**C04 CEMENTS; CONCRETE; ARTIFICIAL STONE; CERAMICS; REFRACTORIES** (alloys based on refractory metals C22C) [4]

**Note**

This class does not cover mechanical features provided for elsewhere, e.g. mechanical working B28, kilns F27.

**C04B LIME; MAGNESIA; SLAG; CEMENTS; COMPOSITIONS THEREOF, E.G. MORTARS, CONCRETE OR LIKE BUILDING MATERIALS; ARTIFICIAL STONE; CERAMICS** (devitrified glass-ceramics C03C 10/00); REFRACTORIES; TREATMENT OF NATURAL STONE [4]

**Note**

In this subclass, the following terms or expressions are used with the meanings indicated: [6]

- “fillers” includes pigments, aggregates and fibrous reinforcing materials; [6]
- “active ingredients” includes processing aids or property improvers, e.g. grinding aids used after the burning process or used in the absence of a burning process; [6]
- “mortars”, “concrete” and “artificial stone” are to be considered as a single group of materials, and therefore, in the absence of an indication to be contrary, they include mortar, concrete and other cementitious compositions. [6]

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**Lime; Magnesia; Slag**

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**Cements**

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C04B

from oil shale; from oil shale residues [4]

Aluminous cements

Hydraulic lime cements; Roman cements

Hydraulic cements not provided for in one of the groups C04B 7/02 to C04B 7/34 [4]

Manufacture of hydraulic cements in general

Preparing or treating the raw materials individually or as batches [4]

Dehydrating; Forming, e.g. granulating (apparatus for granulating B01J 2/00)

Active ingredients added before, or during, the burning process (after the burning process C04B 22/00, C04B 24/00)

Heat treatment, e.g. precalcining, burning, melting; Cooling [4]

Burning; Melting [4]

in fluidised beds [4]

electric [4]

Cooling [4]

Clinker treatment (C04B 7/47 takes precedence) [4]

Hydrating [4]

Grinding

Methods for eliminating alkali metals or compounds thereof [4]

Magnesium cements or similars cements

Magnesium cements containing chlorides, e.g. Sorel cement

Magnesium cements containing sulfates, nitrates, phosphates, or fluorides

Cements containing metal compounds other than magnesium compounds, e.g. compounds of zinc or lead

Mixtures thereof with other inorganic cementitious materials [4]

with hydraulic cements, e.g. Portland cements [4]

Manufacture, e.g. preparing the batches (preheating, burning, calcining or cooling lime stone, magnesite or dolomite C04B 2/10)

Calcium sulfate cements

Dehydrating gypsum

Ingredients added before, or during, the calcining process, e.g. calcination modifiers [4]

Devices therefor [4]

for the wet process, e.g. dehydrating in solution or under saturated vapor conditions [4]

for the dry process, e.g. dehydrating in a fluidised bed or in a rotary kiln [4]

obtaining anhydrite (C04B 11/028 takes precedence) [4]

starting from anhydrite

starting from phosphogypsum or from waste, e.g. purification products of smoke (C04B 11/02 takes precedence; chemical or biological purification of waste gases B01D 53/34) [4]

Mixtures thereof with other inorganic cementitious materials (C04B 7/04, C04B 7/153 take precedence) [4]

with hydraulic cements, e.g. Portland cements [4]

Cements not provided for in groups C04B 7/00 to C04B 11/00 [4]

Phosphate cements (in, or for, the manufacture of ceramics C04B 33/00, C04B 35/00) [4]

Alkali metal or ammonium silicate cements (alkali metal silicates per se, their preparation C01B 33/32; ammonium silicates per se, their preparation C01C 1/00) [4]

Use of materials as fillers (ceramics C04B 33/00, C04B 35/00; reinforcing elements for building materials E04C 5/00) [4]

Use of inorganic materials as fillers, e.g. pigments, for mortars, concrete or artificial stone; Treatment of inorganic materials specially adapted to enhance their filling properties in mortars, concrete or artificial stone (expanding or defibrillating materials C04B 20/00) [4]

Granular materials [4]

Silica-rich materials; Silicates [4]

Quartz; Sand [4]

Diatomaceous earth [4]

Clay [4]

Expanded clay [4]

Minerals of volcanic origin [4]

porous, e.g. pumice [4]

