

ECLA EUROPEAN CLASSIFICATION

C03B MANUFACTURE, SHAPING, OR SUPPLEMENTARY PROCESSES

[N: **WARNING**

[N0308] The following IPC groups are not used in the internal ECLA classification system. Subject matter covered by these groups is classified in the following ECLA groups:

[C03B8/00](#) covered by [C03B19/00](#), [C03B37/00](#)
[C03B8/02](#) covered by [C03B19/10B9B](#), [C03B19/12](#), [C03B37/01B](#),
[C03B37/016](#)
[C03B8/04](#) covered by [C03B19/10B9](#), [C03B19/14](#), [C03B37/014](#)
]

Guide heading: Melting the raw material

C03B1/00 Preparing the batches (chemical compositions [C03C](#))

C03B1/02 . Compacting the glass batches, e.g. pelletising

C03B3/00 Charging the melting furnaces

C03B3/00B . [N: using screw feeders][N0409]

C03B3/02 . combined with preheating, premelting or pretreating the glass-making ingredients, pellets or cullet

C03B3/02A . . [N: Preheating] [N1109]

C03B3/02B . . [N: by charging the ingredients into a flame, through a burner or equivalent heating means used to heat the melting furnace][N0409]

C03B5/00 Melting in furnaces; Furnaces so far as specially adapted for glass manufacture

C03B5/00B . [N: of glass-forming waste materials (disposal or transformation of solid waste in general [B09B](#); treatment of radioactive waste [G21F9/00](#))] [N9601]

C03B5/02 . in electric furnaces, [N: e.g. by dielectric heating (electric heating in general H05B)] [C1109]

C03B5/02B . . [N: by induction heating] [N9702]

C03B5/02C . . [N: by microwave heating] [N9702]

C03B5/02D . . [N: by arc discharge or plasma heating] [N9702]

C03B5/027 . . by passing an electric current between electrodes immersed in the glass bath, i.e. by direct resistance heating

C03B5/027C . . . [N: Pot furnaces]

C03B5/027D . . . [N: Shaft furnaces ([C03B5/027E](#) takes precedence)]

C03B5/027E . . . [N: Rotary furnaces]

C03B5/03 . . . Tank furnaces

C03B5/03B [N: Cold top tank furnaces]

- C03B5/033 . . . by using resistance heaters above or in the glass bath, i.e. by indirect resistance heating
- C03B5/033B . . . [N: Tank furnaces]
- C03B5/033C . . . [N: Pot furnaces; Core furnaces]
- C03B5/033D . . . [N: Shaft furnaces ([C03B5/033E](#) takes precedence)]
- C03B5/033E . . . [N: Rotary furnaces]

- C03B5/04 . . . in tank furnaces [N: ([C03B5/02](#) takes precedence)] [C9510]
- C03B5/05 . . . Discontinuously-working tank furnaces, e.g. day tanks

- C03B5/06 . . . in pot furnaces [N: ([C03B5/02](#) takes precedence)] [C9510]
- C03B5/08 . . . Glass-melting pots

- C03B5/10 . . . in combined tank furnaces and pots [N: ([C03B5/02](#) takes precedence)] [C9510]

- C03B5/12 . . . in shaft furnaces [N: ([C03B5/02](#) takes precedence)] [C9510]

- C03B5/14 . . . in revolving cylindrical furnaces [N: ([C03B5/02](#) takes precedence)] [C9510]

- C03B5/16 . . . Special features of the melting process; Auxiliary means specially adapted for glass-melting furnaces
- C03B5/16B . . . [N: Electrochemical treatments, e.g. to prevent bubbling or to create bubbles ([C03B5/169](#), [C03B5/185](#) take precedence)] [N1106]
- C03B5/167 . . . Means for preventing damage to equipment, e.g. by molten glass, hot gases, batches ([C03B5/20](#), [C03B5/42](#) take precedence)
- C03B5/167B [N: Use of materials therefor]
- C03B5/167B2 [N: Platinum group metals][N0409]
- C03B5/167D [N: by use of electrochemically protection means, e.g. passivation of electrodes] [N1106]
- C03B5/173 . . . Apparatus for changing the composition of the molten glass in glass furnaces, e.g. for colouring the molten glass ([chemical aspects C03C](#))
- C03B5/18 . . . Stirring devices; Homogenisation [N: ([mixing in general B01F](#))] [C1109]
- C03B5/182 by moving the molten glass along fixed elements, e.g. deflectors, weirs, baffle plates
- C03B5/183 using thermal means, e.g. for creating convection currents
- C03B5/185 Electric means
- C03B5/187 with moving elements
- C03B5/187B [N: of the screw or pump-action type][N0409]
- C03B5/193 using gas, e.g. bubblers
- C03B5/20 . . . Bridges, shoes, throats, or other devices for withholding dirt, foam, or batch
- C03B5/20B [N: Devices for blowing onto the melt surface, e.g. high momentum burners][N0409]
- C03B5/20C [N: Mechanical means for skimming or scraping the melt surface][N0409]
- C03B5/20D [N: Foraminous or mesh screens, e.g. submerged sieves][N0409]
- C03B5/225 . . . Refining ([C03B5/18](#) takes precedence; [N: Refining agents [C03C1/00C](#)]) [C9702]
- C03B5/225B [N: under reduced pressure, e.g. with vacuum refiners] [N9702]
- C03B5/225C [N: by centrifuging] [N9702]

- C03B5/225D . . . [N: by thin-layer fining][N0409]
- C03B5/23 . . . Cooling the molten glass ([C03B5/18](#), [C03B5/225](#) take precedence)
- C03B5/235 . . . Heating the glass ([C03B5/02](#), [C03B5/18](#), [C03B5/225](#) take precedence)
- [N: **Note**
Devices for withholding dirt, foam, or batch are also classified in [C03B5/20B](#)
]
- C03B5/235B . . . [N: by combustion with pure oxygen or oxygen-enriched air, e.g. using oxy-fuel burners or oxygen lances] [N9610]
- C03B5/235C . . . [N: Submerged heating, e.g. by using heat pipes, hot gas or submerged combustion burners (**bubblers** [C03B5/193](#))] [N9610]
- C03B5/237 . . . Regenerators or recuperators specially adapted for glass-melting furnaces
- C03B5/237B [N: Regenerator brick design (**brick shapes in general** [F27D1/04A](#)); Use of materials therefor; Brick stacking arrangements][N0409]
- C03B5/24 . . . Automatically regulating the melting process
- C03B5/24B [N: Regulating the melt or batch level, depth or thickness][N0409]
- C03B5/26 . . . Outlets, [N: e.g. drains, siphons]; Overflows, [N: e.g. for supplying the float tank, tweels] [C1106]
- C03B5/26D [N: Drains, i.e. means to dump glass melt or remove unwanted materials] [N0409]
- C03B5/26F [N: Overflows; Lips; Tweels][N0409]
- C03B5/26F2 [N: specially adapted for supplying the float tank][N0409]
- C03B5/28 . . . Siphons
- C03B5/42 . . . Details of construction of furnace walls, e.g. to prevent corrosion; Use of materials for furnace walls
- C03B5/425 . . . Preventing corrosion or erosion ([C03B5/44](#) takes precedence)
- C03B5/43 . . . Use of materials for furnace walls, e.g. fire-bricks
- C03B5/435 . . . Heating arrangements for furnace walls
- C03B5/44 . . . Cooling arrangements for furnace walls
- C03B7/00** **Distributors for the molten glass; Means for taking-off charges of molten glass; Producing the gob, [N: e.g. controlling the gob shape, weight or delivery tact] [C0412]**
- C03B7/00C . . [N: Controlling, regulating or measuring] [N1109]
- C03B7/01 . . Means for taking-off charges of molten glass [N: ([C03B7/08](#), [C03B7/14](#) to [C03B7/22](#) take precedence)]
- C03B7/02 . . Forehearth, i.e. feeder channels
- C03B7/04 . . . Revolving forehearths
- C03B7/06 . . . Means for thermal conditioning or controlling the temperature of the glass
- C03B7/06B [N: by combustion with pure oxygen or oxygen-enriched air] [N9610]
- C03B7/07 Electric means
- C03B7/08 . . Feeder spouts, e.g. gob feeders
- C03B7/082 . . . Pneumatic feeders
- C03B7/084 . . . Tube mechanisms

