

**CPC****COOPERATIVE PATENT CLASSIFICATION****C03C****CHEMICAL COMPOSITION OF GLASSES, GLAZES, OR VITREOUS ENAMELS; SURFACE TREATMENT OF GLASS; SURFACE TREATMENT OF FIBRES OR FILAMENTS FROM GLASS, MINERALS OR SLAGS; JOINING GLASS TO GLASS OR OTHER MATERIALS****NOTES**

1. This subclass covers compositions of polycrystalline fibres
2. This subclass does not cover the preparation of single-crystal fibres, which is covered by subclass [C30B](#)

**WARNING**

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

[C03C 6/00](#) covered by [C03C 1/00](#)

[C03C 10/02](#)–[C03C 10/14](#) covered by [C03C 10/00](#)

[C03C 13/02](#) covered by [C03C 13/00](#)

[C03C 27/12](#) covered by [B32B 17/00](#)

**Chemical composition of glasses, glazes, or vitreous enamels****NOTE**

In groups [C03C 1/00](#) to [C03C 14/00](#), in the absence of an indication to the contrary, classification is made in the last appropriate place.

**C03C 1/00****Ingredients generally applicable to manufacture of glasses, glazes, or vitreous enamels**

- [C03C 1/002](#) . {Use of waste materials, e.g. slags}
- [C03C 1/004](#) . {Refining agents ([refining C03B 5/225](#))}
- [C03C 1/006](#) . {to produce glass through wet route}
- [C03C 1/008](#) . . {for the production of films or coatings}
- [C03C 1/02](#) . Pretreated ingredients
- [C03C 1/022](#) . . {Purification of silica sand or other minerals}
- [C03C 1/024](#) . . {Chemical treatment of cullet or glass fibres}
- [C03C 1/026](#) . . {Pelletisation or prereacting of powdered raw materials ([apparatus or methods C03B 1/02](#))}
- [C03C 1/028](#) . . {Ingredients allowing introduction of lead or other easily volatile or dusty compounds}
- [C03C 1/04](#) . Opacifiers, e.g. fluorides or phosphates; Pigments
- [C03C 1/06](#) . . to produce non-uniformly pigmented, e.g. speckled, marbled, or veined products

- C03C 1/08 . to produce crackled effects
- C03C 1/10 . to produce uniformly-coloured transparent products
- C03C 1/105 . . {by the addition of colorants to the forehearth of the glass melting furnace}

**C03C 3/00****Glass compositions**

- C03C 3/04 . containing silica

**NOTE**

If silica is specified as being present in a percent range covered by two of the groups [C03C 3/06](#), [C03C 3/062](#) or [C03C 3/076](#), classification is made in both groups. If the range is covered by the three groups, classification is made in group [C03C 3/04](#) itself.

- C03C 3/045 . . {Silicon oxycarbide, oxynitride or oxycarbonitride glasses}
- C03C 3/06 . . with more than 90% silica by weight, e.g. quartz {(C03C 3/045 takes precedence)}
- C03C 3/061 . . . {by leaching a soluble phase and consolidating}
- C03C 3/062 . . with less than 40% silica by weight
- C03C 3/064 . . . containing boron
- C03C 3/066 . . . . containing zinc
- C03C 3/068 . . . . containing rare earths
- C03C 3/07 . . . containing lead
- C03C 3/072 . . . . containing boron
- C03C 3/074 . . . . . containing zinc
- C03C 3/0745 . . . . . {containing more than 50% lead oxide, by weight}
- C03C 3/076 . . with 40% to 90% silica, by weight {(C03C 3/045 takes precedence)}
- C03C 3/078 . . . containing an oxide of a divalent metal, e.g. an oxide of zinc
- C03C 3/083 . . . containing aluminium oxide or an iron compound
- C03C 3/085 . . . . containing an oxide of a divalent metal
- C03C 3/087 . . . . . containing calcium oxide, e.g. common sheet or container glass
- C03C 3/089 . . . containing boron
- C03C 3/091 . . . . containing aluminium
- C03C 3/093 . . . . . containing zinc or zirconium
- C03C 3/095 . . . containing rare earths
- C03C 3/097 . . . containing phosphorus, niobium or tantalum
- C03C 3/102 . . . containing lead
- C03C 3/105 . . . . containing aluminium
- C03C 3/108 . . . . containing boron
- C03C 3/11 . . . containing halogen or nitrogen
- C03C 3/111 . . . . {containing nitrogen}
- C03C 3/112 . . . . containing fluorine
- C03C 3/115 . . . . . containing boron
- C03C 3/118 . . . . . containing aluminium

- C03C 3/12 . Silica-free oxide glass compositions
- C03C 3/122 . . {containing oxides of As, Sb, Bi, Mo, W, V, Te as glass formers}
- C03C 3/125 . . {containing aluminium as glass former}
- C03C 3/127 . . {containing TiO<sub>2</sub> as glass former}
- C03C 3/14 . . containing boron
- C03C 3/142 . . . {containing lead}
- C03C 3/145 . . . containing aluminium or beryllium
- C03C 3/15 . . . containing rare earths
- C03C 3/155 . . . . containing zirconium, titanium, tantalum or niobium
- C03C 3/16 . . containing phosphorus
- C03C 3/17 . . . containing aluminium or beryllium
- C03C 3/19 . . . containing boron
- C03C 3/21 . . . containing titanium, zirconium, vanadium, tungsten or molybdenum
- C03C 3/23 . . containing halogen and at least one oxide, e.g. oxide of boron
- C03C 3/247 . . . containing fluorine and phosphorus
- C03C 3/253 . . containing germanium
- C03C 3/32 . Non-oxide glass compositions, e.g. binary or ternary halides, sulfides or nitrides of germanium, selenium or tellurium
- C03C 3/321 . . {Chalcogenide glasses, e.g. containing S, Se, Te}
- C03C 3/323 . . . {containing halogen, e.g. chalcohalide glasses}
- C03C 3/325 . . {Fluoride glasses}
- C03C 3/326 . . . {containing beryllium}
- C03C 3/328 . . {Nitride glasses}

**C03C 4/00****Compositions for glass with special properties****NOTE**

When classifying in group [C03C 4/00](#), classification is also made in the appropriate groups of group [C03C 3/00](#) according to the glass composition.

