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Technical Specification

ISO/DTS 15855

Copper, lead and zinc sulfide concentrates — Step-by-step procedure for the testing of static scales

Concentrés sulfurés de cuivre, de plomb et de zinc — Procédure pas à pas pour les essais des bascules statiques

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 183, *Copper, lead, zinc and nickel ores and concentrates.*

This first edition cancels and replaces ISO/TR 15855:2001, which has been technically revised.

The main changes are as follows:

— in 7.2 e), "a total approximately equal to half the scale capacity" has been changed to "a total approximately equal to full-scale capacity less the certified weight".

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Copper, lead and zinc sulfide concentrates — Step-by-step procedure for the testing of static scales

1 Scope

This document specifies simple procedures to check the performance and calibration status of static scales.

The test sequence is applicable to routine applications, generating results which can be used to calculate explicit scale performance parameters (precision, bias and linearity) in accordance with the relevant formulae shown in ISO 12745.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 General information

ISO 12745:2008, 5.3, 5.4, 5.5, 5.6, respectively, provide a general summary of testing principles and procedures for weighbridges, hopper scales, gantry scales and platform scales, augmented by a list of test mass categories in ISO 12745:2008, Clause 6.

Weighbridges, hopper scales and platform scales represent the most common systems encountered in the context of concentrate mass determinations for commercial consignments. Although the principles of testing are similar, details vary depending on the availability and number of certified weights and the level of automation (in the case of hopper scales having built-in reference weights).

5 Frequency of testing

The frequency of in-house and routine scale performance tests (in addition to mandatory certification intervals stipulated by regulatory authorities) observed in practice ranges from none to as high as three times per consignment in the case of some fully automated weighing hopper installations. The disparity reflects the absence of explicit guidelines as well as different risk perceptions and available resources. Routine scale performance checks carried out once per commercial consignment, before the loading or discharge commences, are regarded as an optimum requirement by many operators.

However, it is practically impossible to carry out such checks once per commercial consignment because the tests cause delays in loading or discharge and are very expensive. In addition, improved stability of scales in recent times should allow reduced frequency of testing. It is therefore recommended that the frequency of testing be decided by agreement between the parties concerned, based on the risk and the reliability of the scales.

6 Precision test procedures

6.1 General

Although precision tests do not require certified test weights, it is stressed that they provide no information concerning potential bias or linearity problems.

6.2 Determining the precision of weighbridges by replicate tests

Use the following procedure:

a) Check, and if necessary, adjust the zero setting of the scale.

b) Place a truck or rail wagon (selected at random) on the weighbridge and record the gross weight W_1.

c) Remove the truck or wagon from the weighbridge and check/adjust the zero setting again.

d) Place the same truck or rail wagon [from step b)] on the weighbridge and record the gross weight W_2.

A minimum of four duplicate determinations (four data pairs W_1 and W_2) are recommended in order to calculate the scale precision, in accordance with ISO 12745.

6.3 Determining the precision of hopper scales by replicate tests

Use the following procedure:

a) Check and, if necessary, adjust the zero setting of the scale.

b) Use a test mass of about five to 10 times the scale's readability or sensitivity (e.g. 25 kg for a scale sensitivity of 5 kg) to produce paired weight measurements with and without this test mass, and record the corresponding gross weights W_1 and W_2.

A minimum of six data pairs (W_1 and W_2) from a single weighing cycle are recommended in order to calculate the scale precision, in accordance with ISO 12745.

7 Calibration (bias and linearity test) procedures

7.1 General

Bias and linearity tests require at least one certified reference weight of suitable mass (1 t or 2 t). In the case of hopper scales, the weight or weights are usually suspended from the weigh frame.

The use of a large number of smaller reference weights (e.g. a set of 100 individually certified test weights of 20 kg each) is a suitable alternative, especially where the entire test sequence has to be performed manually.

7.2 Calibration procedure using a single certified test weight

This procedure applies to situations where only one certified test weight (or set of small weights having an equivalent total mass) covering a small part of the scale's designated range is available. Individual calibration points at increasing initial loads are generated by adding the certified test weight W_{cert} at a given load state W_0 and comparing the expected scale reading $W_1 = W_{cert} + W_0$ to the observed value W_2. The scale deviation at a given point is thus given by $W_2 - W_1$.

A minimum of three determinations is recommended, and one test each at initial loads of: zero; approximately half the scale capacity; and approximately full-scale capacity less the certified weight.

Use the following procedure:

a) Check and, if necessary, adjust the zero setting of the scale.