

SECTION C — CHEMISTRY; METALLURGY

C03 GLASS; MINERAL OR SLAG WOOL

C03B MANUFACTURE OR SHAPING OF GLASS, OR OF MINERAL OR SLAG WOOL; SUPPLEMENTARY PROCESSES IN THE MANUFACTURE OR SHAPING OF GLASS, OR OF MINERAL OR SLAG WOOL (surface treatment C03C)

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MANUFACTURE OF GLASS

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Melting the raw material**1/00 Preparing the batches**

- 1/02 • Compacting the glass batches, e.g. pelletising [5]

3/00 Charging the melting furnaces

- 3/02 • combined with preheating, premelting or pretreating the glass-making ingredients, pellets or cullet [5]

5/00 Melting in furnaces; Furnaces so far as specially adapted for glass manufacture

- 5/02 • in electric furnaces
- 5/027 • • by passing an electric current between electrodes immersed in the glass bath, i.e. by direct resistance heating [3]
- 5/03 • • • Tank furnaces [5]
- 5/033 • • by using resistance heaters above or in the glass bath, i.e. by indirect resistance heating [3]

Note(s)

Group C03B 5/02 takes precedence over groups C03B 5/04-C03B 5/14.

- 5/04 • in tank furnaces
- 5/05 • • Discontinuously-working tank furnaces, e.g. day tanks [5]
- 5/06 • in pot furnaces
- 5/08 • • Glass-melting pots
- 5/10 • in combined tank furnaces and pots
- 5/12 • in shaft furnaces

- 5/14 • in revolving cylindrical furnaces
- 5/16 • Special features of the melting process; Auxiliary means specially adapted for glass-melting furnaces
- 5/167 • • Means for preventing damage to equipment, e.g. by molten glass, hot gases, batches (C03B 5/20, C03B 5/42 take precedence) [5]
- 5/173 • • Apparatus for changing the composition of the molten glass in glass furnaces, e.g. for colouring the molten glass (chemical aspects C03C) [5]
- 5/18 • • Stirring devices; Homogenisation
- 5/182 • • • by moving the molten glass along fixed elements, e.g. deflectors, weirs, baffle plates [5]
- 5/183 • • • using thermal means, e.g. for creating convection currents [5]
- 5/185 • • • • Electric means [5]
- 5/187 • • • with moving elements [3]
- 5/193 • • • using gas, e.g. bubblers [3]
- 5/20 • • Bridges, shoes, throats, or other devices for withholding dirt, foam, or batch
- 5/225 • • Refining (C03B 5/18 takes precedence) [3]
- 5/23 • • Cooling the molten glass (C03B 5/18, C03B 5/225 take precedence) [3]
- 5/235 • • Heating the glass (C03B 5/02, C03B 5/18, C03B 5/225 take precedence) [3]
- 5/237 • • • Regenerators or recuperators specially adapted for glass-melting furnaces [5]
- 5/24 • • Automatically regulating the melting process
- 5/26 • • Outlets; Overflows