- C03C 4/0007 . {for biologically-compatible glass}
- C03C 4/0014 . . {Biodegradable glass}
- C03C 4/0021 . . {for dental use}
- C03C 4/0028 . {for crystal glass, e.g. lead-free crystal glass}
- C03C 4/0035 . {for soluble glass for controlled release of a compound incorporated in said glass}
- C03C 4/0042 . {for glass comprising or including particular isotopes}
- C03C 4/005 . {for opaline glass}
- C03C 4/0057 . {for ultrasonic delay lines glass}
- C03C 4/0064 . {for self-destructing glass ([C03C 4/0014](#) takes precedence)}
- C03C 4/0071 . {for laserable glass}
- C03C 4/0078 . {for glass for dosimeters}

- C03C 4/0085 . {for UV-transmitting glass}
- C03C 4/0092 . {for glass with improved high visible transmittance, e.g. extra-clear glass}
- C03C 4/02 . for coloured glass
- C03C 4/04 . for photosensitive glass
- C03C 4/06 . . for phototropic or photochromic glass
- C03C 4/065 . . . {for silver-halide free photochromic glass}
- C03C 4/08 . for glass selectively absorbing radiation of specified wave lengths
- C03C 4/082 . . {for infra-red absorbing glass}
- C03C 4/085 . . {for ultra-violet absorbing glass}
- C03C 4/087 . . {for X-rays absorbing glass}
- C03C 4/10 . for infra-red transmitting glass
- C03C 4/12 . for luminescent glass; for fluorescent glass
- C03C 4/14 . for electro-conductive glass
- C03C 4/16 . for dielectric glass
- C03C 4/18 . for ion-sensitive glass
- C03C 4/20 . for chemical resistant glass

**C03C 8/00 Enamels; Glazes (cold glazes for ceramics {C04B 41/48}); Fusion seal compositions being frit compositions having non-frit additions**

- C03C 8/02 . Frit compositions, i.e. in a powdered or comminuted form
- C03C 8/04 . . containing zinc
- C03C 8/06 . . containing halogen
- C03C 8/08 . . containing phosphorus
- C03C 8/10 . . containing lead
- C03C 8/12 . . . containing titanium or zirconium
- C03C 8/14 . Glass frit mixtures having non-frit additions, e.g. opacifiers, colorants, mill-additions
- C03C 8/16 . . with vehicle or suspending agents, e.g. slip
- C03C 8/18 . . containing free metals
- C03C 8/20 . . containing titanium compounds; containing zirconium compounds
- C03C 8/22 . containing two or more distinct frits having different compositions
- C03C 8/24 . Fusion seal compositions being frit compositions having non-frit additions, i.e. for use as seals between dissimilar materials, e.g. glass and metal; Glass solders
- C03C 8/245 . . {containing more than 50% lead oxide, by weight}

**C03C 10/00 Devitrified glass ceramics, i.e. glass ceramics having a crystalline phase dispersed in a glassy phase and constituting at least 50% by weight of the total composition**

- C03C 10/0009 . {containing silica as main constituent}
- C03C 10/0018 . {containing SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and monovalent metal oxide as main constituents}
- C03C 10/0027 . . {containing SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Li<sub>2</sub>O as main constituents}
- C03C 10/0036 . {containing SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and a divalent metal oxide as main constituents}
- C03C 10/0045 . . {containing SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and MgO as main constituents}

- C03C 10/0054 . {containing PbO, SnO<sub>2</sub>, B<sub>2</sub>O<sub>3</sub>}
- C03C 10/0063 . {containing waste materials, e.g. slags}
- C03C 10/0072 . {having a ferro-electric crystal phase}
- C03C 10/0081 . {having a magnetic crystal phase}
- C03C 10/009 . {having a superconducting crystal phase}
- C03C 10/16 . Halogen containing crystalline phase
  
- C03C 11/00** **Multi-cellular glass; {Porous or hollow glass or glass particles}**
- C03C 11/002 . {Hollow glass particles}
- C03C 11/005 . {obtained by leaching after a phase separation step}
- C03C 11/007 . {Foam glass, e.g. obtained by incorporating a blowing agent and heating}
  
- C03C 12/00** **Powdered glass ([C03C 8/02](#) takes precedence); Bead compositions**
- C03C 12/02 . Reflective beads
  
- C03C 13/00** **Fibre or filament compositions ([manufacture of fibres or filaments C03B 37/00](#))**
- C03C 13/001 . {Alkali-resistant fibres}
- C03C 13/002 . . {containing zirconium}
- C03C 13/003 . {Conducting or semi-conducting fibres}
- C03C 13/005 . {obtained by leaching of a soluble phase and consolidation}
- C03C 13/006 . {Glass-ceramics fibres}
- C03C 13/007 . . {containing zirconium}
- C03C 13/008 . {Polycrystalline optical fibres}
- C03C 13/04 . Fibre optics, e.g. core and clad fibre compositions ([light guides G02B 6/00](#))
- C03C 13/041 . . {Non-oxide glass compositions}
- C03C 13/042 . . . {Fluoride glass compositions}
- C03C 13/043 . . . {Chalcogenide glass compositions}
- C03C 13/044 . . . . {containing halogen, e.g. chalcohalide glass compositions}
- C03C 13/045 . . {Silica-containing oxide glass compositions}
- C03C 13/046 . . . {Multicomponent glass compositions}
- C03C 13/047 . . . {containing deuterium}
- C03C 13/048 . . {Silica-free oxide glass compositions}
- C03C 13/06 . Mineral fibres, e.g. slag wool, mineral wool, rock wool
  
