

CPC COOPERATIVE PATENT CLASSIFICATION

C CHEMISTRY; METALLURGY (NOTES omitted)

CHEMISTRY

C03 GLASS; MINERAL OR SLAG WOOL

C03C CHEMICAL COMPOSITION OF GLASSES, GLAZES OR VITREOUS ENAMELS; SURFACE TREATMENT OF GLASS; SURFACE TREATMENT OF FIBRES OR FILAMENTS MADE 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](#)

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

| | | |
|---|------------|--|
| C03C 6/00 - C03C 6/10 | covered by | C03C 1/00 - C03C 1/105 |
| 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 |
2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

Chemical composition of glasses, glazes, or vitreous enamels

3/04 . containing silica

NOTE

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

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

- 1/002 . {Use of waste materials, e.g. slags}
- 1/004 . {Refining agents ([refining C03B 5/225](#))}
- 1/006 . {to produce glass through wet route}
- 1/008 . . {for the production of films or coatings}
- 1/02 . Pretreated ingredients
- 1/022 . . {Purification of silica sand or other minerals}
- 1/024 . . {Chemical treatment of cullet or glass fibres}
- 1/026 . . {Pelletisation or prereacting of powdered raw materials ([apparatus or methods C03B 1/02](#))}
- 1/028 . . {Ingredients allowing introduction of lead or other easily volatile or dusty compounds}
- 1/04 . Opacifiers, e.g. fluorides or phosphates; Pigments
- 1/06 . . to produce non-uniformly pigmented, e.g. speckled, marbled, or veined products
- 1/08 . to produce crackled effects
- 1/10 . to produce uniformly-coloured transparent products
- 1/105 . . {by the addition of colorants to the forehearth of the glass melting furnace}

3/00 Glass compositions

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.

- 3/045 . . {Silicon oxycarbide, oxynitride or oxycarbonitride glasses}
- 3/06 . . with more than 90% silica by weight, e.g. quartz {([C03C 3/045](#) takes precedence)}
- 3/061 . . . {by leaching a soluble phase and consolidating}
- 3/062 . . with less than 40% silica by weight
- 3/064 . . . containing boron
- 3/066 containing zinc
- 3/068 containing rare earths
- 3/07 . . . containing lead
- 3/072 containing boron
- 3/074 containing zinc
- 3/0745 {containing more than 50% lead oxide, by weight}
- 3/076 . . with 40% to 90% silica, by weight {([C03C 3/045](#) takes precedence)}
- 3/078 . . . containing an oxide of a divalent metal, e.g. an oxide of zinc
- 3/083 . . . containing aluminium oxide or an iron compound
- 3/085 containing an oxide of a divalent metal