C03B

- 5/28 • • Siphons
- 5/42 • • Details of construction of furnace walls, e.g. to prevent corrosion; Use of materials for furnace walls [3]
- 5/425 • • • Preventing corrosion or erosion (C03B 5/44 takes precedence) [5]
- 5/43 • • • Use of materials for furnace walls, e.g. fire-bricks [5]
- 5/435 • • • Heating arrangements for furnace walls [5]
- 5/44 • • • Cooling arrangements for furnace walls [3]
- 7/00 Distributors for the molten glass; Means for taking-off charges of molten glass; Producing the gob**
- 7/01 • Means for taking-off charges of molten glass [5]
- 7/02 • Forehearth, i.e. feeder channels [3]
- 7/04 • • Revolving forehearth [3]
- 7/06 • • Means for thermal conditioning or controlling the temperature of the glass [3]
- 7/07 • • • Electric means [5]
- 7/08 • Feeder spouts, e.g. gob feeders [3]
- 7/082 • • Pneumatic feeders [5]
- 7/084 • • Tube mechanisms [5]
- 7/086 • • Plunger mechanisms [5]
- 7/088 • • Outlets, e.g. orifice rings [5]
- 7/09 • • Spout blocks [5]
- 7/092 • • Stirring devices; Homogenisation (C03B 5/18 takes precedence) [5]
- 7/094 • • Means for heating, cooling or insulation [5]
- 7/096 • • • for heating [5]
- 7/098 • • • electric [5]
- 7/10 • Cutting-off the glass flow with the aid of knives or scissors; Construction of the blades used [3]
- 7/11 • • Construction of the blades [5]
- 7/12 • • Cutting-off a free-hanging glass stream [3]
- 7/14 • Transferring molten glass or gobs to glass blowing or pressing machines (C03B 7/18-C03B 7/22 take precedence) [3]
- 7/16 • • using deflector chutes [3]
- 7/18 • Suction feeders [3]
- 7/20 • Scoop feeders [3]
- 7/22 • Gathering-devices in the form of rods or pipes [3]

8/00 Production of glass by other processes than melting processes (C03B 37/014 takes precedence; preparation of finely divided silica, in general C01B 33/18) [4]

- 8/02 • by liquid phase reaction processes [4]
- 8/04 • by gas phase reaction processes [4]

Shaping of glass

9/00 Blowing glass; Production of hollow glass articles

- 9/02 • with the mouth; Auxiliary means therefor
- 9/03 • • Blow pipes [3]
- 9/04 • • Making hollow glass articles with feet or projections
- 9/06 • • Making hollow glass articles with double walls, e.g. vacuum flasks
- 9/08 • Finish-blowing with compressed air of blanks blown with the mouth
- 9/10 • Blowing glass cylinders for sheet manufacture
- 9/12 • starting from a ribbon of glass; Ribbon machines
- 9/13 • in gob feeder machines (C03B 9/28, C03B 9/29 take precedence) [3]

- 9/14 • • in "blow" machines or in "blow-and-blow" machines (C03B 9/193, C03B 9/20 take precedence) [3]
- 9/16 • • • in machines with turn-over moulds [3]
- 9/18 • • • • Rotary-table machines [3]
- 9/19 • • • • • having only one rotary table [3]
- 9/193 • • in "press-and-blow" machines [3]
- 9/195 • • • Rotary-table machines [3]
- 9/197 • • • Construction of the blank mould [3]
- 9/20 • in "vacuum blowing" or in "vacuum-and-blow" machines
- 9/22 • • Rotary table machines
- 9/24 • • Construction of the blank mould
- 9/28 • in machines of the endless-chain type (C03B 9/12 takes precedence) [3]
- 9/29 • Paste mould machines (C03B 9/28 takes precedence) [3]
- 9/295 • • Rotary table machines [5]
- 9/30 • Details of blowing glass (for blowing with the mouth C03B 9/02); Use of materials for the moulds
- 9/31 • • Blowing laminated glass articles or glass with enclosures, e.g. wires, bubbles [5]
- 9/32 • • Giving special shapes to parts of hollow glass articles
- 9/325 • • • Forming screw threads or lips at the mouth of hollow glass articles; Neck moulds [3]
- 9/33 • • • Making hollow glass articles with feet or projections; Moulds therefor [3]
- 9/335 • • • Forming bottoms to blown hollow glass articles; Bottom moulds [3]
- 9/34 • • Glass-blowing moulds not otherwise provided for
- 9/347 • • • Construction of the blank or blow mould [3]
- 9/353 • • • Mould holders [3]
- 9/36 • • Blow heads; Supplying, ejecting, or controlling the air
- 9/38 • • Means for cooling, heating, or insulating glass-blowing machines
- 9/40 • • Gearing or controlling mechanisms specially adapted for glass-blowing machines
- 9/41 • • • Electric or electronic systems (in general G05B 19/00) [5]
- 9/42 • • Means for fusing, burning-off, or edge-melting combined with glass-blowing machines (uniting glass pieces by fusing C03B 23/20)
- 9/44 • • Means for discharging combined with glass-blowing machines, e.g. take-outs
- 9/447 • • • Means for the removal of glass articles from the blow-mould, e.g. take-outs [5]
- 9/453 • • • Means for pushing newly formed glass articles onto a conveyer, e.g. sweep-out mechanisms; Dead-plate mechanisms [5]
- 9/46 • • Means for cutting the hot glass in glass-blowing machines (burning-off C03B 9/42)
- 9/48 • • Use of materials for the moulds [3]