- C03C 14/00** **Glass compositions containing a non-glass component, e.g. compositions containing fibres, filaments, whiskers, platelets, or the like, dispersed in a glass matrix ([devitrified glass ceramics C03C 10/00](#))**
- C03C 14/002 . {the non-glass component being in the form of fibres, filaments, yarns, felts or woven material}
- C03C 14/004 . {the non-glass component being in the form of particles or flakes}
- C03C 14/006 . {the non-glass component being in the form of microcrystallites, e.g. of optically or electrically active material}
- C03C 14/008 . {the non-glass component being in molecular form}

**Surface treatment of glass; Surface treatment of fibres or filaments from glass, minerals or slag**

- C03C 15/00**      **Surface treatment of glass , not in the form of fibres or filaments, by etching**  
(etching or surface-brightening compositions, in general [C09K 13/00](#))
- C03C 15/02      .    for making a smooth surface
- C03C 15/025      .    .    {for polishing crystal glass, i.e. lead glass}
- C03C 17/00**      **Surface treatment of glass, not in the form of fibres or filaments, by coating**  
(optical coatings of optical elements [G02B 1/10](#))
- C03C 17/001      .    {General methods for coating; Devices therefor}
- C03C 17/002      .    .    {for flat glass, e.g. float glass}
- C03C 17/003      .    .    {for hollow ware, e.g. containers}
- C03C 17/004      .    .    .    {Coating the inside}
- C03C 17/005      .    .    .    {Coating the outside}
- C03C 17/006      .    {with materials of composite character}
- C03C 17/007      .    .    {containing a dispersed phase, e.g. particles, fibres or flakes, in a continuous phase}
- C03C 17/008      .    .    {comprising a mixture of materials covered by two or more of the groups [C03C 17/02](#), [C03C 17/06](#), [C03C 17/22](#) and [C03C 17/28](#)}
- C03C 17/009      .    .    .    {Mixtures of organic and inorganic materials, e.g. ormosils and ormocers}
- C03C 17/02      .    with glass ([C03C 17/34](#), [C03C 17/44](#) take precedence)
- C03C 17/04      .    .    by fritting glass powder
- C03C 17/06      .    with metals ([C03C 17/34](#), [C03C 17/44](#) take precedence)
- C03C 17/09      .    .    by deposition from the vapour phase
- C03C 17/10      .    .    by deposition from the liquid phase
- C03C 17/22      .    with other inorganic material ([C03C 17/34](#), [C03C 17/44](#) take precedence)
- C03C 17/225      .    .    {Nitrides}
- C03C 17/23      .    .    Oxides ([C03C 17/02](#) takes precedence)
- C03C 17/245      .    .    .    by deposition from the vapour phase
- C03C 17/2453      .    .    .    .    {Coating containing SnO<sub>2</sub>}
- C03C 17/2456      .    .    .    .    {Coating containing TiO<sub>2</sub>}
- C03C 17/25      .    .    .    by deposition from the liquid phase
- C03C 17/253      .    .    .    .    {Coating containing SnO<sub>2</sub>}
- C03C 17/256      .    .    .    .    {Coating containing TiO<sub>2</sub>}
- C03C 17/27      .    .    .    by oxidation of a coating previously applied
- C03C 17/28      .    with organic material ([C03C 17/34](#), [C03C 17/44](#) take precedence)
- C03C 17/30      .    .    with silicon-containing compounds
- C03C 17/32      .    .    with synthetic or natural resins ([C03C 17/30](#) takes precedence)
- C03C 17/322      .    .    .    {Polyurethanes or polyisocyanates}
- C03C 17/324      .    .    .    {Polyesters}

