

CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

SHAPING

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

(NOTES omitted)

B29C SHAPING OR JOINING OF PLASTICS; SHAPING OF MATERIAL IN A PLASTIC STATE, NOT OTHERWISE PROVIDED FOR; AFTER-TREATMENT OF THE SHAPED PRODUCTS, e.g. REPAIRING (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](#))

NOTES

1. This subclass covers:
 - shaping or joining of plastics;
 - shaping of material in a plastic state when a specific material is not identified;
 - shaping of material in a plastic state, not otherwise provided for.
2. This subclass does not cover:
 - working of plastics sheet material in a manner analogous to the working of paper, which is covered by class [B31](#);
 - shaping of materials provided for elsewhere, e.g. of metal, clay or foodstuffs.
3. Attention is drawn to Note (3) following the title of class [B29](#).
4. In this subclass:
 - repairing of articles made from plastics or materials 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](#).
5. In this subclass, it is desirable to add the indexing codes of subclasses [B29K](#) and [B29L](#).

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

Component parts, details or accessories; Auxiliary operations

NOTE

{Attention is drawn to Note (4) following the subclass title.}

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|--------|---|--------|--|
| 31/00 | Handling, e.g. feeding of the material to be shaped {, storage of plastics material before moulding; Automation, i.e. automated handling lines in plastics processing plants, e.g. using manipulators or robots (discharging moulded articles from the mould B29C 37/0003; storage of preregs or SMC after impregnation or during ageing B29C 70/54; baling of rubber B29B 15/02)} | 31/008 | • {Handling preformed parts, e.g. inserts (B29C 37/001 takes precedence; for injection moulding B29C 45/14008 ; for blow moulding B29C 49/2408 ; for thermoforming B29C 51/165)} |
| 31/002 | • {Handling tubes, e.g. transferring between shaping stations, loading on mandrels} | 31/02 | • Dispensing from vessels, e.g. hoppers {(into a mould cavity B29C 31/04 ; large containers characterised by discharge means B65D 88/28 , B65D 88/54)} |
| 31/004 | • {Arrangements for converting the motion of a material which is continuously fed to a working station in a stepwise motion} | 31/04 | • Feeding {of the material to be moulded}, e.g. into a mould cavity {(B29C 39/08 takes precedence; using a material distribution system to two or more fixed injection moulds B29C 45/125)} |
| 31/006 | • {Handling moulds, e.g. between a mould store and a moulding machine (movable moulds B29C 33/34 ; for injection moulding B29C 45/1756)} | 31/041 | • • {using filling or dispensing heads placed in closed moulds or in contact with mould walls (B29C 45/27 takes precedence)} |
| | | 31/042 | • • {using dispensing heads, e.g. extruders, placed over or apart from the moulds (positioning extruded preforms on conveyors B29C 31/085)} |
| | | 31/044 | • • • {with moving heads for distributing liquid or viscous material into the moulds} |