11/00 Pressing glass

- 11/02 • in machines with rotary tables
- 11/04 • in machines with moulds fed by suction
- 11/05 • in machines with reciprocating moulds [3]
- 11/06 • Construction of plunger or mould
- 11/07 • • Suction moulds [3]
- 11/08 • • for making solid articles, e.g. lenses
- 11/10 • • for making hollow articles
- 11/12 • Cooling, heating, or insulating the plunger, the mould, or the glass-pressing machine (C03B 9/38 takes precedence) [3]

- 11/14 • with metal inserts
- 11/16 • Gearing or controlling mechanisms specially adapted for glass presses
- 13/00 Rolling glass**
- 13/01 • Rolling profiled glass articles [5]
- 13/02 • Rolling non-patterned sheets discontinuously
- 13/04 • Rolling non-patterned sheets continuously
- 13/06 • Rolling corrugated sheets
- 13/08 • Rolling patterned sheets
- 13/10 • Rolling multi-layer sheets
- 13/12 • Rolling glass with enclosures, e.g. wire or asbestos
- 13/14 • Rolling other articles
- 13/16 • Construction of the glass rollers
- 13/18 • Auxiliary means for rolling glass, e.g. sheet supports, gripping devices, hand-ladles, means for moving glass pots
- 15/00 Drawing glass upwardly from the melt**
- 15/02 • Drawing glass sheets
- 15/04 • • from the free surface of the melt
- 15/06 • • from a debiteuse
- 15/08 • • by means of bars below the surface of the melt
- 15/10 • • multi-layer glass sheets or glass sheets coated with coloured layers
- 15/12 • • Construction of the annealing tower
- 15/14 • Drawing tubes, cylinders, or rods from the melt
- 15/16 • • Drawing tubes, cylinders, or rods, coated with coloured layers
- 15/18 • Means for laying-down and conveying combined with the drawing of glass sheets, tubes, or rods
- 17/00 Forming glass by flowing out, pushing-out, or drawing downwardly or laterally from forming slits or by overflowing over lips**
- 17/02 • Forming glass coated with coloured layers
- 17/04 • Forming tubes or rods by drawing from stationary or rotating tools or from forming nozzles
- 17/06 • Forming glass sheets [3]
- 18/00 Shaping glass in contact with the surface of a liquid**
- 18/02 • Forming sheets
- 18/04 • • Changing or regulating the dimensions of the molten glass ribbon [3]
- 18/06 • • • using mechanical means, e.g. restrictor bars, edge rollers [3]
- 18/08 • • • using gas [3]
- 18/10 • • • using electric means [3]
- 18/12 • • Making multilayer, coloured or armoured glass (chemical aspects C03C) [3]
- 18/14 • • Changing the surface of the glass ribbon, e.g. roughening (by chemical methods C03C) [3]
- 18/16 • • Construction of the float tank; Use of material for the float tank; Coating or protection of the tank wall [3]
- 18/18 • • Controlling or regulating the temperature of the float bath; Composition or purification of the float bath [3]
- 18/20 • • Composition of the atmosphere above the float bath; Treating or purifying the atmosphere above the float bath [3]