- C03C 17/326 . . . {Epoxy resins}
- C03C 17/328 . . . {Polyolefins}
- C03C 17/34 . with at least two coatings having different compositions ([C03C 17/44](#) takes precedence)
- C03C 17/3405 . . {with at least two coatings of organic materials ([C03C 17/36](#), [C03C 17/42](#) take precedence)}
- C03C 17/3411 . . {with at least two coatings of inorganic materials ([C03C 17/36](#), [C03C 17/42](#) take precedence)}
- C03C 17/3417 . . . {all coatings being oxide coatings}
- C03C 17/3423 . . . {at least one of the coatings comprising a suboxide}
- C03C 17/3429 . . . {at least one of the coatings being a non-oxide coating}
- C03C 17/3435 . . . . {comprising a nitride, oxynitride, boronitride or carbonitride}
- C03C 17/3441 . . . . {comprising carbon, a carbide or oxycarbide}
- C03C 17/3447 . . . . {comprising a halide}
- C03C 17/3452 . . . . . {comprising a fluoride}
- C03C 17/3458 . . . . . {comprising a chloride}
- C03C 17/3464 . . . . . {comprising a chalcogenide}
- C03C 17/347 . . . . . {comprising a sulfide or oxysulfide}
- C03C 17/3476 . . . . . {comprising a selenide or telluride}
- C03C 17/3482 . . . . {comprising silicon, hydrogenated silicon or a silicide}
- C03C 17/3488 . . . . {comprising a boride or phosphide}
- C03C 17/3494 . . . . {comprising other salts, e.g. sulfate, phosphate}
- C03C 17/36 . . at least one coating being a metal
- C03C 17/3602 . . . {the metal being present as a layer}
- C03C 17/3605 . . . . {Coatings of the type glass/metal/inorganic compound}
- C03C 17/3607 . . . . {Coatings of the type glass/inorganic compound/metal}
- C03C 17/361 . . . . {Coatings of the type glass/metal/inorganic compound/metal/inorganic compound/other}
- C03C 17/3613 . . . . {Coatings of type glass/inorganic compound/metal/inorganic compound/metal/other}
- C03C 17/3615 . . . . {Coatings of the type glass/metal/other inorganic layers, at least one layer being non-metallic}
- C03C 17/3618 . . . . {Coatings of type glass/inorganic compound/other inorganic layers, at least one layer being metallic}
- C03C 17/3621 . . . . {one layer at least containing a fluoride}
- C03C 17/3623 . . . . {one layer at least containing a chloride, bromide or iodide}
- C03C 17/3626 . . . . {one layer at least containing a nitride, oxynitride, boronitride or carbonitride}
- C03C 17/3628 . . . . {one layer at least containing a sulfide}
- C03C 17/3631 . . . . {one layer at least containing a selenide or telluride}
- C03C 17/3634 . . . . {one layer at least containing carbon, a carbide or oxycarbide}
- C03C 17/3636 . . . . {one layer at least containing silicon, hydrogenated silicon or a silicide}
- C03C 17/3639 . . . . {Multilayers containing at least two functional metal layers}



- C03C 17/3642 . . . . {the multilayer coating containing a metal layer}
- C03C 17/3644 . . . . {the metal being silver}
- C03C 17/3647 . . . . {in combination with other metals, silver being more than 50%}
- C03C 17/3649 . . . . {made of metals other than silver}
- C03C 17/3652 . . . . {the coating stack containing at least one sacrificial layer to protect the metal from oxidation}
- C03C 17/3655 . . . . {the multilayer coating containing at least one conducting layer}
- C03C 17/3657 . . . . {the multilayer coating having optical properties}
- C03C 17/366 . . . . {Low-emissivity or solar control coatings}
- C03C 17/3663 . . . . {specially adapted for use as mirrors}
- C03C 17/3665 . . . . {specially adapted for use as photomask}
- C03C 17/3668 . . . . {the multilayer coating having electrical properties}
- C03C 17/3671 . . . . {specially adapted for use as electrodes}
- C03C 17/3673 . . . . {specially adapted for use in heating devices for rear window of vehicles}
- C03C 17/3676 . . . . {specially adapted for use as electromagnetic shield}
- C03C 17/3678 . . . . {specially adapted for use in solar cells}
- C03C 17/3681 . . . . {the multilayer coating being used in glazing, e.g. windows or windscreens}
- C03C 17/3684 . . . . {the multilayer coating being used for decoration purposes}
- C03C 17/3686 . . . . {the multilayer coating being used for ovens}
- C03C 17/3689 . . . . {one oxide layer being obtained by oxidation of a metallic layer}
- C03C 17/3692 . . . . {one metallic layer being obtained by reduction of an oxide layer}
- C03C 17/3694 . . . . {one layer having a composition gradient through its thickness}
- C03C 17/3697 . . . . {one metallic layer at least being obtained by electroless plating}
- C03C 17/38 . . . at least one coating being a coating of an organic material
- C03C 17/40 . . . all coatings being metal coatings
- C03C 17/42 . . at least one coating of an organic material and at least one non-metal coating
- C03C 17/44 . Lustring

**C03C 19/00** Surface treatment of glass, not in the form of fibres or filaments, by mechanical means (sand-blasting, grinding, or polishing glass [B24](#))

**C03C 21/00** Treatment of glass, not in the form of fibres or filaments, by diffusing ions or metals in the surface

- C03C 21/001 . {in liquid phase, e.g. molten salts, solutions}
- C03C 21/002 . . {to perform ion-exchange between alkali ions ([C03C 21/005](#) takes precedence)}
- C03C 21/003 . . . {under application of an electrical potential difference}
- C03C 21/005 . . {to introduce in the glass such metals or metallic ions as Ag, Cu}
- C03C 21/006 . . {to perform an exchange of the type  $Xn^{+} \rightarrow nH^{+}$ }
- C03C 21/007 . {in gaseous phase}
- C03C 21/008 . {in solid phase, e.g. using pastes, powders}

**C03C 23/00** Other surface treatment of glass not in the form of fibres or filaments



- C03C 23/0005 . {by irradiation}
- C03C 23/001 . . {by infra-red light}
- C03C 23/0015 . . {by visible light}
- C03C 23/002 . . {by ultra-violet light}
- C03C 23/0025 . . {by a laser beam}
- C03C 23/003 . . {by X-rays}
- C03C 23/0035 . . {by gamma-rays}
- C03C 23/004 . . {by electrons, protons or alpha-particles}
- C03C 23/0045 . . {by neutrons}
- C03C 23/005 . . {by atoms}
- C03C 23/0055 . . {by ion implantation}
- C03C 23/006 . . {by plasma or corona discharge}
- C03C 23/0065 . . {by microwave radiation}
- C03C 23/007 . {by thermal treatment}
- C03C 23/0075 . {Cleaning of glass (specially adapted to plate glass [B08B 11/00](#))}
- C03C 23/008 . {comprising a lixiviation step}
- C03C 23/0085 . {Drying; Dehydroxylation}
- C03C 23/009 . {Poling glass}
- C03C 23/0095 . {Solution impregnating; Solution doping; Molecular stuffing, e.g. of porous glass (in manufacture of preforms [C03B 37/012](#))}