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|-------------|--|--------------|--|
| 3/087 | containing calcium oxide, e.g. common sheet or container glass | 4/0071 | . {for laserable glass} |
| 3/089 | . . . containing boron | 4/0078 | . {for glass for dosimeters} |
| 3/091 | containing aluminium | 4/0085 | . {for UV-transmitting glass} |
| 3/093 | containing zinc or zirconium | 4/0092 | . {for glass with improved high visible transmittance, e.g. extra-clear glass} |
| 3/095 | . . . containing rare earths | 4/02 | . for coloured glass |
| 3/097 | . . . containing phosphorus, niobium or tantalum | 4/04 | . for photosensitive glass |
| 3/102 | . . . containing lead | 4/06 | . . for phototropic or photochromic glass |
| 3/105 | containing aluminium | 4/065 | . . . {for silver-halide free photochromic glass} |
| 3/108 | containing boron | 4/08 | . for glass selectively absorbing radiation of specified wave lengths |
| 3/11 | . . . containing halogen or nitrogen | 4/082 | . . {for infrared absorbing glass} |
| 3/111 | {containing nitrogen} | 4/085 | . . {for ultraviolet absorbing glass} |
| 3/112 | containing fluorine | 4/087 | . . {for X-rays absorbing glass} |
| 3/115 | containing boron | 4/10 | . for infrared transmitting glass |
| 3/118 | containing aluminium | 4/12 | . for luminescent glass; for fluorescent glass |
| 3/12 | . Silica-free oxide glass compositions | 4/14 | . for electro-conductive glass |
| 3/122 | . . {containing oxides of As, Sb, Bi, Mo, W, V, Te as glass formers} | 4/16 | . for dielectric glass |
| 3/125 | . . {containing aluminium as glass former} | 4/18 | . for ion-sensitive glass |
| 3/127 | . . {containing TiO ₂ as glass former} | 4/20 | . for chemical resistant glass |
| 3/14 | . . containing boron | 8/00 | Enamels; Glazes; Fusion seal compositions being frit compositions having non-frit additions |
| 3/142 | . . . {containing lead} | 8/02 | . Frit compositions, i.e. in a powdered or comminuted form |
| 3/145 | . . . containing aluminium or beryllium | 8/04 | . . containing zinc |
| 3/15 | . . . containing rare earths | 8/06 | . . containing halogen |
| 3/155 | containing zirconium, titanium, tantalum or niobium | 8/08 | . . containing phosphorus |
| 3/16 | . . containing phosphorus | 8/10 | . . containing lead |
| 3/17 | . . . containing aluminium or beryllium | 8/12 | . . . containing titanium or zirconium |
| 3/19 | . . . containing boron | 8/14 | . Glass frit mixtures having non-frit additions, e.g. opacifiers, colorants, mill-additions |
| 3/21 | . . . containing titanium, zirconium, vanadium, tungsten or molybdenum | 8/16 | . . with vehicle or suspending agents, e.g. slip |
| 3/23 | . . containing halogen and at least one oxide, e.g. oxide of boron | 8/18 | . . containing free metals |
| 3/247 | . . . containing fluorine and phosphorus | 8/20 | . . containing titanium compounds; containing zirconium compounds |
| 3/253 | . . containing germanium | 8/22 | . containing two or more distinct frits having different compositions |
| 3/32 | . Non-oxide glass compositions, e.g. binary or ternary halides, sulfides or nitrides of germanium, selenium or tellurium | 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 |
| 3/321 | . . {Chalcogenide glasses, e.g. containing S, Se, Te} | 8/245 | . . {containing more than 50% lead oxide, by weight} |
| 3/323 | . . . {containing halogen, e.g. chalcogenide glasses} | 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 |
| 3/325 | . . {Fluoride glasses} | 10/0009 | . {containing silica as main constituent} |
| 3/326 | . . . {containing beryllium} | 10/0018 | . {containing SiO ₂ , Al ₂ O ₃ and monovalent metal oxide as main constituents} |
| 3/328 | . . {Nitride glasses} | 10/0027 | . . {containing SiO ₂ , Al ₂ O ₃ , Li ₂ O as main constituents} |
| 4/00 | Compositions for glass with special properties | 10/0036 | . {containing SiO ₂ , Al ₂ O ₃ and a divalent metal oxide as main constituents} |
| | NOTE | 10/0045 | . . {containing SiO ₂ , Al ₂ O ₃ and MgO as main constituents} |
| | 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. | 10/0054 | . {containing PbO, SnO ₂ , B ₂ O ₃ } |
| 4/0007 | . {for biologically-compatible glass} | 10/0063 | . {containing waste materials, e.g. slags} |
| 4/0014 | . . {Biodegradable glass} | 10/0072 | . {having a ferro-electric crystal phase} |
| 4/0021 | . . {for dental use} | 10/0081 | . {having a magnetic crystal phase} |
| 4/0028 | . {for crystal glass, e.g. lead-free crystal glass} | 10/009 | . {having a superconducting crystal phase} |
| 4/0035 | . {for soluble glass for controlled release of a compound incorporated in said glass} | | |
| 4/0042 | . {for glass comprising or including particular isotopes} | | |
| 4/005 | . {for opaline glass} | | |
| 4/0057 | . {for ultrasonic delay lines glass} | | |
| 4/0064 | . {for self-destructing glass (C03C 4/0014 takes precedence)} | | |