- 18/22 • • • Controlling or regulating the temperature of the atmosphere above the float tank [3]
- 19/00 Other methods of shaping glass** (manufacture or treatment of flakes, fibres, or filaments from softened glass, minerals, or slags C03B 37/00)
- 19/01 • by progressive fusion of powdered glass onto a shaping substrate, i.e. accretion [5]
- 19/02 • by casting
- 19/04 • by centrifuging
- 19/06 • by sintering (production of quartz or fused silica articles C03B 20/00) [2]
- 19/08 • by foaming
- 19/09 • by fusing powdered glass in a shaping mould [3]
- 19/10 • Forming beads
- 19/12 • by liquid-phase reaction processes [5]
- 19/14 • by gas-phase reaction processes [5]
- 20/00 Processes specially adapted for the production of quartz or fused silica articles [3]**
- 21/00 Severing glass sheets, tubes, or rods while still plastic**
- 21/02 • by cutting (C03B 9/46 takes precedence)
- 21/04 • by punching out
- 21/06 • by flashing-off, burning-off, or fusing (C03B 9/42 takes precedence) [3]
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- 23/00 Re-forming shaped glass** (re-forming fibres or filaments C03B 37/14)
- 23/02 • Re-forming glass sheets
- 23/023 • • by bending [3]
- 23/025 • • • by gravity [3]
- 23/027 • • • • with moulds having at least two upward pivotable mould sections [3]
- 23/03 • • • by press-bending between shaping moulds [3]
- 23/031 • • • • the glass sheets being in a vertical position (C03B 23/033 takes precedence) [5]
- 23/033 • • • • in a continuous way, e.g. roll forming [3]
- 23/035 • • • • using a gas cushion or by changing gas pressure, e.g. by applying vacuum [3]
- 23/037 • • by drawing [3]
- 23/04 • Re-forming tubes or rods
- 23/043 • • Heating devices specially adapted for re-forming tubes or rods in general, e.g. burners [5]
- 23/045 • • Tools or apparatus specially adapted for re-forming tubes or rods in general, e.g. glass lathes, chucks (C03B 23/043 takes precedence) [5]
- 23/047 • • by drawing (C03B 37/025 takes precedence) [5]
- 23/049 • • by pressing (C03B 21/04, C03B 23/26 take precedence) [5]
- 23/051 • • by gravity, e.g. sagging [5]
- 23/053 • • by centrifuging (C03B 37/04 takes precedence) [5]
- 23/055 • • by rolling [5]
- 23/057 • • by fusing, e.g. for flame sealing (C03B 9/42, C03B 21/06, C03B 33/08 take precedence) [5]
- 23/06 • • by bending
- 23/07 • • by blowing, e.g. for making electric bulbs [3]
- 23/08 • • to exact dimensions, e.g. calibrating
- 23/09 • • Reshaping the ends, e.g. as grooves, threads or mouths [3]
- 23/11 • • Reshaping by drawing without blowing, in combination with separating, e.g. for making ampoules [3]
- 23/13 • • Reshaping combined with uniting or heat sealing, e.g. making vacuum bottles [3]
- 23/18 • Re-forming and sealing ampoules
- 23/20 • Uniting glass pieces by fusing without substantial reshaping
- 23/203 • • Uniting glass sheets (C03B 23/24 takes precedence) [3]