- C03B7/086 . . Plunger mechanisms
- C03B7/088 . . Outlets, e.g. orifice rings
- C03B7/09 . . Spout blocks
- C03B7/092 . . Stirring devices; Homogenisation ([C03B5/18](#) takes precedence)
- C03B7/094 . . Means for heating, cooling or insulation
- C03B7/096 . . . for heating
- C03B7/098 electric

- C03B7/10 . Cutting-off [N: or severing] the glass flow with the aid of knives or scissors [N: or non-contacting cutting means, e.g. a gas jet]; Construction of the blades used [C0412]
- C03B7/11 . . Construction of the blades
- C03B7/12 . . Cutting-off [N: or severing] a free-hanging glass stream, [N: e.g. by the combination of gravity and surface tension forces] [C0412]

- C03B7/14 . Transferring molten glass or gobs to glass blowing or pressing machines ([C03B7/18](#) to [C03B7/22](#) take precedence)
- C03B7/16 . . using deflector chutes
- C03B7/18 . Suction feeders
- C03B7/20 . Scoop feeders
- C03B7/22 . Gathering-devices in the form of rods or pipes

Guide heading: **Shaping of glass** ([manufacture of fibres C03B37/00](#))

C03B9/00 Blowing glass; Production of hollow glass articles

- C03B9/02 . with the mouth; Auxiliary means therefor
- C03B9/03 . . Blow pipes
- C03B9/04 . . Making hollow glass articles with feet or projections
- C03B9/06 . . Making hollow glass articles with double walls, e.g. vacuum flasks

- C03B9/08 . Finish-blowing with compressed air of blanks blown with the mouth

- C03B9/10 . Blowing glass cylinders for sheet manufacture

- C03B9/12 . starting from a ribbon of glass; Ribbon machines

- C03B9/13 . in gob feeder machines ([C03B9/28](#), [C03B9/29](#) take precedence)
- C03B9/14 . . in "blow" machines or in "blow-and-blow" machines ([C03B9/193](#), [C03B9/20](#) take precedence)
- C03B9/14B . . . [N: Details of machines without turn-over moulds]
- C03B9/16 . . . in machines with turn-over moulds
- C03B9/16B [N: Details of such machines, e.g. guide funnels, turn-over mechanisms ([C03B9/18](#) takes precedence)] [C0308]
- C03B9/18 Rotary-table machines

- C03B9/18B [N: having at least two rotary tables]
- C03B9/19 having only one rotary table
- C03B9/193 . . . in "press-and-blow" machines
- C03B9/193B [N: Details of such machines, e.g. plungers or plunger mechanisms for the press-and-blow machine, cooling of plungers (C03B9/195 takes precedence) [C0308]]
- C03B9/193B1 [N: Mechanical displacement means of the plunger] [N0607]
- C03B9/193B2 [N: Hydraulic or pneumatic displacement means of the plunger] [N0607]
- C03B9/193B3 [N: Electrical means for the displacement of the plunger] [N1007]
- C03B9/195 Rotary-table machines
- C03B9/195B [N: having at least two rotary tables]
- C03B9/197 Construction of the blank mould

- C03B9/20 . . . in "vacuum blowing" or in "vacuum-and-blow" machines
- C03B9/22 . . . Rotary-table machines
- C03B9/22B [N: having at least two rotary tables]
- C03B9/24 . . . Construction of the blank mould

- C03B9/28 . . . in machines of the endless-chain type (C03B9/12 takes precedence)

- C03B9/29 . . . Paste mould machines (C03B9/28 takes precedence)
- C03B9/29B [N: Details of such machines (C03B9/295 takes precedence)]
- C03B9/295 Rotary-table machines
- C03B9/295B [N: having at least two rotary tables]

- C03B9/30 . . . Details of blowing glass (for blowing with the mouth C03B9/02); Use of materials for the moulds
- C03B9/31 . . . Blowing laminated glass articles or glass with enclosures, e.g. wires, bubbles
- C03B9/32 . . . Giving special shapes to parts of hollow glass articles
- C03B9/325 Forming screw-threads or lips at the mouth of hollow glass articles; Neck moulds
- C03B9/33 Making hollow glass articles with feet or projections; Moulds therefor
- C03B9/335 Forming bottoms to blown hollow glass articles; Bottom moulds
- C03B9/34 . . . Glass-blowing moulds not otherwise provided for
- C03B9/34B [N: Neck moulds (C03B9/325 takes precedence)]
- C03B9/34C [N: Bottom moulds (C03B9/335 takes precedence)]
- C03B9/347 Construction of the blank or blow mould
- C03B9/353 Mould holders; [N: Mould opening and closing mechanisms] [C0308]
- C03B9/353A [N: Mechanisms for holders of half moulds moving by rotation about a common vertical axis] [N0509] [C0605]
- C03B9/353A1 [N: with the half moulds parallel upon opening and closing] [N0509] [C0605]
- C03B9/353B [N: Mechanisms for holders of half moulds moving by linear translation] [N0509] [C0605]
- C03B9/36 . . . Blow heads; Supplying, ejecting or controlling the air
- C03B9/36B [N: Selection or characteristics of the blowing medium, e.g. gas composition,

		moisture content, cryogenic state] [N0507] [C0607]
C03B9/36C	. . .	[N: Means for holding or transferring the blow head] [N0507]
C03B9/36D	. . .	[N: Means for general supply or distribution of the air to the blow heads] [N0507]
C03B9/36D2	. . . .	[N: Manifolds or regulating devices, e.g. valves] [N0507]
C03B9/36E	. . .	[N: Details thereof relating to plungers] [N0507]
C03B9/36F	. . .	[N: Details thereof relating to neck forming] [N0507]
C03B9/36G	. . .	[N: Details thereof relating to internal blowing of the hollow glass] [N0507]
C03B9/36G2	. . . .	[N: using a tube] [N0507]
C03B9/36G2B	. . . . .	[N: Movable tubes] [N0507]
C03B9/36H	. . .	[N: Details thereof relating to bottom forming] [N0507]
C03B9/38	. .	Means for cooling, heating, or insulating glass-blowing machines [N: or for cooling the glass moulded by the machine] [C0308]
C03B9/38B	. . .	[N: Selection or characteristics of the cooling, heating or insulating medium, e.g. gas composition, moisture content, cryogenic state] [N0607] [C0703]
C03B9/38D	. . .	[N: Means for general supply, distribution or control of the medium to the mould, e.g. sensors, circuits, distribution networks] [N0607]
C03B9/38E	. . .	[N: Details thereof relating to plungers] [N0607]
C03B9/38F	. . .	[N: Details thereof relating to neck moulds] [N0607]
C03B9/38G	. . .	[N: Details thereof relating to direct cooling, heating or insulating of the moulded glass] [N0607] [C0703]
C03B9/38G2	. . . .	[N: using a tube for cooling or heating the inside, e.g. blowheads] [N0607] [C0703]
C03B9/38G2B	. . . . .	[N: Movable tubes] [N0607]
C03B9/38H	. . .	[N: Details thereof relating to bottom moulds, e.g. baffles] [N0607] [N0703]
C03B9/38J	. . .	[N: Details thereof relating to the side-wall, body or main part of the moulds] [N0607]
C03B9/38J2	. . . .	[N: Air delivery thereto, e.g. plenum, piping] [N0703]
C03B9/38V	. . .	[N: Manifolds or regulating devices, e.g. valves, injectors] [N0703]
C03B9/40	. .	Gearing or controlling mechanisms specially adapted for glass-blowing machines
C03B9/40B	. . .	[N: Hydraulic or pneumatic systems] [N0607]
C03B9/40B1	. . . .	[N: Manifolds or regulating devices, e.g. valves] [N0607]
C03B9/41	. . .	Electric or electronic systems (in general G05B19/00)
C03B9/42	. .	Means for fusing, burning-off, or edge-melting combined with glass-blowing machines (uniting glass pieces by fusing C03B23/20)
C03B9/44	. .	Means for discharging combined with glass-blowing machines, e.g. take-outs
C03B9/447	. . .	Means for the removal of glass articles from the blow-mould, e.g. take-outs
C03B9/453	. . .	Means for pushing newly formed glass articles onto a conveyer, e.g. sweep-out mechanisms; Dead-plate mechanisms
C03B9/453A	. . . .	[N: Dead-plate mechanisms] [N0512]
C03B9/46	. .	Means for cutting the hot glass in glass-blowing machines (burning-off C03B9/42)
C03B9/48	. .	Use of materials for the moulds
C03B11/00		Pressing [N: molten] glass [N: or performed glass reheated to equivalent low viscosity without blowing (shaping molten glass by a press-blow process C03B9/00 , e.g. C03B9/193 ; re-forming shaped glass C03B23/00 ; re-heating the performed glass C03B29/00 ; transporting the performed or pressed glass during its manufacture C03B35/00)] [C0307]

