BRITISH STANDARD

BS EN
12475-3:1998
BS 7225-1.4:1998

Classification of dense shaped refractory products —

Part 3: Basic products containing from 7 % to 30 % residual carbon

The European Standard EN 12475-3:1998 has the status of a British Standard

ICS 81.080

National foreword

This British Standard is the English language version of EN 12475-3:1998. It supersedes BS 7225-1.4:1989 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee RPI/1, Refractory products and materials, to Subcommittee RPI/11, Sampling and physical testing of refractory materials, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 5 and a back cover.

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English version

Classification of dense shaped refractory products — Part 3: Basic products containing from 7 % to 30 % residual carbon

Classification des produits réfractaires façonnés denses —
Partie 3: Produits basiques contenant de 7 % à 30 % de carbone résiduel

Klassifizierung dichter geformter feuerfester Erzeugnisse —
Teil 3: Basische Erzeugnisse mit einem Massananeteil an Restkohlenstoff von 7 % bis 30 %

This European Standard was approved by CEN on 18 January 1998.

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CEN
European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Ref. No. EN 12475-3 : 1998 E

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 187, Refractory products and materials, the Secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 1998, and conflicting national standards shall be withdrawn at the latest by August 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

EN 12475 consists of four parts:

— *Part 1: Alumina-silica products;*

— *Part 2: Basic products containing less than 7 % residual carbon;*

— *Part 3: Basic products containing from 7 % to 30 % residual carbon;*

— *Part 4: Special products.*

Contents

1 Scope

This part of EN 12475 specifies the classification and designation of dense shaped basic refractory products containing equal to or more than 7 % and less than 30 % residual carbon after coking. It is applicable to products with or without antioxidant additives, with or without metal plates and reinforcement.

NOTE 1 EN 12475-2 covers the classification of dense shaped basic products containing less than 7 % carbon.

NOTE 2 All bricks can be encased in metal plate and be reinforced by means of an internal metal plate.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN ISO 10058, *Magnesites and dolomites — Chemical analysis.*

prEN 955-3, *Chemical analysis of refractory products — Part 3: Chrome bearing materials.*

prEN 955-5, *Chemical analysis of refractory products — Part 5: XRF analysis by the fused cast bead method.*

EN 993-3, *Methods of test for dense shaped refractory products — Part 3: Tests for products containing carbon.*

3 Classification

3.1 Basis of classification

Dense shaped basic products containing more than or equal to 7 % and less than 30 % residual carbon after coking shall be classified according to the following five criteria:

a) the type of product;

b) the group determined by its magnesia content, its carbon content and the presence of antioxidant additives;

c) the state of the raw materials;

d) the nature of the bond;

e) any post treatment.

3.2 Type of product

The types of dense shaped basic refractory products included in this classification are:

a) magnesia carbon (MC);

b) magnesia doloma carbon (MDC);

c) doloma carbon (DC).

These product types shall be classified in accordance with Table 1 by their chemical analysis carried out on the calcined samples in accordance with EN ISO 10058, prEN 955-3 or prEN 955-5. Residual carbon content shall be determined in accordance with EN 993-3.

3.3 Classification groups

The product types shall be classified into groups according to their magnesia and carbon contents and according to the presence or not of antioxidant additives.

The product types without antioxidant additives shall be classified into groups according to Table 1. Two criteria shall be used for defining the group classification:

1) the magnesia content of the product type with each group generally covering a range of magnesia content of 5 % to 10 %;

2) the residual carbon content after carbonization with each group covering ranges of residual carbon content of 5 % when the total carbon content is above 10 %.

For magnesia doloma carbon and doloma carbon products, limits on lime content is imposed on the various groups.

The product types with antioxidant additives shall be classified according to the same criteria with the addition of a suffix A indicating the presence of antioxidant additives.

3.4 State of raw materials

The raw materials shall be classified by using one of the four designations as follows:

a) naturally occurring (raw or sintered);

b) synthetic sintered;

c) co-clinker;

d) fused.

3.5 Nature of the bond

The bonding system shall be classified by using one of the two designations as follows:

a) organic chemical bond, formed at ambient temperature or higher temperatures;

b) inorganic chemical bond, formed by chemical reaction.

3.6 Post treatment

The post treatment shall be classified by using one, or both, of the two designations as follows:

a) tempering (at a temperature up to 800 °C);

b) impregnation.

Table 1 — Classification of magnesia carbon, magnesia doloma carbon and doloma carbon products

