BS ISO 23825:2020

BSI Standards Publication

Method for evaluating the nodularity of spheroidal carbides — Steels for cold heading and cold extruding

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National foreword

This British Standard is the UK implementation of ISO 23825:2020.

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A list of organizations represented on this committee can be obtained on request to its committee manager.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 documents 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 17, *Steel,* Subcommittee SC 4, *Heat treatable and alloy steels.*

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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Introduction

The nodularity of spheroidal carbide is an important characteristic of steel for cold heading or cold extruding. However, the degree of spheroidization is assessed with reference to an agreed series of standard images, which does not exist up-to-now as subject of an International standard. Thus, there has been a continuing debate between supply and demand for the determination of the degree of spheroidization.

This document specifies a test method for evaluating the degree of spheroidal carbide in CHQ wire (Cold Heading Quality wire).

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Method for evaluating the nodularity of spheroidal carbides — Steels for cold heading and cold extruding

1 Scope

This document specifies a micrographic method based on comparison charts for determining the degree of spheroidisation of carbides after annealing of wire rod, wire or bars made of non-alloy and low alloy steels intended for cold heading and cold extrusion. The range of carbon content is up to 1,20 % C.

In addition, Annex A includes a method based on machine vision for routine measurements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4954, *Steels for cold heading and cold extruding*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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

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

3.1
maximum Féret diameter
maximum length of an object whatever its orientation, as shown in Figure 1

3.2
roundness
area of the carbide particle divided by the area of the circle whose diameter is the maximum Féret diameter of the same carbide particle, calculated according to Formula (1):

$$\text{Roundness} = A/A_m = 4A/\pi \cdot l_m^2 \quad (1)$$

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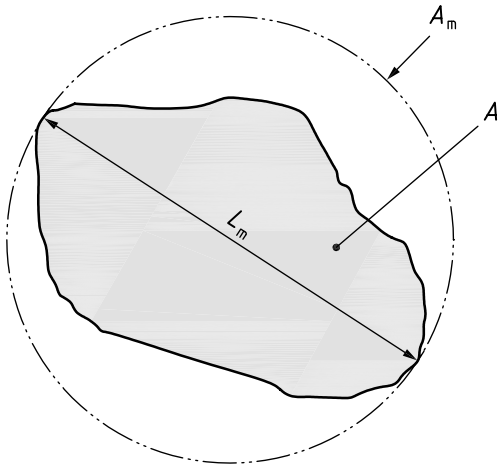

Figure 1 — Illustration of maximum Féret diameter of a carbide particle

where

l_m is the maximum Féret diameter of the carbide particle;

A_m is the area of the circle diameter lm;

A is the area of the carbide particle

3.3
area ratio
accepted/all objects area ratio and describes the relative amount of round objects on the image, calculated according to Formula (2):

$$A\% = \frac{A_{\text{accepted}}}{\left(A_{\text{accepted}} + A_{\text{rejected}}\right)} \tag{2}$$

Note 1 to entry: Round (spheroidized) objects on real images are shown in Figure 2 in green colour (bright) whereas rejected (non-round) objects are drawn in red colour (dark). From class 70 to class 90 the area ratio is increased, so 90 class images contain relatively more round particles.

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