- C03B11/00B . [N: Pressing under special atmospheres, e.g. inert, reactive, vacuum, clean] [N0307]
- C03B11/02 . in machines with rotary tables
- C03B11/04 . in machines with moulds fed by suction
- C03B11/05 . in machines with reciprocating moulds
- C03B11/06 . Construction of plunger or mould
- C03B11/07 . . Suction moulds
- C03B11/08 . . for making solid articles, e.g. lenses
- C03B11/08B . . . [N: having profiled, patterned or micro-structured surfaces] [N0307]
- C03B11/08C . . . [N: material composition or material properties of press dies therefor] [N0307]
- C03B11/08C2 [N: of coated dies (use of materials as release or lubricating compositions [C03B40/02](#))] [N0307]
- C03B11/08D . . . [N: Flat discs] [N0307]
- C03B11/10 . . for making hollow [N: or semi-hollow] articles [C0307]
- C03B11/12 . Cooling, heating, or insulating the plunger, the mould, or the glass-pressing machine; [N: cooling or heating of the glass in the mould] ([C03B9/38](#) takes precedence) [C0307]
- C03B11/12B . . [N: Heating] [N0307]
- C03B11/12C . . [N: Cooling] [N0307]
- C03B11/12C2 . . . [N: of hollow or semi-hollow articles or their moulds] [N0307]
- C03B11/14 . [N: Pressing laminated glass articles or glass] with metal inserts [N: or enclosures, e.g. wires, bubbles, coloured parts] [C0307]
- C03B11/16 . Gearing or controlling mechanisms specially adapted for glass presses
- C03B13/00** **Rolling [N: molten] glass, [N: i.e. where the molten glass is shaped by rolling (re-forming shaped glass by rolling [C03B23/00F](#), [C03B23/033](#), [C03B23/055](#))] [C0307]**
- C03B13/01 . Rolling profiled glass articles, [N: e.g. with I, L, T cross-sectional profiles] [C0307]
- C03B13/02 . Rolling non-patterned sheets discontinuously
- C03B13/04 . Rolling non-patterned sheets continuously
- C03B13/06 . Rolling corrugated sheets, [N: e.g. with undulating waving form] [C0307]
- C03B13/08 . Rolling patterned sheets, [N: e.g. sheets having a surface pattern] [C0307]
- C03B13/10 . Rolling multi-layer sheets, [N: e.g. sheets having a coloured glass layer] [C0307]
- C03B13/12 . Rolling glass with enclosures, e.g. wire, [N: bubbles, fibres, particles] or asbestos [C0307]
- C03B13/14 . Rolling other articles, [N: i.e. not covered by [C03B13/01](#) to [C03B13/12](#), e.g. channeled articles, briquette-shaped articles] [C0307]

- C03B13/16 . Construction of the glass rollers
- C03B13/18 . Auxiliary means for rolling glass, e.g. sheet supports, gripping devices, hand-ladles, means for moving glass pots
- C03B13/18B . . [N: Receiving tables or roller beds for the rolled plateglass] [C0311]
- C03B13/18C . . [N: Pot gripping devices]

- C03B15/00 Drawing glass upwardly from the melt**

- C03B15/02 . Drawing glass sheets
- C03B15/04 . . from the free surface of the melt
- C03B15/06 . . from a debiteuse
- C03B15/08 . . by means of bars below the surface of the melt
- C03B15/10 . . multi-layer glass sheets or glass sheets coated with coloured layers
- C03B15/12 . . Construction of the annealing tower

- C03B15/14 . Drawing tubes, cylinders, or rods from the melt
- C03B15/16 . . Drawing tubes, cylinders or rods, coated with coloured layers

- C03B15/18 . Means for laying-down and conveying combined with the drawing of glass sheets, tubes or rods

- C03B17/00 Forming [N: molten] glass by flowing-out, pushing-out, [N: extruding] or drawing downwardly or laterally from forming slits or by overflowing over lips [C0311]**

- C03B17/02 . Forming [N: molten] glass coated with coloured layers; [N: Forming molten glass of different compositions or layers; Forming molten glass comprising reinforcements or inserts] [C0311]
- C03B17/02B . . [N: Tubes or rods]

- C03B17/04 . Forming tubes or rods by drawing from stationary or rotating tools or from forming nozzles

- C03B17/06 . Forming glass sheets
- C03B17/06C . . [N: by lateral drawing or extrusion] [N0412]
- C03B17/06C2 . . . [N: combined with flowing onto a solid or gaseous support from which the sheet is drawn] [N0412]
- C03B17/06D . . [N: by the overflow downdraw fusion process; Isopipes therefor] [N0412]
- C03B17/06E . . [N: Forming profiled, patterned or corrugated sheets] [N0412]
- C03B17/06F . . [N: combined with thermal conditioning of the sheets] [N0412]
- C03B17/06G . . [N: Means for providing the drawing force, e.g. traction or draw rollers] [N0412]

- C03B18/00 Shaping glass in contact with the surface of a liquid**

- C03B18/02 . Forming sheets
- C03B18/04 . . Changing or regulating the dimensions of the molten glass ribbon

- C03B18/06 . . . using mechanical means, e.g. restrictor bars, edge rollers
- C03B18/08 . . . using gas
- C03B18/10 . . . using electric means
- C03B18/12 . . Making multi-layer, coloured or armoured glass (chemical aspects [C03C](#))
- C03B18/14 . . Changing the surface of the glass ribbon, e.g. roughening (by chemical methods [C03C](#))
- C03B18/16 . . Construction of the float tank; Use of material for the float tank; Coating or protection of the tank wall
- C03B18/18 . . Controlling or regulating the temperature of the float bath; Composition or purification of the float bath
- C03B18/20 . . Composition of the atmosphere above the float bath; Treating or purifying the atmosphere above the float bath
- C03B18/22 . . . Controlling or regulating the temperature of the atmosphere above the float tank

- C03B19/00** **Other methods of shaping glass** (manufacture or treatment of flakes, fibres or filaments from softened glass, minerals or slags [C03B37/00](#))

- C03B19/01 . by progressive fusion [N: or sintering] of powdered glass onto a shaping substrate, i.e. accretion, [N: e.g. plasma oxidation deposition (making fibre preforms [C03B37/012D5](#))] [C0311]
- C03B19/02 . by casting [N: molten glass, e.g. injection moulding] [C0311]
- C03B19/02B . . [N: by injection moulding, e.g. extrusion] [N1106]
- C03B19/04 . by centrifuging [N: ([C03B19/09B](#) takes precedence)] [C0001]
- C03B19/06 . by sintering, [N: e.g. by cold isostatic pressing of powders and subsequent sintering, by hot pressing of powders, by sintering slurries or dispersions not undergoing a liquid phase reaction] [C0908]
- C03B19/06B . . [N: by hot-pressing powders] [N0412]
- C03B19/06Q . . [N: for the production of quartz or fused silica articles (other processes specially adapted for the production of quartz or fused silica articles [C03B20/00](#))] [N0908]

- C03B19/08 . by foaming

- C03B19/09 . by fusing powdered glass in a shaping mould
- C03B19/09B . . [N: by centrifuging, e.g. arc discharge in rotating mould (crucibles for crystal pulling in general [C30B15/10](#), [C30B35/00B](#))] [N0001] [C1109]