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|---|---|---------|---|
| 10/16 | • Halogen containing crystalline phase | 17/004 | • • • {Coating the inside} |
| 11/00 | Multi-cellular glass {; Porous or hollow glass or glass particles} | 17/005 | • • • {Coating the outside} |
| 11/002 | • {Hollow glass particles} | 17/006 | • {with materials of composite character} |
| 11/005 | • {obtained by leaching after a phase separation step} | 17/007 | • • {containing a dispersed phase, e.g. particles, fibres or flakes, in a continuous phase} |
| 11/007 | • {Foam glass, e.g. obtained by incorporating a blowing agent and heating} | 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 } |
| 12/00 | Powdered glass (C03C 8/02 takes precedence); Bead compositions | 17/009 | • • • {Mixtures of organic and inorganic materials, e.g. ormosils and ormocers} |
| 12/02 | • Reflective beads | 17/02 | • with glass (C03C 17/34 , C03C 17/44 take precedence) |
| 13/00 | Fibre or filament compositions (manufacture of fibres or filaments C03B 37/00) | 17/04 | • • by fritting glass powder |
| 13/001 | • {Alkali-resistant fibres} | 17/06 | • with metals (C03C 17/34 , C03C 17/44 take precedence) |
| 13/002 | • • {containing zirconium} | 17/09 | • • by deposition from the vapour phase |
| 13/003 | • {Conducting or semi-conducting fibres} | 17/10 | • • by deposition from the liquid phase |
| 13/005 | • {obtained by leaching of a soluble phase and consolidation} | 17/22 | • with other inorganic material (C03C 17/34 , C03C 17/44 take precedence) |
| 13/006 | • {Glass-ceramics fibres} | 17/225 | • • {Nitrides} |
| 13/007 | • • {containing zirconium} | 17/23 | • • Oxides (C03C 17/02 takes precedence) |
| 13/008 | • {Polycrystalline optical fibres} | 17/245 | • • • by deposition from the vapour phase |
| 13/04 | • Fibre optics, e.g. core and clad fibre compositions (light guides G02B 6/00) | 17/2453 | • • • • {Coating containing SnO ₂ } |
| 13/041 | • • {Non-oxide glass compositions} | 17/2456 | • • • • {Coating containing TiO ₂ } |
| 13/042 | • • • {Fluoride glass compositions} | 17/25 | • • • by deposition from the liquid phase |
| 13/043 | • • • {Chalcogenide glass compositions} | 17/253 | • • • • {Coating containing SnO ₂ } |
| 13/044 | • • • • {containing halogen, e.g. chalcohalide glass compositions} | 17/256 | • • • • {Coating containing TiO ₂ } |
| 13/045 | • • {Silica-containing oxide glass compositions} | 17/27 | • • • by oxidation of a coating previously applied |
| 13/046 | • • • {Multicomponent glass compositions} | 17/28 | • with organic material (C03C 17/34 , C03C 17/44 take precedence) |
| 13/047 | • • • {containing deuterium} | 17/30 | • • with silicon-containing compounds |
| 13/048 | • • {Silica-free oxide glass compositions} | 17/32 | • • with synthetic or natural resins (C03C 17/30 takes precedence) |
| 13/06 | • Mineral fibres, e.g. slag wool, mineral wool, rock wool | 17/322 | • • • {Polyurethanes or polyisocyanates} |
| 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) | 17/324 | • • • {Polyesters} |
| 14/002 | • {the non-glass component being in the form of fibres, filaments, yarns, felts or woven material} | 17/326 | • • • {Epoxy resins} |
| 14/004 | • {the non-glass component being in the form of particles or flakes} | 17/328 | • • • {Polyolefins} |
| 14/006 | • {the non-glass component being in the form of microcrystallites, e.g. of optically or electrically active material} | 17/34 | • with at least two coatings having different compositions (C03C 17/44 takes precedence) |
| 14/008 | • {the non-glass component being in molecular form} | 17/3405 | • • {with at least two coatings of organic materials (C03C 17/36 , C03C 17/42 take precedence)} |
| Surface treatment of glass; Surface treatment of fibres or filaments from glass, minerals or slags | | 17/3411 | • • {with at least two coatings of inorganic materials (C03C 17/36 , C03C 17/42 take precedence)} |
| 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) | 17/3417 | • • • {all coatings being oxide coatings} |
| 15/02 | • for making a smooth surface | 17/3423 | • • • {at least one of the coatings comprising a suboxide} |
| 15/025 | • • {for polishing crystal glass, i.e. lead glass} | 17/3429 | • • • {at least one of the coatings being a non-oxide coating} |
| 17/00 | Surface treatment of glass, not in the form of fibres or filaments, by coating (optical coatings of optical elements G02B 1/10) | 17/3435 | • • • • {comprising a nitride, oxynitride, boronitride or carbonitride} |
| 17/001 | • {General methods for coating; Devices therefor} | 17/3441 | • • • • {comprising carbon, a carbide or oxycarbide} |
| 17/002 | • • {for flat glass, e.g. float glass} | 17/3447 | • • • • {comprising a halide} |
| 17/003 | • • {for hollow ware, e.g. containers} | 17/3452 | • • • • • {comprising a fluoride} |
| | | 17/3458 | • • • • • {comprising a chloride} |
| | | 17/3464 | • • • • • {comprising a chalcogenide} |
| | | 17/347 | • • • • • {comprising a sulfide or oxysulfide} |
| | | 17/3476 | • • • • • {comprising a selenide or telluride} |
| | | 17/3482 | • • • • • {comprising silicon, hydrogenated silicon or a silicide} |
| | | 17/3488 | • • • • • {comprising a boride or phosphide} |
| | | 17/3494 | • • • • • {comprising other salts, e.g. sulfate, phosphate} |

