Mn, P, S, Si, Al, (Cu, Ni, Cr, V, Mo, Ti, Sn).	150	2.00
129	High-sulfur	C, Mn, P, S, Si, (Cu, Ni, Cr)	150	2.00
130	Lead-bearing	C, Mn, P, S, Si, Pb, (Cu, Ni, Cr, Mo)	150	2.00
33b	Nickel (SAE 2335)	C, Mn, P, S, Si, Ni, (Cu, Cr, V, Mo, As)	150	3.00
32c	Cr-Ni (SAE 3140)	C, Mn, P, S, Si, Ni, Cr, (Cu, V, Mo, N)	150	3.00
72b	Cr-Mo (SAE X4130)	C, Mn, P, S, Si, Cr, Mo, (Cu, Ni, V)	150	3.00
111	Ni-Mo (SAE 4615)	C, Mn, P, S, Si, Ni, Cr, Mo, (Cu, V, As)	150	3.00
30d	Cr-V (SAE 6135)	C, Mn, P, S, Si, Cr, V, (Cu, Ni, Mo)	150	3.00
106	Cr-Mo-Al (Nitralloy G)	C, Mn, P, S, Si, Cr, Mo, Al, (Cu, Ni, V, As, N).	150	3.00
36	2 Cr-1 Mo	C, Mn, P, S, Si, Cr, Mo, (Cu, Ni, V, N)	150	3.00
135	5 Cr-0.5 Mo	C, Mn, P, S, Si, Cr, Mo, (Cu, Ni, V)	150	3.00
50a	18W-4 Cr-1V	C, Mn, P, S, Si, W, Cr, V, (Cu, Ni, Mo, As, Sn).	150	3.00
132	7 Mo-6 W-4 Cr-1.5 V	C, Mn, P, S, Si, Cr, V, Mo, W (Cu, Ni)	150	3.00
134	9 Mo-2 W-4 Cr-1 V	C, Mn, P, S, Si, Cr, V, Mo, W, (Cu, Ni)	150	3.00
73a	Stainless (14 Cr)	C, Mn, P, S, Si, Cr, (Cu, Ni, V, Mo, W, N).	150	3.00
133	Stainless (14 Cr-0.6 Mo-0.4 S)	C, Mn, P, S, Si, Cr, Mo, (Cu, Ni, V, N)	150	3.00
101a	18 Cr-9 Ni (SAE 30905)	C, Mn, P, S, Si, Cr, Ni, (Cu, V, Mo, Co, N).	150	3.00
121	18 Cr-9 Ni (Ti-bearing)	C, Mn, P, S, Si, Cr, Ni, Ti, (Cu, V, Mo, Co).	150	3.00
123a	18 Cr-8 Ni (Cb-bearing)	Cb, Ta, V, Ti, P	150	3.00
126	High-nickel (36 Ni)	C, Mn, Si, Ni, (Cu, Cr, Co)	150	3.00

IRONS

4f	Cast iron	C, Mn, P, S, Si, Ti, (Cu, Ni, Cr, V)	150	$3.00
5h	Cast iron	C, Mn, P, S, Si, Ti, (Cu, Ni, Cr, V)	150	3.00
6e	Cast iron	C, Mn, P, S, Si, Ti, (Cu, Ni, Cr, V)	150	3.00
7c	Cast iron	C, Mn, P, S, Si, Ti, (Cu, Ni, Cr, V)	150	3.00
55a	Ingot iron	C, Mn, P, S, Si, Cu, (Ni, Cr, N, Al, Al_2O_3, Co, Sn).	150	3.00
82	Nickel-chromium cast iron	C, Mn, P, S, Si, Cr, Ni, (Ti, Cu, V)	150	3.00
107	Nickel-molybdenum cast iron	C, Mn, P, S, Si, Ni, Mo, Cr, (V, Cu, Ti).	150	3.00
115	Nickel-chromium-copper cast iron	C, Mn, P, S, Si, Ni, Cr, Cu, (V, Mo)	150	3.00
122	Cast iron (car wheel)	C, Mn, P, S, Si, Ni, Cr, Cu, (V, Mo)	150	3.00

