A-59

Memorandum to: R. P. Koenig From: Lawrence Addicks

Subject: Electrolytic Zinc Quality Date: May 19, 1950

In connection with your memorandum of April 21 on this subject, I had lunch today with G. Howard LeFevre who is in charge of metal sales of the U. S. Smelting, Refining & Mining Company and also secretary of the American Society for Testing Materials committee dealing with metal specifications, of which, incidentally, I have been a member for many years. I enclose a copy of the current specifications for slab zinc. The U. S. Smelting have their zinc concentrates refined by Anaconda and their market is naturally domestic.

In general there is an easy market problem in selling "special high grade" at 1.25¢ premium to die casters and particular users and "prime western" to galvanizers but a tighter one in "high grade" at 1.10¢ premium to brass makers, all delivered to customer. The remaining grades are in negligible demand.

There has been a fight of five years standing between the producers and die casting consumers, the latter having insisted on 0.003% lead but only succeeding in obtaining a concession from the former 0.006% to the current 0.005%. There is no likelihood of further change in the near future beyond placing some permissible limit on aluminum in place of the obviously impossible "none".

Spelter containing more than 0.007% or possibly 0.008% lead reaches the "unstable" point in a die casting which results in its falling apart due to intergranular corrosion. 0.005% is a perfectly safe figure but due to clamor by purchasing agents, somewhat lower figures are customary in the standard brands. Any of the electrolytic refineries can reach very low lead content if they care to spend the additional money in supervision of solution purification and tank operation, but there is no difficulty in selling all the market will consume at 0.004% and this is what Anaconda aims for. For a newcomer introducing a brand, it would be wise to aim at 0.0025% until customer relations were established. Any of the plants could do this if they chose. Cadmium is important but easily dealt with and iron never puts in a noticeable appearance. Possibly Cerro could start with "high grade" first.

E. C. Van Blarcom is in charge of the zinc refinery at Great Falls and W. E. Mitchell at Anaconda. All of the "special high grade" comes from the Anaconda plant.

As to new outputs of electrolytic zinc, I think Tsumeb and Morocco are on the horizon. Mr. Bancroft and Mr. Zimmer would know all about that. One of my reasons for not recommending immediate 200 ton-a-day operation at Oroya was to see how the world market was going to absorb these increases.

LA:wbg
Encl.

STANDARD SPECIFICATIONS FOR SLAB ZINC (SPELTER)[1]

A.S.T.M. Designation: B6

Adopted, 1911; Revised, 1914, 1918, 1933, 1937, 1946.

This standard of the American Society for Testing Materials is issued under the fixed designation B6; the final number indicates the year of original adoption as standard, or, in the case of revision, the year of last revision.

Scope

1. (a) These specifications cover slab zinc (spelter) made from ore or other material by a process of distillation or by electrolysis, in six grades, as follows:

(1a) Special High Grade
(1) High Grade
(2) Intermediate
(3) Brass Special
(4) Selected
(5) Prime Western

(b) These specifications do not cover zinc produced by "sweating" or remelting of secondary zinc.

Marking

2. A brand shall be cast in each slab by which the manufacturer can be identified.

Quality

3. The manufacturer shall use care to have each carload of slab zinc (spelter) of as uniform quality as possible.

Composition

4. The slab zinc (spelter) shall conform to the maximum requirements as to chemical composition prescribed in Table I.

[1]Under the standardization procedure of the Society, these specifications are under the jurisdiction of the A.S.T.M. Committee B-2 on Non-Ferrous Metals and Alloys.

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Table 1 - Chemical Requirements

Grade	Lead, max., per cent	Iron, max., per cent	Cadmium, max., per cent	Aluminum	Sum of Lead, Iron, and Cadmium, max., per cent
(1a) Special High Grade..	0.006	0.005	0.004	None	0.010
(1) High Grade.....	0.07	0.02	0.07	None	0.10
(2) Intermediate.....	0.20	0.03	0.50	None	0.50
(3) Brass Special.....	0.60	0.03	0.50	None	1.0
(4) Selected.....	0.80	0.04	0.75	None	1.25
(5) Prime Western.....	1.60	0.08	--	--	--

Note 1 - Analysis shall not regularly be made for tin but when used for die castings, if found by the purchaser, tin shall not exceed 0.003 per cent. Greater amounts may constitute cause for rejection.

Note 2 - For purposes of acceptance or rejection, an observed value or calculated value obtained from analysis should be rounded off to the nearest unit in the last right-hand place of figures used in expressing the specified limit, in accordance with the rounding-off procedure prescribed in Section 4 of the Tentative Recommended Practices for Designation of Numerical Requirements in Standards (A.S.T.M. Designation: E29).

Physical Appearance

5. The slabs shall be reasonably free from surface corrosion or adhering foreign matter.

Sampling

6. Tentative Method of Sampling Slab Zinc (Spelter) E65-46T shall be used. Sections 3, 4, and 5 of this method are quoted as follows:

Selection of Portion

3. A portion representative of the total shipment or order shall be selected at random for the final sample. The portion preferably shall be taken during loading or unloading. From full carload lots of zinc, one slab shall be taken for every 10,000 pounds. From smaller lots, one slab shall be taken for every 2000 to 5000 pounds.