- 31/045 {moving along predetermined circuits or distributing the material according to predetermined patterns}
- 31/047 . . . {combined with moving moulds ([B29C 31/044](#), [B29C 31/048](#) take precedence)}
- 31/048 . . . {the material being severed at the dispensing head exit, e.g. as ring, drop or gob, and transported immediately into the mould, e.g. by gravity}
- 31/06 . . in measured doses {, e.g. by weighting ([feeding mixers with measured doses B01F 15/0216](#), [B01F 15/0454](#), [B29B 7/24](#), [B29B 7/603](#))}
- 31/061 . . . {using stationary volumetric measuring chambers}
- 31/063 {of the piston type}
- 31/065 . . . {using volumetric measuring chambers moving between a charging station and a discharge station}
- 31/066 {using feed frames, e.g. for dry material}
- 31/068 {of the piston type}
- 31/08 . . of preforms {to be moulded, e.g. tablets, fibre reinforced preforms, extruded ribbons, tubes or profiles; Manipulating means specially adapted for feeding preforms, e.g. supports conveyors ([B29C 31/066](#), [B29C 37/001](#), [B29C 43/085](#) take precedence)}
- NOTE**
Documents describing feeding preforms, e.g. parisons, tubes, sheets in connection with shaping techniques described in groups [B29C 49/00](#) - [B29C 65/00](#) are not classified in group [B29C 31/08](#), but in the relevant groups of these techniques
- 31/085 {combined with positioning the preforms according to predetermined patterns, e.g. positioning extruded preforms on conveyors ([B29C 70/30](#) takes precedence; for building tyres [B29D 30/08](#))}
- 31/10 . . of several materials
- 33/00 Moulds or cores; Details thereof or accessories therefor**
- 2033/0005 . {with transparent parts, e.g. permitting visual inspection of the interior of the cavity}
- 33/0011 . {thin-walled moulds}
- 33/0016 . . {Lost moulds, e.g. staying on the moulded object (flexible bags without particular shape filled with expandable material [B29C 44/182](#); single use mandrels for winding and forming [B29C 53/822](#))}
- 33/0022 . {Multi-cavity moulds ([B29C 33/301](#) takes precedence)}
- 33/0027 . . {with deep narrow cavities, e.g. for making piles (non-woven pile fabrics [D04H 11/00](#))}
- 33/0033 . {constructed for making articles provided with holes}
- NOTE**
If the hole is made by cutting means associated with the mould, see the relevant moulding technique
- 33/0038 . {with sealing means or the like (seals on envelopes used in tyre retreading [B29D 30/542](#); for injection moulding footwear [B29D 35/0045](#))}
- 33/0044 . . {for sealing off parts of inserts projecting into the mould cavity}
- 33/005 . {characterised by the location of the parting line of the mould parts}
- 33/0055 . {with incorporated overflow cavities (in particular in injection moulds [B29C 45/2669](#))}
- 33/0061 . {characterised by the configuration of the material feeding channel (sprue channels for injection moulding [B29C 45/27](#))}
- 33/0066 . . {with a subdivided channel for feeding the material to a plurality of locations}
- 33/0072 . . {with a configuration promoting turbulency, e.g. for after-mixing in the mould}
- 33/0077 . {characterised by the configuration of the mould filling gate (mixing chambers situated in the mould opening [B29B 7/7471](#)); accessories for connecting the mould filling gate with the filling spout}
- 33/0083 . {Electrical or fluid connection systems therefor}
- 33/0088 . {Multi-face stack moulds}
- 2033/0094 . {Means for masking a part of the moulding surface}
- 33/02 . with incorporated heating or cooling means
- 2033/023 . . {Thermal insulation of moulds or mould parts}
- 33/026 . . {in rolls, calenders or drums}
- 33/04 . . using liquids, gas or steam {(tyre moulds with incorporated heating or cooling means using liquids, gas or steam [B29D 30/0601](#))}
- 2033/042 . . . {Meander or zig-zag shaped cooling channels, i.e. continuous cooling channels whereby a plurality of cooling channel sections are oriented in a substantial parallel direction}
- 33/044 . . . {in rolls calenders or drums}
- 33/046 . . . {using gas}
- 33/048 . . . {using steam}
- 33/06 . . using radiation {, e.g. electro-magnetic waves, induction heating}
- 33/065 . . . {in rolls, calenders or drums}
- 33/08 . . for dielectric heating
- 33/085 . . . {using rolls, calenders or drums}
- 33/10 . with incorporated venting means
- 33/12 . with incorporated means for positioning inserts, e.g. labels {(positioning reinforcements [B29C 70/541](#))}
- 33/123 . . {for centering the inserts}
- 33/126 . . . {using centering means forming part of the insert}
- 33/14 . . against the mould wall
- 33/16 . . . using magnetic means
- 33/18 . . . using vacuum
- 33/20 . Opening, closing or clamping
- 33/202 . . {Clamping means operating on closed or nearly closed mould parts, the clamping means being independently movable of the opening or closing means (clamping devices for injection moulding machines [B29C 45/64](#))}
- 2033/205 . . . {mould clamping by membranes, e.g. inflatable membranes or cushions}
- 2033/207 . . . {mould clamping by pivoting members}
- 33/22 . . by rectilinear movement
- 33/24 . . . using hydraulic or pneumatic means
- 33/26 . . by pivotal movement
- 33/28 . . . using hydraulic or pneumatic means