- C03B19/10 . Forming beads
- C03B19/10B . . [N: Forming solid beads (chemical aspects [C03C12/00](#))]
- C03B19/10B2 . . . [N: by casting molten glass into a mould or onto a wire]
- C03B19/10B3 . . . [N: by using centrifugal force or by pouring molten glass onto a rotating cutting body, e.g. shredding]
- C03B19/10B4 . . . [N: by blowing a gas onto a stream of molten glass or onto particulate materials, e.g. pulverising]
- C03B19/10B4B [N: Bead furnaces or burners] [C0412]
- C03B19/10B4B2 [N: Fluidised-bed furnaces]

- C03B19/10B5 . . . [N: by pressing]
- C03B19/10B6 . . . [N: by rolling, e.g. using revolving cylinders, rotating discs, rolls]
- C03B19/10B7 . . . [N: by bringing hot glass in contact with a liquid, e.g. shattering]
- C03B19/10B7B [N: the liquid being a molten metal or salt]
- C03B19/10B8 . . . [N: by extruding, e.g. dripping molten glass in a gaseous atmosphere]
- C03B19/10B9 . . . [N: by chemical vapour deposition; by liquid phase reaction]
- C03B19/10B9B [N: by liquid phase reactions, e.g. by means of a gel phase]
- C03B19/10C . . . [N: Forming hollow beads (chemical aspects [C03C11/00B](#))]
- C03B19/10C2 . . . [N: by blowing, pressing, centrifuging, rolling or dripping]
- C03B19/10D . . . [N: Forming porous, sintered or foamed beads (chemical aspects [C03C11/00](#))]
- C03B19/10D2 . . . [N: by blowing, pressing, centrifuging, rolling or dripping]
- C03B19/10E . . . [N: Glass-melting furnaces specially adapted for making beads]
- C03B19/10F . . . [N: Thermal after-treatment of beads, e.g. tempering, crystallisation, annealing]

- C03B19/12 . . . by liquid-phase reaction processes

- C03B19/14 . . . by gas- [N: or vapour-]phase reaction processes [[C9506](#)]
- C03B19/14A . . . [N: Deposition reactors therefor] [[N0001](#)]
- C03B19/14B . . . [N: Reactant delivery systems] [[N9506](#)] [[C0001](#)]
- C03B19/14B2 [N: Reactant deposition burners] [[N0001](#)]
- C03B19/14B2B [N: Plasma vapour deposition] [[N0311](#)]
- C03B19/14B4 [N: for delivering and depositing additional reactants as liquids or solutions, e.g. solution doping of the article or deposit] [[N9506](#)]
- C03B19/14C . . . [N: Means for after-treatment or catching of worked reactant gases] [[N9506](#)]
- C03B19/14D . . . [N: Thermal after-treatment of the shaped article, e.g. dehydrating, consolidating, sintering] [[N9506](#)]
- C03B19/14D1 [N: for doping the shaped article with fluorine] [[N0607](#)]
- C03B19/14E . . . [N: Means for changing or stabilising the shape or form of the shaped article or deposit] [[N9506](#)]
- C03B19/14F . . . [N: Means for heating during or immediately prior to deposition ([C03B19/14B](#) takes precedence)] [[N9506](#)]
- C03B19/14G . . . [N: Means for supporting, rotating or translating the article being formed] [[N9506](#)]
- C03B19/14G2 [N: Deposition substrates, e.g. targets] [[N9711](#)]

- C03B20/00** **Processes specially adapted for the production of quartz or fused silica articles, [N: not otherwise provided for ([C03B19/01](#), [C03B19/06Q](#), [C03B19/10B9](#), [C03B19/12](#), [C03B19/14](#), [C03B37/00](#) take precedence)] [[C0908](#)]**

- C03B21/00** **Severing glass sheets, tubes or rods while still plastic**

- C03B21/02 . . . by cutting ([C03B9/46](#) takes precedence)
- C03B21/04 . . . by punching out
- C03B21/06 . . . by flashing-off, burning-off or fusing ([C03B9/42](#) takes precedence)

- C03B23/00** **Re-forming shaped glass** (re-forming fibres or filaments [C03B37/14](#))
- C03B23/00B . [N: by drawing ([C03B23/02](#), [C03B23/04](#), [C03B23/18](#) take precedence)] [C9510]
- C03B23/00C . [N: by pressing ([C03B21/04](#), [C03B23/02](#), [C03B23/04](#), [C03B23/18](#), [C03B23/26](#) take precedence)] [C9510]
- C03B23/00C2 . . [N: Re-forming the rim portions]
- C03B23/00D . [N: by gravity, e.g. sagging ([C03B23/02](#), [C03B23/04](#), [C03B23/18](#) take precedence)] [C9510]
- C03B23/00E . [N: by centrifuging ([C03B23/02](#), [C03B23/04](#), [C03B23/18](#) take precedence)] [C9510]
- C03B23/00F . [N: by rolling ([C03B23/02](#), [C03B23/04](#), [C03B23/18](#) take precedence)] [C9510]
- C03B23/00F2 . . [N: Re-forming the rim portions]
- C03B23/00F2B . . . [N: Hand tools therefor]
- C03B23/00G . [N: by fusing, e.g. for flame sealing ([C03B9/42](#), [C03B21/06](#), [C03B23/02](#), [C03B23/04](#), [C03B23/18](#), [C03B33/08](#) take precedence)] [C9510]
- C03B23/00H . [N: by bending ([C03B23/02](#), [C03B23/04](#), [C03B23/18](#) take precedence)] [C9510]
- C03B23/00I . [N: by blowing ([C03B23/02](#), [C03B23/04](#), [C03B23/18](#) take precedence)] [C9510]
- C03B23/00I2 . . [N: Vacuum-blowing]
- C03B23/00J . [N: Heating devices specially adapted for re-forming shaped glass articles in general, e.g. burners ([C03B23/02](#), [C03B23/04](#), [C03B23/18](#) take precedence)] [C9510]
- C03B23/00K . [N: Tools and machines specially adapted for re-forming shaped glass articles in general, e.g. chucks ([C03B23/00J](#), [C03B23/02](#), [C03B23/04](#), [C03B23/18](#) take precedence)] [C9510]
- C03B23/02 . Re-forming glass sheets
- C03B23/023 . . by bending
- C03B23/023D . . . [N: involving applying local or additional heating, cooling or insulating means] [N0707]
- C03B23/025 . . . by gravity
- C03B23/025B [N: by gravity only, e.g. sagging ([C03B23/035](#) takes precedence)]
- C03B23/025B2 [N: in a continuous way, e.g. gravity roll bending] [C0412]
- C03B23/025C [N: Gravity bending accelerated by applying mechanical forces, e.g. inertia, weights or local forces] [C0608]
- C03B23/025D [N: Gravity bending involving applying local or additional heating, cooling or insulating means] [N0608] [C0707]
- C03B23/027 with moulds having at least two upward pivotable mould sections
- C03B23/03 . . . by press-bending between shaping moulds
- C03B23/03B [N: between opposing full-face shaping moulds] [N0710]
- C03B23/03C [N: Press-bending accelerated by applying mechanical forces, e.g. inertia, weights or local forces] [N0608]

