U. S. DEPARTMENT OF COMMERCE
HARRY L. HOPKINS, 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

[Issued August 1, 1940]

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1940

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

CONTENTS

	Page
I. Purchase procedure	1
1. Identification of samples	1
2. Ordering	1
3. Terms and shipping	1
(a) Domestic	1
(b) Foreign	1
(c) Money orders, etc.	1
II. Standard samples, with schedule of weights and fees	2
1. Descriptive list	2
Steels	2
Irons	2
Steel-making alloys	2
Nonferrous alloys	3
Ores	3
Ceramic materials	3
Fineness standards	3
Melting-point standards	3
Chemicals	3
Thermoelectric standards	3
III. Summary of analyses	4
1. Averaged analyses	4
Irons and steels	4, 5
Ferroalloys	6
Sheet brass and bronzes	6
Bearing metals	6
Aluminum-base casting alloy	6
Zinc-base die-casting alloys	7
Zinc spelters	7

	Page
III. Summary of analyses—Cont.	
1. Averaged analyses—	
Bauxite and alumina refractories	7
Iron ores	7
Magnetite iron ore	7
Manganese ore	7
Phosphate rocks	8
Zinc ores	8
Chrome refractory	8
Clays	8
Feldspars	8
Fluorspar	8
Glasses	9
Glass sand	9
Limestone, dolomite, silica brick, and burned magnesite	9
Silicon carbide	9
2. Chemicals	10
Acid potassium phthalate	10
Benzoic acid	10
Sodium oxalate	10
Arsenic trioxide	10
Naphthalene	10
Sugars	10
IV. General information	11
1. Bottling	11
2. Literature	11
3. Samples out of stock	11
4. New samples	11
5. Mixing	11

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. 9c, steel, Beessmer, 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 cents 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.

242968—40

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
8e	Bessemer, 0.1 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	$2.00
9c	Bessemer, 0.2 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, Sn)	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
13c	B. O. H., 0.6 C	C, Mn, P, S, Si, (Cu, Ni, Cr. Al, Sn)	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 furnace, 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	1.00
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
131	High silicon (0.005 C)	C	100	3.00
30c	Chromium-vanadium	C, Mn, P, S, Si, Cr, V, (Cu, Ni)	150	3.00
32b	Chromium-nickel	C, Mn, P, S, Si, Cr, Ni, (Cu)	150	3.00
33b	Nickel	C, Mn, P, S, Si, Ni, (Cu, Cr, V)	150	3.00
50a	Chromium-tungsten-vanadium	C, Mn, P, S, Si, W, Cr, V, (Cu, Mo, Sn)	150	3.50
72a	Chromium-molybdenum	C, Mn, P, S, Si, Cr, Mo, (Cu, V)	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
111	Ni-Mo-Cr, (SAE 4615)	C, Mn, P, S, Si, Cr, Ni, Mo, (Cu, V, As).	150	2.50
132	Molybdenum, high speed (6 Mo, 6 W).	C, Mn, P, S, Si, Cr, V, Mo, W	150	2.50
73	Stainless (13 Cr)	C, Mn, P, S, Si, Cr, (Cu, V, Mo)	150	3.00
101a	18 Cr, 8 Ni	C, Mn, P, S, Si, Cr, Ni, (Cu, V, Mo, Co, N).	150	3.00
121	18 Cr, 8 Ni (Ti bearing)	C, Mn, P, S, Si, Cr, Ni, Ti, (Cu, V, Mo, Co).	150	3.00
123	18 Cr, 11 Ni (Cb bearing)	Cb, Si, Ta, V, Ti, P, S	150	3.00
126	High nickel	C, Mn, Si, Ni, (Cu, Co)	150	2.50