STEEL-MAKING ALLOYS

57	Refined silicon	Complete analysis	60	$3.00
58	Ferrosilicon (75% silicon)	do	75	3.00
59	Ferrosilicon (50% silicon)	do	75	3.00
61	Ferrovanadium (high carbon)	do	100	3.00
64	Ferrochromium (high carbon)	do	100	3.00
66	Spiegeleisen	do	100	3.00
67	Manganese metal	do	100	3.00
68a	Ferromanganese	Mn, C, P, S, Si, Cr, As	100	3.00
75	Ferrotungsten	Complete analysis	150	3.00
90	Ferrophosphorus	P	75	3.00
71	Calcium molybdate	Mo, Fe, Ti	60	3.00
116a	Ferrotitanium (low carbon)	Ti, C, Si, V, Cr, Al	100	3.00
117	Ferrotitanium (high carbon)	Ti, C, Si, V, Cr, Al	100	3.00

1. DESCRIPTIVE LIST—Continued

NONFERROUS ALLOYS

Sample number	Name	Constituents determined or intended use	Approximate weight of sample, in grams	Price per sample
85	Aluminum alloy, wrought	Complete analysis	65	$3.00
86b	Aluminum-base casting alloy	do	65	3.00
53b	Bearing metal, lead-base	do	200	3.00
54a	Bearing metal, tin-base	do	200	3.00
63a	Bearing metal, phosphor-bronze	do	150	3.00
37c	Brass, sheet	do	150	3.00
52a	Bronze, cast	do	150	3.00
124	Ounce metal	do	150	3.00
62a	Bronze, manganese	do	150	3.00
127	Solder, 35 Sn–65 Pb	do	200	3.00
94	Zinc-base, die-casting alloy	do	100	3.00
108	Zinc spelter	do	200	3.00
109	Do	do	200	3.00
110	Do	do	200	3.00

ORES

69	Bauxite	Complete analysis	60	$2.00
26	Iron ore, Crescent	Al_2O_3, CaO, MgO	100	2.00
29a	Iron ore, Magnetite	Complete analysis	75	2.00
28	Iron ore, Norrie	Mn (low)	50	2.00
27b	Iron ore, Sibley	SiO_2, P, Fe	125	2.00
25b	Manganese ore	Mn, available oxygen	100	2.00
56a	Phosphate rock (Tennessee)	P_2O_5, Fe_2O_3, Al_2O_3, etc	45	2.00
120	Phosphate rock (Florida)	P_2O_5, Fe_2O_3, Al_2O_3, etc	45	2.00
137	Tin ore (Bolivian concentrate)	Sn	50	2.00
138	Tin ore (N. E. I. concentrate)	Sn	50	2.00
113	Zinc ore (Tri-State Concentrate)	Zn	50	2.00

CERAMIC MATERIALS

104	Burned magnesite	Complete analysis	60	$2.00
76	Burned refractory (40% Al_2O_3)	do	60	2.00
77	Burned refractory (60% Al_2O_3)	do	60	2.00
78	Burned refractory (70% Al_2O_3)	do	60	2.00
103	Chrome refractory	Cr_2O_3, SiO_2, Al_2O_3, FeO, CaO, MgO	60	2.00
97	Clay, flint	Complete analysis	60	2.00
98	Clay, plastic	do	60	2.00
70	Feldspar, potash	do	40	2.00
99	Feldspar, soda	do	40	2.00
79	Fluorspar	do	60	2.00
92	Glass, low boron	B_2O_3	45	2.00
93	Glass, high boron	Complete analysis	45	2.00
89	Glass, lead-barium	do	45	2.00
91	Glass, opal	do	45	2.00
80	Glass, soda-lime	do	45	2.00
128	Glass, soda-lime (B_2O_3, BaO)	do	45	2.00
81	Glass sand	Fe_2O_3, Al_2O_3, TiO_2, ZrO_2, CaO, MgO	60	2.00
1a	Limestone, argillaceous	Complete analysis	50	2.00
88	Limestone, dolomitic	do	50	2.00
102	Silica brick	Complete analysis and density	60	2.00
112	Silicon carbide	Complete analysis	85	2.00