- C03B23/03D [N: Press-bending involving applying local or additional heating, cooling or insulating means] [N0608] [C0707]
- C03B23/031 the glass sheets being in a vertical position ([C03B23/033](#) takes precedence)
- C03B23/031B [N: and supported on the lower edge] [C9510]
- C03B23/033 in a continuous way, e.g. roll forming, [N: or press-roll bending] [C0412]
- C03B23/035 using a gas cushion or by changing gas pressure, e.g. by applying vacuum [N: or blowing for supporting the glass while bending] [C0412]
- C03B23/035B [N: by suction or blowing out for providing the deformation force to bend the glass sheet] [C0412]
- C03B23/035B2 [N: by blowing without suction directly on the glass sheet] [N0608] [C0703]
- C03B23/035B3 [N: by suction without blowing, e.g. with vacuum or by venturi effect] [N0608] [C0703]
- C03B23/037 . . . by drawing
- C03B23/04 . . Re-forming tubes or rods
- C03B23/043 . . Heating devices specially adapted for re-forming tubes or rods in general, e.g. burners
- C03B23/045 . . Tools or apparatus specially adapted for re-forming tubes or rods in general, e.g. glass lathes, chucks ([C03B23/043](#) takes precedence)
- C03B23/047 . . by drawing ([N: [C03B23/09B](#)], [C03B37/025](#) takes precedence) [C9510]
- C03B23/047B [N: for forming constrictions]
- C03B23/047C [N: onto a forming die, e.g. a mandrel or a wire]
- C03B23/049 . . by pressing ([C03B21/04](#), [N: [C03B23/09C](#)], [C03B23/26](#) take precedence) [C9510]
- C03B23/049B [N: in a longitudinal direction, e.g. for upsetting or extrusion]
- C03B23/049C [N: for expanding in a radial way, e.g. by forcing a mandrel through a tube or rod]
- C03B23/051 . . by gravity, e.g. sagging [N: ([C03B23/09D](#) takes precedence)] [C9510]
- C03B23/053 . . by centrifuging ([N: [C03B23/09E](#)], [C03B37/04](#) takes precedence) [C9510]
- C03B23/055 . . by rolling [N: ([C03B23/09F](#) takes precedence)] [C9510]
- C03B23/057 . . by fusing, e.g. for flame sealing ([C03B9/42](#), [C03B21/06](#) [N: [C03B23/09I](#)], [C03B33/08](#) take precedence)
- C03B23/06 . . by bending [N: ([C03B23/09G](#) takes precedence)] [C9510]
- C03B23/06B [N: in only one plane, e.g. for making circular neon tubes]
- C03B23/07 . . by blowing, e.g. for making electric bulbs [N: ([C03B23/09H](#) takes precedence)] [C9510]
- C03B23/07B [N: Vacuum-blowing]
- C03B23/07B2 [N: Shrinking the glass tube on to a mandrel]
- C03B23/08 . . to exact dimensions, e.g. calibrating
- C03B23/09 . . Reshaping the ends, e.g. as grooves, threads or mouths
- C03B23/09B [N: by drawing]
- C03B23/09C [N: by pressing]
- C03B23/09D [N: by gravity, e.g. sagging]
- C03B23/09E [N: by centrifuging]
- C03B23/09F [N: by rolling]

- C03B23/09G . . . [N: by bending]
- C03B23/09H . . . [N: by blowing]
- C03B23/09H2 [N: Vacuum-blowing]
- C03B23/09I . . . [N: by fusing, e.g. flame sealing]
- C03B23/11 . . Reshaping by drawing without blowing, in combination with separating, e.g. for making ampoules
- C03B23/11B . . . [N: Apparatus for conveying the tubes or rods in a curved path around a vertical axis through one or more forming stations]
- C03B23/11B2 [N: Devices for feeding tubes or rods to these machines]
- C03B23/11C . . . [N: Apparatus for conveying the tubes or rods in a curved path around a horizontal axis through one or more forming stations]
- C03B23/11D . . . [N: Apparatus for conveying the tubes or rods in a horizontal or an inclined plane through one or more forming stations]
- C03B23/13 . . Reshaping combined with uniting or heat sealing, e.g. for making vacuum bottles
- C03B23/18 . Re-forming and sealing ampoules
- C03B23/20 . Uniting glass pieces by fusing without substantial reshaping
- C03B23/203 . . Uniting glass sheets ([C03B23/24 takes precedence](#))
- C03B23/207 . . Uniting glass rods, glass tubes, or hollow glassware ([C03B23/24 takes precedence](#))
- C03B23/213 . . . Joining projections or feet
- C03B23/217 . . . for the production of cathode ray tubes or similarly shaped tubes
- C03B23/22 . . Uniting glass lenses, e.g. forming bifocal lenses
- C03B23/24 . . Making hollow glass sheets or bricks
- C03B23/24B . . . [N: Hollow glass sheets]
- C03B23/26 . Punching reheated glass

Guide heading: **After-treatment of glass products** ([of fibres C03B37/10](#))

C03B25/00 **Annealing glass products**

- C03B25/02 . in a discontinuous way
- C03B25/02B . . [N: Glass sheets] [N0002]
- C03B25/04 . in a continuous way
- C03B25/06 . . with horizontal displacement of the glass products
- C03B25/08 . . . of glass sheets
- C03B25/087 being in a vertical position
- C03B25/093 being in a horizontal position on a fluid support, e.g. a gas or molten metal
- C03B25/10 . . with vertical displacement of the glass products
- C03B25/12 . . . of glass sheets

C03B27/00 **Tempering [N: or quenching] glass products** [C0607]

- C03B27/004 . by bringing the hot glass product in contact with a solid cooling surface, e.g. sand grains
- C03B27/008 . by using heat of sublimation of solid particles
- C03B27/012 . by heat treatment, e.g. for crystallisation; Heat treatment of glass products before tempering by cooling ([C03B27/008](#), [C03B27/016](#) take precedence)
- C03B27/016 . by absorbing heat radiated from the glass product
- C03B27/02 . using liquid
- C03B27/02B . . [N: the liquid being organic, e.g. an oil]
- C03B27/02B2 . . . [N: the liquid being sprayed on the object]
- C03B27/02C . . [N: the liquid being a liquid gas, e.g. a cryogenic liquid, liquid nitrogen]
- C03B27/02E . . [N: the liquid being water-based]
- C03B27/03 . . the liquid being a molten metal or a molten salt
- C03B27/03B . . . [N: the liquid being sprayed on the object]
- C03B27/04 . using gas
- C03B27/04A . . [N: Nozzles, blow heads, blowing units or their arrangements, specially adapted for flat or bent glass sheets] [N0607] [C0909]
- C03B27/04A4 . . . [N: being dismountable] [N0909]
- C03B27/04B . . [N: Stresses, e.g. patterns, values or formulae for flat or bent glass sheets] [N0607]
- C03B27/04C . . [N: Controlling or regualting for flat or bent glass sheets] [N0607]
- C03B27/04H . . [N: for flat or bent glass sheets starting in an horizontal position and ending in a non-horizontal position] [N0909]
- C03B27/04H2 . . . [N: for bent glass sheets] [N0909]
- C03B27/04H2B [N: the quench unit being adapted to the bend of the sheet ([C03B27/04H2D](#) takes precedence)] [N0909]
- C03B27/04H2D [N: the quench unit being variably adaptable to the bend of the sheet] [N0909]
- C03B27/044 . . for flat or bent glass sheets being in a horizontal position
- C03B27/044B . . . [N: for bent glass sheets] [N0607]
- C03B27/044B2 [N: the quench unit being adapted to the bend of the sheet ([C03B27/044B4](#) takes precedence)] [N0607] [C1106]
- C03B27/044B4 [N: the quench unit being variably adaptable to the bend of the sheet] [N0909]
- C03B27/048 . . . on a gas cushion
- C03B27/052 . . for flat or bent glass sheets being in a vertical position
- C03B27/052A . . . [N: Nozzles, blow heads, blowing units or their arrangements] [N1109]
- C03B27/052A4 [N: being dismountable] [N1109]
- C03B27/052B . . . [N: Stresses, e.g. patterns, values or formulae] [N1109]
- C03B27/052C . . . [N: Controlling or regulating] [N1109]
- C03B27/056 . . . supported on the lower edge
- C03B27/06 . . for glass products other than flat or bent glass plates, e.g. hollow glassware, lenses
- C03B27/06A . . . [N: Nozzles or blow-heads, e.g. tubes] [N0607]

- C03B27/06B . . . [N: Stresses, e.g. patterns, values or formulae] [N0607]
- C03B27/06C . . . [N: Controlling or regulating] [N0607]

- C03B29/00 Reheating glass products for softening or fusing their surfaces; Fire-polishing; Fusing of margins**

- C03B29/02 . in a discontinuous way
- C03B29/02B . . [N: Glass sheets] [N0002]

- C03B29/04 . in a continuous way
- C03B29/06 . . with horizontal displacement of the products
- C03B29/08 . . . Glass sheets
- C03B29/10 being in a vertical position
- C03B29/12 being in a horizontal position on a fluid support, e.g. a gas or molten metal
- C03B29/14 . . with vertical displacement of the products
- C03B29/16 . . . Glass sheets