Preparation of Sample

4. (a) Each slab shall be thoroughly cleaned to rid the surface of extraneous material and drilled or sawed[3], without lubricant, in accordance with Paragraph (b) or (c).

(b) Drilling - Two holes shall be drilled, preferably from the bottom, or brand side, of each slab, at two points located along one diagonal of the slab so that each point is half way between the center and one extremity of the diagonal. If two holes from each slab do not yield the weight of sample prescribed in Section 5, a third hole shall be drilled at the center of each slab. Each hole shall be bored completely through the slab, care being taken to avoid starting the drill in a depression and to adjust the feed to give drillings 0.010 to 0.020" in thickness. The drill used preferably shall be one twisted from flat stock. The diameter of the drill shall be 5/8" for grade la[4] zinc, and shall be 5/16" for zinc of grades 1, 2, 3, 4, and 5. The drillings shall be broken or cut with clean shears into pieces not over 1/2" in length and thoroughly mixed.

[3] Sampling by sawing is not recommended for grade la zinc, as complete removal of the final traces of adventitious iron from sawings is very difficult.

[4] These grade numbers correspond to those prescribed in the Standard Specifications for Slab Zinc (Spelter) (A.S.T.M. Designation: B-6), 1946 Book of A.S.T.M. Standards, Part I-B, page 192.

(c) Sawing[3] - Using, preferably, a heat-treated, high-speed steel saw, make two cuts completely across the slab from one long side to the other. Each cut shall be approximately half way between the center and each end. The width of the saw cut shall be sufficient to give the weight of sample prescribed in Section 5, and the cuttings from all the slabs shall be thoroughly mixed to form a uniform sample.

(d) Removal of Adventitious Iron - The drillings or sawings (Paragraph (b) or (c)) shall be subjected to the action of a strong magnet to remove any adventitious iron with which the sample may have become contaminated from the drill or saw[3].

Size of Sample and Storage

5. The prepared sample shall weigh at least 1600 grams for grade 1a[4] zinc, and at least 300 grams for zinc of grades 1, 2, 3, 4, and 5. The sample shall be divided into three equal parts, each of which shall be placed in a sealed package, one for the manufacturer, one for the purchaser, and one for an umpire, if necessary. Tight, leak-proof, paper sample envelopes or cardboard cartons may be used to hold the sample.

Methods of Chemical Analysis

7. The chemical compositions enumerated in these specifications shall be determined by the following methods of the American Society for Testing Materials (in cases of dispute, Standard Methods E40 shall be used, except for the Special High Grade and the High Grade, where Tentative Methods E26 may be used as an alternate):

	A.S.T.M. Designation*
Chemical analysis.....	E40
Spectrochemical analysis.....	E26
Photometric analysis.....	E64
Polarographic analysis.....	E68

*These designations refer to the following methods listed in 1946 Book of A.S.T.M. Methods of Chemical Analysis of Metals.
Standard Methods of Chemical Analysis of Slab Zinc (Spelter) (A.S.T.M. Designation: E40).
Tentative Methods of Spectrochemical Analysis of Zinc for Lead, Iron, and Cadmium (A.S.T.M. Designation: E26).
Tentative Photometric Methods for Determination of Iron in Slab Zinc (Spelter) (A.S.T.M. Designation: E64).
Tentative Method for Polarographic Determination of Lead and Cadmium in Zinc (A.S.T.M. Designation: E68).

Claims

8. Claims to be considered shall be made in writing to the manufacturer within 30 days of receipt of material at the purchaser's plant and the results of the purchaser's tests shall be given. The manufacturer shall be given one week from date of receipt of such claim to investigate his records and then shall agree either to satisfy the claim or send a representative to the plant of the purchaser.

(a) Analysis by Car Lots - No claims shall be considered unless the minimum samples as specified can be shown to such representative.

(b) Physical Defects of Individual Pieces - No claims shall be considered unless the slab zinc (spelter) in question, unused, can be shown to such representative.

Plant Treatment

9. When the slab zinc (spelter) satisfies the chemical and physical requirements of these specifications, it shall not be condemned for defects in manufacturing, for defects of alloys in which it is used, or for defects in the coating of galvanized products.

Investigation of Claims

10. (a) The inspector representing the manufacturer shall examine all pieces where physical defects are claimed. If agreement is not reached the question of fact shall be submitted to a mutually agreeable umpire, whose decision shall be final.

(b) On a question of metal contents a sample shall be drawn by representatives of both the manufacturer and the purchaser as described in Section 6. The properly mixed and quartered sample shall be separated into three parts, each of which shall be placed in a sealed package, one for the manufacturer, one for the purchaser, and one for an umpire, if necessary. The manufacturer and the purchaser shall each make an analysis, and if the results do not establish or dismiss the claim to the satisfaction of both parties, the third sample shall be submitted to a mutually agreeable umpire, who shall determine the question of quality, and whose determination shall be final.

Settlement of Claims

11. The expenses of the manufacturer's representative and of the umpire shall be paid by the loser or divided in proportion to concession made in case of compromise. In case of rejection being established, damages shall be limited to the payment of freight both ways by the manufacturer for substitution of an equivalent weight of slab zinc (spelter) conforming to these specifications.