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Microstructure of cast irons —

Part 1: Graphite classification by visual analysis

Microstructure des fontes —

Partie 1: Classification du graphite par analyse visuelle

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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 25, *Cast irons and pig irons*.

This third edition cancels and replaces the second edition (ISO 945-1:2017), of which it constitutes a minor revision. The changes compared with the previous edition are as follows:

— Figures 3 and 4 have been corrected to a diameter of 120 mm to allow a direct comparison with the microscope display screen;

— Figures 3 and 4 have been corrected so that the maximum graphite sizes conform with Table 1.

A list of all parts in the ISO 945 series can be found on the ISO website.

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.

Introduction

Microstructure designation is a useful feature that provides a means of classifying the graphite form, distribution and size in cast irons.

Graphite classification by visual analysis is a well-established method which is well recognized within the foundry industry as a means of quickly determining the overall graphite microstructure of a cast iron casting.

Microstructure of cast irons —

Part 1:
Graphite classification by visual analysis

1 Scope

This document specifies a method of classifying the microstructure of graphite in cast irons by comparative visual analysis.

The purpose of this document is to provide information about the method of graphite classification. It is not intended to give information on the suitability of cast-iron types and grades for any particular application.

The particular material grades are specified mainly by mechanical properties and, in the case of austenitic and abrasion resistant cast irons, by their chemical composition. The interpretation of graphite form and size does not allow a statistically valid statement on the fulfilment of the requirements specified in the relevant material standard.

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 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/

4 General

4.1 Designation system for classifying graphite in cast irons

When cast iron materials are examined under a microscope in accordance with this document, the graphite shall be classified by the following:

a) its form, designated by Roman numbers I to VI (see Figure 1 and Annex A);

b) its distribution, designated by capital letters A to E (see Figure 2 and Annex B); the graphite distribution designation is only specified for grey cast irons (form I);

c) its size, designated by numbers 1 to 8 (see Figures 3, 4 and 5 and Table 1).

NOTE Figures 1 to 5 show only the outlines and not the structure of the graphite.