- 17/36 . . . at least one coating being a metal
- 17/3602 . . . {the metal being present as a layer}
- 17/3605 {Coatings of the type glass/metal/inorganic compound}
- 17/3607 {Coatings of the type glass/inorganic compound/metal}
- 17/361 {Coatings of the type glass/metal/inorganic compound/metal/inorganic compound/other}
- 17/3613 {Coatings of type glass/inorganic compound/metal/inorganic compound/metal/other}
- 17/3615 {Coatings of the type glass/metal/other inorganic layers, at least one layer being non-metallic}
- 17/3618 {Coatings of type glass/inorganic compound/other inorganic layers, at least one layer being metallic}
- 17/3621 {one layer at least containing a fluoride}
- 17/3623 {one layer at least containing a chloride, bromide or iodide}
- 17/3626 {one layer at least containing a nitride, oxynitride, boronitride or carbonitride}
- 17/3628 {one layer at least containing a sulfide}
- 17/3631 {one layer at least containing a selenide or telluride}
- 17/3634 {one layer at least containing carbon, a carbide or oxycarbide}
- 17/3636 {one layer at least containing silicon, hydrogenated silicon or a silicide}
- 17/3639 {Multilayers containing at least two functional metal layers}
- 17/3642 {the multilayer coating containing a metal layer}
- 17/3644 {the metal being silver}
- 17/3647 {in combination with other metals, silver being more than 50%}
- 17/3649 {made of metals other than silver}
- 17/3652 {the coating stack containing at least one sacrificial layer to protect the metal from oxidation}
- 17/3655 {the multilayer coating containing at least one conducting layer}
- 17/3657 {the multilayer coating having optical properties}
- 17/366 {Low-emissivity or solar control coatings}
- 17/3663 {specially adapted for use as mirrors}
- 17/3665 {specially adapted for use as photomask}
- 17/3668 {the multilayer coating having electrical properties}
- 17/3671 {specially adapted for use as electrodes}
- 17/3673 {specially adapted for use in heating devices for rear window of vehicles}
- 17/3676 {specially adapted for use as electromagnetic shield}
- 17/3678 {specially adapted for use in solar cells}
- 17/3681 {the multilayer coating being used in glazing, e.g. windows or windscreens}
- 17/3684 {the multilayer coating being used for decoration purposes}
- 17/3686 {the multilayer coating being used for ovens}
- 17/3689 {one oxide layer being obtained by oxidation of a metallic layer}
- 17/3692 {one metallic layer being obtained by reduction of an oxide layer}
- 17/3694 {one layer having a composition gradient through its thickness}
- 17/3697 {one metallic layer at least being obtained by electroless plating}
- 17/38 at least one coating being a coating of an organic material
- 17/40 all coatings being metal coatings
- 17/42 . . . at least one coating of an organic material and at least one non-metal coating
- 17/44 . Lustring
- 19/00** **Surface treatment of glass, not in the form of fibres or filaments, by mechanical means (sand-blasting, grinding, or polishing glass B24)**
- 21/00** **Treatment of glass, not in the form of fibres or filaments, by diffusing ions or metals in the surface**
- 21/001 . {in liquid phase, e.g. molten salts, solutions}
- 21/002 . . {to perform ion-exchange between alkali ions (C03C 21/005 takes precedence)}
- 21/003 . . . {under application of an electrical potential difference}
- 21/005 . . {to introduce in the glass such metals or metallic ions as Ag, Cu}
- 21/006 . . {to perform an exchange of the type $Xn^{+} \rightarrow nH^{+}$ }
- 21/007 . {in gaseous phase}
- 21/008 . {in solid phase, e.g. using pastes, powders}
- 23/00** **Other surface treatment of glass not in the form of fibres or filaments**
- 23/0005 . {by irradiation}
- 23/001 . . {by infrared light}
- 23/0015 . . {by visible light}
- 23/002 . . {by ultraviolet light}
- 23/0025 . . {by a laser beam}
- 23/003 . . {by X-rays}
- 23/0035 . . {by gamma-rays}
- 23/004 . . {by electrons, protons or alpha-particles}
- 23/0045 . . {by neutrons}
- 23/005 . . {by atoms}
- 23/0055 . . {by ion implantation}
- 23/006 . . {by plasma or corona discharge}
- 23/0065 . . {by microwave radiation}
- 23/007 . {by thermal treatment}
- 23/0075 . {Cleaning of glass (specially adapted to plate glass B08B 11/00)}
- 23/008 . {comprising a lixiviation step}
- 23/0085 . {Drying; Dehydroxylation}
- 23/009 . {Poling glass}
- 23/0095 . {Solution impregnating; Solution doping; Molecular stuffing, e.g. of porous glass (in manufacture of preforms C03B 37/012)}
- 25/00** **Surface treatment of fibres or filaments made from glass, minerals or slags**

