

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****NOTE**

This subclass covers compositions of polycrystalline fibres

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](#)

Guidance heading: **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 ₂ 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 SiO₂, Al₂O₃ and monovalent metal oxide as main constituents}
- C03C 10/0027 . . {containing SiO₂, Al₂O₃, Li₂O as main constituents}
- C03C 10/0036 . {containing SiO₂, Al₂O₃ and a divalent metal oxide as main constituents}

- C03C 10/0045 . . {containing SiO₂, Al₂O₃ and MgO as main constituents}
- C03C 10/0054 . {containing PbO, SnO₂, B₂O₃}
- 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. chalcogen halide 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}

Guidance heading: **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 SnO₂}

C03C 17/2456 {Coating containing TiO₂}

C03C 17/25 ... by deposition from the liquid phase

C03C 17/253 {Coating containing SnO₂}

C03C 17/256 {Coating containing TiO₂}

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 [C03C 25/243](#)}
- [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](#) take s 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 (dehydroxylation [C03C 25/46](#))
- C03C 25/68 . . by etching
- C03C 25/70 . Cleaning, e.g. for reuse ({[C03C 25/002](#)}, [C03C 25/62](#) and [C03C 25/66](#) take precedence)

Guidance heading: 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](#).

- C03C 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](#))
- 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 (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](#))
- 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

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
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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
C03C 2209/00	Compositions specially applicable for the manufacture of vitreous glazes
C03C 2209/02	. to produce non-uniformly coloured glazes
C03C 2213/00	Glass fibres or filaments
C03C 2213/02	. Biodegradable glass fibres
C03C 2213/04	. Dual fibres
C03C 2214/00	Nature of the non-vitreous component
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
C03C 2217/00	Coatings on glass
C03C 2217/20	. Materials for coating a single layer on glass
C03C 2217/21	. . Oxides
C03C 2217/211	. . . SnO ₂
C03C 2217/212	. . . TiO ₂
C03C 2217/213	. . . SiO ₂

C03C 2217/214	...	Al ₂ O ₃
C03C 2217/215	...	In ₂ O ₃
C03C 2217/216	...	ZnO
C03C 2217/217	...	FeOx, CoOx, NiOx
C03C 2217/218	...	V ₂ O ₅ , Nb ₂ O ₅ , Ta ₂ O ₅
C03C 2217/219	...	CrOx, MoOx, WOx
C03C 2217/22	...	ZrO ₂
C03C 2217/228	...	Other specific oxides
C03C 2217/229	...	Non-specific enumeration
C03C 2217/23	...	Mixtures
C03C 2217/231	....	In ₂ O ₃ /SnO ₂
C03C 2217/232	....	CdO/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]
C03C 2218/00	Methods for coating glass
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