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Steel — Macrographic examination by sulphur print (Baumann method)

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Foreword

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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 17, *Steel*, Subcommittee SC 7, *Methods of testing (other than mechanical tests and chemical analysis)*.

This second edition cancels and replaces the first edition (ISO 4968:1979), which has been technically revised.

The main changes are as follows:

— in the Scope, the applicable steels for this method are specified as from 0,005 % to 0,40 %, and this method may also be applied to cast irons;

— type and concentration of recommended reagents have been explicitly specified for steels with different sulphur content, respectively, to improve test effect and efficiency;

— method to remove extra acid solution and bubbles, and method to drain have been added in detail;

— classification of test results as positive segregation, negative segregation and central segregation, with examples in Annex, has been added.

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.

Steel — Macrographic examination by sulphur print (Baumann method)

1 Scope

This document specifies a method (Baumann) for the macrographic examination of steel by means of contact printing using silver salts and acid.

The method is applicable to steels of which the sulphur content is less than 0,40 %. This method can also be applied to cast irons.

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

4.1 The sulphur print test is essentially a qualitative test. It is inadvisable to evaluate the sulphur content of a given steel merely on the basis of its sulphur print.

4.2 Experience shows that the degree of darkening of the photo-sensitive emulsion is not always in proportion to the quantity of sulphides present in the metal. Certain factors may influence the macrographic attack to a greater or lesser extent; as examples, the following may be quoted:

— the chemical composition of the steel: the presence of certain elements modifies the type and shape of the sulphides and consequently the appearance of the image obtained, for example concentrations of titanium greater than 0,1 % give prints which do not reveal sulphides;

— the surface condition of the sample: the presence of surface cold working may alter the image obtained;

— the sensitivity of the photographic paper.

4.3 The use of the test, and the conditions for interpreting the results observed, depend on the particular case: details are laid down in product standards or shall be subject to special agreement.

5 Principle and aim of the test

5.1 The aim of macrographic examination by sulphur printing is to detect, by printing on photo-sensitive papers previously soaked in acid, the position of areas containing sulphur inclusions found