SECTION B — PERFORMING OPERATIONS; TRANSPORTING

B29 WORKING OF PLASTICS; WORKING OF SUBSTANCES IN A PLASTIC STATE IN GENERAL

B29C SHAPING OR JOINING OF PLASTICS; SHAPING OF SUBSTANCES IN A PLASTIC STATE, IN GENERAL; AFTER-TREATMENT OF THE SHAPED PRODUCTS, e.g. REPAIRING (working in the manner of metal B23; grinding, polishing B24; cutting B26D, B26F; making preforms B29B 11/00; making laminated products by combining previously unconnected layers which become one product whose layers will remain together B32B 37/00-B32B 41/00) **[4]**

Note(s)

1. Attention is drawn to Note (3) following the title of class B29.
2. In this subclass:
   - repairing of articles made from plastics or substances in a plastic state, e.g. of articles shaped or produced by using techniques covered by this subclass or subclass B29D, is classified in group B29C 73/00;
   - component parts, details, accessories or auxiliary operations which are applicable to more than one moulding technique are classified in groups B29C 31/00 - B29C 37/00;
   - component parts, details, accessories or auxiliary operations which are only applicable or only of use for one specific shaping technique are classified only in the relevant subgroups of groups B29C 39/00 - B29C 71/00.
3. In this subclass, it is desirable to add the indexing codes of subclasses B29K and B29L.

Subclass index

COMPONENT PARTS, DETAILS ACCESSORIES, AUXILIARY OPERATIONS
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- Heating, cooling, curing....35/00
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MOULDING
- by casting, by coating a mould....39/00, 41/00
- Compression moulding....43/00
- by internal pressure....44/00
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- Blow-moulding....49/00
- Thermoforming....51/00

OTHER SHAPING TECHNIQUES
- Bending, folding, twisting, straightening, flattening....53/00
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- Liberation of internal stresses....61/00
- Other techniques....67/00

JOINING....65/00

PARTICULAR APPLICATIONS
- Shaping tube ends....57/00
- Surface shaping....59/00
- Lining or sheathing....63/00
- Shaping composites....70/00

COMBINATIONS OF SHAPING TECHNIQUES....69/00

AFTER-TREATMENT....71/00

REPAIRING....73/00

Component parts, details or accessories; Auxiliary operations [4]

31/00 Handling, e.g. feeding of the material to be shaped (in general B65G) **[4]**

31/02 • Dispensing from vessels, e.g. hoppers **[4]**

31/04 • Feeding, e.g. into a mould cavity (to presses in general B30B 15/30) **[4]**

31/06 • • in measured doses (in general G01F) **[4]**

31/08 • • of preforms **[4]**

31/10 • • of several materials **[4]**

33/00 Moulds or cores; Details thereof or accessories therefor [4]

33/02 • with incorporated heating or cooling means **[4]**

33/04 • • using liquids, gas or steam **[4]**

33/06 • • using radiation **[4]**

33/08 • • for dielectric heating **[4]**
33/10 • with incorporated venting means **[4]**
33/12 • with incorporated means for positioning inserts, e.g. labels **[4]**
33/14 • • against the mould wall **[4]**
33/16 • • • using magnetic means **[4]**
33/18 • • • using vacuum **[4]**
33/20 • Opening, closing or clamping **[4]**
33/22 • • by rectilinear movement **[4]**
33/24 • • • using hydraulic or pneumatic means **[4]**
33/26 • • by pivotal movement **[4]**
33/28 • • • using hydraulic or pneumatic means **[4]**
33/30 • Mounting, exchanging or centering **[4]**
33/32 • • using magnetic means **[4]**
33/34 • movable, e.g. to or from the moulding station **[4]**
33/36 • • continuously movable **[4]**
33/38 • characterised by the material or the manufacturing process (B29C 33/44 takes precedence; manufacture of moulds or parts thereof from metal B22, B23) **[4]**
33/40 • • Plastics, e.g. foam, rubber **[4]**
33/42 • characterised by the shape of the moulding surface, e.g. ribs, grooves **[4]**
33/44 • with means for, or specially constructed to facilitate, the removal of articles, e.g. of undercut articles **[4]**
33/46 • • using fluid pressure **[4]**
33/48 • • with means for collapsing or disassembling **[4]**
33/50 • • • elastic **[4]**
33/52 • • soluble or fusible **[4]**
33/54 • • made of powdered or granular material **[4]**
33/56 • Coatings; Releasing, lubricating or separating agents **[4]**
33/58 • • Applying the releasing agents **[4]**
33/60 • • Releasing, lubricating or separating agents **[4]**
33/62 • • • based on polymers or oligomers **[4]**
33/64 • • • • Silicone **[4]**
33/66 • • • • Cellulose; Derivatives thereof **[4]**
33/68 • • Release sheets **[4]**
33/70 • Maintenance **[4]**
33/72 • • Cleaning **[4]**
33/74 • • Repairing **[4]**
33/76 • Cores (B29C 33/02-B29C 33/70 take precedence) **[4]**

35/00 Heating, cooling or curing, e.g. crosslinking, vulcanising; Apparatus therefor (moulds with incorporated heating or cooling means B29C 33/02; curing devices for plastics dental prostheses A61C 13/14; before moulding B29B 13/00; chemical aspects C08J 3/00) **[4]**
35/02 • Heating or curing, e.g. crosslinking, vulcanising (cold vulcanisation B29C 35/18) **[4]**
35/04 • • using liquids, gas or steam **[4]**
35/06 • • • for articles of indefinite length **[4]**
35/08 • • by wave energy or particle radiation **[4]**
35/10 • • • for articles of indefinite length **[4]**
35/12 • • Dielectric heating **[4]**
35/14 • • • for articles of indefinite length **[4]**
35/16 • Cooling **[4]**
35/18 • Cold vulcanisation **[4]**