Perlite [4]

Mica; Vermiculite [4]

Glass [4]

porous, e.g. foamed glass [4]

Carbonates [4]

of calcium [4]

Oxides other than silica [4]

Carbides; Nitrides; Borides [4]

Metals [4]

Inorganic materials not provided for in groups C04B 14/04 to C04B 14/34 [4]

Fibrous materials; Whiskers [4]

Asbestos [4]

Glass [4]

Treatment for enhancing alkali resistance [4]

Rock wool [4]

Metal [4]

Use of organic materials as fillers, e.g. pigments, for mortars, concrete or artificial stone. Treatment of organic materials specially adapted to enhance their filling properties in mortars, concrete or artificial stone [4]

Cellulosic materials (cellulosic waste materials, e.g. sawdust, rice husks, C04B 18/24) [4]

Macromolecular compounds (C04B 16/02 takes precedence) [4]

fibrous [4]

porous, e.g. expanded polystyrene beads [4]

Treatment for enhancing the mixability with the mortar [4]

characterised by the shape (fibrous macromolecular compounds C04B 16/06; porous macromolecular compounds C04B 16/08) [4]
18/00 Use of agglomerated or waste materials or refuse as fillers for mortars, concrete or artificial stone (use of waste materials for the manufacture of cement C04B 7/24); Treatment of agglomerated or waste materials or refuse, specially adapted to enhance their filling properties in mortars, concrete or artificial stone [4]

18/02 . . . Agglomerated materials [4]
18/04 . . . Waste materials; Refuse [4]
18/06 . . . Combustion residues, e.g. purification products of smoke, fumes or exhaust gases [4]
18/08 . . . . Flue dust [4]
18/12 . . . . from quarries, mining or the like [4]
18/14 . . . . from metallurgical processes (treatment of molten slag C04B 5/00; for manufacture of cement C04B 7/14) [4]
18/16 . . . . from building or ceramic industry [4]
18/18 . . . . organic (C04B 18/10 takes precedence) [4]
18/20 . . . . from macromolecular compounds [4]
18/22 . . . . . Rubber [4]
18/24 . . . . . Vegetable refuse, e.g. rice husks, maize-ear refuse; Cellulosic materials, e.g. paper [4]
18/26 . . . . . Wood, e.g. sawdust, wood shavings [4]
18/28 . . . . . Mineralising; Compositions therefor [4]
18/30 . . . . . Mixed waste; Waste of undefined composition, e.g. municipal waste (C04B 18/10 takes precedence) [4]

20/00 Use of materials as fillers for mortars, concrete or artificial stone according to more than one of groups C04B 14/00 to C04B 18/00 and characterised by shape or grain distribution; Treatment of materials according to more than one of the groups C04B 14/00 to C04B 18/00 specially adapted to enhance their filling properties in mortars, concrete or artificial stone; Expanding or defibrillating materials [4]

20/02 . . . Treatment [4]
20/06 . . . Expanding clay, perlite, vermiculite or like granular materials [4]
20/08 . . . Defibrillating asbestos [4]
20/10 . . . Coating or impregnating [4]
20/12 . . . Multiple coating or impregnating [4]

Use of materials as active ingredients [4]

Note

Active ingredients which react with cement compounds for forming new or modified mineralogical phases and are added before the hardening process, as well as cements added as additives to other cements, are classified in groups C04B 7/00 to C04B 12/00. [4]

Note

In groups C04B 22/00 and C04B 24/00, it is desirable to add the indexing codes of group C04B 103/00. [6]

22/00 Use of inorganic materials as active ingredients for mortars, concrete or artificial stone, e.g. accelerators [4]

22/02 . . . Elements [4]
22/04 . . . Metals, e.g. aluminium used as blowing agent [4]
22/06 . . . Oxides; Hydroxides [4]
22/08 . . . Acids or salts thereof [4]

22/10 . . containing carbon in the anion, e.g. carbonates [4]
22/12 . . containing halogen in the anion, e.g. chlorides [4]
22/14 . . containing sulfur in the anion, e.g. sulfides [4]
22/16 . . containing phosphorus in the anion, e.g. phosphates [4]

24/00 Use of organic materials as active ingredients for mortars, concrete or artificial stone, e.g. plasticisers [4]