MICROCHEMICAL STANDARDS

140	Benzoic acid	C, H	2	$2.50
141	Acetanilide	N, C, H	2	2.50
142	Anisic acid	Methoxyl	2	2.50
143	Cystine	S, C, H, N	2	2.50

CHEMICALS

84a	Acid potassium phthalate	Acidimetric and pH values	60	$3.00
39f	Benzoic acid	Acidimetric and calorimetric values	30	2.00
40d	Sodium oxalate	Oxidimetric value	60	2.00
83	Arsenic trioxide	do	75	2.00
17	Sucrose (cane-sugar)	Calorimetric and saccharimetric values	60	2.00
41	Dextrose (glucose)	Reducing value	70	2.00

MELTING-POINT STANDARDS

44c	Aluminum	660.15° C	200	$2.00
45b	Copper	1083.2° C	450	2.00
49b	Lead	327.40° C	1,000	2.00
42c	Tin	231.87° C	350	2.00
43c	Zinc	419.50° C	350	2.00

1. DESCRIPTIVE LIST—Continued

Sample number	Name	Constituents determined or intended use	Approximate weight of sample, in grams	Price per sample
		FINENESS STANDARDS		
47h	Cement (extra fine)	No. 200 sieve residue, 6.4%	160	$2.00
114d	Cement (turbidimetric standard)	No. 325 sieve residue, 11.2%	12	2.00
		THERMOELECTRIC STANDARDS		
118	Alumel wire No. 8 gage	emf vs. NBS Pt no. 27, 0 to 1,300° C	3 ft	$2.00
119	Chromel wire No. 8 gage	emf vs. NBS Pt no. 27, 0 to 1,300° C	3 ft	2.00

STANDARDS OF REFERENCE

In addition to the standards already enumerated, the Bureau distributes standards of reference which have been compared with master samples at the Bureau, or measured for compliance with an arbitrary standard. These standards are:

Standard viscosity oils for viscometer calibration, and for use with Saybolt viscometers.

Photometric standards (incandescent electric lamps).

Lamp standards of color temperature.

Glass opacity standards for the paper industry.

Glass standards for the calibration of spectrophotometers.

Radon standards, 10^{-9} and 10^{-11} g.

Gamma-ray standards, $0.1\times10^{-6}\times100.0\times10^{-6}$ g.

Rock samples analyzed for radium content.

Standard colors for sanitary ware (flat, vitreous plaques, 2 by 4 inches).

Standard colors for kitchen and bathroom accessories (flat, enameled iron plaques, 3 by 5 inches).

Standard finish samples for builders hardware (issued only in sets of 18, 7 by 2¼ inches, metal escutcheons).

Prices and further information on these standards can be obtained by applying to the Bureau.

III. SUMMARY OF ANALYSES

The values given in the following sections are listed primarily as a guide for purchasers. In some cases provisional values are given which may differ slightly from those given on the certificates. For this reason *the certificates issued with the standards should always be consulted to obtain the proper values.*

1. AVERAGED ANALYSES

ALUMINUM-BASE ALLOYS

Number	Cu	Mn	Si	Mg	Fe	Ti	Zn	Pb	Sn
85	4.11	0.564	0.463	0.402	0.395	0.02	0.013	0.006	0.002
86b	7.87	0.013	0.47	----------	1.53	0.03	1.51	----------	----------

BEARING METALS

Number	Kind	Pb	Sn	Sb	Bi	Cu	Fe	As	P	Zn
53b	Lead-base									
54a	Tin-base	0.21	88.61	7.32	0.019	3.75	0.041	0.032		
63a	Phosphor-bronze									