37/00 Component parts, details, accessories or auxiliary operations, not covered by group B29C 33/00 or B29C 35/00 [4]
37/02 • Deburring or deflashing (by grinding or polishing B24B) **[4]**
37/04 • • of welded articles, e.g. deburring or deflashing in combination with welding **[4]**

Particular shaping techniques, e.g. moulding, joining; Apparatus therefor [4]

39/00 Shaping by casting, i.e. introducing the moulding material into a mould or between confining surfaces without significant moulding pressure; Apparatus therefor (B29C 41/00 takes precedence) **[4]**
39/02 • for making articles of definite length, i.e. discrete articles **[4]**
39/04 • • using movable moulds (B29C 41/02 takes precedence) **[4]**
39/06 • • • continuously movable, e.g. along a production line **[4]**
39/08 • • • Introducing the material into the mould by centrifugal force **[4]**
39/10 • • incorporating preformed parts or layers, e.g. casting around inserts or for coating articles **[4]**
39/12 • • Making multilayered or multicoloured articles **[4]**
39/14 • for making articles of indefinite length **[4]**
39/16 • • between endless belts **[4]**
39/18 • • incorporating preformed parts or layers, e.g. casting around inserts or for coating articles **[4]**
39/20 • • Making multilayered or multicoloured articles **[4]**
39/22 • Component parts, details or accessories; Auxiliary operations **[4]**
39/24 • • Feeding the material into the mould **[4]**
39/26 • • Moulds or cores **[4]**
39/28 • • • with means to avoid flashes **[4]**
39/30 • • • with means for cutting the article **[4]**
39/32 • • • with joints or the like for making the mould impervious **[4]**
39/34 • • • for undercut articles **[4]**
39/36 • • Removing moulded articles **[4]**
39/38 • • Heating or cooling **[4]**
39/40 • • Compensating volume change, e.g. retraction **[4]**
39/42 • • Casting under special conditions, e.g. vacuum **[4]**
39/44 • • Measuring, controlling or regulating **[4]**

41/00 Shaping by coating a mould, core or other substrate, i.e. by depositing material and stripping-off the shaped article; Apparatus therefor (with compacting pressure B29C 43/00) **[4]**
41/02 • for making articles of definite length, i.e. discrete articles **[4]**
41/04 • • Rotational or centrifugal casting, i.e. coating the inside of a mould by rotating the mould **[4]**
41/06 • • • about two or more axes **[4]**
41/08 • • Coating a former, core or other substrate by spraying or fluidisation, e.g. spraying powder **[4]**
41/10 • • • by fluidisation **[4]**
41/12 • • Spreading-out the material on a substrate **[4]**
41/14 • • Dipping a core **[4]**
41/16 • • Slip casting, i.e. applying a slip or slurry on a perforated or porous or absorbent surface with the liquid being drained away **[4]**
41/18 • • Slush casting, i.e. pouring moulding material into a hollow mould with excess material being poured off **[4]**
41/20 • • incorporating preformed parts or layers, e.g. moulding around inserts or for coating articles **[4]**
41/22 • • Making multilayered or multicoloured articles **[4]**
41/24 • for making articles of indefinite length **[4]**

41/26 • • by depositing flowable material on a rotating drum **[4]**
41/28 • • by depositing flowable material on an endless belt **[4]**
41/30 • • incorporating preformed parts or layers, e.g. moulding around inserts or for coating articles **[4]**
41/32 • • Making multilayered or multicoloured articles **[4]**
41/34 • Component parts, details or accessories; Auxiliary operations **[4]**
41/36 • • Feeding the material on to the mould, core or other substrate **[4]**
41/38 • • Moulds, cores or other substrates **[4]**
41/40 • • • Cores **[4]**
41/42 • • Removing articles from moulds, cores or other substrates **[4]**
41/44 • • • Articles of indefinite length **[4]**
41/46 • • Heating or cooling **[4]**
41/48 • • Compensating volume change, e.g. retraction **[4]**
41/50 • • Shaping under special conditions, e.g. vacuum **[4]**
41/52 • • Measuring, controlling or regulating **[4]**

43/00 Compression moulding, i.e. applying external pressure to flow the moulding material; Apparatus therefor (shaping or impregnating by compression composites comprising reinforcements other than fibres of short length B29C 70/40; presses in general B30B) **[4, 6]**
43/02 • of articles of definite length, i.e. discrete articles **[4]**
43/04 • • using movable moulds **[4]**
43/06 • • • continuously movable **[4]**
43/08 • • • • with circular movement **[4]**
43/10 • • Isostatic pressing, i.e. using non-rigid pressure-exerting members against rigid parts or dies **[4]**
43/12 • • • using bags surrounding the moulding material **[4]**
43/14 • • in several steps **[4]**
43/16 • • Forging **[4]**
43/18 • • incorporating preformed parts or layers, e.g. compression moulding around inserts or for coating articles **[4]**
43/20 • • Making multilayered or multicoloured articles **[4]**
43/22 • of articles of indefinite length **[4]**
43/24 • • Calendering **[4]**
43/26 • • in several steps (B29C 43/30 takes precedence) **[4]**
43/28 • • incorporating preformed parts or layers, e.g. compression moulding around inserts or for coating articles **[4]**
43/30 • • Making multilayered or multicoloured articles **[4]**
43/32 • Component parts, details or accessories; Auxiliary operations **[4]**
43/34 • • Feeding the material to the mould or the compression means **[4]**
43/36 • • Moulds for making articles of definite length, i.e. discrete articles **[4]**
43/38 • • • with means to avoid flashes **[4]**
43/40 • • • with means for cutting the article **[4]**
43/42 • • • for undercut articles **[4]**
43/44 • • Compression means for making articles of indefinite length **[4]**
43/46 • • • Rollers **[4]**
43/48 • • • Endless belts **[4]**
43/50 • • Removing moulded articles **[4]**
43/52 • • Heating or cooling **[4]**
43/54 • • Compensating volume change, e.g. retraction **[4]**
43/56 • • Compression moulding under special conditions, e.g. vacuum **[4]**
43/58 • • Measuring, controlling or regulating **[4]**