Product type	Group	Contents (calcined sample) m %		Residual carbon content m %
		MgO	CaO	
Magnesia carbon	MC 98/7	MgO ≥ 98		7 ≤ C < 10
	MC 98/10	MgO ≥ 98		10 ≤ C < 15
	MC 98/15	MgO ≥ 98		15 ≤ C < 20
	MC 98/20	MgO ≥ 98		20 ≤ C < 25
	MC 98/25	MgO ≥ 98		25 ≤ C < 30
Magnesia carbon	MC 95/7	95 ≤ MgO < 98		7 ≤ C < 10
	MC 95/10	95 ≤ MgO < 98		10 ≤ C < 15
	MC 95/15	95 ≤ MgO < 98		15 ≤ C < 20
	MC 95/20	95 ≤ MgO < 98		20 ≤ C < 25
	MC 95/25	95 ≤ MgO < 98		25 ≤ C < 30
Magnesia carbon	MC 90/7	90 ≤ MgO < 95		7 ≤ C < 10
	MC 90/10	90 ≤ MgO < 95		10 ≤ C < 15
	MC 90/15	90 ≤ MgO < 95		15 ≤ C < 20
	MC 90/20	90 ≤ MgO < 95		20 ≤ C < 25
	MC 90/25	90 ≤ MgO < 95		25 ≤ C < 30
Magnesia carbon	MC 85/7	85 ≤ MgO < 90		7 ≤ C < 10
	MC 85/10	85 ≤ MgO < 90		10 ≤ C < 15
	MC 85/15	85 ≤ MgO < 90		15 ≤ C < 20
	MC 85/20	85 ≤ MgO < 90		20 ≤ C < 25
	MC 85/25	85 ≤ MgO < 90		25 ≤ C < 30
Magnesia carbon	MC 80/7	80 ≤ MgO < 85		7 ≤ C < 10
	MC 80/10	80 ≤ MgO < 85		10 ≤ C < 15
	MC 80/15	80 ≤ MgO < 85		15 ≤ C < 20
	MC 80/20	80 ≤ MgO < 85		20 ≤ C < 25
	MC 80/25	80 ≤ MgO < 85		25 ≤ C < 30
Magnesia doloma carbon	MDC 80/7	80 ≤ MgO < 90	CaO ≥ 10	7 ≤ C < 10
	MDC 80/10	80 ≤ MgO < 90	CaO ≥ 10	10 ≤ C < 15
	MDC 80/15	80 ≤ MgO < 90	CaO ≥ 10	15 ≤ C < 20
	MDC 80/20	80 ≤ MgO < 90	CaO ≥ 10	20 ≤ C < 25
	MDC 80/25	80 ≤ MgO < 90	CaO ≥ 10	25 ≤ C < 30
Magnesia doloma carbon	MDC 70/7	70 ≥ MgO < 80	CaO ≥ 20	7 ≤ C < 10
	MDC 70/10	70 ≤ MgO < 80	CaO ≥ 20	10 ≤ C < 15
	MDC 70/15	70 ≤ MgO < 80	CaO ≥ 20	15 ≤ C < 20
	MDC 70/20	70 ≤ MgO < 80	CaO ≥ 20	20 ≤ C < 25
	MDC 70/25	70 ≤ MgO < 80	CaO ≥ 20	25 ≤ C < 30
Magnesia doloma carbon	MDC 60/7	60 ≤ MgO < 70	CaO ≥ 30	7 ≤ C < 10
	MDC 60/10	60 ≤ MgO < 70	CaO ≥ 30	10 ≤ C < 15
	MDC 60/15	60 ≤ MgO < 70	CaO ≥ 30	15 ≤ C < 20
	MDC 60/20	60 ≤ MgO < 70	CaO ≥ 30	20 ≤ C < 25
	MDC 60/25	60 ≤ MgO < 70	CaO ≥ 30	25 ≤ C < 30
Magnesia doloma carbon	MDC 50/7	50 ≤ MgO < 60	CaO ≥ 40	7 ≤ C < 10
	MDC 50/10	50 ≤ MgO < 60	CaO ≥ 40	10 ≤ C < 15
	MDC 50/15	50 ≤ MgO < 60	CaO ≥ 40	15 ≤ C < 20
	MDC 50/20	50 ≤ MgO < 60	CaO ≥ 40	20 ≤ C < 25
	MDC 50/25	50 ≤ MgO < 60	CaO ≥ 40	25 ≤ C < 30
Magnesia doloma carbon	MDC 40/7	40 ≤ MgO < 50	CaO ≥ 50	7 ≤ C < 10
	MDC 40/10	40 ≤ MgO < 50	CaO ≥ 50	10 ≤ C < 15
	MDC 40/15	40 ≤ MgO < 50	CaO ≥ 50	15 ≤ C < 20
	MDC 40/20	40 ≤ MgO < 50	CaO ≥ 50	20 ≤ C < 25
	MDC 40/25	40 ≤ MgO < 50	CaO ≥ 50	25 ≤ C < 30

Table 1 — Classification of magnesia carbon, magnesia doloma carbon and doloma carbon products *(continued)*

Product type	Group	Contents (calcined sample) *m* %		Residual carbon content *m* %
		MgO	CaO	
Doloma carbon	DC 40/7	MgO < 40	CaO ≥ 50	7 ≤ C < 10
	DC 40/10	MgO < 40	CaO ≥ 50	10 ≤ C < 15
	DC 40/15	MgO < 40	CaO ≥ 50	15 ≤ C < 20
	DC 40/20	MgO < 40	CaO ≥ 50	20 ≤ C < 25
	DC 40/25	MgO < 40	CaO ≥ 50	25 ≤ C < 30

4 Designation

The designation of dense shaped refractories of the basic series with more than or equal to 7 % and less than 30 % residual carbon after coking shall comprise the listing of the five criteria of classification given in clause **3**: product type, group, state of raw materials, nature of the bond, post treatment.

Examples:

a) magnesia carbon product of the group MC 95/10, based on naturally occurring sintered magnesia and fused magnesia, with organic chemical bond with tempering;

b) magnesia carbon product with antioxidant additives, of the group MC 85/10A, based on synthetic sintered magnesia, with organic chemical bond with tempering and impregnation.

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