**C03C 25/00****Surface treatment of fibres or filaments from glass, minerals, or slags**

{(woven fabrics [D03](#); non-woven fabrics [D04](#); treatment of fabrics in general or non-chemical aspects of treatment of glass fabrics [D06M](#))}

- C03C 25/002 . {by thermal treatment}
- C03C 25/005 . {by mechanical means}
- C03C 25/007 . {by solution impregnating; solution doping or molecular stuffing of porous glass}
- C03C 25/10 . by coating
- C03C 25/1005 . . {with materials of composite character}
- C03C 25/101 . . . {containing particles, fibres or flakes, e.g. in a continuous phase}
- C03C 25/1015 . . {with rubber latex-containing coatings}
- C03C 25/102 . . {Coating with colouring agent-containing compositions, e.g. for obtaining coloured textiles}
- C03C 25/1025 . . {Fibres used for reinforcing cement-based products}
- C03C 25/103 . . . {with organic coatings}
- C03C 25/1035 . . . {with inorganic coatings}
- C03C 25/104 . . {to obtain optical fibres}
- C03C 25/1045 . . . {with organic coatings or claddings}
- C03C 25/105 . . . . {Organic claddings}
- C03C 25/1055 . . . . {Organic coatings}
- C03C 25/106 . . . . . {Single coatings}

C03C 25/1065	. . . . . {Multiple coatings}
C03C 25/107	. . . {with inorganic coatings}
C03C 25/1075	. . . . {Carbon}
C03C 25/108	. . . . {Metals}
C03C 25/1085	. . . . {Multiple inorganic coatings}
C03C 25/109	. . . {with at least one organic coating and at least one inorganic coating}
C03C 25/1095	. . {to obtain coated fabrics}
C03C 25/12	. . General methods for coating; Devices therefor
C03C 25/14	. . . Spraying, e.g. pulverisation
C03C 25/143	. . . . {Pulverisation on continuous fibres}
C03C 25/146	. . . . {Pulverisation on fibres in suspension in a gaseous medium}
C03C 25/16	. . . Dipping
C03C 25/18	. . . using extrusion devices
C03C 25/20	. . . Contacting the fibres with applicators, e.g. rolls
C03C 25/22	. . . Depositing from the vapour phase
C03C 25/223	. . . . {by chemical vapour deposition or pyrolysis}
C03C 25/226	. . . . {by sputtering}

#### **NOTE**

In groups [C03C 25/24](#) to [C03C 25/40](#), organic coating compositions also cover mixtures of organic and inorganic compounds. A coating composition which cannot be completely classified in a single one of groups [C03C 25/24](#) to [C03C 25/40](#) should be classified in each relevant group, in accordance with the following rules:

- Compositions containing only one macromolecular constituent and one or more conventional inorganic or non-macromolecular compounds, e.g. acids, solvents, are classified according to the macromolecular constituent only.
- Compositions containing two or more macromolecular constituents and further conventional inorganic or non-macromolecular compounds are classified according to the macromolecular constituent present in the highest proportion. If, however, the other macromolecular constituents represent invention information, classification is also made for these constituents.
- Compositions containing macromolecular constituents present in comparable proportions are classified according to these constituents.
- If non-macromolecular compounds in the composition also represent invention information, [C03C 25/38](#), for specific solvents, fillers, dyes or pigments, surfactants, biocides or the like in [C03C 25/24](#) or subgroups.

C03C 25/24	. . Coatings containing organic materials
C03C 25/243	. . . {Oils, waxes, fats or derivatives thereof}
C03C 25/246	. . . {Non-macromolecular compounds not covered by <a href="#">C03C 25/243</a> }
C03C 25/26	. . . Macromolecular compounds or prepolymers, {e.g. sizing compositions}

- C03C 25/28 . . . . . obtained by reactions involving only carbon-to-carbon unsaturated bonds
- C03C 25/285 . . . . . {Acrylic resins}
- C03C 25/30 . . . . . Polyolefins
- C03C 25/305 . . . . . {Polyfluoro olefins}
- C03C 25/32 . . . . . obtained otherwise than by reactions involving only carbon-to-carbon unsaturated bonds
- C03C 25/321 . . . . . {Starch or starch derivatives}
- C03C 25/323 . . . . . {Esters or alkyd resins}
- C03C 25/325 . . . . . {Polycarbonates}
- C03C 25/326 . . . . . {Polyureas or polyurethanes}
- C03C 25/328 . . . . . {Polyamides}
- C03C 25/34 . . . . . Condensation polymers of aldehydes, e.g. with phenol, ureas, melamines, amides or amines
- C03C 25/36 . . . . . Epoxy resins
- C03C 25/38 . . . . . Organo-metal compounds
- C03C 25/40 . . . . . Organo-silicon compounds
- C03C 25/42 . . . . . Coatings containing inorganic materials
- C03C 25/44 . . . . . Carbon, e.g. graphite
- C03C 25/46 . . . . . Metals
- C03C 25/48 . . . . . with two or more coatings having different compositions {(C03C 25/104 takes precedence)}

#### NOTE

If one or more of the individual coatings are of interest, for each of these coatings classification is also made in one or more of groups [C03C 25/24](#) to [C03C 25/46](#), in accordance with the note before group [C03C 25/24](#).