- 33/30 . . Mounting, exchanging or centering {(moulds, mould parts or cores; [B29C 33/485](#) takes precedence)}
- 33/301 . . {Modular mould systems [MMS], i.e. moulds built up by stacking mould elements, e.g. plates, blocks, rods ([B29C 33/0088](#) takes precedence)}
- 33/302 . . . {Assembling a large number of mould elements to constitute one cavity}
- 33/303 . . {centering mould parts or halves, e.g. during mounting}
- 33/304 . . . {centering cores}
- 33/305 . . {Mounting of moulds or mould support plates (handling of moulds [B29C 31/006](#); mounting of moulds for injection moulding [B29C 45/1742](#))}
- 33/306 . . {Exchangeable mould parts, e.g. cassette moulds, mould inserts (moulds with exchangeable mould parts for injection moulding [B29C 45/2673](#); mounting of exchangeable mould inserts for injection moulding [B29C 45/2675](#))}
- 33/307 . . {Mould plates mounted on frames; Mounting the mould plates; Frame constructions therefor (shaping plates for making moulds [B29C 33/3842](#); thin walled moulds [B29C 33/0011](#))}
- 33/308 . . {Adjustable moulds (for injection moulding [B29C 45/376](#))}
- 33/32 . . using magnetic means
- 33/34 . . movable, e.g. to or from the moulding station
- 33/36 . . continuously movable {in one direction, e.g. in a closed circuit ([B29C 49/0021](#) takes precedence)}
- 33/38 . . characterised by the material or the manufacturing process ([B29C 33/44](#) takes precedence)
- 33/3807 . . {Resin-bonded materials, e.g. inorganic particles}
- 33/3814 . . {Porous moulds (adapted for vacuum forming [B29C 51/365](#))}
- 33/3821 . . {composed of particles enclosed in a bag}
- 33/3828 . . {Moulds made of at least two different materials having different thermal conductivities}
- 33/3835 . . {Designing moulds, e.g. using CAD-CAM}
- 33/3842 . . {Manufacturing moulds, e.g. shaping the mould surface by machining}
- 2033/385 . . . {by laminating a plurality of layers (moulds built up by stacking mould elements, e.g. plates, blocks, rods, in general [B29C 33/301](#), tyre moulds made of a plurality of laminations [B29D 2030/0609](#))}
- 33/3857 . . . {by making impressions of one or more parts of models, e.g. shaped articles and including possible subsequent assembly of the parts}
- 2033/3864 {Spraying at least one layer to create the mould}
- 2033/3871 {the models being organic material, e.g. living or dead bodies or parts thereof}
- 33/3878 {used as masters for making successive impressions}
- 33/3885 {the mould parts being co-operating impressions}
- 33/3892 {Preparation of the model, e.g. by assembling parts}
- 33/40 . . Plastics, e.g. foam or rubber
- 33/405 . . . {Elastomers, e.g. rubber ([B29C 33/50](#) takes precedence)}
- 33/42 . . characterised by the shape of the moulding surface, e.g. ribs or grooves
- 2033/422 . . . {Moulding surfaces provided with a shape to promote flow of material in the mould cavity}
- 33/424 . . . {Moulding surfaces provided with means for marking or patterning (for injection moulding [B29C 45/372](#))}
- 2033/426 {Stampers}
- 33/428 {For altering indicia, e.g. data, numbers (for injection moulding [B29C 45/374](#))}
- 33/44 . . with means for, or specially constructed to facilitate, the removal of articles, e.g. of undercut articles
- 33/442 . . {with mechanical ejector or drive means therefor}
- 33/444 . . . {for stripping articles from a mould core, e.g. using stripper plates}
- 33/446 {and using a rotating movement to unscrew articles (in particular in injection moulds [B29C 45/262](#))}
- 33/448 . . {destructible ([B29C 33/52](#) takes precedence; in particular used in injection moulding [B29C 45/4457](#))}
- 33/46 . . using fluid pressure
- 33/48 . . with means for collapsing or disassembling
- 33/485 . . . {cores or mandrels (collapsible mandrels for shaping tube ends [B29C 57/02](#); collapsible mandrels for winding and joining [B29C 53/824](#))}
- 33/50 elastic {or flexible (for isostatic pressing [B29C 43/3642](#))}
- 33/505 {cores or mandrels, e.g. inflatable ([B29C 33/0016](#) takes precedence; for winding and joining [B29C 53/824](#); for supporting articles during joining [B29C 66/634](#); flexible cores for vulcanizing tyres [B29D 30/0654](#))}
- 33/52 . . soluble or fusible {(in particular used in injection moulding [B29C 45/4457](#))}
- 2033/525 {Cores made of frozen liquids, e.g. ice}
- 33/54 . . made of powdered or granular material
- 33/56 . . Coatings {, e.g. enameled or galvanised}; Releasing, lubricating or separating agents {(in-mould coating [B29C 37/0028](#); using or applying separating agents [B29C 37/0067](#))}
- 33/565 . . {Consisting of shell-like structures supported by backing material}
- 33/58 . . Applying the releasing agents
- 33/60 . . Releasing, lubricating or separating agents {(in general [C10M](#))}
- 33/62 . . . based on polymers or oligomers
- 33/64 Silicone
- 33/66 Cellulose; Derivatives thereof
- 33/68 . . Release sheets
- 33/70 . . Maintenance
- 2033/705 . . {Mould inspection means, e.g. cameras}
- 33/72 . . Cleaning {(extruder parts [B29C 48/27](#); in general [B08B 7/00](#))}
- 33/722 . . . {Compositions for cleaning moulds}
- 2033/725 . . . {cleaning by plasma treatment}
- 2033/727 . . . {cleaning during moulding}
- 33/74 . . Repairing
- 33/76 . . Cores ([B29C 33/02](#) - [B29C 33/70](#), {[B29C 41/40](#), [B29C 53/74](#), [B29C 53/82](#)} take precedence)

