

DEPARTMENT OF COMMERCE

BUREAU OF STANDARDS

S. W. STRATTON, Director

SUPPLEMENT TO CIRCULAR No. 25¹

[Issued April 1, 1919]

STANDARD SAMPLES ISSUED OR IN PREPARATION

The samples are numbered consecutively nearly in 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, 4a is the first and 5b the second renewal of irons B and C, respectively. 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.

Sample number	Name	Constituents determined or intended use	Weight of sample in grams	Fee per sample with certificate
1	Argillaceous limestone	Complete analysis	100	\$1. 00
2	Zinc Ore D	Zinc	100	1. 00
4b	Iron B	C, Si, Ti, P, S, Mn	150	2. 00
5c	Iron C	C, Si, Ti, P, S, Mn, Cu	150	2. 00
6c	Iron D	C, Si, Ti, P, S, Mn, Cu, Cr, Ni, V	150	2. 00
7	Iron E	C, Si, Ti, P, S, Mn, Cu, Cr, Ni, V	150	2. 00
8b	Steel, Bessemer, 0.1 C	C, Si, P, S, Mn	150	2. 00
9b	Steel, Bessemer, 0.2 C	do	150	2. 00
10c	Steel, Bessemer, 0.4 C	do	150	2. 00
11b	Steel, B. O. H., 0.2 C	do	150	2. 00
12b	Steel, B. O. H., 0.4 C	do	150	2. 00
13b	Steel, B. O. H., 0.6 C	do	150	2. 00
14b	Steel, B. O. H., 0.8 C	do	150	2. 00
15a	Steel, B. O. H., 0.1 C	do	150	2. 00
16a	Steel, B. O. H., 1.0 C	do	150	2. 00
17	Sucrose	Calorimetric and Saccharimetric values	60	2. 00
19b	Steel, A. O. H., 0.2 C	C, Si, P, S, Mn, Cu, Cr, Mo, V	150	2. 00
20a	Steel, A. O. H., 0.4 C	C, Si, P, S, Mn, Cu, Cr, V, Ni	150	2. 00
21a	Steel, A. O. H., 0.6 C	do	150	2. 00
22a	Steel, Bessemer, 0.6 C	C, Si, P, S, Mn	150	2. 00
23a	Steel, Bessemer, 0.8 C	do	150	2. 00
24	Steel, Vanadium, 0.15 V	C, Si, P, S, Mn, V (Ni, Cr, Cu, Mo)	150	2. 50
25a	Manganese Ore	Mn, available O	100	1. 50
26	Crescent Iron Ore	Al ₂ O ₃ , CaO, MgO	100	1. 50
27a	Sibley Iron Ore	SiO ₂ , P, Fe	150	2. 00
28	Norrie Iron Ore	Mn (low)	100	1. 50
29	Magnetite Iron Ore (titaniferous)	Full analysis	150	2. 00
30a	Steel, Chrome-vanadium	C, Si, P, S, Mn, Cr, V (Ni, Cu, Mo)	150	2. 50
31a	Steel, Chrome-tungsten	C, Si, P, S, Mn, Cr, W (Ni, Mo, V)	150	2. 50
32a	Steel, Chrome-nickel	C, Si, P, S, Mn, Cr, Ni (Co, Cu, Mo)	150	2. 50
33	Steel, Nickel	C, Si, P, S, Mn, Ni (Co, Cr, Cu, W, Mo)	150	2. 50
34	Steel, A. O. H., 0.8 C	C, Si, P, S, Mn (Cu, Cr, Mo)	150	2. 00
35	Steel, A. O. H., 1.0 C	C, Si, P, S, Mn (Cu, Cr)	150	2. 00
37a	Brass, sheet	Cu, Zn, Sn, Pb, Fe, Ni	150	3. 00
38	Naphthalene	Calorimetric value	50	2. 00
39a	Benzoic acid	do		
40	Sodium oxalate	Oxidimetric value	75	1. 25
41	Dextrose	Reduction value	70	2. 00
42	Tin	Melting point	350	2. 00
43	Zinc	do	350	2. 00
44	Aluminium	do	200	2. 00
45	Copper	do	450	2. 00
46	Cement (normal)	Testing sieves	160	. 25
47	Cement (extra fine)	do	160	. 25
48	Benzoic acid	Alkalimetric value	20	. 80

¹This supplement supersedes all previous ones. See pages 5 and 6 for changes in discounts, ordering and shipping regulations.