24/02 . . . Alcohols; Phenols; Ethers [4]
24/04 . . . Carboxylic acids; Salts, anhydrides or esters thereof [4]
24/06 . . . containing hydroxy groups [4]
24/08 . . . Fats; Fatty oils; Ester type waxes; Higher fatty acids, i.e. having at least seven carbon atoms in an unbroken chain bound to a carboxyl group; Oxidised oils or fats [4]

24/10 . . . Carbohydrates or derivatives thereof [4]
24/14 . . . Peptides; Proteins; Derivatives thereof [4]
24/18 . . . Lignin sulfonic acid or derivatives thereof, e.g. sulfite lye [4]
24/24 . . . . Macromolecular compounds (C04B 24/14 takes precedence; macromolecular compounds comprising sulfonate or sulfate groups C04B 24/16) [4,6]

24/26 . . . obtained by reactions only involving carbon-to-carbon unsaturated bonds [4]
24/28 . . . obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds [4]
24/30 . . . . Condensation polymers of aldehydes or ketones [4]
24/32 . . . . Polymers, e.g. alkylphenol polyglycolether [4]
24/34 . . . . Natural resins, e.g. rosin [4]
24/36 . . . . Bituminous materials, e.g. tar, pitch [4]
24/38 . . . . Polysaccharides or derivatives thereof [4]
24/40 . . . . Compounds containing silicon, titanium or zirconium [4]
24/42 . . . . Compounds having one or more carbon-to-silicon linkages [4]

Compositions of mortars, concrete or artificial stone (artificial stone from molten slag C04B 5/00) [4]

Notes

(1) Any ingredient of compositions of mortars, concrete or artificial stone, classified in groups C04B 26/00 to C04B 32/00 according to the last place rule, and which itself is determined to be novel and non-obvious, must also be classified in the last appropriate place in groups C04B 7/00 to C04B 24/00. [4,8]
Any ingredient of compositions of mortars, concrete or artificial stone, which is not identified by the classification in groups C04B 26/00 to C04B 32/00 according to the last place rule, and which is considered to represent information of particular interest for search, may also be classified in the last appropriate place in groups C04B 7/00 to C04B 24/00. This can for example be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as “additional information”. For example, a well defined Portland cement mortar mixture containing clay as an essential or characterising filler is classified in group C04B 28/04 and may also additionally be classified in group C04B 14/10. [4,8]

Note

In groups C04B 26/00 to C04B 32/00, it is desirable to add the indexing codes of group C04B 111/00. [6]

Ceramics

33/00 Clay-wares (monolithic refractories or refractory mortars C04B 35/66; porous products C04B 38/00) [2]
33/02 . Preparing or treating the raw materials individually or as batches
33/04 . Clay; Kaolin
33/06 . Rendering lime harmless
33/08 . Preventing efflorescence
33/10 . Eliminating iron or lime
33/13 . Compounding ingredients (C04B 33/36, C04B 35/71 take precedence) [2]
33/132 . Waste materials; Refuse (C04B 33/16 takes precedence) [8]
33/135 . Combustion residues, e.g. fly ash, incineration waste [8]
33/138 . from metallurgical processes, e.g. slag, furnace dust, galvanic waste [8]
33/14 . Colouring matters
33/16 . Lean materials, e.g. grog, quartz
33/18 . for liquefying the batches
33/20 . for dry-pressing (C04B 33/13 takes precedence)
33/22 . Grog products
33/24 . Manufacture of porcelain or white ware
33/26 . of porcelain for electrical insulation
33/28 . Slip casting (mechanical features B28B 1/26)
33/30 . Drying methods
33/32 . Burning methods
33/34 . combined with glazing
33/36 . Reinforced clay-ware [2]

35/00 Shaped ceramic products characterised by their composition (porous products C04B 38/00; articles characterised by particular shape, see the relevant classes, e.g. linings for casting ladles, tundishes, cups or the like B22D 41/02). Ceramic compositions (containing free metal bonded to carbides, diamond, oxides, borides, nitrides, silicides, e.g. cermets, or other metal compounds, e.g. oxynitrides or sulfides, other than as macroscopic reinforcing agents C22C); Processing powders of inorganic compounds preparatory to the manufacturing of ceramic products (chemical preparation of powders of inorganic compounds C01) [4]

Notes

(1) In this group, in the absence of an indication to the contrary, compositions are classified according to the constituent present in the highest proportion by weight. [3]
(2) In this group, magnesium is considered as an alkaline earth metal. [6]
The production of ceramic powder is classified in this group, fine ceramics are considered as products with specific characteristics, e.g. of dimensions below 100 micrometers.