44/00 Shaping by internal pressure generated in the material, e.g. swelling, foaming [6]
44/02 • for articles of definite length, i.e. discrete articles **[6]**
44/04 • • consisting of at least two parts of chemically or physically different materials, e.g. having different densities **[6]**
44/06 • • • Making multilayered articles **[6]**
44/08 • • using several expanding steps **[6]**
44/10 • • Applying counter-pressure during expanding **[6]**
44/12 • • Incorporating or moulding on preformed parts, e.g. inserts, reinforcements **[6]**
44/14 • • • the preformed part being a lining **[6]**
44/16 • • • • shaped by the expansion of the material **[6]**
44/18 • • • Filling preformed cavities **[6]**
44/20 • for articles of indefinite length **[6]**
44/22 • • consisting of at least two parts of chemically or physically different materials, e.g. having different densities **[6]**
44/24 • • • Making multilayered articles **[6]**
44/26 • • using several expanding steps **[6]**
44/28 • • Expanding the moulding material on continuous moving surfaces **[6]**
44/30 • • Expanding the moulding material between endless belts or rollers **[6]**
44/32 • • Incorporating or moulding on preformed parts, e.g. linings, inserts, reinforcements **[6]**
44/34 • Component parts, details or accessories; Auxiliary operations **[6]**
44/36 • • Feeding the material to be shaped **[6]**
44/38 • • • into a closed space, i.e. to make articles of definite length **[6]**
44/40 • • • • by gravity, e.g. by casting **[6]**
44/42 • • • • using pressure difference, e.g. by injection, by vacuum **[6]**
44/44 • • • • in the form of expandable particles or beads **[6]**
44/46 • • • into an open space or onto moving surfaces, i.e. to make articles of indefinite length **[6]**
44/48 • • • • by gravity, e.g. casting onto, or between, moving surfaces **[6]**
44/50 • • • • using pressure difference, e.g. by extrusion, by spraying **[6]**
44/52 • • • • • between moving surfaces **[6]**
44/54 • • • • in the form of expandable particles or beads **[6]**
44/56 • • After-treatment of articles, e.g. for altering the shape **[6]**
44/58 • • Moulds **[6]**
44/60 • • Measuring, controlling or regulating **[6]**

45/00 Injection moulding, i.e. forcing the required volume of moulding material through a nozzle into a closed mould; Apparatus therefor (injection blow-moulding B29C 49/06) **[4]**
45/02 • Transfer moulding, i.e. transferring the required volume of moulding material by a plunger from a "shot" cavity into a mould cavity **[4]**
45/03 • Injection moulding apparatus (transfer moulding B29C 45/02) **[4]**
45/04 • • using movable moulds (B29C 45/08 takes precedence) **[4]**
45/06 • • • on a turntable **[4]**
45/07 • • using movable injection units **[4]**

45/08 • • • moving with the mould during the injection operation **[4]**
45/10 • • using moulds or injection units usable in different arrangements or combinations to each other **[4]**
45/12 • • using two or more fixed moulds, e.g. in tandem **[4]**
45/13 • • using two or more injection units co-operating with a single mould **[4]**
45/14 • incorporating preformed parts or layers, e.g. injection moulding around inserts or for coating articles **[4]**
45/16 • Making multilayered or multicoloured articles **[4]**
45/17 • Component parts, details or accessories; Auxiliary operations **[4]**
45/18 • • Feeding the material into the injection moulding apparatus **[4]**
45/20 • • Injection nozzles **[4]**
45/22 • • • Multiple nozzle systems **[4]**
45/23 • • • Feed stopping equipment **[4]**
45/24 • • • Cleaning equipment **[4]**
45/26 • • Moulds **[4]**
45/27 • • • Sprue channels **[4]**
45/28 • • • • Closure devices therefor **[4]**
45/30 • • • • Flow control means disposed within the sprue channel, e.g. "torpedo" construction **[4]**
45/32 • • • having several axially spaced mould cavities **[4]**
45/33 • • • having transversely, e.g. radially, movable mould parts **[4]**
45/34 • • • having venting means **[4]**
45/36 • • • having means for locating or centering cores **[4]**
45/37 • • • Mould cavity walls **[4]**
45/38 • • Cutting-off equipment for sprues or ingates **[4]**
45/40 • • Removing or ejecting moulded articles **[4]**
45/42 • • • using means movable from outside the mould between mould parts **[4]**
45/43 • • • using fluid under pressure **[4]**
45/44 • • • for undercut articles **[4]**
45/46 • • Means for plasticising or homogenising the moulding material or forcing it into the mould **[4]**
45/47 • • • using screws (B29C 45/54 takes precedence) **[4]**
45/48 • • • • Plasticising screw and injection screw **[4]**
45/50 • • • • Axially movable screw **[4]**
45/52 • • • • • Non-return devices **[4]**
45/53 • • • using injection ram or piston **[4]**
45/54 • • • • and plasticising screw **[4]**
45/56 • • • using mould parts movable during or after injection, e.g. injection-compression moulding **[4]**
45/57 • • • Exerting after-pressure on the moulding material **[4]**
45/58 • • • Details **[4]**
45/60 • • • • Screws **[4]**
45/62 • • • • Barrels or cylinders **[4]**
45/63 • • • • Venting or degassing means **[4]**
45/64 • • Mould opening, closing or clamping devices **[4]**
45/66 • • • mechanical **[4]**
45/67 • • • hydraulic **[4]**
45/68 • • • hydro-mechanical **[4]**
45/70 • • Means for plasticising or homogenising the moulding material or forcing it into the mould, combined with mould opening, closing or clamping devices **[4]**
45/72 • • Heating or cooling **[4]**
45/73 • • • of the mould **[4]**
45/74 • • • of the injection unit **[4]**
45/76 • • Measuring, controlling or regulating **[4]**
45/77 • • • of velocity or pressure of moulding material **[4]**
45/78 • • • of temperature **[4]**
45/80 • • • of relative position of mould parts **[4]**
45/82 • • • Hydraulic circuits **[4]**
45/83 • • Lubricating means **[4]**
45/84 • • Safety devices **[4]**