SUMMARY OF ANALYSES

In general, the values here given represent the averages of all determinations. In certain cases, for reasons explained on the certificates, other values are given in these tables and are recommended by the Bureau of Standards.

AVERAGED ANALYSES

IRONS

Number	Sample	Total carbon	Graphite	Combined carbon	Silicon	Titanium	Phosphorus gravimetric
4b	B	3.02	2.46	0.57	1.33	0.054	0.104
5c	C	2.65	2.11	0.55	1.85	0.073	0.229
6c	D	.....	.....	.....	.....	.....	.....
7	E	2.19	1.82	0.38	2.21	0.095	0.864

Number	Sample	Phosphorus permanganate titration	Phosphorus alkali titration	Sulphur by oxidation	Sulphur by evolution	Manganese	Copper
4b	B	0.103	0.103	0.037	.....	1.01	0.009
5c	C	0.226	0.227	0.050	.....	0.806	0.093
6c	D	.....	.....	.....	.....	.....	.....
7	E	0.855	0.862	0.051	.....	0.444	0.021

STEELS

Number	Kind of sample with approximate carbon content	Carbon			Silicon	Phosphorus	Sulphur		Manganese
		Direct combustion	Solution and combustion	Colorimetric			By oxidation	Evolved as hydrogen sulphide	
8b	Bessemer 0.1	.....	.....	.....	0.003	0.104	0.103	.....	0.390
9b	0.2	0.183	0.195	.....	0.023	0.111	0.065	.....	0.747
10c	0.4	.....	.....	.....	.....	.....	.....	.....	.....
22a	0.6	0.577	0.587	.....	0.149	0.119	0.100	.....	0.794
23a	0.8	.....	.....	.....	.....	.....	.....	.....	.....
15a	Basic open-hearth 0.1	0.109	0.115	0.107	0.009	0.0066	0.028	0.030	0.372
11b	0.2	0.210	0.225	.....	0.008	0.006	0.042	.....	0.438
12b	0.4	0.408	0.414	.....	0.021	0.014	0.024	.....	0.538
13b	0.6	.....	.....	.....	.....	.....	.....	.....	.....
14b	0.8	.....	.....	.....	.....	.....	.....	.....	.....
16a	1.0	1.01	1.00	.....	0.144	0.035	0.030	0.029	0.264
19b	Acid open-hearth 0.2	.....	.....	.....	.....	.....	.....	.....	.....
20a	0.4	0.393	0.383	.....	0.140	0.046	0.027	.....	0.661
21a	0.6	0.617	0.613	.....	0.166	0.063	0.034	.....	0.621
34	0.8	0.84	0.84	0.85	0.18	0.095	0.029	0.029	0.70
35	1.0	1.03	1.03	.....	0.17	0.033	0.027	0.027	0.30

AVERAGED ANALYSES—Continued

ALLOY STEELS

Number	Kind	Carbon		Silicon	Phosphorus	Sulphur	Manganese	Vanadium	Chromium	Nickel	Tungsten
		Direct combustion	Solution and combustion								
24	Vanadium.....	0.350	0.348	0.303	0.035	0.027	0.669	0.15	0.007	0.009	.....
30a	Chrome-vanadium.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31a	Chrome-tungsten.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
32a	Chrome-nickel.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
33	Nickel.....	0.278	0.280	0.11	0.026	0.038	0.551	.....	0.12	3.33	0.15

SHEET BRASS

Number	Copper	Zinc	Tin	Lead		Iron	Nickel
				PbSO ₄ method	PbO ₂ method		
37a

ARGILLACEOUS LIMESTONE

[Cf. J. Am. Chem. Soc., 28, p. 223; 1906]