- C03B31/00 Manufacture of rippled or crackled glass**

- C03B32/00 Thermal after-treatment of glass products not provided for in groups [N: C03B19/00], C03B25/00 to C03B31/00 [N: or C03B37/00], e.g. crystallisation, eliminating gas inclusions or other impurities; [N: Hot-pressing vitrified, non-porous, shaped glass products] [C0308]**

- C03B32/00B . [N: Hot-pressing vitrified, non-porous, shaped glass products] [N0412]
- C03B32/02 . Thermal crystallisation, e.g. for crystallising glass bodies into glass-ceramic articles [N: (C03B27/012 takes precedence)]

- C03B33/00 Severing cooled glass (severing glass fibres C03B37/16)**

- C03B33/02 . Cutting or splitting sheet glass [N: or ribbons]; Apparatus or machines therefor (C03B33/09 takes precedence; glass-cutting tools C03B33/10) [C0605]
- C03B33/02A . . [N: the sheet being in a substantially vertical plane] [N0604]
- C03B33/02B . . [N: the ribbon being in a substantially vertical plane] [N0604]
- C03B33/02L . . [N: Scoring using a focussed radiation beam, e.g. laser] [N0607]
- C03B33/023 . . the sheet [N: or ribbon] being in a horizontal position [C0605]
- C03B33/023B . . . [N: Ribbons] [N0604]
- C03B33/027 . . . Scoring tool holders; Driving mechanisms therefor
- C03B33/03 . . . Glass cutting tables; Apparatus for transporting or handling sheet glass during the cutting or breaking operations
- C03B33/033 . . . Apparatus for opening score lines in glass sheets
- C03B33/037 . . . Controlling or regulating
- C03B33/04 . . Cutting or splitting in curves, especially for making spectacle lenses

- C03B33/06 . Cutting or splitting glass tubes, rods, or hollow products (C03B33/09 takes

precedence)

- C03B33/07 . Cutting armoured, [N: multi-layered, coated] or laminated, glass products [C0412]
- C03B33/07B . . [N: Armoured glass, i.e. comprising reinforcement] [N0412]
- C03B33/07C . . [N: Glass products comprising an outer layer or surface coating of non-glass material] [N0412]
- C03B33/07D . . [N: Laminated glass comprising interlayers] [N0412] [C1102]
- C03B33/07D2 . . . [N: Polymeric interlayers] [N1102]

- C03B33/08 . by fusing, [N: i.e. by melting through the glass] [C0412]
- C03B33/08B . . [N: using a focussed radiation beam, e.g. laser (C03B33/085B takes precedence)] [N0205]
- C03B33/085 . . Tubes, rods or hollow products
- C03B33/085B . . . [N: using a focussed radiation beam, e.g. laser] [N0205]

- C03B33/09 . by thermal shock
- C03B33/09B . . [N: using at least one focussed radiation beam, e.g. laser beam (C03B33/095B takes precedence)] [N0205] [C1008]
- C03B33/09B2 . . . [N: using two or more focussed radiation beams] [N1008]
- C03B33/095 . . Tubes, rods or hollow products
- C03B33/095B . . . [N: using a focussed radiation beam, e.g. laser] [N0205]

- C03B33/10 . Glass-cutting tools, e.g. scoring tools
- C03B33/10B . . [N: involving a focussed radiation beam, e.g. lasers] [N0205]
- C03B33/10C . . [N: Details of cutting or scoring means, e.g. tips] [N0412] [C0607]
- C03B33/10C2 . . . [N: Wheel design, e.g. materials, construction, shape] [N0607]
- C03B33/12 . . Hand tools (wheel design C03B33/10C2) [C0607]
- C03B33/14 . . . specially adapted for cutting tubes, rods, or hollow products [N: (for cutting ampoules B67B7/92)]

- C03B35/00** **Transporting of glass products during their manufacture, [N: e.g. hot glass lenses, prisms] (conveying systems for fragile sheets, e.g. glass B65G49/06) [C0307]**

- C03B35/00B . [N: Transporting hot solid glass products other than sheets or rods, e.g. lenses, prisms, by suction or floatation] [N0307]

- C03B35/04 . Transporting of hot hollow [N: or semi-hollow] glass products (C03B35/26 takes precedence) [C0307]
- C03B35/06 . . Feeding of hot hollow glass products into annealing or heating kilns
- C03B35/06B . . . [N: using conveyers, e.g. chain- or roller conveyers, dead-plates]
- C03B35/06B2 [N: specially adapted as a lehr loader]
- C03B35/06B2B [N: combined with article distributing means, e.g. pivoting deflectors, arresting fingers, stationary guides]
- C03B35/06C . . . [N: by gravitational force, e.g. via chutes]
- C03B35/08 . . . using rotary means directly acting on the products
- C03B35/08B [N: Transfer mechanisms of the "endless-chain" type]

- C03B35/10 . . . using reciprocating means directly acting on the products, e.g. pushers, stackers
- C03B35/12 . . . by picking-up and depositing
- C03B35/12B [N: Transfer mechanisms of the "rotary" type, e.g. "take-outs", "setting-over" mechanisms]
- C03B35/14 . Transporting hot glass sheets [N: or ribbons, e.g. by heat-resistant conveyor belts or bands] [C0404]
- C03B35/14B . . [N: by travelling transporting tables]
- C03B35/14C . . [N: by top-side transfer or supporting devices, e.g. lifting or conveying using suction] [N0307]
- C03B35/14C2 . . . [N: of the non-contact type] [N0307]
- C03B35/16 . . by roller conveyors
- C03B35/16B . . . [N: specially adapted for bent sheets or ribbons ([C03B35/16F](#) takes precedence)] [N0412]
- C03B35/16C . . . [N: combined with means for thermal adjustment of the rollers, e.g. cooling ([C03B35/18C](#) takes precedence)] [N0412]
- C03B35/16D . . . [N: Drive means, clutches, gearing or drive speed control means] [N0412]
- C03B35/16D2 [N: electric or electronicsystems therefor, e.g. for automatic control] [N0412]
- C03B35/16E . . . [N: Supports or couplings for roller ends, e.g. trunions, gudgeons] [N0412]
- C03B35/16F . . . [N: specially adapted for both flat and bent sheets or ribbons] [N0412]
- C03B35/16G . . . [N: specially adapted for removing defect sheets, ribbons or parts thereof] [N0412]
- C03B35/16H . . . [N: Means for cleaning the rollers] [N0708]
- C03B35/18 . . . Construction of the conveyer rollers [N: Materials, coatings or coverings thereof] [C0406]
- C03B35/18A [N: Materials, coatings, loose coverings or sleeves thereof] [N0501]
- C03B35/18B [N: specially adapted for bent sheets or ribbons ([C03B35/18F](#) takes precedence)] [N0406]
- C03B35/18C [N: specially adapted for thermal adjustment of the rollers, e.g. insulating, heating, cooling thereof] [N0406] [C0412]
- C03B35/18C2 [N: Cooling] [N0412]
- C03B35/18D [N: having a discontinuous surface for contacting the sheets or ribbons other than cloth or fabric, e.g. having protrusions or depressions, spirally wound cable, projecting discs or tires] [N0406]
- [N: **Note**
[N0406] Disc rollers having a discontinuous surface are also classified in [C03B35/18H](#)
]
- C03B35/18E [N: End caps, end fixtures or roller end shape designs] [N0406]
- C03B35/18F [N: Rollers specially adapted for both flat and bent sheets or ribbons, i.e. rollers of adjustable curvature] [N0406] [C0412]
- C03B35/18G [N: Rollers specially adapted for supplying a gas, e.g. porous or foraminous rollers with internal air supply] [N0406]
- C03B35/18H [N: Disc rollers] [N0406]
- [N: **Note**
[N0406] Disc rollers having a discontinuous surface are also classified in

C03B35/18D

]

- C03B35/20 . . . by gripping tongs or supporting frames
- C03B35/20B . . . [N: by supporting frames ([C03B35/14C](#) takes precedence)] [C0307]
- C03B35/20B2 [N: the glass sheets being in a vertical position] [N0308]
- C03B35/20B4 [N: Construction or design of supporting frames][N0410]
- C03B35/22 . . . on a fluid support bed, e.g. on molten metal
- C03B35/24 on a gas support bed
- C03B35/24B [N: having a non-planar surface, e.g. curved, for bent sheets] [N0307]
- C03B35/24C [N: Transporting continuous glass ribbons] [N0404]