NOTES

1. In groups C03C 25/24 - C03C 25/48, the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the last appropriate place.
2. A coating composition, i.e. a mixture of two or more constituents, is classified in the last of groups

C03C 25/00

(continued)

- [C03C 25/25](#) - [C03C 25/42](#) that provides for at least one of these constituents.
3. When classifying in groups [C03C 25/24](#) - [C03C 25/42](#), any individual constituent, i.e. compound or ingredient of a coating composition, which is not identified by the classification according to Note (2), and which itself is determined to be novel and non-obvious, must also be classified in the last appropriate place in groups [C03C 25/24](#) - [C03C 25/42](#).
 4. When classifying in groups [C03C 25/24](#) - [C03C 25/42](#), any individual constituent of a coating composition which is not identified by the classification according to Note (2) or (3), and which is considered to represent information of interest for search, may also be classified in groups [C03C 25/24](#) - [C03C 25/42](#). This can, for example, be the case when it is considered of interest to enable searching of coating compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information".
 5. When classifying in groups [C03C 25/1025](#) - [C03C 25/1095](#), the composition of the coatings must also be classified in one or more of groups [C03C 25/24](#) - [C03C 25/54](#), according to Notes (1) to (4).
 6. When classifying in group [C03C 25/48](#), any individual coating which itself is determined to be novel and non-obvious must also be classified in groups [C03C 25/24](#) - [C03C 25/42](#), according to Notes (1) to (4).
- 25/002 . Thermal treatment
- 25/005 . by mechanical means
- 25/007 . Impregnation by solution; Solution doping or molecular stuffing of porous glass
- 25/10 . Coating
- 25/1025 . . to obtain fibres used for reinforcing cement-based products
- 25/103 . . . {Organic coatings}
- 25/1035 . . . {Inorganic coatings}
- 25/104 . . to obtain optical fibres
- 25/105 . . . Organic claddings
- 25/106 . . . Single coatings
- 25/1061 {Inorganic coatings}
- 25/1062 {Carbon}
- 25/1063 {Metals}
- 25/1065 . . . Multiple coatings
- 25/1068 {Inorganic coatings}
- 25/109 {with at least one organic coating and at least one inorganic coating}
- 25/1095 . . to obtain coated fabrics
- 25/12 . . General methods of coating; Devices therefor
- 25/14 . . . Spraying
- 25/143 onto continuous fibres
- 25/146 onto fibres in suspension in a gaseous medium ([C03C 25/143](#) takes precedence)
- 25/16 . . . Dipping
- 25/18 . . . Extrusion
- 25/20 . . . Contacting the fibres with applicators, e.g. rolls
- 25/22 . . . Deposition from the vapour phase
- 25/223 by chemical vapour deposition or pyrolysis
- 25/226 by sputtering
- 25/24 . . Coatings containing organic materials
- 25/25 . . . Non-macromolecular compounds
- 25/255 . . . Oils, waxes, fats or derivatives thereof
- 25/26 . . . Macromolecular compounds or prepolymers
- 25/27 Rubber latex
- 25/28 obtained by reactions involving only carbon-to-carbon unsaturated bonds
- 25/285 Acrylic resins
- 25/30 Polyolefins
- 25/305 Polyfluoroolefins
- 25/32 obtained otherwise than by reactions involving only carbon-to-carbon unsaturated bonds
- 25/321 Starch; Starch derivatives
- 25/323 Polyesters, e.g. alkyd resins
- 25/325 Polycarbonates
- 25/326 Polyureas; Polyurethanes
- 25/328 Polyamides
- 25/34 Condensation polymers of aldehydes, e.g. with phenols, ureas, melamines, amides or amines
- 25/36 Epoxy resins
- 25/38 . . . Organo-metal compounds
- 25/40 . . . Organo-silicon compounds
- 25/42 . . Coatings containing inorganic materials
- 25/44 . . . Carbon, e.g. graphite
- 25/46 . . . Metals
- 25/465 . . Coatings containing composite materials
- 25/47 . . . containing particles, fibres or flakes, e.g. in a continuous phase
- 25/475 . . . containing colouring agents
- 25/48 . . with two or more coatings having different compositions {([C03C 25/104](#) takes precedence)}
- 25/50 . . . Coatings containing organic materials only
- 25/52 . . . Coatings containing inorganic materials only
- 25/54 . . . Combinations of one or more coatings containing organic materials only with one or more coatings containing inorganic materials only
- 25/60 . by diffusing ions or metals into the surface
- 25/601 . . in the liquid phase, e.g. using solutions or molten salts
- 25/602 . . . to perform ion-exchange between alkali ions ([C03C 25/605](#) takes precedence)
- 25/603 under application of an electrical potential difference
- 25/605 . . . to introduce metals or metallic ions, e.g. silver or copper, into the glass
- 25/606 . . . {to perform an exchange of the type $X_{n+} \rightleftharpoons nH^+$ }
- 25/607 . . in the gaseous phase
- 25/608 . . in the solid phase, e.g. using pastes or powders
- 25/62 . by application of electric or wave energy ([for drying or dehydration C03C 25/64](#)); by particle radiation or ion implantation
- 25/6206 . . Electromagnetic waves
- 25/6208 . . . Laser
- 25/621 . . . Microwaves
- 25/6213 . . . Infrared
- 25/622 . . . Visible light
- 25/6226 . . . Ultraviolet
- 25/624 . . . X-Rays