47/00 Extrusion moulding, i.e. expressing the moulding material through a die or nozzle which imparts the desired form; Apparatus therefor (extrusion blow-moulding B29C 49/04; extrusion presses in general B30B 11/22) **[4]**
47/02 • incorporating preformed parts or layers, e.g. extrusion moulding around inserts or for coating articles **[4]**
47/04 • of multilayered or multicoloured articles **[4]**
47/06 • • Multilayered articles **[4]**
47/08 • Component parts, details or accessories; Auxiliary operations **[4]**
47/10 • • Feeding the material to the extruder **[4]**
47/12 • • Extrusion nozzles or dies **[4]**
47/14 • • • with broad opening, e.g. for sheets **[4]**
47/16 • • • • adjustable **[4]**
47/18 • • • • with die parts oscillating relative to each other **[4]**
47/20 • • • with annular opening, e.g. for tubular articles **[4]**
47/22 • • • • adjustable **[4]**
47/24 • • • • with die parts rotatable relative to each other **[4]**
47/26 • • • • Multiple annular extrusion nozzles **[4]**
47/28 • • • • Cross-head annular extrusion nozzles **[4]**
47/30 • • • Multi-port extrusion nozzles **[4]**
47/32 • • • Roller-extrusion nozzles **[4]**
47/34 • • Conveyors for extruded material **[4]**
47/36 • • Means for plasticising or homogenising the moulding material or forcing it through the nozzle or die **[4]**
47/38 • • • using screws **[4]**
47/40 • • • • using at least two intermeshing screws **[4]**
47/42 • • • • • using sub-screws, e.g. planetary screws **[4]**
47/44 • • • • using axially movable screws **[4]**
47/46 • • • • using screws extruding in opposite directions **[4]**
47/48 • • • • using screws arranged coaxially, one within the other **[4]**
47/50 • • • • using at least two screws, one after the other, e.g. multi-stage plasticisers **[4]**
47/52 • • • using rollers or discs **[4]**
47/54 • • • using press rams or pistons **[4]**
47/56 • • • using more than one extruder to feed one die **[4]**
47/58 • • • Details **[4]**
47/60 • • • • Screws **[4]**
47/62 • • • • • having more than one screw-thread **[4]**
47/64 • • • • • having incorporated mixing devices **[4]**
47/66 • • • • Barrels or cylinders **[4]**
47/68 • • • • Filters **[4]**
47/70 • • • • Flow dividers **[4]**
47/72 • • • • Feedback means **[4]**
47/74 • • • • By-pass means **[4]**
47/76 • • • • Venting or degassing means **[4]**

47/78 • • Heating or cooling the material to be extruded or the stream of extruded material **[4]**
47/80 • • • at plasticising zone **[4]**
47/82 • • • • Heating the cylinders **[4]**
47/84 • • • • Heating the screws **[4]**
47/86 • • • at nozzle zone **[4]**
47/88 • • • Heating or cooling the stream of extruded material **[4]**
47/90 • • • • with calibration or sizing **[4]**
47/92 • • Measuring, controlling or regulating **[4]**
47/94 • • Lubricating **[4]**
47/96 • • Safety devices **[4]**

