

**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**

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 ( <a href="#">C03C 17/44</a> takes precedence)
C03C 17/3405	..	{with at least two coatings of organic materials ( <a href="#">C03C 17/36</a> , <a href="#">C03C 17/42</a> take precedence)}
C03C 17/3411	..	{with at least two coatings of inorganic materials ( <a href="#">C03C 17/36</a> , <a href="#">C03C 17/42</a> 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 ( <a href="#">C03C 21/005</a> 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 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 <a href="#">C03C 25/64</a> )
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	....	In <sub>2</sub> O <sub>3</sub> /SnO <sub>2</sub>
C03C 2217/232	....	CdO/SnO <sub>2</sub>
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