C03B

- 23/207 • • • Uniting glass rods, glass tubes, or hollow glassware (C03B 23/24 takes precedence) [3]
- 23/213 • • • Joining projections or feet [3]
- 23/217 • • • for the production of cathode ray tubes or similarly shaped tubes [3]
- 23/22 • • • Uniting glass lenses, e.g. forming bifocal lenses
- 23/24 • • • Making hollow glass sheets or bricks
- 23/26 • • • Punching reheated glass

After-treatment of glass product

25/00 Annealing glass products (after-treatment of fibres C03B 37/10)

- 25/02 • • • in a discontinuous way
- 25/04 • • • in a continuous way
- 25/06 • • • with horizontal displacement of the glass products [3]
- 25/08 • • • of glass sheets [3]
- 25/087 • • • • being in a vertical position [5]
- 25/093 • • • • being in a horizontal position on a fluid support, e.g. a gas or molten metal [5]
- 25/10 • • • with vertical displacement of the glass products [3]
- 25/12 • • • of glass sheets [3]

27/00 Tempering glass products (after-treatment of fibres C03B 37/10)

- 27/004 • • • by bringing the hot glass product in contact with a solid cooling surface, e.g. sand grains [5]
- 27/008 • • • by using heat of sublimation of solid particles [5]
- 27/012 • • • by heat treatment, e.g. for crystallisation; Heat treatment of glass products before tempering by cooling (C03B 27/008, C03B 27/016 take precedence) [5]
- 27/016 • • • by absorbing heat radiated from the glass product [5]
- 27/02 • • • using liquid [3, 5]
- 27/03 • • • the liquid being a molten metal or a molten salt [5]
- 27/04 • • • using gas [3]
- 27/044 • • • for flat or bent glass sheets being in a horizontal position [5]
- 27/048 • • • • on a gas cushion [5]
- 27/052 • • • for flat or bent glass sheets being in a vertical position [5]
- 27/056 • • • supported on the lower edge [5]
- 27/06 • • • for glass products other than flat or bent glass plates, e.g. hollow glassware, lenses [3]

29/00 Reheating glass products for softening or fusing their surfaces; Fire-polishing; Fusing of margins (after-treatment of fibres C03B 37/10)

- 29/02 • • • in a discontinuous way
- 29/04 • • • in a continuous way
- 29/06 • • • with horizontal displacement of the products [5]
- 29/08 • • • • Glass sheets [5]
- 29/10 • • • • being in a vertical position [5]
- 29/12 • • • • being in a horizontal position on a fluid support, e.g. a gas or molten metal [5]
- 29/14 • • • with vertical displacement of the products [5]
- 29/16 • • • • Glass sheets [5]

31/00 Manufacture of rippled or crackled glass

32/00 Thermal after-treatment of glass products not provided for in groups C03B 25/00-C03B 31/00, e.g. crystallisation, eliminating gas inclusions or other impurities (after-treatment of fibres C03B 37/10) [2]

- 32/02 • • • Thermal crystallisation, e.g. for crystallising glass bodies into glass-ceramic articles [5]

33/00 Severing cooled glass (severing glass fibres C03B 37/16)

- 33/02 • • • Cutting or splitting sheet glass; Apparatus or machines therefor (C03B 33/09 takes precedence; glass-cutting tools C03B 33/10) [3]
- 33/023 • • • the sheet being in a horizontal position [5]
- 33/027 • • • • Scoring tool holders; Driving mechanisms therefor [5]
- 33/03 • • • • Glass cutting tables; Apparatus for transporting or handling sheet glass during the cutting or breaking operations [5]
- 33/033 • • • • Apparatus for opening score lines in glass sheets [5]
- 33/037 • • • • Controlling or regulating [5]
- 33/04 • • • Cutting or splitting in curves, especially for making spectacle lenses
- 33/06 • • • Cutting or splitting glass tubes, rods, or hollow products (C03B 33/09 takes precedence) [3]
- 33/07 • • • Cutting armoured or laminated glass products [3]
- 33/08 • • • by fusing
- 33/085 • • • Tubes, rods or hollow products [5]
- 33/09 • • • by thermal shock [3]
- 33/095 • • • Tubes, rods or hollow products [5]
- 33/10 • • • Glass-cutting tools, e.g. scoring tools
- 33/12 • • • Hand tools [3]
- 33/14 • • • • specially adapted for cutting tubes, rods or hollow products [5]

35/00 Transporting of glass products during their manufacture (conveying systems for fragile sheets, e.g. glass, B65G 49/06) [2]

- 35/04 • • • Transporting of hot hollow glass products (C03B 35/26 takes precedence) [3]
- 35/06 • • • Feeding of hot hollow glass products into annealing or heating kilns [3]
- 35/08 • • • • using rotary means directly acting on the products [3]
- 35/10 • • • • using reciprocating means directly acting on the products, e.g. pushers, stackers [3]
- 35/12 • • • • by picking-up and depositing [3]
- 35/14 • • • Transporting hot glass sheets [3]
- 35/16 • • • by roller conveyers [3]
- 35/18 • • • • Construction of the conveyer rollers [3]
- 35/20 • • • by gripping tongs or supporting frames [3]
- 35/22 • • • on a fluid support bed, e.g. on molten metal [3]
- 35/24 • • • • on a gas support bed [3]
- 35/26 • • • Transporting of glass tubes or rods [3]