49/00 Blow-moulding, i.e. blowing a preform or parison to a desired shape within a mould; Apparatus therefor [4]
49/02 • Combined blow-moulding and manufacture of the preform or the parison **[4]**
49/04 • • Extrusion blow-moulding **[4]**
49/06 • • Injection blow-moulding **[4]**
49/08 • Biaxial stretching during blow-moulding **[4]**
49/10 • • using mechanical means **[4]**
49/12 • • • Stretching rods **[4]**
49/14 • • • Clamps **[4]**
49/16 • • using pressure difference, e.g. pre-blowing **[4]**
49/18 • using several blowing steps (B29C 49/16 takes precedence) **[4]**
49/20 • of articles having inserts or reinforcements **[4]**
49/22 • using multilayered preforms or parisons **[4]**
49/24 • Lining or labelling **[4]**
49/26 • • inner lining of tubes **[4]**
49/28 • Blow-moulding apparatus **[4]**
49/30 • • having movable moulds or mould parts **[4]**
49/32 • • • moving "to and fro" **[4]**
49/34 • • • • the mould parts moving "hand-over-hand" **[4]**
49/36 • • • rotatable about one axis **[4]**
49/38 • • • mounted on movable endless supports **[4]**
49/40 • • • • on co-operating drums **[4]**
49/42 • Component parts, details or accessories; Auxiliary operations **[4]**
49/44 • • for applying pressure through the walls of an inflated bag **[4]**
49/46 • • characterised by using particular environment or blow fluids other than air **[4]**
49/48 • • Moulds **[4]**
49/50 • • • having cutting or deflashing means **[4]**
49/52 • • • having decorating or printing means **[4]**
49/54 • • • for undercut articles **[4]**
49/56 • • Opening, closing or clamping means **[4]**
49/58 • • Blowing means **[4]**
49/60 • • • Blow-needles **[4]**
49/62 • • Venting means **[4]**
49/64 • • Heating or cooling preforms, parisons or blown articles **[4]**
49/66 • • • Cooling by refrigerant introduced into the blown article **[4]**
49/68 • • • Ovens specially adapted for heating preforms or parisons **[4]**
49/70 • • Removing or ejecting blown articles from the mould **[4]**
49/72 • • Deflashing outside the mould **[4]**
49/74 • • • Deflashing the neck portion **[4]**
49/76 • • Neck calibration **[4]**
49/78 • • Measuring, controlling or regulating **[4]**
49/80 • • • Testing, e.g. for leaks **[4]**

51/00 Shaping by thermoforming, e.g. shaping sheets in matched moulds or by deep-drawing; Apparatus therefor [4]
51/02 • Combined thermoforming and manufacture of the preform **[4]**
51/04 • Combined thermoforming and prestretching, e.g. biaxial stretching **[4]**
51/06 • • using pressure difference **[4]**
51/08 • Deep-drawing or matched-mould forming, i.e. using mechanical means only **[4]**
51/10 • Forming by pressure difference, e.g. vacuum **[4]**
51/12 • of articles having inserts or reinforcements **[4]**
51/14 • using multilayered preforms or sheets **[4]**
51/16 • Lining or labelling **[4]**
51/18 • Thermoforming apparatus **[4]**
51/20 • • having movable moulds or mould parts **[4]**
51/22 • • • rotatable about an axis **[4]**
51/24 • • • mounted on movable endless supports **[4]**
51/26 • Component parts, details or accessories; Auxiliary operations **[4]**
51/28 • • for applying pressure through the wall of an inflated bag or diaphragm **[4]**
51/30 • • Moulds **[4]**
51/32 • • • having cutting means **[4]**
51/34 • • • for undercut articles **[4]**
51/36 • • • specially adapted for vacuum forming **[4]**
51/38 • • • Opening, closing or clamping means **[4]**
51/40 • • • Venting means **[4]**
51/42 • • Heating or cooling **[4]**
51/44 • • Removing or ejecting moulded articles **[4]**
51/46 • • Measuring, controlling or regulating **[4]**

53/00 Shaping by bending, folding, twisting, straightening or flattening; Apparatus therefor (B29C 61/10 takes precedence) **[4]**
53/02 • Bending or folding (B29C 53/22, B29C 53/34, B29C 53/36, B29C 53/56 take precedence) **[4]**
53/04 • • of plates or sheets **[4]**
53/06 • • • Forming folding lines by pressing or scoring **[4]**
53/08 • • of tubes **[4]**
53/10 • • of blown tubular films, e.g. gusseting **[4]**
53/12 • • helically, e.g. for making springs **[4]**
53/14 • Twisting **[4]**
53/16 • Straightening or flattening **[4]**
53/18 • • of plates or sheets **[4]**
53/20 • • of tubes **[4]**
53/22 • Corrugating **[4]**
53/24 • • of plates or sheets **[4]**
53/26 • • • parallel with direction of feed **[4]**
53/28 • • • transverse to direction of feed **[4]**
53/30 • • of tubes (by blow-moulding B29C 49/00) **[4]**
53/32 • Coiling (B29C 53/56 takes precedence) **[4]**
53/34 • Rim rolling (of tube ends B29C 57/12) **[4]**
53/36 • Bending and joining, e.g. for making hollow articles (B29C 53/56 takes precedence; from paper B31C) **[4]**
53/38 • • by bending sheets or strips at right angles to the longitudinal axis of the article being formed and joining the edges **[4]**
53/40 • • • for articles of definite length, i.e. discrete articles **[4]**
53/42 • • • • using internal forming surfaces, e.g. mandrels **[4]**
53/44 • • • • • rotatable about the axis of the article **[4]**