SHEET BRASS AND BRONZES

Number	Kind	Cu	Zn	Sn	Pb	Fe	Ni	Sb
37c	Sheet brass	70.07	27.22	0.96	0.97	0.17	0.58	----------
52a	Cast bronze	88.17	3.17	7.83	.013	.05	.73	0.003
62a	Manganese bronze	61.51	33.05	.84	.50	1.04	.61	----------
124	Ounce metal	83.77	5.46	4.69	4.78	.38	.45	.23

Number	Kind	Mn	Al	As	Ag	Si	S	P
37c	Sheet brass							
52a	Cast bronze	0.02	[1]	0.003	0.015	0.001	0.002	0.001
62a	Manganese bronze	1.51	0.92					
124	Ounce metal	----------	.016	[1]	----------	.075	.071	.037

SOLDER

Number	Kind	Sn	Sb	As	Bi	Cu
127	65Pb–35Sn	34.88	0.75	0.118	0.041	0.014

ZINC-BASE DIE-CASTING ALLOY

Number	Cu	Pb	Cd	Al	Mg	Fe	Sn
94	2.82	0.031	0.004	3.92	0.11	0.048	<0.0005

ZINC SPELTERS

Number	Pb	Cd	Fe	Cu	Sn	Ag	Mn	Ga	As	Sb	Ge	In
108	0.047	0.092	0.031	0.0004	0.0008	<0.00005	0.0002	0.0003	0.0001	0.0003	0.0001	------
109	.0020	.0018	.0006	.0005	.0002	.00008	------	------	------	------	------	------
110	.53	.56	.014	.0031	.0005	<.0001	.00004	.0002	------	------	------	0.001

[1] Not detected.