- C03C 25/50 . . . . . Coatings containing organic materials only
- C03C 25/52 . . . . . Coatings containing inorganic materials only
- C03C 25/54 . . . . . Combinations of one or more coatings containing organic materials only with one or more coatings containing inorganic materials only
- C03C 25/60 . . . . . by diffusing ions or metals in the surface
- C03C 25/601 . . . . . {in the liquid phase, e.g. using molten salts or solutions}
- C03C 25/602 . . . . . {to perform ion-exchange between alkali ions (C03C 25/605 takes precedence)}
- C03C 25/603 . . . . . {under application of an electrical potential difference}
- C03C 25/605 . . . . . {to introduce in the glass such metals or metallic ions as Ag or Cu}
- C03C 25/606 . . . . . {to perform an exchange of the type  $Xn^{+} \rightarrow nH^{+}$ }
- C03C 25/607 . . . . . {in the gaseous phase}
- C03C 25/608 . . . . . {in the solid phase, e.g. using pastes, powders}
- C03C 25/62 . . . . . by application of electric or wave energy or particle radiation, or by ion implantation (for drying or dehydration [C03C 25/64](#))
- C03C 25/6206 . . . . . {Electromagnetic waves}
- C03C 25/6213 . . . . . {Infra-red}

C03C 25/622	. . . {Visible light}
C03C 25/6226	. . . {Ultra-violet}
C03C 25/6233	. . . {Laser}
C03C 25/624	. . . {X-rays}
C03C 25/6246	. . . {Gamma-rays}
C03C 25/6253	. . . {Microwaves}
C03C 25/626	. . {Particle radiation or ion implantation}
C03C 25/6266	. . . {Electrons, protons or alpha-particles}
C03C 25/6273	. . . {Neutrons}
C03C 25/628	. . . {Atoms}
C03C 25/6286	. . . {Ion implantation}
C03C 25/6293	. . {Plasma or corona discharge}
C03C 25/64	. Drying; Dehydration; Dehydroxylation
C03C 25/66	. Chemical treatment, e.g. leaching, acid alkali treatment ( <a href="#">dehydroxylation C03C 25/46</a> )
C03C 25/68	. . by etching
C03C 25/70	. Cleaning, e.g. for reuse ( <a href="#">C03C 25/002</a> , <a href="#">C03C 25/62</a> and <a href="#">C03C 25/66</a> take precedence)

#### **Joining glass to glass or to other materials** ([fusion seal compositions C03C 8/24](#))

#### **NOTE**

Layered products classified in groups [C03C 27/00](#) or [C03C 29/00](#) are also classified in subclass [B32B](#).

<b>C03C 27/00</b>	<b>Joining pieces of glass to pieces of other inorganic material; Joining glass to glass other than by fusing</b> ( <a href="#">C03C 17/00</a> takes precedence; layered structures comprising at least one glass sheet <a href="#">B32B 17/00</a> ; wired glass <a href="#">C03B</a> ; joining glass to ceramics <a href="#">C04</a> )
C03C 27/005	. {with compositions containing more than 50% lead oxide by weight}
C03C 27/02	. by fusing glass directly to metal
C03C 27/04	. Joining glass to metal by means of an interlayer
C03C 27/042	. . {consisting of a combination of materials selected from glass, glass-ceramic or ceramic material with metals, metal oxides or metal salts}
C03C 27/044	. . . {of glass, glass-ceramic or ceramic material only}
C03C 27/046	. . . {of metals, metal oxides or metal salts only}
C03C 27/048	. . {consisting of an adhesive specially adapted for that purpose}
C03C 27/06	. Joining glass to glass by processes other than fusing ( <a href="#">fusing C03B 23/20</a> ; units for use as elements for closing wall or like openings and comprising two or more parallel glass panes in spaced relationship, the panes being permanently secured together <a href="#">E06B 3/66</a> )
C03C 27/08	. . with the aid of intervening metal
C03C 27/10	. . with the aid of adhesive specially adapted for that purpose

**C03C 29/00****Joining metals with the aid of glass**

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**C03C 2201/00****Glass compositions**

- C03C 2201/02 . Pure silica glass, e.g. pure fused quartz
- C03C 2201/06 . Doped silica-based glasses
- C03C 2201/08 . . containing boron or halide
- C03C 2201/10 . . . containing boron ([C03C 2201/14 takes precedence](#))
- C03C 2201/11 . . . containing chlorine
- C03C 2201/12 . . . containing fluorine ([C03C 2201/14 takes precedence](#))
- C03C 2201/14 . . . containing boron and fluorine
- C03C 2201/20 . . containing non-metals other than boron or halide
- C03C 2201/21 . . . containing molecular hydrogen
- C03C 2201/22 . . . containing deuterium
- C03C 2201/23 . . . containing hydroxyl groups
- C03C 2201/24 . . . containing nitrogen, e.g. silicon oxy-nitride glasses
- C03C 2201/26 . . . containing carbon
- C03C 2201/28 . . . containing phosphorus
- C03C 2201/30 . . containing metals
- C03C 2201/31 . . . containing germanium
- C03C 2201/32 . . . containing aluminium ([C03C 2201/36 takes precedence](#))
- C03C 2201/34 . . . containing rare earth metals ([C03C 2201/36 takes precedence](#))
- C03C 2201/3405 . . . . Scandium
- C03C 2201/3411 . . . . Yttrium
- C03C 2201/3417 . . . . Lanthanum
- C03C 2201/3423 . . . . Cerium
- C03C 2201/3429 . . . . Praseodymium
- C03C 2201/3435 . . . . Neodymium
- C03C 2201/3441 . . . . Samarium
- C03C 2201/3447 . . . . Europium
- C03C 2201/3452 . . . . Gadolinium
- C03C 2201/3458 . . . . Terbium
- C03C 2201/3464 . . . . Dysprosium
- C03C 2201/347 . . . . Holmium
- C03C 2201/3476 . . . . Erbium
- C03C 2201/3482 . . . . Thulium
- C03C 2201/3488 . . . . Ytterbium
- C03C 2201/3494 . . . . Lutetium
- C03C 2201/36 . . . . containing rare earth metals and aluminium, e.g. Er-Al co-doped
- C03C 2201/40 . . . containing transition metals other than rare earth metals, e.g. Zr, Nb, Ta or Zn
- C03C 2201/42 . . . . containing titanium