53/46 • • • • using external forming surfaces, e.g. sleeves **[4]**
53/48 • • • for articles of indefinite length, i.e. bending a strip progressively **[4]**
53/50 • • • • using internal forming surfaces, e.g. mandrels **[4]**
53/52 • • • • using external forming surfaces, e.g. sleeves **[4]**
53/54 • • • • Guiding, aligning or shaping edges **[4]**
53/56 • Winding and joining, e.g. winding spirally **[4]**
53/58 • • helically **[4]**
53/60 • • • using internal forming surfaces, e.g. mandrels **[4]**
53/62 • • • • rotatable about the winding axis **[4]**
53/64 • • • • • and moving axially **[4]**
53/66 • • • • • with axially movable winding feed member **[4]**
53/68 • • • • with rotatable winding feed member **[4]**
53/70 • • • • • and moving axially **[4]**
53/72 • • • using external forming surfaces **[4]**
53/74 • • • using a forming surface in the shape of an endless belt which is recycled after the forming operation **[4]**
53/76 • • • about more than one axis **[4]**
53/78 • • • using profiled sheets or strips **[4]**
53/80 • Component parts, details or accessories; Auxiliary operations **[4]**
53/82 • • Cores or mandrels **[4]**
53/84 • • Heating or cooling **[4]**

55/00 Shaping by stretching, e.g. drawing through a die; Apparatus therefor (B29C 61/08 takes precedence) **[4]**
55/02 • of plates or sheets **[4]**
55/04 • • uniaxial, e.g. oblique **[4]**
55/06 • • • parallel with the direction of feed **[4]**
55/08 • • • transverse to the direction of feed **[4]**
55/10 • • multiaxial **[4]**
55/12 • • • biaxial **[4]**
55/14 • • • • successively **[4]**
55/16 • • • • simultaneously **[4]**
55/18 • • by squeezing between surfaces, e.g. rollers **[4]**
55/20 • • Edge clamps **[4]**
55/22 • of tubes **[4]**
55/24 • • radial **[4]**
55/26 • • biaxial **[4]**
55/28 • of blown tubular films, e.g. by inflation **[4]**
55/30 • Drawing through a die **[4]**

57/00 Shaping of tube ends, e.g. flanging, belling, closing; Apparatus therefor [4]
57/02 • Belling or enlarging, e.g. combined with forming a groove **[4]**
57/04 • • using mechanical means **[4]**
57/06 • • • elastically deformable **[4]**
57/08 • • using pressure difference **[4]**
57/10 • Closing **[4]**
57/12 • Rim rolling **[4]**

59/00 Surface shaping, e.g. embossing; Apparatus therefor [4]
59/02 • by mechanical means, e.g. pressing **[4]**
59/04 • • using rollers or endless belts **[4]**
59/06 • • using vacuum drums **[4]**
59/08 • by flame treatment **[4]**
59/10 • by electric discharge treatment (electrodes H01T) **[4]**
59/12 • • in an environment other than air **[4]**
59/14 • by plasma treatment (in general H05H) **[4]**
59/16 • by wave energy or particle radiation **[4]**
59/18 • by liberation of internal stresses, e.g. plastic memory **[4]**

61/00 Shaping by liberation of internal stresses; Making preforms having internal stresses; Apparatus therefor (for surface shaping B29C 59/18; for lining articles B29C 63/38; for joining preformed parts B29C 65/66) **[4]**
61/02 • Thermal shrinking **[4]**
61/04 • Thermal expansion **[4]**
61/06 • Making preforms having internal stresses, e.g. plastic memory **[4]**
61/08 • • by stretching tubes **[4]**
61/10 • • by bending plates or sheets **[4]**

63/00 Lining or sheathing, i.e. applying preformed layers or sheathings of plastics; Apparatus therefor (B29C 73/00 takes precedence; by blowing B29C 49/00; by thermoforming B29C 51/00) **[4, 5]**
63/02 • using sheet or web-like material (B29C 63/26 takes precedence) **[4]**
63/04 • • by folding, winding, bending or the like **[4]**
63/06 • • • around tubular articles **[4]**
63/08 • • • by winding helically **[4]**
63/10 • • • • around tubular articles **[4]**
63/12 • • • by winding spirally **[4]**
63/14 • • • • around tubular articles **[4]**
63/16 • • applied by "rubber" bag or diaphragm **[4]**
63/18 • using tubular layers or sheathings (B29C 63/26 takes precedence) **[4]**
63/20 • • using pressure difference, e.g. vacuum **[4]**
63/22 • using layers or sheathings having a shape adapted to the shape of the article (B29C 63/26 takes precedence) **[4]**
63/24 • using threads **[4]**
63/26 • Lining or sheathing of internal surfaces (B29C 63/38 takes precedence) **[4]**
63/28 • • applied by "rubber" bag or diaphragm **[4]**
63/30 • • using sheet or web-like material **[4]**
63/32 • • • by winding helically **[4]**
63/34 • • using tubular layer or sheathings **[4]**
63/36 • • • being turned inside out **[4]**
63/38 • by liberation of internal stresses **[4]**
63/40 • • using sheet or web-like material **[4]**
63/42 • • using tubular layers or sheathings **[4]**
63/44 • • the shape of the layers or sheathings being adapted to the shape of the articles **[4]**
63/46 • • of internal surfaces **[4]**
63/48 • Preparation of the surfaces **[4]**

65/00 Joining of preformed parts; Apparatus therefor (for making boxes, cartons, envelopes or bags B31B; for sealing or securing package folds or closures B65B 51/00; joining constructional elements, in general F16B; splicing of light guides G02B 6/255) **[4, 5]**
65/02 • by heating, with or without pressure **[4]**
65/04 • • Dielectric heating, e.g. high-frequency welding **[4]**
65/06 • • using friction, e.g. spin welding **[4]**
65/08 • • using ultrasonic vibrations **[4]**
65/10 • • using hot gases **[4]**
65/12 • • • and welding bar **[4]**
65/14 • • using wave energy or particle radiation **[4]**
65/16 • • • Laser beam **[4]**

65/18 • • using heated tool **[4]**
65/20 • • • with direct contact, e.g. using "mirror" **[4]**
65/22 • • • Heated wire **[4]**
65/24 • • • characterised by the means for heating the tool **[4]**

Note(s)

Classification is made in this group only if the details or adaptations of the heating means are of interest.

