

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 TiO₂ 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 $X^{n+} \rightarrow nH^{+}$ }
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

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 ... SnO₂
 - C03C 2217/212 ... TiO₂
 - C03C 2217/213 ... SiO₂
 - C03C 2217/214 ... Al₂O₃
 - C03C 2217/215 ... In₂O₃
 - C03C 2217/216 ... ZnO
 - C03C 2217/217 ... FeO_x, CoO_x, NiO_x
 - C03C 2217/218 ... V₂O₅, Nb₂O₅, Ta₂O₅
 - C03C 2217/219 ... CrO_x, MoO_x, WO_x
 - C03C 2217/22 ... ZrO₂
 - C03C 2217/228 ... Other specific oxides
 - C03C 2217/229 ... Non-specific enumeration
 - C03C 2217/23 ... Mixtures
 - C03C 2217/231 In₂O₃/SnO₂
 - C03C 2217/232 CdO/SnO₂
 - 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