Number	SiO ₂	TiO ₂	Al ₂ O ₃	P ₂ O ₅	Fe ₂ O ₃	MnO	CaO	MgO	K ₂ O
1	13.15	0.22	5.70	0.18	1.72	0.04	37.65	1.94	1.15

Number	Na ₂ O	H ₂ O 100°—	H ₂ O 100°+	S	SO ₃	CO ₂	C	Total	Ign. loss
1	0.33	0.16	1.51	0.27	0.013	30.68	0.65	100.25	32.27

ZINC ORE

[Cf. J. Am. Chem. Soc., 29, p. 262; 1907]

Number	Zinc—General average
2	31.43

MANGANESE ORE

Number	Total manganese	Available oxygen	Calculated MnO ₂
25a

LAKE SUPERIOR IRON ORES

Number	Name	SiO ₂	TiO ₂	P	Al ₂ O ₃	Fe	Mn	CaO	MgO
26	Crescent.....	² 5.03	² 0.07	² 0.040	1.02	² 58.62	.....	2.56	3.27
27a	Sibley.....	.....	.....	.....	.....	.....	.....	.....	.....
28	Norrie.....	.....	.....	.....	.....	.....	0.465	.....	.....

² Values derived from a small number of determinations at the Bureau of Standards, and not so well established as the other values.

Circular of the Bureau of Standards

AVERAGED ANALYSES—Continued

MAGNETITE IRON ORE

Number	SiO ₂	TiO ₂	Al ₂ O ₃	V ₂ O ₅	FeO	Fe ₂ O ₃	Fe	MnO
29	12.02	0.99	1.91	0.08	24.78	52.20	[55.75]	0.09

Number	CaO	MgO	K ₂ O	Na ₂ O	H ₂ O+	CO ₂	P ₂ O ₅	S
29	2.90	2.01	0.51	0.45	0.47	0.68	1.01	0.025

PURE CHEMICALS

SUGARS

Number	Name	Moisture	Reducing substances	Ash
17	Sucrose.....	<0.01	<0.003	<0.003
41	Dextrose.....	<0.05	.....	<0.003

NAPHTHALENE

Number	S	
38	<0.05	Cf. method of purification, p. 13, Circular No. 25

BENZOIC ACID

Number	
39	No impurities could be detected Cf. method of purification, p. 12, Circular No. 25 Contains chlorine. Use factor .999
48	

SODIUM OXALATE

Number	Water		NaHC ₂ O ₄	S	K	Fe	Cl	Organic impurity
	105°	240°						
40	0.005	0.027	<0.01	Very faint trace	Very faint trace	None	<0.002	None

IX. ORDERING AND SHIPPING REGULATIONS.

(a) **Ordering.**—Orders should give both the number and name of the sample wanted. Example: No. 9b Steel, Bessemer 0.2 C. The list of standard samples, their numbers, prices, and analyses are to be found in the four preceding pages. No samples of smaller size than those listed are distributed.

(b) **Shipping.**—Samples for points in the United States or its possessions are sent by parcel post under Government frank. Shipments intended for Canada, Mexico, and other foreign countries are made by express at the expense of the purchaser.

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

Detailed certificates of analysis and also gummed labels with the summary of analysis, together with the corresponding descriptive circulars, are sent with certain 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.

(c) **Terms.**—Cash on delivery is required by the regulations of this Department. All samples are sent by C. O. D. parcel post in the United States and its possessions and by C. O. D. express to foreign countries. Payment must be by postal or express money order, given at the time of receipt of samples from the post office, and should be payable to the "Secretary of Commerce." This is a departure from our former practice of requiring prepayment on samples. The change was made because of the delays and difficulties arising from the necessity for holding orders here until remittance has been received and for making refunds of small sums through the disbursing office when certain samples ordered and covered by the remittance were out of stock.

The 10 per cent discount on four or more samples has also been discontinued in line with the general policy of doing away with quantity discounts in the commerce of to-day.

(d) **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. Notice will also be sent when the "Renewal" is ready. 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.

(e) **New Samples.**—When new samples are issued, announcement will be made in scientific and trade journals, such as *Journal of Industrial and Engineering Chemistry*, *Metallurgical and Chemical Engineer*, and *Iron Age*.

(f) **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.*