IRONS

4e	Cast iron	C, Mn, P, S, Si, Ti,(Cu, Ni, Cr, V)	150	$2.50
5g	Cast iron	C, Mn, P, S, Si, Ti, (Cu, Ni, Cr, V)	150	2.50
6d	Cast iron	C, Mn, P, S, Si, Ti, (Cu, Ni, Cr, V)	150	2.50
7c	Cast iron	C, Mn, P, S, Si, Ti, (Cu, Ni, Cr, V)	150	2.50
55a	Ingot iron	C, Mn, P, S, Si, Cu, (Ni, Cr, N, Al, Al_2O_3, Co, Sn).	150	2.00
82	Nickel-chromium cast iron	C, Mn, P, S, Si, Cr, Ni, (Ti, Cu, V)	150	2.50
107	Nickel-molybdenum cast iron	C, Mn, P, S, Si, Ni, Mo, Cr, (V, Cu, Ti)	150	2.50
115	Nickel-chromium-copper cast iron	C, Mn, P, S, Si, Ni, Cr, Cu, (V, Mo)	150	2.50
122	Cast iron (car wheel)	C, Mn, P, S, Si, Ni, Cr, Cu, (V, Mo)	150	2.50

STEEL-MAKING ALLOYS

57	Refined silicon	Complete analysis	60	$2.00
58	Ferrosilicon (75% silicon)	do	75	2.00
59	Ferrosilicon (50% silicon)	do	75	2.00
61	Ferrovanadium (high carbon)	do	100	3.00
64	Ferrochromium (high carbon)	do	100	3.00
66	Spiegeleisen	do	100	2.00
67	Manganese metal	do	100	2.50
68a	Ferromanganese	Mn, C, P, S, Si, Cr, As	100	2.50
75	Ferrotungsten	Complete analysis	150	4.00
90	Ferrophosphorus	Phosphorus	75	2.50
71	Calcium molybdate	Mo, Fe, Ti	60	2.50
116	Ferrotitanium (low carbon)	Ti, C, Si, V, Cr, Al	100	2.50
117	Ferrotitanium (high carbon)	Ti, C, Si, V, Cr, Al	100	2.50

1. DESCRIPTIVE LIST—Continued

NONFERROUS ALLOYS

Sample number	Name	Constituents determined or intended use	Approximate weight of sample, in grams	Price per sample
86a	Aluminum-base casting alloy	Complete analysis	60	$2.00
53a	Bearing metal, lead base	do	200	3.00
54a	Bearing metal, tin base	do	200	3.00
63	Bearing metal, phosphor-bronze	do	150	3.00
37b	Brass, sheet	do	150	3.00
52a	Bronze, cast	do	150	3.00
124	Ounce metal	do	150	3.00
62	Bronze, manganese	do	150	3.00
94	Zinc-base, die-casting alloy	do	100	2.00
95	Do	do	100	2.00
96	Do	do	100	2.00
108	Zinc spelter	do	200	3.00
109	Do	do	200	4.00
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	1.50
28	Iron ore, Norrie	Mn (low)	50	1.00
27b	Iron ore, Sibley	SiO_2, P, Fe	125	2.00
25b	Manganese ore	Manganese, 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
2a	Zinc ore	Zinc	50	1.00
113	Zinc ore (Tri-State Concentrate)	do	50	1.00

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	2.50
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

FINENESS STANDARDS

46r	Cement (normal)	No. 200 sieve residue, 13.3%	160	$1.00
47h	Cement (extra fine)	No. 200 sieve residue, 6.4%	160	1.00
114c	Cement (turbidimetric standard)	No. 325 sieve residue, 10.8%	12	2.00

MELTING-POINT STANDARDS

44c	Aluminum	660.15° C	200	$2.00
45a	Copper	1,083° C	450	2.00
49a	Lead	327.35° C	1,400	2.00
42c	Tin	231.87° C	350	2.00
43d	Zinc	419.52° C	350	2.00

CHEMICALS

84a	Acid potassium phthalate	Acidimetric and pH values	60	$3.00
39e	Benzoic acid	Acidimetric and calorimetric values	30	2.00
40c	Sodium oxalate	Oxidimetric value	60	2.00
83	Arsenic trioxide	do	75	2.00
38b	Naphthalene	Calorimetric value	50	2.00
17	Sucrose (cane-sugar)	Calorimetric and saccharimetric values	60	2.00
41	Dextrose (glucose)	Reducing value	70	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