- 25/6246 . . . Gamma rays
- 25/626 . . Particle radiation or ion implantation
- 25/6266 . . . Electrons, protons or alpha particles
- 25/6273 . . . Neutrons
- 25/628 . . . Atoms
- 25/6286 . . . Ion implantation
- 25/6293 . . Plasma or corona discharge
- 25/64 . Drying; Dehydration; Dehydroxylation
- 25/66 . Chemical treatment, e.g. leaching, acid or alkali treatment ([dehydroxylation C03C 25/64](#))
- 25/68 . . by etching
- 25/70 . Cleaning, e.g. for reuse ([C03C 25/62](#) -[C03C 25/66](#) 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](#).

- 27/00** **Joining pieces of glass to pieces of other inorganic material; Joining glass to glass other than by fusing** ([C03C 17/00](#) takes precedence; layered structures comprising at least one glass sheet [B32B 17/00](#); wired glass [C03B](#); joining glass to ceramics [C04](#))
- 27/005 . {with compositions containing more than 50% lead oxide by weight}
- 27/02 . by fusing glass directly to metal
- 27/04 . Joining glass to metal by means of an interlayer
- 27/042 . . {consisting of a combination of materials selected from glass, glass-ceramic or ceramic material with metals, metal oxides or metal salts}
- 27/044 . . . {of glass, glass-ceramic or ceramic material only}
- 27/046 . . . {of metals, metal oxides or metal salts only}
- 27/048 . . {consisting of an adhesive specially adapted for that purpose}
- 27/06 . Joining glass to glass by processes other than fusing ([fusing C03B 23/20](#); 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 [E06B 3/66](#))
- 27/08 . . with the aid of intervening metal
- 27/10 . . with the aid of adhesive specially adapted for that purpose
- 29/00** **Joining metals with the aid of glass**

2201/00 **Glass compositions**

- 2201/02 . Pure silica glass, e.g. pure fused quartz
- 2201/06 . Doped silica-based glasses
- 2201/08 . . containing boron or halide
- 2201/10 . . . containing boron ([C03C 2201/14](#) takes precedence)
- 2201/11 . . . containing chlorine
- 2201/12 . . . containing fluorine ([C03C 2201/14](#) takes precedence)
- 2201/14 . . . containing boron and fluorine
- 2201/20 . . containing non-metals other than boron or halide
- 2201/21 . . . containing molecular hydrogen

- 2201/22 . . . containing deuterium
- 2201/23 . . . containing hydroxyl groups
- 2201/24 . . . containing nitrogen, e.g. silicon oxy-nitride glasses
- 2201/26 . . . containing carbon
- 2201/28 . . . containing phosphorus
- 2201/30 . . containing metals
- 2201/31 . . . containing germanium
- 2201/32 . . . containing aluminium ([C03C 2201/36](#) takes precedence)
- 2201/34 . . . containing rare earth metals ([C03C 2201/36](#) takes precedence)
- 2201/3405 Scandium
- 2201/3411 Yttrium
- 2201/3417 Lanthanum
- 2201/3423 Cerium
- 2201/3429 Praseodymium
- 2201/3435 Neodymium
- 2201/3441 Samarium
- 2201/3447 Europium
- 2201/3452 Gadolinium
- 2201/3458 Terbium
- 2201/3464 Dysprosium
- 2201/347 Holmium
- 2201/3476 Erbium
- 2201/3482 Thulium
- 2201/3488 Ytterbium
- 2201/3494 Lutetium
- 2201/36 containing rare earth metals and aluminium, e.g. Er-Al co-doped
- 2201/40 . . . containing transition metals other than rare earth metals, e.g. Zr, Nb, Ta or Zn
- 2201/42 containing titanium
- 2201/50 . . . containing alkali metals
- 2201/54 . . . containing beryllium, magnesium or alkaline earth metals
- 2201/58 . . . containing metals in non-oxide form, e.g. CdSe
- 2201/60 . containing organic material
- 2201/80 . containing bubbles or microbubbles, e.g. opaque quartz glass