65/26 • • • • Hot fluid **[4]**
65/28 • • • • Flame or combustible material **[4]**
65/30 • • • • Electrical means **[4]**
65/32 • • • • • Induction **[4]**
65/34 • • using heated elements which remain in the joint, e.g. "verlorenes Schweisselement" **[4]**
65/36 • • • heated by induction **[4]**
65/38 • • Impulse heating **[4]**
65/40 • • Applying molten plastics, e.g. hot melt (using welding bar B29C 65/12; by moulding B29C 65/70) **[4]**
65/42 • • • between pre-assembled parts **[4]**
65/44 • • Joining a heated non-plastics element to a plastics element **[4]**
65/46 • • • heated by induction **[4]**
65/48 • using adhesives (heat-activated B29C 65/02; hot melts B29C 65/40; non-mechanical parts of adhesive processes, in general C09J 5/00) **[4]**
65/50 • • using adhesive tape **[4]**
65/52 • • Applying the adhesive **[4]**
65/54 • • • between pre-assembled parts **[4]**
65/56 • using mechanical means **[4]**
65/58 • • Snap connection **[4]**
65/60 • • Riveting **[4]**
65/62 • • Stitching **[4]**
65/64 • • Joining a non-plastics element to a plastics element, e.g. by force (B29C 65/44 takes precedence) **[4]**
65/66 • by liberation of internal stresses, e.g. shrinking of one of the parts to be joined **[4]**
65/68 • • using auxiliary shrinkable element **[4]**
65/70 • by moulding (using a particular moulding technique, see the relevant place for that technique) **[4]**
65/72 • by combined operations, e.g. welding and stitching **[4]**
65/74 • by welding and severing **[4]**
65/76 • Making non-permanent or releasable joints **[4]**
65/78 • Means for handling the parts to be joined, e.g. for making containers or hollow articles **[4]**
65/80 • • Rotatable transfer means **[4]**
65/82 • Testing the joint **[4]**

67/00 Shaping techniques not covered by groups B29C 39/00-B29C 65/00, B29C 70/00 or B29C 73/00 [4, 6]

67/02 • Moulding by agglomerating **[4]**
67/04 • • Sintering (combined with compression B29C 43/00) **[4]**
67/06 • • Coagulating **[4]**
67/08 • Screen moulding, e.g. forcing the moulding material through a perforated screen on to a moulding surface **[4]**
67/20 • for porous or cellular articles, e.g. of foam plastics, coarse-pored **[4]**
67/24 • characterised by the choice of material **[4]**

69/00 Combinations of shaping techniques not provided for in a single one of main groups B29C 39/00-B29C 67/00, e.g. associations of moulding and joining techniques; Apparatus therefor [4]

69/02 • of moulding techniques only **[4]**

70/00 Shaping composites, i.e. plastics material comprising reinforcements, fillers or preformed parts, e.g. inserts (chemical aspects C08, e.g. C08J 5/00) **[6]**

Note(s)

In this group, the following terms or expressions are used with the meanings indicated:

- "reinforcement" means a structure in the form of fibres, wires, rods, bars, sections, plates or blocks, which improves the strength of an article;
- "filler" means a relatively inert substance in the form of particles, powder, beads, flakes or spheres, which improves the physical properties or increases the bulk or weight of an article;
- "preformed part" means a part made of any material, being completely shaped to have a determined form and which is not used as a reinforcement, e.g. wires or nets forced only into the surface of an article;
- "insert" means a preformed part incorporated in an article during moulding.

70/02 • comprising combinations of reinforcements and fillers incorporated in matrix material, forming one or more layers, with or without non-reinforced or non-filled layers **[6]**
70/04 • comprising reinforcements only, e.g. self-reinforcing plastics **[6]**
70/06 • • Fibrous reinforcements only **[6]**
70/08 • • • comprising combinations of different forms of fibrous reinforcements incorporated in matrix material, forming one or more layers, with or without non-reinforced layers **[6]**
70/10 • • • characterised by the structure of fibrous reinforcements **[6]**
70/12 • • • • using fibres of short length, e.g. in the form of a mat **[6]**
70/14 • • • • • oriented (oriented filler material B29C 70/62) **[6]**
70/16 • • • • using fibres of substantial or continuous length **[6]**
70/18 • • • • • in the form of a mat, e.g. sheet moulding compound (SMC) **[6]**
70/20 • • • • • oriented in a single direction, e.g. roving or other parallel fibres **[6]**
70/22 • • • • • oriented in at least two directions forming a two dimensional structure **[6]**
70/24 • • • • • oriented in at least three directions forming a three dimensional structure **[6]**
70/26 • • Non-fibrous reinforcements only **[6]**
70/28 • • Shaping operations therefor **[6]**

Note(s)

1. This group covers:
   - the shaping of coherent fibrous reinforcements which are pre-impregnated or without binder, or of non-coherent reinforcements of fibres placed in a mould or on a support;

- the impregnation or introduction of a plastics matrix in reinforcements during shaping.