- C03B35/26 . . . Transporting of glass tubes or rods

C03B37/00 Manufacture or treatment of flakes, fibres, or filaments from softened glass, minerals, or slags

- C03B37/005 . . . Manufacture of flakes

- C03B37/01 . . . Manufacture of glass fibres or filaments
- C03B37/01B . . . [N: starting from a liquid phase reaction process, e.g. through a gel phase]
- C03B37/012 . . . Manufacture of preforms for drawing fibres or filaments
- C03B37/012A [N: Means for storing or carrying optical fibre preforms, e.g. containers] [N9911]
- C03B37/012B [N: starting from tubes, rods, fibres or filaments ([C03B37/014](#) takes precedence)]
- C03B37/012B1 [N: for making preforms of microstructured, photonic crystal or holey optical fibres] [N0601]
- C03B37/012B2 [N: by inserting one or more rods or tubes into a tube]
- C03B37/012B2A [N: for making preforms of multifibres, fibre bundles other than multiple core preforms] [N0406]
- C03B37/012B2B [N: for making preforms of polarisation-maintaining optical fibres ([polarisation-maintaining optical fibres per se G02B6/10P](#))] [N0404]
- C03B37/012B2C [N: for making preforms of photonic crystal, microstructured or holey optical fibres] [N0412]
- C03B37/012B2D [N: for making preforms of multiple core optical fibres (preforms of multifibres C03B37/012B2A)] [N0601]
- C03B37/012B3 [N: Means for changing or stabilising the shape, e.g. diameter, of tubes or rods in general, e.g. collapsing] [C0307]
- C03B37/012B3A [N: Removal of preform material ([C03B37/012B3D](#) takes precedence)] [N0404] [C0406]
- C03B37/012B3A2 [N: to form a longitudinal hole, e.g. by drilling] [N0406]
- C03B37/012B3A4 [N: to form longitudinal grooves, e.g. by chamfering] [N1109]
- C03B37/012B3A6 [N: to modify the diameter by heat-polishing, e.g. fire-polishing] [N1109]
- C03B37/012B3B [N: Means for reducing the diameter of rods or tubes by drawing, e.g. for preform draw-down] [N9912] [C0307]
- C03B37/012B3B2 [N: Controlling or regulating the down-draw process] [N0404]

C03B37/012B3B3	. . . . .	[N: by drawing and collapsing] [N0412]
C03B37/012B3C	. . . . .	[N: by collapsing without drawing] [N0412]
C03B37/012B3D	. . . . .	[N: Reshaping the ends] [N0412]
C03B37/012B3E	. . . . .	[N: by expanding radially, e.g. by forcing a mandrel through or axial pressing a tube or rod] [N0412]
C03B37/012B3F	. . . . .	[N: Heating devices therefor] [N0412]
C03B37/012B3G	. . . . .	[N: Means for supporting, rotating, translating the rod, tube or preform] [N0412]
C03B37/012B4	. . . . .	[N: Depositing additional preform material as liquids or solutions, e.g. solution doping of preform tubes or rods] [N9711]
C03B37/012C	. . . . .	[N: starting entirely or partially from molten glass, e.g. by dipping a preform in a melt] [C9506]
C03B37/012C2	. . . . .	[N: by casting] [N9506]
C03B37/012C3	. . . . .	[N: by centrifuging] [N9506]
C03B37/012C4	. . . . .	[N: by extrusion or drawing] [N9506]
C03B37/012C5	. . . . .	[N: by projecting or spraying the melt, e.g. as droplets, on a preform] [N9506]
C03B37/012D	. . . . .	[N: starting from pulverulent glass] [C9506]
C03B37/012D2	. . . . .	[N: by pressing or sintering, e.g. hot-pressing] [N9506]
C03B37/012D3	. . . . .	[N: by centrifuging] [N9506]
C03B37/012D4	. . . . .	[N: by extrusion, e.g. of glass powder and binder (moulding plastics around a core using a cross-head annular extrusion nozzle B29C47/28C ; extrusion presses in general B30B11/22)] [N9506]
C03B37/012D5	. . . . .	[N: by progressive melting, e.g. melting glass powder during delivery to and adhering the so-formed melt to a target or preform, e.g. the Plasma Oxidation Deposition (POD) process] [N9506] [C0307]
C03B37/012D5B	. . . . .	[N: by delivering pulverulent glass to the deposition target or preform where the powder is progressively melted, e.g. accretion] [N9506]
C03B37/012D5C	. . . . .	[N: by melting glass powder in a mould] [N9506]
C03B37/014	. . . . .	made entirely or partially by chemical means, [N: e.g. vapour phase deposition of bulk porous glass either by outside vapour deposition (OVD), or by outside vapour phase oxidation (OVPO) or by vapour axial deposition (VAD) (C03C17/02 takes precedence)] [C9506]
C03B37/014A	. . . . .	[N: Deposition reactors therefor] [N9911]
C03B37/014B	. . . . .	[N: Reactant delivery systems (C03B37/018B takes precedence; devices therefor in general B01D1/00 , B01J4/00)] [C9510]
C03B37/014B2	. . . . .	[N: Reactant deposition burners]
C03B37/014B2B	. . . . .	[N: Plasma deposition burners or torches]
C03B37/014B4	. . . . .	[N: for delivering and depositing additional reactants as liquids or solutions, e.g. for solution doping of the porous glass preform]
C03B37/014C	. . . . .	[N: Means for after-treatment or catching of worked reactant gases (C03B37/018C takes precedence)] [C9510]
C03B37/014D	. . . . .	[N: Thermal after-treatment of preforms, e.g. dehydrating, consolidating, sintering (C03B37/018D takes precedence)] [C9510]
C03B37/014D1	. . . . .	[N: for doping the preform with fluorine] [N0607]
C03B37/014D2	. . . . .	[N: Furnaces therefor, e.g. muffle tubes, furnace linings]
C03B37/014E	. . . . .	[N: Means for changing or stabilising the diameter or form of tubes or rods (C03B37/018E takes precedence)] [C9711]

- C03B37/014E2 [N: Collapsing] [N9711]
- C03B37/014F [N: Means for heating preforms during or immediately prior to deposition
([C03B37/014B2](#), [C03B37/018F](#) take precedence)] [C9510]
- C03B37/014G [N: Means for supporting, rotating or translating the preforms being formed,
e.g. lathes ([C03B37/018G](#) takes precedence)] [C9510]
- C03B37/014G2 [N: Deposition substrates, e.g. targets, mandrels, start rods or tubes]
[N9711]
- C03B37/016 by a liquid phase reaction process, e.g. through a gel phase
- C03B37/018 by glass deposition on a glass substrate, e.g. by [N: inside-, modified-,
plasma-, or plasma modified- chemical vapour deposition (ICVD, MCVD,
PCVD, PMCVD), i.e. by thin layer coating on the inside or outside of a glass
tube or on a glass rod] ([C03B37/016](#) takes precedence; [N: bulk deposition
of porous glass by OVD or VAD [C03B37/014](#)]; surface treatment of glass by
coating [C03C17/02](#)) [C9506]
- C03B37/018B [N: Reactant delivery systems, e.g. reactant deposition burners]
- C03B37/018B2 [N: Reactant deposition burners or deposition heating means] [N9506]
- C03B37/018B2B {7 dots} [N: Plasma deposition burners or heating means] [N9506]
- C03B37/018B2B2 {8 dots} [N: for plasma within a tube substrate] [N0607]
- C03B37/018B4 [N: for delivering and depositing additional reactants as liquids or
solutions, e.g. for solution doping of the deposited glass]
- C03B37/018C [N: Means for after-treatment or catching of worked reactant gases]
[C9506]
- C03B37/018D [N: Thermal after-treatment of preforms, e.g. dehydrating, consolidating,
sintering]
- C03B37/018E [N: Means for changing or stabilising the diameter or form of tubes or
rods] [C9711]
- C03B37/018E2 [N: Collapsing] [N9711]
- C03B37/018F [N: Means for heating tubes or rods during or immediately prior to
deposition, e.g. electric resistance heaters ([C03B37/018B2](#) takes
precedence)] [C9506]
- C03B37/018G [N: Means for supporting, rotating and translating tubes or rods being
formed, e.g. lathes]
- C03B37/018G2 [N: Deposition substrates, e.g. tubes, mandrels] [N9711]
- C03B37/02 by drawing or extruding, [N: e.g. direct drawing of molten glass from nozzles;
Cooling fins therefor ([C03B37/04](#) takes precedence; sizing of the fibres
[C03C25/00](#))] [C0307]
- C03B37/02B [N: Cooling non-optical fibres drawn or extruded from bushings, nozzles or
orifices] [N1106]
- C03B37/02B1 [N: by contacting of the fibres with liquid or mist] [N1106]
- C03B37/02B2 [N: by means of a solid heat sink, e.g. cooling fins] [N1106]
- C03B37/02B3 [N: by forced gas cooling, i.e. blowing or suction] [N1106]
- C03B37/02D [N: Solving the problem of disruption of drawn fibre, e.g. breakage, start-up,
shut-down procedures] [N1106]
- C03B37/022 from molten glass in which the resultant product consists of different sorts of
glass or is characterised by shape, e.g. hollow fibres, [N: undulated fibres, fibres
presenting a rough surface ([C03B37/025](#) takes precedence)]
- C03B37/023 Fibres composed of different sorts of glass, [N: e.g. glass optical fibres,
made by the double crucible technique] [C0307]
- C03B37/023B [N: Thermal treatment of the fibre during the drawing process, e.g.