1. AVERAGED ANALYSES—Continued

IRONS AND STEELS

Kind and number	C		Mn	P	S		Si	Cu	Ni
	Total	Graphitic			By oxidation	Evolved as H_2S			
Cast iron 4f									
Cast iron 5h	2.92	2.17	0.60	0.26	0.12	0.12	1.85	1.46	0.13
Cast iron 6e									
Cast iron 7c	2.33	1.89	.564	.778	.065	0.63	1.79	.039	.010
Cast iron 82	2.78	2.29	.722	.102	.033	.031	2.09	.020	1.00
Cast iron 107	2.57	1.86	.706	.197	.090	.082	2.34	.074	.807
Cast iron 115	2.42	1.85	1.01	.113	.032	.031	1.60	6.44	15.89
Cast iron (car wheel) 122	3.06	2.32	.511	.310	.134	.132	.585	.043	.023
Ingot iron 55a	.014		.022	.004	.020	.020	<.001	.046	.019
Bessemer steel 8f	.073		.421	.097	.080	.080	.013	.009	.003
Bessemer steel 9d	.20		.62	.097	.037	.036	.03	.008	.004
Bessemer steel 10d	.419		.915	.088	.030	.031	.063	.010	.002
Bessemer steel 22b	.674		.935	.084	.041	.042	.123	.009	.003
B. O. H. steel 15c	.131		.533	.014	.022	.023	.266	.141	.080
B. O. H. steel 11d	.202		.430	.006	.041	.041	.027	.010	.008
B. O. H. steel 12d	.418		.344	.013	.036	.036	.016	.015	.007
B. O. H. steel 13d	.576		.924	.016	.025	.026	.265	.022	.010
B. O. H. steel 14c	.791		.462	.012	.030	.029	.058	.025	.010
B. O. H. steel 16c	1.01		.385	.032	.044	.042	.168	.060	.023
A. O. H. steel 19c	.214		.630	.049	.040	.040	.201	.161	.179
A. O. H. steel 20d	.411		.916	.048	.098	.093	.254	.164	.227
A. O. H. steel 21c	.574		.630	.062	.030	.030	.107	.050	.152
A. O. H. steel 34a	.762		.501	.028	.026	.026	.276	.222	.232
A. O. H. steel 35a	1.03		.345	.037	.037	.035	.387	.267	.254
Electric steel 51a	1.27		.233	.010	.010	.010	.308	.082	.063
Basic-electric steel 65b	.294		.725	.031	.012	.013	.341	.205	.052
Mn-rail steel 100	.617		1.38	.023	.021	.022	.191	.124	.151
High-sulfur steel 105	.193								
High-silicon steel 125	.058		.103	.008	.005	.004	4.97	.066	.047
High-sulfur steel 129	.131		.855	.109	.260	.258	.014	.166	.061
Lead-bearing steel 130	.454		.688	.025	.021	.022	.237	.017	.009
Nickel steel 33b (SAE 2335)	.366		.700	.037	.032	.031	.233	.114	3.48
Cr-Ni steel 32c (SAE 3140)	.43		.75	.010		.019	.28	.10	1.20
Cr-Mo steel 72b (SAE X4130)	.321		.520	.009	.016	.016	.285	.098	.113
Ni-Mo steel 111 (SAE 4615)	.202		.662	.023	.020	.019	.292	.122	1.75
Cr-V steel 30d (SAE 6135)	.36		.78	.031	.032	.030	.29	.090	.15
Cr-Mo-Al steel 106	.343		.484	.020	.019	.020	.250	.142	.129
2 Cr-1 Mo steel 36	.129		.390	.018	.020	.016	.309	.112	.128
5 Cr-0.5 Mo steel 135									
W-Cr-V steel 50a	.660		.287	.020	.007		.48	.047	.045
Mo-W-Cr-V steel 132	.803		.252	.027	.004		.239	.149	.094
Mo-W-Cr-V steel 134	.81		.15	.015	.005		.32	.11	.08
14 Cr steel 73a	.35		.25	.015	.031	.029	.31	.08	.16
14 Cr-0.6 Mo steel 133	.12		.80	.022	.36		.43	.06	.29
Cr-Ni (18-9) steel 101a	.049		.465	.017	.009	.010	.338	.051	8.99
Cr-Ni (18-9, Ti) steel 121	.057		.409	.016	.007	.005	.371	.045	9.04
Cr-Ni-Cb steel 123a									
36 Ni steel 126	.034		.506				.109	.096	36.42

1. AVERAGED ANALYSES—Continued

IRONS AND STEELS—Continued

Cr	V	Mo	Ti	As	Sn	Al total	Al_2O_3	N	W	Co	Sample number
											4f
0.02	0.02	0.01									5h
											6e
.019	.042	.002	0.067	0.071							7c
.245	.011	.004	.048	.009							82
.455	.015	.687	.037	.01					0.002		107
2.17	.009	.002	.021	.007						0.08	115
.032	.016	.002	.009	.019							122
.006	.0005	.002		.012	0.007	0.002	0.002	0.004		.008	55a
.004	.003	.001						.015			8f
.004	.006	.001						.018			9d
.006	.006	.003		.005				.008			10d
.003	.005	.002		.004	.0004						22b
.055	.006	.004						.005			15c
.008	.002	.001		.008							11d
.015	.002	.002		.008							12d
.023	.002	.002									13d
.025	.003	.002				.025	.006				14c
.045	.003	.001									16c
.063	.005	.016		.013							19c
.283	.049	.062									20d
.166	.007	.005		.008							21c
.275	.007	.003		.009							34a
.264	.011	.004		.009		.005					35a
.056	.002	.002			.011						51a
.042	.004	.006									65b
.180	.011	.005									100
											105
.017	.001	.003	.006		.007	.261					125
.049							Lead				129
.029		.003					0.204				130
.029	.005	.003		.016							33b
.65		.06									32c
.962	.003	.223									72b
.272	.003	.215		.016							111
1.15	.19	.035									30d
1.29	.008	.164		.009		1.06		.009			106
2.31	.006	1.01						.013			36
											135
3.52	.970	.009		.042					18.25		50a
4.11	1.64	7.07							6.29		132
3.73	1.14	8.70		.025					1.82		134
14.10	.03	.07							.09		73a
13.58	.02	.56									133
18.33	.030	.010						.044		.070	101a
17.83	.035	.010	.394					.008		.08	121
											123a
.008										.008	126