- C03C 2201/50 . . . containing alkali metals
- C03C 2201/54 . . . containing beryllium, magnesium or alkaline earth metals
- C03C 2201/58 . . . containing metals in non-oxide form, e.g. CdSe
- C03C 2201/60 . containing organic material
- C03C 2201/80 . containing bubbles or microbubbles, e.g. opaque quartz glass

**C03C 2203/00****Production processes**

- C03C 2203/10 . Melting processes
- C03C 2203/20 . Wet processes, e.g. sol-gel process
  - C03C 2203/22 . . using colloidal silica sols
  - C03C 2203/24 . . using alkali silicate solutions
  - C03C 2203/26 . . using alkoxides
    - C03C 2203/27 . . . the alkoxides containing other organic groups, e.g. alkyl groups
    - C03C 2203/28 . . . . functional groups, e.g. vinyl, glycidyl
- C03C 2203/30 . . Additives
  - C03C 2203/32 . . . Catalysts
- C03C 2203/34 . . adding silica powder
- C03C 2203/36 . . Gel impregnation
- C03C 2203/40 . Gas-phase processes
  - C03C 2203/42 . . using silicon halides as starting materials
    - C03C 2203/44 . . . chlorine containing
    - C03C 2203/46 . . . fluorine containing
- C03C 2203/50 . After-treatment
  - C03C 2203/52 . . Heat-treatment
    - C03C 2203/54 . . . in a dopant containing atmosphere

**C03C 2204/00****Glasses, glazes or enamels with special properties**

- C03C 2204/02 . Antibacterial glass, glaze or enamel
- C03C 2204/04 . Opaque glass, glaze or enamel
  - C03C 2204/06 . . opacified by gas
- C03C 2204/08 . Glass having a rough surface

**C03C 2205/00****Compositions applicable for the manufacture of vitreous enamels or glazes**

- C03C 2205/02 . for opaque enamels or glazes
- C03C 2205/04 . for self-cleaning enamels or glazes
- C03C 2205/06 . for dental use

**C03C 2207/00****Compositions specially applicable for the manufacture of vitreous enamels**

- C03C 2207/02 . containing ingredients for securing a good bond between the vitrified enamel and the metal
- C03C 2207/04 . for steel
- C03C 2207/06 . for cast iron

C03C 2207/08	. for light metals
C03C 2207/10	. for copper, silver or gold
<b>C03C 2209/00</b>	<b>Compositions specially applicable for the manufacture of vitreous glazes</b>
C03C 2209/02	. to produce non-uniformly coloured glazes
<b>C03C 2213/00</b>	<b>Glass fibres or filaments</b>
C03C 2213/02	. Biodegradable glass fibres
C03C 2213/04	. Dual fibres
<b>C03C 2214/00</b>	<b>Nature of the non-vitreous component</b>
C03C 2214/02	. Fibres; Filaments; Yarns; Felts; Woven material
C03C 2214/03	. . surface treated, e.g. coated
C03C 2214/04	. Particles; Flakes
C03C 2214/05	. . surface treated, e.g. coated
C03C 2214/06	. Whiskers ss
C03C 2214/07	. . surface treated, e.g. coated
C03C 2214/08	. Metals
C03C 2214/10	. Superconducting materials
C03C 2214/12	. Polymers
C03C 2214/14	. Waste material, e.g. to be disposed of
C03C 2214/16	. Microcrystallites, e.g. of optically or electrically active material
C03C 2214/17	. in molecular form (for molecular composites)
C03C 2214/20	. Glass-ceramics matrix
C03C 2214/30	. Methods of making the composites
C03C 2214/32	. comprising a sol-gel process
C03C 2214/34	. comprising an impregnation by molten glass step
<b>C03C 2217/00</b>	<b>Coatings on glass</b>
C03C 2217/20	. Materials for coating a single layer on glass
C03C 2217/21	. . Oxides
C03C 2217/211	. . . SnO <sub>2</sub>
C03C 2217/212	. . . TiO <sub>2</sub>
C03C 2217/213	. . . SiO <sub>2</sub>
C03C 2217/214	. . . Al <sub>2</sub> O <sub>3</sub>
C03C 2217/215	. . . In <sub>2</sub> O <sub>3</sub>
C03C 2217/216	. . . ZnO
C03C 2217/217	. . . FeOx, CoOx, NiOx
C03C 2217/218	. . . V <sub>2</sub> O <sub>5</sub> , Nb <sub>2</sub> O <sub>5</sub> , Ta <sub>2</sub> O <sub>5</sub>
C03C 2217/219	. . . CrOx, MoOx, WOx
C03C 2217/22	. . . ZrO <sub>2</sub>



C03C 2217/228	. . .	Other specific oxides
C03C 2217/229	. . .	Non-specific enumeration
C03C 2217/23	. . .	Mixtures
C03C 2217/231	. . . .	$\text{In}_2\text{O}_3/\text{SnO}_2$
C03C 2217/232	. . . .	$\text{CdO}/\text{SnO}_2$
C03C 2217/24	. . .	Doped oxides
C03C 2217/241	. . . .	with halides
C03C 2217/242	. . . .	with rare earth metals
C03C 2217/243	. . . .	with S, Se, Te
C03C 2217/244	. . . .	with Sb
C03C 2217/25	. .	Metals
C03C 2217/251	. . .	Al, Cu, Mg or noble metals
C03C 2217/252	. . . .	Al
C03C 2217/253	. . . .	Cu
C03C 2217/254	. . . .	Noble metals
C03C 2217/255	. . . . .	Au
C03C 2217/256	. . . . .	Ag
C03C 2217/257	. . .	Refractory metals
C03C 2217/258	. . . .	Ti, Zr, Hf
C03C 2217/259	. . . .	V, Nb, Ta
C03C 2217/26	. . . .	Cr, Mo, W
C03C 2217/261	. . .	Iron-group metals, i.e. Fe, Co or Ni
C03C 2217/262	. . .	Light metals other than Al
C03C 2217/263	. . .	Metals other than noble metals, Cu or Hg

**NOTE**

This code is only to be used in combination with [C03C](#) classification symbols having the +IDT notation.