- cooling ([C03B37/027B](#) takes precedence; coating [C03C25/10](#))
- [C03B37/025](#) . . . from reheated softened tubes, rods, fibres or filaments, [N: e.g. drawing fibres from preforms (draw-down of tubes, rods or preforms to reduced diameter preforms [C03B37/012B3B](#))] [C0307]
- [C03B37/025B](#) [N: Controlling or regulating (for glass fibre manufacture in general [C03B37/07](#))] [N9602]
- [C03B37/025C](#) [N: Drawing hollow fibres ([C03B37/027H](#) takes precedence)] [N0412]
- [C03B37/026](#) Drawing fibres reinforced with a metal wire [N: or with other non-glass material] [C0606]
- [C03B37/027](#) Fibres composed of different sorts of glass, [N: e.g. glass optical fibres] ([C03B37/025B](#), [C03B37/028](#) take precedence) [C0307]
- [C03B37/027A](#) [N: Polarisation maintaining fibres, e.g. PM, PANDA, bi-refrangent optical fibres] [C0607]
- [C03B37/027B](#) [N: Thermal treatment of the fibre during the drawing process, e.g. cooling (coating [C03C25/10](#))]
- [C03B37/027B2](#) [N: Annealing or re-heating] [N0412]
- [C03B37/027C](#) [N: Means for supporting, rotating or feeding the tubes, rods, fibres or filaments to be drawn, e.g. fibre draw towers, preform alignment, butt-joining preforms or dummy parts during feeding (uniting rods or tubes [C03B23/207](#))] [N9602]
- [C03B37/027D](#) [N: Fibres having rotational spin around the central longitudinal axis, e.g. alternating +/- spin to reduce polarisation mode dispersion] [N0406]
- [C03B37/027E](#) [N: Solid fibres drawn from hollow preforms] [N0412]
- [C03B37/027F](#) [N: Fibres having axial variations, e.g. axially varying diameter, material or optical properties (rotational spin [C03B37/027D](#))] [N0412]
- [C03B37/027G](#) [N: shaping the preform lower end or bulb, e.g. pre-gobbing, controlling draw bulb shape, or preform draw start-up procedures] [N0412] [C0606]
- [C03B37/027H](#) [N: Hollow fibres, e.g. holey fibres] [N0412]
- [C03B37/027J](#) [N: Photonic crystal fibres or microstructured optical fibres other than holey optical fibres] [N0601]
- [C03B37/028](#) Drawing fibre bundles, e.g. for making fibre bundles of multifibres, [N: image fibres; (Drawing multicore or photonic crystal fibres [C03B37/027](#))] [C0412]
- [C03B37/029](#) Furnaces therefor
- [C03B37/03](#) . . . Drawing means, e.g. drawing drums; [N: Traction or tensioning devices] [C9602]
- [C03B37/03B](#) [N: for glass optical fibres] [N0404]
- [C03B37/035](#) having means for deflecting or stripping-off fibres [N: or for removing defective parts] [C9602]
- [C03B37/04](#) . . by using centrifugal force, [N: e.g. spinning through radial orifices; Construction of the spinner cups therefor (bonder application [C03C25/00](#))] [C0307]
- [C03B37/04A](#) . . . [N: Transferring molten glass to the spinner] [N0609]
- [C03B37/04B](#) . . . [N: starting from tubes, rods, fibres or filaments]
- [C03B37/04C](#) . . . [N: for producing fibres of at least two distinct glass compositions, e.g. bi-component fibres (conjugated artificial filaments or the like, e.g. with glass fibres, [D01F8/00](#))] [N0307]
- [C03B37/04D](#) . . . [N: Construction of the spinner cups] [N0609]
- [C03B37/04E](#) . . . [N: Selection of materials for the spinner cups] [N0609]
- [C03B37/04F](#) . . . [N: Means for attenuating the spun fibres, e.g. blowers for spinner cups]

-]
- C03B37/05 . . . by projecting [N: molten glass] on a rotating body having no radial orifices
 - C03B37/05B [N: by projecting onto and spinning off the outer surface of the rotating body] [N0307]
 - C03B37/06 . . . by blasting or blowing molten glass, e.g. for making staple fibres
 - C03B37/065 . . . starting from tubes, rods, fibres or filaments
 - C03B37/07 . Controlling or regulating ([N: [C03B37/025B](#) takes precedence]; controlling or regulating in general [G05](#)) [C9602]
 - C03B37/075 . Manufacture of [N: non-optical] fibres or filaments consisting of different sorts of glass or characterised by shape, e.g. undulated fibres ([C03B37/022](#), [C03B37/027](#), [C03B37/028](#) take precedence; light guides [G02B6/00](#)) [C0307]
 - C03B37/075B . . [N: consisting of different sorts of glass, e.g. bi-component fibres] [N9711] [C0307]
 - C03B37/075C . . [N: Hollow fibres] [N9711]
 - C03B37/08 . Bushings, [N: e.g. construction, bushing reinforcement means]; Spinnerettes; Nozzles; Nozzle plates [C0311]
 - C03B37/08D . . [N: Manufacturing, repairing, or other treatment of bushings, nozzles or bushing nozzle plates]
 - C03B37/081 . . Indirect-melting bushings
 - C03B37/083 . . Nozzles; Bushing nozzle plates ([C03B37/095](#) takes precedence)
 - C03B37/085 . . Feeding devices therefor
 - C03B37/09 . . electrically heated
 - C03B37/09C . . . [N: Indirect-resistance heating]
 - C03B37/092 . . . Direct-resistance heating
 - C03B37/095 . . Use of materials therefor
 - C03B37/10 . Non-chemical treatment ([C03C25/00](#) takes precedence; yarns or threads [D02](#); woven fabrics [D03](#); non-woven fabrics [D04](#))
 - C03B37/12 . . of fibres or filaments during winding up
 - C03B37/14 . . Re-forming fibres or filaments, [N: i.e. changing their shape] ([C03B37/025](#) takes precedence) [C0307]
 - C03B37/15 . . . with heat application, e.g. for making optical fibres (fusion-splicing of light guides [G02B6/255](#); treatment of light guides to shape optical elements [G02B6/28](#))
 - C03B37/16 . . Cutting or severing (light guides [G02B6/25](#))
 - C03B40/00** **Preventing adhesion between glass and glass or between glass and the means used to shape it, [N: hold it or support it] [C1008]**
 - C03B40/00F . [N: Fabrics, felts or loose covers] [N1008]
 - C03B40/02 . by lubrication; Use of materials as release or lubricating compositions
 - C03B40/027 . . Apparatus for applying lubricants to glass shaping moulds or tools
 - C03B40/033 . . Means for preventing adhesion between glass and glass
 - C03B40/04 . using gas