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

1. AVERAGED ANALYSES

IRONS AND STEELS

Kind and number	Carbon		Manganese	Phosphorus	Sulfur		Silicon	Copper	Nickel
	Total	Graphitic			By oxidation	Evolved as hydrogen sulfide			
Cast iron 4e	2.89	2.41	0.721	0.109	0.052	0.051	1.29	0.010	0.012
Cast iron 5g	2.86	2.15	.610	.261	.122	.120	1.84	1.44	.128
Cast iron 6d	2.69	2.03	1.60	.486	.025	.023	2.54	.151	.025
Cast iron 7c	2.33	1.89	.564	.778	.065	.063	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 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 8e	.073	------	.420	.099	.081	.080	.013	.008	.004
Bessemer steel 9c	.202	------	.668	.096	.036	.036	.047	.020	.003
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 13c	.573	------	.700	.013	.023	.023	.200	.165	.196
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	------	------	------	------	------	------	------	------	------
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
High-silicon steel 131	------	------	------	------	------	------	------	------	------
Nickel steel 33b	.366	------	.700	.037	.032	.031	.233	.114	3.48
Cr-V steel 30c	.489	------	.707	.019	.014	.013	.237	.099	.080
Cr-Ni steel 32b	.413	------	.624	.016	.018	.018	.217	.117	1.21
Cr-W-V steel 50a	.660	------	.287	.020	.007	------	.48	.047	.045
Cr-Mo steel 72a	.317	------	.599	.016	.029	.029	.224	.079	.030
Cr-Mo-Al steel 106	.343	------	.484	.020	.019	.020	.250	.142	.129
Ni-Mo-Cr (S. A. E. 4615) 111	.202	------	.662	.023	.020	.019	.292	.122	1.75
Cr-Mo-W-V steel 132	------	------	------	------	------	------	------	------	------
Stainless steel 73	.314	------	.276	.023	.031	.031	.360	.033	.072
Cr-Ni (18-8) steel 101a	.049	------	.465	.017	.009	.010	.338	.051	8.99
Cr-Ni (18-8, Ti) steel 121	.057	------	.409	.016	.007	.005	.371	.045	9.04
Cr-Ni (18-11, Cb) steel 123	------	------	------	.007	.006	.006	.384	------	------
High-nickel steel 126	.034	------	.506	------	------	------	.109	.096	36.42

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—Continued

IRONS AND STEELS—Continued

Chromium	Vanadium	Molybdenum	Titanium	Arsenic	Tin	Aluminum (total)	Alumina Al_2O_3	Nitrogen	Tungsten	Cobalt	Sample number
0.012	0.031	0.001	0.067	0.006							4e
.018	.021	.001	.066	0.32							5g
.011	.029	<.005	.139	.26							6d
.019	.042	.002	.067	.071							7c
.245	.011	.004	.048	.009							32
.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
.005	.002	.001									8e
.007	.006	.003		.009	.002						9c
.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
.053	.003	.003		.010	.010	.019					13c
.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
											65b
.180	.011	.005									100
											105
.017	.001	.003	.006		.007	.261					125
.049							Lead				129
.029		.003					0.204				130
											131
.029	.005	.003		.016							33b
.977	.235	.010		.016							30c
.638	.006	.005		.017							32b
3.52	.970	.009		.042	.025				18.25		50a
.655	.003	.202							nil		72a
1.29	.008	.164		.009		1.06		.009			106
.272	.003	.215		.016							111
											132
13.93	.034	.005		.011							73
18.33	.030	.010						.044		.070	101a
17.83	.035	.010	.394			Cb	Ta	.008		.08	121
	.021		.004			0.433	0.027				123
.008										.008	126

1. AVERAGED ANALYSES—Continued

FERROALLOYS

Number	Kind	Carbon	Manganese	Phosphorus	Sulfur	Silicon	Vanadium	Titanium	Aluminum	Calcium	Iron	Chromium
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	.004	.105	.93	.04	48.4	-------
116	Ferrotitanium	.097	-------	-------	-------	1.27	.32	25.48	5.51	-------	-------	0.066
117	Ferrotitanium	5.45	-------	-------	-------	2.57	.07	14.62	.95	-------	-------	.25