2203/00 **Production processes**

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

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

| | | | |
|----------------|---|----------|--|
| 2204/02 | . Antibacterial glass, glaze or enamel | 2217/24 | . . . Doped oxides |
| 2204/04 | . Opaque glass, glaze or enamel | 2217/241 | with halides |
| 2204/06 | . . opacified by gas | 2217/242 | with rare earth metals |
| 2204/08 | . Glass having a rough surface | 2217/243 | with S, Se, Te |
| 2205/00 | Compositions applicable for the manufacture of vitreous enamels or glazes | 2217/244 | with Sb |
| 2205/02 | . for opaque enamels or glazes | 2217/25 | . . Metals |
| 2205/04 | . for self-cleaning enamels or glazes | 2217/251 | . . . Al, Cu, Mg or noble metals |
| 2205/06 | . for dental use | 2217/252 | Al |
| | | 2217/253 | Cu |
| | | 2217/254 | Noble metals |
| | | 2217/255 | Au |
| | | 2217/256 | Ag |
| 2207/00 | Compositions specially applicable for the manufacture of vitreous enamels | 2217/257 | . . . Refractory metals |
| 2207/02 | . containing ingredients for securing a good bond between the vitrified enamel and the metal | 2217/258 | Ti, Zr, Hf |
| 2207/04 | . for steel | 2217/259 | V, Nb, Ta |
| 2207/06 | . for cast iron | 2217/26 | Cr, Mo, W |
| 2207/08 | . for light metals | 2217/261 | . . . Iron-group metals, i.e. Fe, Co or Ni |
| 2207/10 | . for copper, silver or gold | 2217/262 | . . . Light metals other than Al |
| 2209/00 | Compositions specially applicable for the manufacture of vitreous glazes | 2217/263 | . . . Metals other than noble metals, Cu or Hg |
| 2209/02 | . to produce non-uniformly coloured glazes | | |
| 2213/00 | Glass fibres or filaments | | NOTE |
| 2213/02 | . Biodegradable glass fibres | | This code is only to be used in combination with C03C classification symbols having the +IDT notation. |
| 2213/04 | . Dual fibres | | |
| 2214/00 | Nature of the non-vitreous component | 2217/268 | . . . Other specific metals |
| 2214/02 | . Fibres; Filaments; Yarns; Felts; Woven material | 2217/269 | . . . Non-specific enumeration |
| 2214/03 | . . surface treated, e.g. coated | 2217/27 | . . . Mixtures of metals, alloys |
| 2214/04 | . Particles; Flakes | 2217/28 | . . Other inorganic materials |
| 2214/05 | . . surface treated, e.g. coated | 2217/281 | . . . Nitrides |
| 2214/06 | . Whiskers ss | 2217/282 | . . . Carbides, silicides |
| 2214/07 | . . surface treated, e.g. coated | 2217/283 | . . . Borides, phosphides |
| 2214/08 | . Metals | 2217/284 | . . . Halides |
| 2214/10 | . Superconducting materials | 2217/285 | Fluorides |
| 2214/12 | . Polymers | 2217/286 | Chlorides |
| 2214/14 | . Waste material, e.g. to be disposed of | 2217/287 | . . . Chalcogenides |
| 2214/16 | . Microcrystallites, e.g. of optically or electrically active material | 2217/288 | Sulfides |
| 2214/17 | . in molecular form (for molecular composites) | 2217/289 | Selenides, tellurides |
| 2214/20 | . Glass-ceramics matrix | 2217/29 | . . Mixtures |
| 2214/30 | . Methods of making the composites | 2217/40 | . Coatings comprising at least one inhomogeneous layer |
| 2214/32 | . comprising a sol-gel process | 2217/42 | . . consisting of particles only |
| 2214/34 | . comprising an impregnation by molten glass step | 2217/425 | . . consisting of a porous layer |
| | | 2217/43 | . . consisting of a dispersed phase in a continuous phase |
| 2217/00 | Coatings on glass | 2217/44 | . . . characterized by the composition of the continuous phase |
| 2217/20 | . Materials for coating a single layer on glass | 2217/445 | Organic continuous phases |
| 2217/21 | . . Oxides | 2217/45 | Inorganic continuous phases |
| 2217/211 | . . . SnO ₂ | 2217/452 | Glass |
| 2217/212 | . . . TiO ₂ | 2217/46 | . . . characterized by the dispersed phase |
| 2217/213 | . . . SiO ₂ | 2217/465 | having a specific shape |
| 2217/214 | . . . Al ₂ O ₃ | 2217/47 | consisting of a specific material |
| 2217/215 | . . . In ₂ O ₃ | 2217/475 | Inorganic materials |
| 2217/216 | . . . ZnO | 2217/476 | Tin oxide or doped tin oxide |
| 2217/217 | . . . FeOx, CoOx, NiOx | 2217/477 | Titanium oxide |
| 2217/218 | . . . V ₂ O ₅ , Nb ₂ O ₅ , Ta ₂ O ₅ | 2217/478 | Silica |
| 2217/219 | . . . CrOx, MoOx, WOx | 2217/479 | Metals |
| 2217/22 | . . . ZrO ₂ | 2217/48 | having a specific function |
| 2217/228 | . . . Other specific oxides | 2217/485 | Pigments |
| 2217/229 | . . . Non-specific enumeration | 2217/70 | . Properties of coatings |
| 2217/23 | . . . Mixtures | 2217/71 | . Photocatalytic coatings |
| 2217/231 | In ₂ O ₃ /SnO ₂ | | |
| 2217/232 | CdO/SnO ₂ | | |