37/00 Manufacture or treatment of flakes, fibres, or filaments from softened glass, minerals, or slags

- 37/005 • • • Manufacture of flakes [5]
- 37/01 • • • Manufacture of glass fibres or filaments [3]
- 37/012 • • • • Manufacture of preforms for drawing fibres or filaments [4]
- 37/014 • • • • made entirely or partially by chemical means [4]
- 37/016 • • • • by a liquid phase reaction process, e.g. through a gel phase [4]

- 37/018 • • • • by glass deposition on a glass substrate, e.g. by chemical vapour deposition (C03B 37/016 takes precedence; surface treatment of glass by coating with glass C03C 17/02) [4]
- 37/02 • • • by drawing or extruding (C03B 37/04 takes precedence) [3]
- 37/022 • • • • from molten glass in which the resultant product consists of different sorts of glass or is characterised by shape, e.g. hollow fibres [4]
- 37/023 • • • • Fibres composed of different sorts of glass, e.g. fibre optics [4]
- 37/025 • • • • from reheated softened tubes, rods, fibres or filaments [3]
- 37/026 • • • • Drawing fibres reinforced with a metal wire [5]
- 37/027 • • • • Fibres composed of different sorts of glass, e.g. fibre optics (C03B 37/028 takes precedence) [4]
- 37/028 • • • • Drawing fibre bundles, e.g. for making fibre bundles of multifibres [4]
- 37/029 • • • • Furnaces therefor [5]
- 37/03 • • • Drawing means, e.g. drawing drums [3]
- 37/035 • • • • having means for deflecting or stripping-off fibres [3]
- 37/04 • • • by using centrifugal force [3]
- 37/05 • • • • by projecting on a rotating body having no radial orifices [3]
- 37/06 • • • by blasting or blowing molten glass, e.g. for making staple fibres [3]
- 37/065 • • • • starting from tubes, rods, fibres, or filaments [3]
- 37/07 • • Controlling or regulating (controlling or regulating in general G05) [3]
- 37/075 • • Manufacture of fibres or filaments consisting of different sorts of glass or characterised by shape, e.g. hollow fibres, undulated fibres (C03B 37/022, C03B 37/027, C03B 37/028 take precedence) [3, 4]
- 37/08 • • Bushings; Spinnerettes; Nozzles; Nozzle plates (nozzles in general B05B)
- 37/081 • • Indirect-melting bushings [5]
- 37/083 • • Nozzles; Bushing nozzle plates (C03B 37/095 takes precedence) [5]
- 37/085 • • Feeding devices therefor [3]
- 37/09 • • electrically heated [3]
- 37/092 • • • Direct-resistance heating [5]
- 37/095 • • Use of materials therefor [3]
- 37/10 • • Non-chemical treatment (C03C 25/00 takes precedence; yarns or threads D02; woven fabrics D03; non-woven fabrics D04)
- 37/12 • • • of fibres or filaments during winding up [3]
- 37/14 • • Re-forming fibres or filaments (C03B 37/025 takes precedence) [3]
- 37/15 • • • with heat application, e.g. for making optical fibres (fusion-splicing of light guides G02B 6/255; treatment of light guides to shape optical elements G02B 6/287) [5]
- 37/16 • • Cutting or severing (light guides G02B 6/25) [3, 5]
- 40/00 Preventing adhesion between glass and glass or between glass and the means used to shape it [3]**
- 40/02 • • by lubrication; Use of materials as release or lubricating compositions [3]
- 40/027 • • Apparatus for applying lubricants to glass shaping moulds or tools [5]
- 40/033 • • Means for preventing adhesion between glass and glass [5]
- 40/04 • • using gas [3]