Number	Kind	Carbon	Manganese	Phosphorus	Sulfur	Silicon	Nickel	Chromium	Vanadium	Aluminum	Iron
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	6.85	80.03	.29	.016	.81	-------	-------	-------	-------	-------

Number	Kind	Carbon	Manganese	Phosphorus	Sulfur	Silicon	Tungsten	Copper	Tin	Arsenic	Antimony
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	-------	-------	-------	-------	-------	-------	-------

71	Calcium molybdate	Molybdenum=35.30; iron=1.92; titanium=0.06.

SHEET BRASS AND BRONZES

Number	Kind	Copper	Zinc	Tin	Lead	Iron	Nickel	Antimony
37b	Sheet brass	70.36	27.09	0.99	0.90	0.21	0.45	-------
52a	Cast bronze	88.17	3.18	7.80	.012	.05	.73	<0.01
62	Manganese bronze	59.07	35.06	.82	.56	1.13	.64	-------
124	Ounce metal	83.77	5.46	4.69	4.78	.38	.45	.23

Number	Kind	Manganese	Aluminum	Arsenic	Silver	Silicon	Sulfur	Phosphorus
37b	Sheet brass	-------	-------	-------	-------	-------	-------	-------
52a	Cast bronze	0.02	-------	0.004	0.009	-------	-------	-------
62	Manganese bronze	1.59	1.13	-------	-------	-------	-------	-------
124	Ounce metal	-------	.016	(1)	-------	0.075	0.071	0.037

BEARING METALS

Number	Kind	Lead	Tin	Antimony	Bismuth	Copper	Iron	Arsenic	Phosphorus	Zinc
53a	Lead-base	79.37	10.23	10.29	0.054	0.002	0.006	0.07	-------	-------
54a	Tin-base	.21	88.61	7.32	.019	3.75	.041	.031	-------	-------
63	Phosphor-bronze	9.74	9.91	.55	-------	78.05	.27	.19	0.62	0.48

ALUMINUM-BASE CASTING ALLOY

Number	Si	Cu	Fe	Zn	Mn	Mg	Ti	Zr
86a	0.35	7.65	1.53	1.52	0.01	<0.001	0.017	0.007

[1] Not detected.

1. AVERAGED ANALYSES—Continued

ZINC-BASE DIE-CASTING ALLOYS

Number	Cu	Pb	Cd	Al	Mg	Fe	Sn
94	2.83	0.03	0.003	3.92	0.11	0.048	0.0001
95	2.87	.32	.28	3.92	.10	.061	.0003
96	2.97	.58	.10	.56	.002	.029	5.98

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

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_3	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 sulfur as SO_3	TiO_2
56a	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

ZINC ORES

Number	Name	Zinc
2a		30.53
113	Tri-State Concentrates	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

FELDSPARS

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	-----	.022	.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 carbon	Free carbon	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/cm³ 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	<.0005	1.636	4.008 at 25° C.

BENZOIC ACID

Number	Purity on basis of titration	Nonvolatile matter at 600° C	Heavy metals	Cl	S	Heat of combustion
39e	99.99	0.002%	<0.0005%	<0.001%	0.001%	26.419 International kilojoules per gram mass (wt in vacuo).

SODIUM OXALATE

Number	Water, 105°	Loss, 105 to 240°	$NaHC_2O_4$	Na_2SO_4	K	Fe	Cl	Specific gravity
40c	0.01	0.05	0.04	0.005	None found	None	<0.001	2.347

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

NAPHTHALENE

Number	Heat of combustion, per gram weight (in air)
38b	9,614 calories 20° C.

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. BOTTLING

Iron, steel, ceramic, and ore samples are sent in screw-capped glass bottles and organic samples in glass-stoppered bottles under seal.

2. 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.

3. SAMPLES OUT OF STOCK

The preparation of "renewal" samples is intended to be complete 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.

4. NEW SAMPLES

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

5. 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 June 3, 1937. It supersedes all previous supplements and is effective on the date of issue hereof.

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

Approved:

HARRY L. HOPKINS,
Secretary of Commerce.

○