2. This group does not cover:
   - the moulding by a single technique of plastics matrix material mixed with and containing reinforcing fibres of short length, which is covered by the appropriate place for that technique;
   - the pretreatment, e.g. impregnation, of reinforcements per se, i.e. independently of their shaping, which is covered by group B29B 15/08.

70/30 • • • Shaping by lay-up, i.e. applying fibres, tape or broadsheet on a mould, former or core; Shaping by spray-up, i.e. spraying of fibres on a mould, former or core **[6]**

70/32 • • • • on a rotating mould, former or core **[6]**

70/34 • • • • and shaping or impregnating by compression **[6]**

70/36 • • • • and impregnating by casting, e.g. vacuum casting **[6]**

70/38 • • • • Automated lay-up, e.g. using robots, laying filaments according to predetermined patterns **[6]**

70/40 • • • Shaping or impregnating by compression (B29C 70/34 takes precedence) **[6]**

70/42 • • • • for producing articles of definite length, i.e. discrete articles **[6]**

70/44 • • • • • using isostatic pressure, e.g. pressure difference-, vacuum bag-, autoclave- or expanding rubber-moulding **[6]**

70/46 • • • • • using matched moulds, e.g. for deforming sheet moulding compounds (SMC), prepregs **[6]**

70/48 • • • • • • and impregnating the reinforcements in the closed mould, e.g. resin transfer moulding (RTM) **[6]**

70/50 • • • • for producing articles of indefinite length, e.g. prepregs, sheet moulding compounds (SMC), cross moulding compounds (XMC) **[6]**

70/52 • • • • • Pultrusion, i.e. forming and compressing by continuously pulling through a die **[6]**

70/54 • • • Component parts, details or accessories; Auxiliary operations **[6]**

70/56 • • • • Tensioning reinforcements before or during shaping **[6]**

70/58 • comprising fillers only **[6]**

Note(s)

Moulding of plastics matrix material mixed with fillers by a single technique is classified in the appropriate place for that technique.

70/60 • • comprising a combination of distinct filler types incorporated in matrix material, forming one or more layers, and with or without non-filled layers **[6]**

70/62 • • the filler being oriented during moulding (for fibres of short length B29C 70/14) **[6]**

70/64 • • the filler influencing the surface characteristics of the material, e.g. by concentrating near the surface or by incorporation into the surface by force **[6]**

70/66 • • the filler comprising hollow constituents, e.g. syntactic foam **[6]**

70/68 • by incorporating or moulding on preformed parts, e.g. inserts, layers **[6]**

Note(s)

This group does not cover:
- incorporating, or moulding on, preformed parts by a single technique, which is covered by the appropriate place for that technique;
- pretreatment of preformed parts per se, i.e. independently of their shaping, which is covered by group B29B 15/00.

70/70 • • Completely encapsulating inserts **[6]**

70/72 • • Encapsulating inserts having non-encapsulated projections, e.g. extremities, terminal portions of electrical components **[6]**

70/74 • • Moulding material on a relatively small portion of the preformed part, e.g. outsert moulding **[6]**

70/76 • • • Moulding on edges or extremities of the preformed part **[6]**

70/78 • • Moulding material on one side only of the preformed part **[6]**

70/80 • • • Moulding sealing material into closure members **[6]**

70/82 • • Forcing wires, nets or the like partially or completely into the surface of an article, e.g. by cutting and pressing (pressing beads or the like into a surface B29C 70/64) **[6]**

70/84 • • Moulding material on preformed parts to be joined **[6]**

70/86 • • Incorporating in coherent impregnated reinforcing layers **[6]**

70/88 • characterised primarily by possessing specific properties, e.g. electrically conductive, locally reinforced **[6]**

71/00 After-treatment of articles without altering their shape; Apparatus therefor (B29C 44/56, B29C 73/00 take precedence; surface shaping B29C 59/00; chemical aspects C08J 7/00) **[4, 5, 6]**

71/02 • Thermal after-treatment **[4]**

71/04 • by wave energy or particle radiation **[4]**

73/00 Repairing of articles made from plastics or substances in a plastic state, e.g. of articles shaped or produced by using techniques covered by this subclass or subclass B29D (retreading tyres B29D 30/54; devices for covering leaks in pipes or hoses F16L 55/16) **[5]**

73/02 • using liquid or paste-like material (B29C 73/16 takes precedence) **[5]**

73/04 • using preformed elements **[5]**

73/06 • • using plugs sealing in the hole **[5]**

73/08 • • • Apparatus therefor, e.g. for inserting **[5]**

73/10 • • using patches sealing on the surface of the article (B29C 73/14 takes precedence) **[5]**

73/12 • • • Apparatus therefor, e.g. for applying (B29C 73/30 takes precedence) **[5]**

73/14 • • using elements composed of two parts joined together after having been placed one on each side of the article **[5]**

73/16 • Auto-repairing or self-sealing arrangements or agents (sealing compositions, see Section C, e.g. C09K 3/10) **[5]**

73/18 • • the article material itself being self-sealing, e.g. by compression **[5]**

73/20 • • • the article material only consisting in part of a deformable sealing material **[5]**

73/22 • • the article containing elements including a sealing composition, e.g. powder being liberated when the article is damaged **[5]**

73/24 • Apparatus or accessories not otherwise provided for **[5]**

73/26 • • for mechanical pretreatment **[5]**

73/28 • • for clamping and stretching flexible material, e.g. inner tubes **[5]**

73/30 • • for local pressing or local heating **[5]**

73/32 • • • using an elastic element, e.g. inflatable bag **[5]**

73/34 • • • for local heating **[5]**