1. AVERAGED ANALYSES—Continued

FERROALLOYS

Number	Kind	C	Mn	P	S	Si	V	Ti	Al	Ca	Fe	Cr
57	Refined silicon	0.087	0.034	0.008	0.005	96.8	-------	0.10	0.67	0.73	0.65	-------
58	Ferrosilicon (75%Si)	.033	.165	.016	.01	75.6	0.004	.085	.77	.45	22.5	-------
59	Ferrosilicon (50%Si)	.015	.310	.035	.008	50.0	0.04	.105	.93	.04	48.4	-------
116a	Ferrotitanium	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
117	Ferrotitanium	5.45	-------	-------	-------	2.57	.07	14.62	.95	-------	-------	.25

Number	Kind	C	Mn	P	S	Si	Ni	Cr	V	Al	Fe
61	Ferrovanadium	1.15	3.57	0.243	0.003	7.78	1.33	0.52	31.15	0.02	52.8
64	Ferrochromium	5.10	.23	.016	.070	2.05	.33	67.9	.11	.02	24.05
66	Spiegeleisen	4.05	19.93	.070	.016	2.22	.015	.009	.012	-------	73.45
67	Manganese metal	.06	97.25	.235	<.001	.407	.045	.18	.19	-------	1.50
68a	Ferromanganese	6.83	80.07	.294	.014	.81	-------	-------	-------	-------	-------

Number	Kind	C	Mn	P	S	Si	W	Cu	Sn	As	Sb
75	Ferrotungsten	0.54	1.16	0.015	0.039	0.67	75.2	0.039	0.18	0.035	<0.002
90	Ferrophosphorus	-------	-------	26.2	-------	-------	-------	-------	-------	-------	-------

Number	Kind	
71	Calcium molbdate	Mo=35.30; Fe=1.92; Ti=0.06.

BAUXITE AND ALUMINA REFRACTORIES

Number	Total Al_2O_3	Total Fe_2O_3	Loss on ignition	SiO_2	TiO_2	ZrO_2	MnO
69	55.06	5.66	28.77	6.3	3.07	0.08	0.55
76	37.7	2.4	.22	54.7	2.2	.07	-------
77	59.4	.90	.21	32.4	2.9	.09	-------
78	70.0	.79	.26	20.7	3.4	.12	-------

IRON ORES

Number	Name	SiO_2	TiO_2	P	Al_2O_3	Fe	Mn	CaO	MgO
26	Crescent	[1] 5.03	[1] 0.07	0.040	[1] 1.02	[1] 58.62	-------	2.56	3.27
27b	Sibley	1.31	-------	.036	-------	68.23	-------	-------	-------
28	Norrie	-------	-------	-------	-------	-------	0.465	-------	-------

MAGNETITE IRON ORE

Number	SiO_2	Al_2O_2	TiO_2	Total Fe	FeO	Fe_2O_3	Cr_2O_3	V_2O_3	MnO	CaO	MgO	P_2O_5
29a	2.86	0.46	0.15	69.54	28.10	68.20	0.002	0.002	0.03	0.096	0.095	0.007

MANGANESE ORE

Number	Total manganese	Available oxygen	Calculated MnO_2
25b	58.35	16.67	90.59

[1] Values derived from a small number of determinations at the National Bureau of Standards and not so well established as the other values.