Refractories from grain sized mixtures containing non-oxide refractory materials, e.g. carbon based on silica or alumina, with cobalt oxide as the principal oxide take precedence.

Refractories by fusion casting, containing also zirconium oxide or titanates, take precedence.

Composites obtained by sintering without pressure, containing also titanates or also lead compounds, take precedence.

Refractories from grain sized mixtures containing zirconium oxide or zircon, containing also zirconium or hafnium oxides, zirconates or hafnates, take precedence.

Fine ceramics based on magnesium oxide, calcium oxide or oxide mixtures derived from dolomite.

Refractories from grain sized mixtures containing non-oxide refractory materials, e.g. carbon based on compounds of actinides (nuclear fuel materials G21C 3/62) take precedence.

Refractories by fusion casting, containing also titanium oxides or titanates (containing also zirconium or hafnium oxides, zirconates or hafnates)

Refractories from grain sized mixtures containing a carbonisable binder obtained by sintering without pressure, containing also other lead compounds, take precedence.

Refractories from grain sized mixtures containing a carbonisable binder obtained by pressure sintering, containing also other lead compounds, take precedence.

Refractories by fusion casting, containing also titanium oxides or titanates, take precedence.

Refractories from grain sized mixtures containing a carbonisable binder obtained by sintering without pressure, containing also other non-organic components, take precedence.

Refractories by fusion casting, containing also carbonisable binder, take precedence.

Refractories from grain sized mixtures containing a carbonisable binder obtained by pressure sintering, containing also other non-organic components, take precedence.

Refractories from grain sized mixtures containing a carbonisable binder obtained by sintering without pressure, containing also other non-organic components, take precedence.

Refractories from grain sized mixtures containing a carbonisable binder obtained by sintering without pressure, containing also other non-organic components, take precedence.
C04B

35/582 . . . Composites [6]
35/583 . . . based on boron nitride [6]
35/5831 . . . based on cubic boron nitride [6]
35/5833 . . . based on hexagonal boron nitride [6]
35/584 . . . based on silicon nitride [6]
35/589 . . . obtained from polymer precursors [6]
35/591 . . . obtained by reaction sintering [6]
35/593 . . . obtained by pressure sintering
(C04B 35/594 takes precedence) [6]
35/594 . . . obtained by sintering a reaction-sintered product, with or without pressure [6]
35/596 . . . Composites [6]
35/597 . . . based on silicon oxynitrides [6]
35/599 . . . based on silicon aluminium oxynitrides (SIALONS) [6]
35/622 . Forming processes; Processing powders of inorganic compounds preparatory to the manufacturing of ceramic products [6]
35/626 . Preparing or treating the powders individually or as batches [6]
35/628 . Coating the powders [6]
35/63 . using additives specially adapted for forming the products [6]
35/634 . . . Polymers (C04B 35/636 takes precedence) [6]
35/636 . . . Polysaccharides or derivatives thereof [6]
35/64 . . . Burning or sintering processes (C04B 33/32 takes precedence) [6]
35/645 . . . Reaction sintering of free metal- or free silicon-containing compositions [3]
35/657 . . . for manufacturing refractories (C04B 35/05, C04B 35/107, C04B 35/484 take precedence) [6]
35/66 . Monolithic refractories or refractory mortars, including those whether or not containing clay

**Note**

Any ingredient of a refractory mortar composition containing a hydraulic cement, e.g. aluminous cement, classified in group C04B 35/66, which is considered to represent information of interest for search, may also be classified in the last appropriate place in groups C04B 7/00 to C04B 24/00. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as “additional information”. For example, such an additional classification in group C04B 24/00 may be given for an organic retarder added to the mortar composition. [8]

35/71 . Ceramic products containing macroscopic reinforcing agents (C04B 35/66 takes precedence) [3,4]
35/74 . . . containing shaped metallic materials [2]
35/76 . . . Fibres, filaments, whiskers, platelets, or the like [2]
35/78 . . . containing non-metallic materials [2]
35/80 . . . Fibres, filaments, whiskers, platelets, or the like [2]
35/81 . . . Whiskers [6]
35/82 . . . Asbestos; Glass; Fused silica [2]