4.2 Form

Magnification × 100

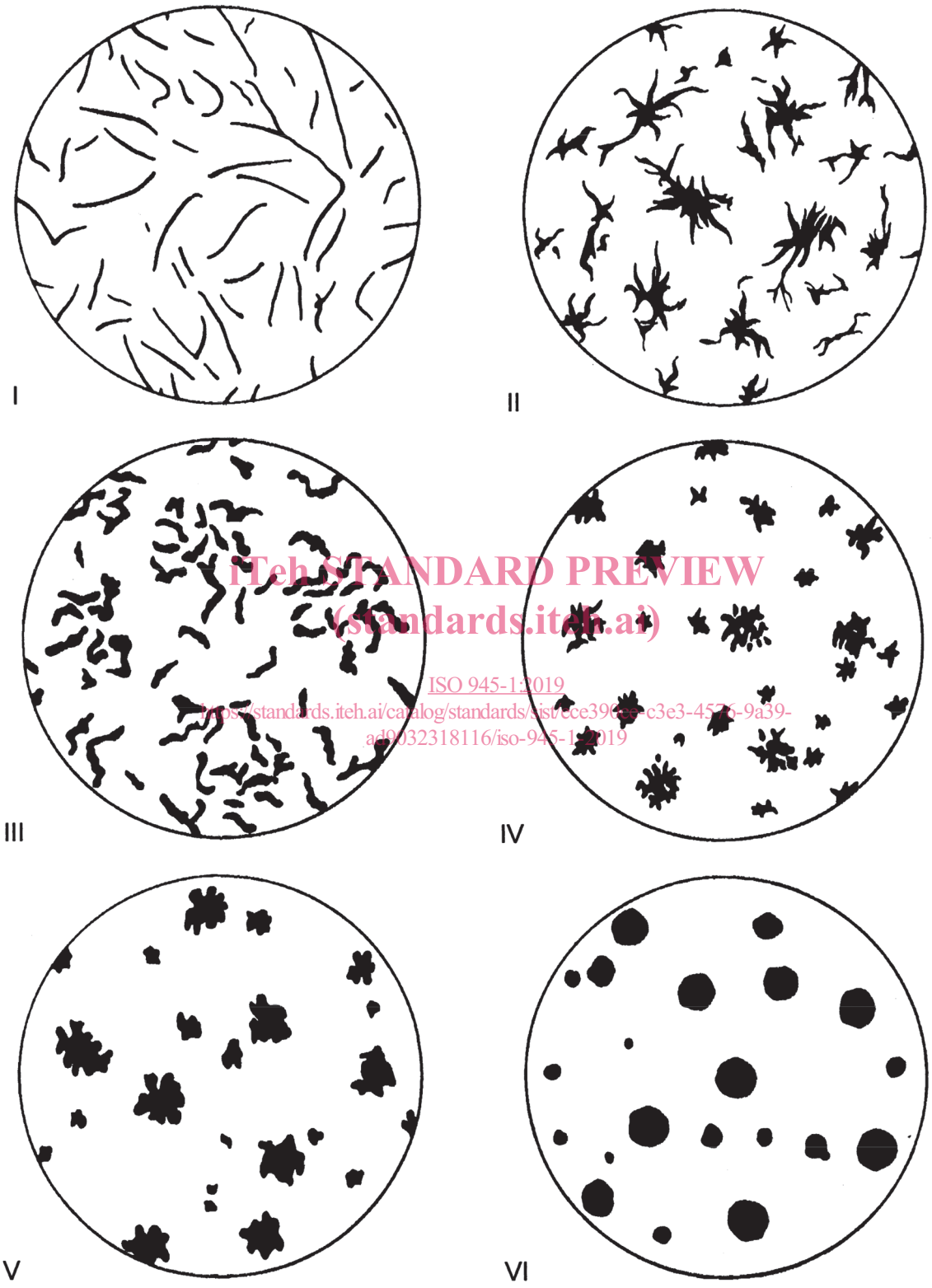

Figure 1 — Reference images for principal graphite forms in cast irons

4.3 Distribution

Magnification × 100

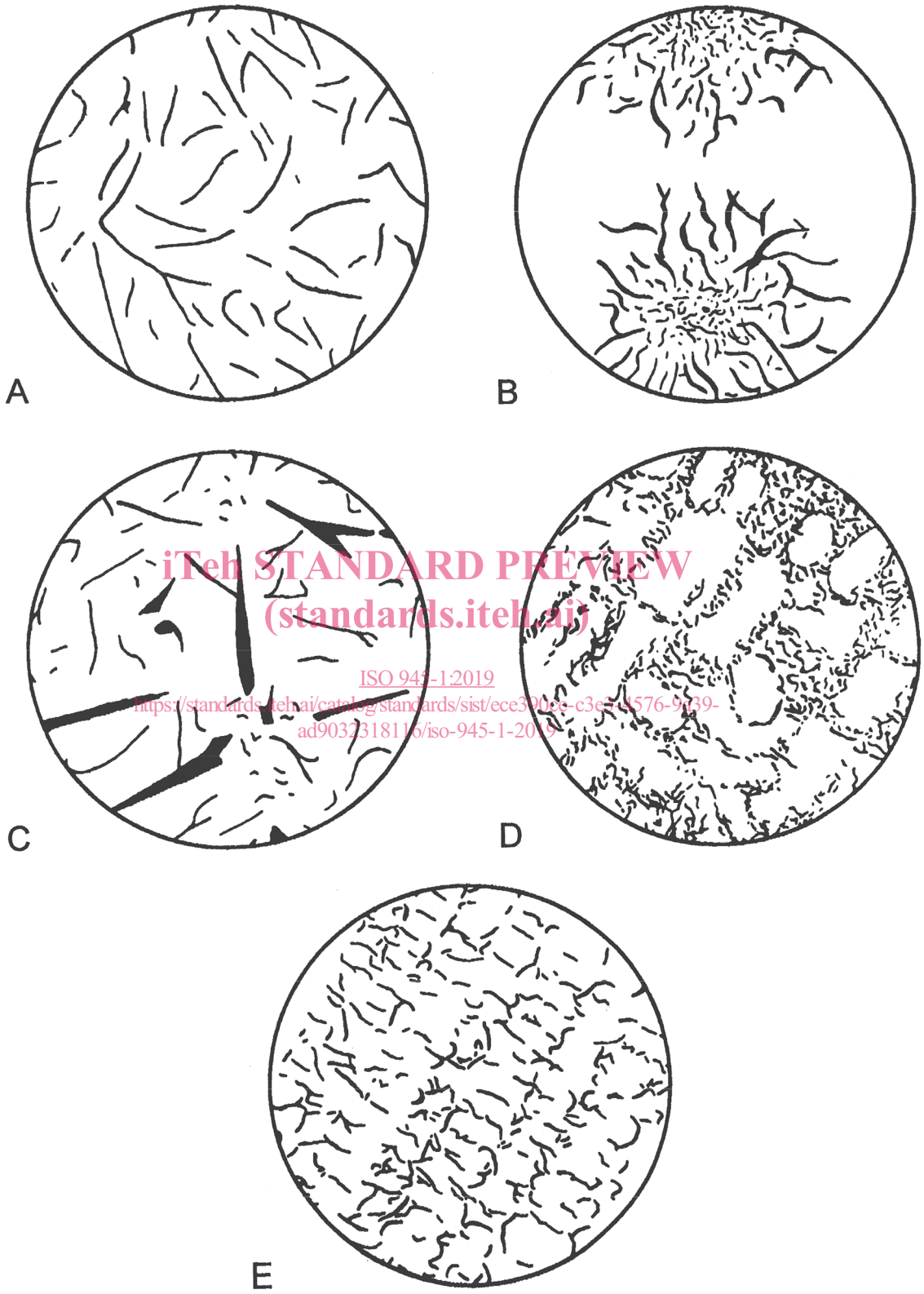

Figure 2 — Reference images for graphite distribution (form I)

4.4 Size

Magnification × 100

a) Reference image for graphite size 1: ≥ 1 mm (form I)

Magnification × 100

b) Reference image for graphite size 2: 0,5 mm to < 1 mm (form I)

Magnification × 100

100µm

c) Reference image for graphite size 3: 0,25 mm to < 0,5 mm (form I)

Magnification × 100

d) Reference image for graphite size 4: 0,12 mm to < 0,25 mm (form I)