INTERNATIONAL STANDARD

ISO 12986-2

Third edition
2014-06-15

Carbonaceous materials used in the production of aluminium — Prebaked anodes and cathode blocks —

Part 2: Determination of flexural strength by the four-point method

Produits carbonés utilisés pour la production de l'aluminium — Anodes précuites et blocs cathodiques —

Partie 2: Détermination de la résistance à la flexion par la méthode quatre points



Reference number
ISO 12986-2:2014(E)

© ISO 2014



COPYRIGHT PROTECTED DOCUMENT

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword ... **iv**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **1**

4 Principle ... **2**

5 Apparatus ... **2**

6 Test specimen ... **3**
6.1 Sampling and sample preparation ... 3
6.2 Size and geometry ... 4

7 Procedure ... **4**

8 Calculation and expression of results ... **4**
8.1 Bending moment, M_b ... 4
8.2 Flexural strength, σ_b ... 5

9 Precision ... **6**

10 Test report ... **6**

Bibliography ... **7**

© ISO 2014 – All rights reserved

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 226, *Materials for production of primary aluminium*.

This third edition cancels and replaces the second edition (ISO 12986-2:2009), which has been technically revised.

ISO 12986 consists of the following parts, under the general title *Carbonaceous materials used in the production of aluminium — Prebaked anodes and cathode blocks*:

— *Part 1: Determination of bending strength by the three-point method*

— *Part 2: Determination of flexural strength by the four-point method*

 © ISO 2014 – All rights reserved

Carbonaceous materials used in the production of aluminium — Prebaked anodes and cathode blocks —

Part 2: Determination of flexural strength by the four-point method

1 Scope

This part of ISO 12986 specifies a four-point method to determine the flexural strength of carbon and solid graphite materials at room temperature.

NOTE This part of ISO 12986 is based on DIN 51944.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4288, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture*

ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

ISO 8007-1, *Carbonaceous materials used in the production of aluminium — Sampling plans and sampling from individual units — Part 1: Cathode blocks*

ISO 8007-2, *Carbonaceous materials used in the production of aluminium — Sampling plans and sampling from individual units — Part 2: Prebaked anodes*

ISO 8007-3, *Carbonaceous materials used in the production of aluminium — Sampling plans and sampling from individual units — Part 3: Sidewall blocks*

3 Terms and definitions

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

3.1
flexural strength
σ_b
maximum flexural stress developed in a specimen during a flexural test to rupture

Note 1 to entry: The flexural strength is calculated as the quotient of the bending moment at maximum force, before or at rupture of the specimen under the conditions of the four-point method and its section modulus.

$$\sigma_b = \frac{M_b}{Z}$$

where

© ISO 2014 – All rights reserved