1. AVERAGED ANALYSES—Continued

PHOSPHATE ROCKS

Number	Kind	P_2O_5	Fe_2O_3	Al_2O_3	CaO	MgO	F
56a	Tennessee brown	33.01	2.18	2.02	45.55	0.14	3.56
120	Florida land pebble	35.33	.89	.87	49.62	.14	3.76

Number	Kind	SiO_2	MnO	Na_2O	K_2O	Total S as SO_3	TiO_2
50a	Tennessee brown	11.01	0.18	0.28	0.28	0.73	0.08
120	Florida land pebble	7.40	.033	.14	.09	.32	.07

TIN ORES

Number	Kind	Sn
137	Bolivian concentrate	56.6
138	N. E. I. concentrate	75.0

ZINC ORE

Number	Name	Zn
113	Tri-State Concentrate	61.1

CHROME REFRACTORY

Number	Cr_2O_3	SiO_2	FeO	Al_2O_3	CaO	MgO	TiO_2
103	36.97	8.24	14.39	20.83	0.79	16.27	0.93

CLAYS

Number	Kind	SiO_2	Al_2O_3	TiO_2	ZrO_2	Fe_2O_3	P_2O_5	V_2O_5	Cr_2O_3	K_2O
97	Flint clay	42.87	38.77	2.38	0.25	0.98	0.08	0.04	0.079	0.54
98	Plastic clay	59.11	25.54	1.43	.04	2.05	.08	.025	.021	3.17

Number	Kind	Na_2O	CaO	MgO	BaO	SO_3	MnO	CuO	MoO_3	Loss on ignition
97	Flint clay	0.33	0.10	0.26	0.015	0.042	0.002	0.003	0.0002	13.35
98	Plastic clay	.28	.21	.72	.06	.07	.005	.009	.0001	7.28

FELDSPAR

Number	Kind	K_2O	Na_2O	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	TiO_2	Ignition loss
70	Potash	12.58	2.38	66.66	18.03	0.03	0.07	0.013	0.002	0.22
99	Soda	.41	10.73	68.66	19.06	.067	.36	.053	.017	.52

FLUORSPAR

Number	CaF_2	CO_2	SiO_2	Zn	Pb	S	Fe_2O_3	Al_2O_3	P_2O_5	TiO_2	K_2O	Na_2O	MgO	BaO	MnO
79	94.83	0.99	1.88	0.35	0.23	0.13	0.15	0.02	0.005	0.003	0.01	0.06	0.13	0.07	0.003

1. AVERAGED ANALYSES—Continued

GLASSES

Number	Kind	SiO_2	PbO	Al_2O_3	Fe_2O_3	ZnO	MnO	TiO_2	ZrO_2	CaO	BaO
89	Lead-barium	65.35	17.50	0.18	0.049	------	0.088	0.01	0.005	0.21	1.40
91	Opal	67.53	.10	6.01	.081	0.08	.008	.019	.01	10.48	------
92	Low-boron	------	------	------	------	------	------	------	------	------	------
93	High-boron	80.60	------	1.94	.076	------	------	.027	.013	[1]	------
80	Soda-lime	74.1	------	.33	.065	------	.003	.02	.003	4.65	------
128	Soda-lime (B_2O_3, BaO)	69.51	------	1.89	.039	------	------	.017	------	4.76	.49

Number	Kind	MgO	K_2O	Na_2O	B_2O_3	P_2O_5	As_2O_5	As_2O_3	SO_3	Cl	F	Ignition loss
89	Lead-barium	0.03	8.40	5.70	------	0.23	0.36	0.03	0.03	0.05	------	0.32
91	Opal	.008	3.25	8.48	------	0.22	.102	.091	------	.014	5.72	------
92	Low-boron	------	------	------	0.70	------	------	------	------	------	------	------
93	High-boron	.026	.16	4.16	12.76	[1]	.14	.085	.009	.036	------	------
80	Soda-lime	3.23	.04	16.65	------	------	.07	.03	.41	.047	------	.30
128	Soda-lime (B_2O_3, BaO)	3.33	.99	16.83	1.52	.01	------	------	.35	.04	------	.18

GLASS SAND

Number	Fe_2O_3	Al_2O_3	TiO_2	ZrO_2	CaO	MgO
81	0.073	0.265	0.095	0.031	0.029	0.016

