



ISO 4967

**Steel — Determination of the
non-metallic inclusion content —
Micrographic method**

*Acier — Détermination de la teneur en inclusions non métalliques
— Méthode micrographique*

**Fourth edition
2026-05**



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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 fourth edition cancels and replaces the third edition (ISO 4967:2013), which has been technically revised.

The main changes are as follows:

- added the mandatory clauses normative references (see [Clause 2](#)) and terms and definitions (see [Clause 3](#)), and renumbered the subsequent clauses;
- modified the proximity conditions for stringers (allowing for legacy conditions): the new transverse conditions mirror the conditions used longitudinally and remove ambiguity;
- changed the width definition (allowing for legacy/alternative definitions): the new definition avoids the sensitivity to misalignment of the bounding box and the underestimation of the “largest particle” approach;
- added further illustrations of width definitions, including the largest particle approach to inclusions with overlapping particles;
- clarified the treatment of inclusions intersecting the field of view, particularly for long inclusions (allowing for legacy treatment);
- clarified the treatment of B/C hybrid stringers;
- modified [Tables 2](#) and [3](#);
- added sampling specifications and the possibility to use stacking and/or rectangular fields for cross-section thicknesses under 0,71 mm;
- included the DS subgroup into D thick rating;
- clarified the treatment of DS inclusions in Method B;

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- modified most of the chart diagrams;
- replaced the global metrics for Method B (allowing for legacy metrics);
- added more analysis examples.

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.

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Every routine inclusion rating by necessity applies the analysis of an incomplete sample to an entire heat. On the one hand, only a very small fraction of the total material volume is analysed, and on the other hand the analysis is performed on a two-dimensional section of three-dimensional inclusions. Standards like this document cannot eliminate the associated statistical uncertainties but can strive to add as little uncertainty as possible by defining the process as clearly as possible.

Despite the statistical shortcomings, methods like those described in this document are widely used to assess the suitability of a steel product for a given use. However, since it is difficult to achieve reproducible results owing to the distributional randomness of non-metallic inclusions, even with a large number of specimens, precautions should be taken when using the method.

One way to reduce the scatter inherent to the method is to avoid relying on subjective human judgment. Image analysis has shown itself to be a useful tool to improve reproducibility — if the hardware is appropriately configured and if the rules in the standard are indisputably clear for the software developer. This document addresses the minimal system requirements for resolution and reduces ambiguity in its rules compared to the previous revision.

However, it is acknowledged that neither steel producers and customers can instantly change specifications, nor can software developers immediately change the rules for evaluation. To allow for an adaptation period, where methods and definitions have changed, it is permitted to continue to use the methods and definitions that have been established in the past. This document refers to such methods and definitions as well as derived interpretations as “legacy.” Because of the ambiguities of previous editions, there is no one legacy approach, but instead a variety of legacy approaches.

Another clarification relative to the 2013 revision concerns the DS inclusions. There was much ambiguity surrounding them because they were presented as another type of inclusions. This made it unclear whether large globular particles were part of the D rating as well, since one important rule of inclusion rating is to rate every inclusion once and only once. With the redefinition of DS as a subgroup of type D designed for easy rating and reporting of oversized type D inclusions it is clear that every DS particle is rated in the D_{thick} rating, just as every oversized sulfide is rated in the A_{thick} rating.

Historically, ISO 4967 has always shown a significant similarity to the ASTM E 45 standard. With the revised definitions, particularly those defining proximity limits, there is a greater separation between the standards, though due to the inherent statistical uncertainties the ratings will correlate in most instances. However, these increased differences convinced the ISO/TC 17/SC 7 to continue using the terms “fine” and “thick” in order to more clearly distinguish ISO 4967 results from ASTM E 45 results.

Revisions always take place on a strict timeline and often the deadline forces the publication of a standard that is good enough, but not yet perfect. Topics that further revisions can address include the treatment of particle clusters, easier oversized reporting for Types A to C, and more guidelines on computer-assisted rating.

It is worth remembering that the changes in this inclusion rating method do not change a good steel into a bad steel, but serve the goal of a clearer, more differentiated description of the steel.