C03C 2217/268	. . .	Other specific metals
C03C 2217/269	. . .	Non-specific enumeration
C03C 2217/27	. . .	Mixtures of metals, alloys
C03C 2217/28	. .	Other inorganic materials
C03C 2217/281	. . .	Nitrides
C03C 2217/282	. . .	Carbides, silicides
C03C 2217/283	. . .	Borides, phosphides
C03C 2217/284	. . .	Halides
C03C 2217/285	. . . .	Fluorides
C03C 2217/286	. . . .	Chlorides
C03C 2217/287	. . .	Chalcogenides
C03C 2217/288	. . . .	Sulfides

C03C 2217/289	. . . . Selenides, tellurides
C03C 2217/29	. . Mixtures
C03C 2217/40	. Coatings comprising at least one inhomogeneous layer
C03C 2217/42	. . consisting of particles only
C03C 2217/425	. . consisting of a porous layer
C03C 2217/43	. . consisting of a dispersed phase in a continuous phase
C03C 2217/44	. . . characterized by the composition of the continuous phase
C03C 2217/445	. . . . Organic continuous phases
C03C 2217/45	. . . . Inorganic continuous phases
C03C 2217/452	. . . . . Glass
C03C 2217/46	. . . characterized by the dispersed phase
C03C 2217/465	. . . . having a specific shape
C03C 2217/47	. . . . consisting of a specific material
C03C 2217/475	. . . . . Inorganic materials
C03C 2217/476	. . . . . Tin oxide or doped tin oxide
C03C 2217/477	. . . . . Titanium oxide
C03C 2217/478	. . . . . Silica
C03C 2217/479	. . . . . Metals
C03C 2217/48	. . . . having a specific function
C03C 2217/485	. . . . . Pigments
C03C 2217/70	. Properties of coatings
C03C 2217/71	. . Photocatalytic coatings
C03C 2217/72	. . Decorative coatings
C03C 2217/73	. . Anti-reflective coatings with specific characteristics
C03C 2217/732	. . . made of a single layer
C03C 2217/734	. . . comprising an alternation of high and low refractive indexes
C03C 2217/74	. . UV-absorbing coatings
C03C 2217/75	. . Hydrophilic and oleophilic coatings
C03C 2217/76	. . Hydrophobic and oleophobic coatings
C03C 2217/77	. . Coatings having a rough surface
C03C 2217/775	. . . to provide anti-slip characteristics
C03C 2217/78	. . Coatings specially designed to be durable, e.g. scratch-resistant
C03C 2217/90	. Other aspects of coatings
C03C 2217/91	. . Coatings containing at least one layer having a composition gradient through its thickness
C03C 2217/92	. . Coating of crystal glass
C03C 2217/93	. . Coatings containing a reinforcement comprising fibers or grids
C03C 2217/94	. . Transparent conductive oxide layers [TCO] being part of a multilayer coating
C03C 2217/944	. . . Layers comprising zinc oxide
C03C 2217/948	. . . Layers comprising indium tin oxide [ITO]

<b>C03C 2218/00</b>	<b>Methods for coating glass</b>
C03C 2218/10	. Deposition methods
C03C 2218/11	. . from solutions or suspensions
C03C 2218/111	. . . by dipping, immersion
C03C 2218/112	. . . by spraying
C03C 2218/113	. . . by sol-gel processes
C03C 2218/114	. . . by brushing, pouring or doctorblading
C03C 2218/115	. . . electro-enhanced deposition
C03C 2218/116	. . . by spin-coating, centrifugation
C03C 2218/117	. . . by ultrasonic methods
C03C 2218/118	. . . by roller-coating
C03C 2218/119	. . . by printing
C03C 2218/13	. . from melts
C03C 2218/15	. . from the vapour phase
C03C 2218/151	. . . by vacuum evaporation
C03C 2218/152	. . . by cvd
C03C 2218/1525	. . . . by atmospheric CVD
C03C 2218/153	. . . . by plasma-enhanced cvd
C03C 2218/154	. . . by sputtering
C03C 2218/155	. . . . by reactive sputtering
C03C 2218/156	. . . . by magnetron sputtering
C03C 2218/17	. . from a solid phase
C03C 2218/30	. Aspects of methods for coating glass not covered above
C03C 2218/31	. . Pre-treatment
C03C 2218/32	. . After-treatment
C03C 2218/322	. . . Oxidation
C03C 2218/324	. . . De-oxidation
C03C 2218/326	. . . Nitriding
C03C 2218/328	. . . Partly or completely removing a coating
C03C 2218/33	. . . . by etching
C03C 2218/335	. . Reverse coating
C03C 2218/34	. . Masking
C03C 2218/345	. . Surface crystallisation
C03C 2218/35	. . Exuding
C03C 2218/355	. . Temporary coating
C03C 2218/36	. . Underside coating of a glass sheet
C03C 2218/365	. . Coating different sides of a glass substrate