LIMESTONE, DOLOMITE, SILICA BRICK, AND BURNED MAGNESITE

Number	Kind	SiO_2	Fe_2O_3	Al_2O_3	TiO_2	MnO	CaO	SrO	MgO	Na_2O
1a	Limestone	14.11	1.63	4.16	0.16	0.038	41.32	0.12	2.19	0.39
88	Dolomite	.31	.084	.067	.005	.006	30.49	<.01	21.48	.08
102	Silica brick [2]	93.94	.66	1.96	.16	.005	2.29	------	.21	.06
104	Burned magnesite	2.54	7.06	.84	.03	.43	3.35	------	85.67	.04

Number	Kind	K_2O	SO_3	S	P_2O_5	CO_2	C	H_2	Ignition loss
1a	Limestone	0.71	0.04	0.25	0.15	33.53	0.61	------	34.55
88	Dolomite	.03	.035	.013	.003	47.25	.08	0.008	47.52
102	Silica brick	.29	------	------	.025	------	------	------	.38
104	Burned magnesite	<.01	------	------	.057	------	------	------	------

SILICON CARBIDE

Number	Total Si	Total C	Free C	SiC	Fe	Al	Ti	Zr	Ca	Mg
112	69.11	29.10	0.09	96.85	0.45	0.23	0.025	0.027	0.03	0.02

[1] Not detected.
[2] Density 2.33 g/cm$_3$ at 25° C.

2. CHEMICALS

ACID POTASSIUM PHTHALATE

Number	Purity on basis of titration	Chlorides	Sulfates	Heavy metals	Iron	Density	pH of 0.05 Molal solution
84a	100.00	<0.001	None found	None found	<0.0005	1.636	4.008 at 25° C.

BENZOIC ACID

Number	Purity on basis of titration	Heat of combustion
39f	100.0_3	26.428 International kilojoules per gram mass (wt in vacuo).

SODIUM OXALATE

Number	Purity on basis of titration	Water 105°	Loss, 105° to 240°
40d	99.9_5	0.008	0.06

ARSENIC TRIOXIDE

Number	Purity on basis of titration	Nonvolatile matter	Sulfides	Chlorides	Antimony	Iron	Other foreign metals	Specific gravity
83	99.97	0.014	<0.001	<0.002	<0.005	<0.003	None found	3.71

SUGARS

Number	Name	Moisture	Reducing substances	Ash	Heat of combustion
17	Sucrose	<0.003	<0.002	<0.003	16.476 International kilojoules per gram mass (wt in vacuo).
41	Dextrose	<0.01		<0.003	

IV. GENERAL INFORMATION

1. LITERATURE

Detailed certificates of analysis are sent under separate cover to the same destination as the samples. Gummed labels with the summary of analysis are also furnished with most samples. In the case of new or renewed samples provisional typewritten certificates will be supplied until they can be replaced by the printed certificates and labels when ready.

2. SAMPLES OUT OF STOCK

The preparation of "renewal" samples is intended to be completed at the time each kind of sample becomes exhausted, but owing to delays encountered in obtaining a proper grade of material and for other reasons this is not always possible. If orders are received for samples that are out of stock, notice will be mailed to that effect. The "renewal" of an analyzed sample will have a composition more or less different from that of its predecessor, but, as regards the characteristic constituent or constituents, will pattern after it closely.

3. NEW SAMPLES

When new samples or renewals of old one are issued, announcement will be made in scientific and trade journals.

4. MIXING

In order to overcome the effect of any segregation of granular samples in shipment, the contents of each bottle (except the organic samples) *should be thoroughly mixed before any is used for analysis.*

NOTE.—This supplement replaces that issued August 1, 1940. It supersedes all previous supplements and is effective on the date of issue hereof.

LYMAN J. BRIGGS,
Director, National Bureau of Standards.

Approved:
JESSE H. JONES,
Secretary of Commerce.

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