**Note**
The products covered by this group are usually referred to as “carbon-carbon composites”. [6]

35/84 . . . Impregnated or coated materials [2]
37/00 Joining burned ceramic articles with other burned ceramic articles or other articles by heating (laminated products B32B, E04C)
37/02 . with metallic articles
37/04 . with articles made from glass

38/00 Porous mortars, concrete, artificial stone or ceramic ware; Preparation thereof (treating slag with gases or gas generating material C04B 5/06) [4,6]

**Note**
Porous mortars, concrete, artificial stone or ceramic ware characterised by the ingredients or compositions are also classified in groups C04B 2/00 to C04B 35/00. [4]

38/02 . by adding chemical blowing agents [4]
38/04 . by dissolving-out added substances [4]
38/06 . by burning-out added substances [4]
38/08 . by adding porous substances [4]
38/10 . by using foaming agents (C04B 38/02 takes precedence) [4]

40/00 Processes, in general, for influencing or modifying the properties of mortars, concrete or artificial stone compositions, e.g. their setting or hardening ability
(active ingredients C04B 22/00 to C04B 24/00; hardening of a well-defined composition C04B 26/00 to C04B 28/00; making porous, cellular or lightening C04B 38/00; mechanical aspects B28, e.g. conditioning the materials prior to shaping B28B 17/02) [4,6]

40/02 . Selection of the hardening environment [4]
40/04 . Preventing evaporation of the mixing water (permanent coverings C04B 41/00) [4]
40/06 . Inhibiting the setting, e.g. mortars of the deferred action type containing water in breakable containers [4]

41/00 After-treatment of mortars, concrete, artificial stone or ceramics; Treatment of natural stone (conditioning of the materials prior to shaping C04B 40/00; applying liquids or other fluent materials to surfaces, in general B05; grinding or polishing B24; apparatus or processes for treating or working shaped articles of clay or other ceramic compositions, slag or mixtures containing cementitious material B28B 11/00; working stone or stone-like materials B28D; glazes, other than cold glazes, C03C 8/00; etching, surface-brightening or pickling compositions C09K 13/00) [3]

**Notes**

1) In this group, the following terms or expressions are used with the meanings indicated: [6] – “mortars”, “concrete” and “artificial stone” cover materials after primary shaping. [6]
Treating, e.g. coating or impregnating, a material with the same material or with a substance which ultimately is transformed into the same material is not considered after-treatment for this group but is classified as preparation of the material, e.g. a carbon body impregnated with a carbonisable substance is classified in C04B 35/52.

In groups C04B 41/45 to C04B 41/80, in the absence of an indication to the contrary, classification is made in the last appropriate place.

Indexing scheme associated with groups C04B 26/00 to C04B 32/00, relating to the function, property or use of the mortars, concrete or artificial stone, [6]

111/00 Function, property or use of the mortars, concrete or artificial stone [6]
111/10 . Compositions characterized by the absence of a specified material [6]
111/12 . Absence of asbestos, e.g. cement-asbestos substitutes [6]
111/20 . Resistance against asbestos, e.g. cement-asbestos substitutes [6]
111/27 . Water resistance, i.e. waterproof or water repellent materials [6]
111/30 . Nailable or sawable materials [6]
111/32 . Expansion inhibited materials [6]
111/34 . Non-shrinking materials [6]
111/40 . Porous or lightweight materials [6]
111/42 . Floating materials [6]
111/50 . Flexible or elastic materials [6]
111/52 . Sound insulating materials [6]
111/54 . Substitutes for natural stone, e.g. artificial marble [6]
111/56 . Compositions suited for fabrication of pipes, e.g. by centrifugal casting [6]
111/60 . Flooring materials [6]
111/70 . Grouts [6]
111/72 . Compositions used for repairing existing buildings or building materials [6]
111/74 . Underwater applications [6]
111/76 . Use at sub-zero temperatures [6]
111/80 . Optical properties, e.g. transparency [6]
111/82 . Coloured materials [6]
111/90 . Electrical properties [6]
111/92 . Electrically insulating materials [6]
111/94 . Electrically conducting materials [6]