- 2217/72 . . Decorative coatings
- 2217/73 . . Anti-reflective coatings with specific characteristics
- 2217/732 . . . made of a single layer
- 2217/734 . . . comprising an alternation of high and low refractive indexes
- 2217/74 . . UV-absorbing coatings
- 2217/75 . . Hydrophilic and oleophilic coatings
- 2217/76 . . Hydrophobic and oleophobic coatings
- 2217/77 . . Coatings having a rough surface
- 2217/775 . . . to provide anti-slip characteristics
- 2217/78 . . Coatings specially designed to be durable, e.g. scratch-resistant
- 2217/90 . Other aspects of coatings
- 2217/91 . . Coatings containing at least one layer having a composition gradient through its thickness
- 2217/92 . . Coating of crystal glass
- 2217/93 . . Coatings containing a reinforcement comprising fibers or grids
- 2217/94 . . Transparent conductive oxide layers [TCO] being part of a multilayer coating
- 2217/944 . . . Layers comprising zinc oxide
- 2217/948 . . . Layers comprising indium tin oxide [ITO]
- 2218/00 Methods for coating glass**
- 2218/10 . Deposition methods
- 2218/11 . . from solutions or suspensions
- 2218/111 . . . by dipping, immersion
- 2218/112 . . . by spraying
- 2218/113 . . . by sol-gel processes
- 2218/114 . . . by brushing, pouring or doctorblading
- 2218/115 . . . electro-enhanced deposition
- 2218/116 . . . by spin-coating, centrifugation
- 2218/117 . . . by ultrasonic methods
- 2218/118 . . . by roller-coating
- 2218/119 . . . by printing
- 2218/13 . . from melts
- 2218/15 . . from the vapour phase
- 2218/151 . . . by vacuum evaporation
- 2218/152 . . . by cvd
- 2218/1525 by atmospheric CVD
- 2218/153 by plasma-enhanced cvd
- 2218/154 . . . by sputtering
- 2218/155 by reactive sputtering
- 2218/156 by magnetron sputtering
- 2218/17 . . from a solid phase
- 2218/30 . Aspects of methods for coating glass not covered above
- 2218/31 . . Pre-treatment
- 2218/32 . . After-treatment
- 2218/322 . . . Oxidation
- 2218/324 . . . De-oxidation
- 2218/326 . . . Nitriding
- 2218/328 . . . Partly or completely removing a coating
- 2218/33 by etching
- 2218/335 . . Reverse coating
- 2218/34 . . Masking
- 2218/345 . . Surface crystallisation
- 2218/35 . . Exuding
- 2218/355 . . Temporary coating
- 2218/36 . . Underside coating of a glass sheet
- 2218/365 . . Coating different sides of a glass substrate