- 35/00 Heating, cooling or curing, e.g. crosslinking or vulcanising; Apparatus therefor (moulds with incorporated heating or cooling means [B29C 33/02](#) {; thermal after-treatment of shaped articles [B29C 71/02](#)}; curing devices for plastics dental prostheses [A61C 13/14](#); before moulding [B29B 13/00](#))**
- 35/002 . {Component parts, details or accessories; Auxiliary operations}
- 2035/005 . . {Enveloping the material to be cured, e.g. by helically winding a film around the material}
- 35/007 . {Tempering units for temperature control of moulds or cores, e.g. comprising heat exchangers, controlled valves, temperature-controlled circuits for fluids ([B29C 35/0294](#) takes precedence)}
- 35/02 . Heating or curing, e.g. crosslinking or vulcanizing {during moulding, e.g. in a mould}{cold vulcanisation [B29C 35/18](#) {; vulcanising tyres, presses therefor [B29D 30/0601](#)}}
- 2035/0211 . . {resistance heating ([B29C 2035/0811](#) takes precedence)}
- 2035/0216 . . {using Peltier-effect}
- 35/0222 . . {the curing continuing after removal from the mould ([B29C 35/0233](#) takes precedence)}
- 35/0227 . . {using pressure vessels, e.g. autoclaves, vulcanising pans ([B29C 35/065](#) takes precedence)}
- 35/0233 . . . {the curing continuing after removal from the mould}
- 35/0238 . . . {Presses provided with pressure vessels, e.g. steam chambers}
- 35/0244 . . {using fluidised bed}
- 35/025 . . . {for articles of indefinite length}
- 35/0255 . . {using friction}
- 35/0261 . . {using ultrasonic or sonic vibrations}
- 35/0266 . . {Local curing (for repairing [B29C 73/34](#))}
- 35/0272 . . {using lost heating elements, i.e. heating means incorporated and remaining in the formed article (for preforms with internal stresses [B29C 61/0625](#); joining using lost heating elements [B29C 65/34](#); making electrically conductive articles [B29C 70/882](#))}
- 35/0277 . . {Apparatus with continuous transport of the material to be cured ([B29C 35/025](#), [B29C 35/06](#), [B29C 35/10](#), [B29C 35/14](#) take precedence)}
- 2035/0283 . . {Thermal pretreatment of the plastics material (thermal after-treatment [B29C 71/02](#))}
- 35/0288 . . {Controlling heating or curing of polymers during moulding, e.g. by measuring temperatures or properties of the polymer and regulating the process (controlling or regulating chemical, physical or physico- chemical processes in general [B01J 19/0006](#))}
- 35/0294 . . . {using tempering units for temperature control of moulds or cores}
- 35/04 . . using liquids, gas or steam
- 35/041 . . . {using liquids}
- 2035/042 {other than water}
- 2035/043 {oil}
- 2035/044 {mercury}
- 35/045 . . . {using gas or flames}
- 2035/046 {dried air}
- 2035/047 {other than air}
- 2035/048 {inert gas}
- 35/049 . . . {using steam or damp}
- 35/06 . . . for articles of indefinite length
- 35/065 {in long tubular vessels}
- 35/08 . . by wave energy or particle radiation {([B29C 64/00](#), [B29C 71/04](#) take precedence)}
- 35/0805 . . . {using electromagnetic radiation}
- 2035/0811 {using induction}
- 2035/0816 {using eddy currents}
- 2035/0822 {using IR radiation}
- 2035/0827 {using UV radiation}
- 2035/0833 {using actinic light}
- 2035/0838 {using laser}
- 2035/0844 {using X-ray}
- 2035/085 {using gamma-ray}
- 2035/0855 {using microwave}
- 2035/0861 {using radio frequency}
- 35/0866 . . . {using particle radiation}
- 2035/0872 {using ion-radiation, e.g. alpha-rays}
- 2035/0877 {using electron radiation, e.g. beta-rays}
- 2035/0883 {using neutron radiation}
- 35/0888 . . . {using transparent moulds}
- 35/0894 {provided with masks or diaphragms}
- 35/10 . . . for articles of indefinite length
- 35/12 . . Dielectric heating
- 35/14 . . . for articles of indefinite length
- 35/16 . . Cooling {(cooling extruded material [B29C 48/911](#); cooling preforms for blow moulding [B29C 49/6427](#); cooling blown articles [B29C 49/66](#); cooling tyres during post cure inflation [B29D 30/0643](#))}
- 2035/1608 . . . {using Peltier-effect}
- 2035/1616 . . . {using liquids}
- 2035/1625 {other than water}
- 2035/1633 {oil}
- 2035/1641 {mercury}
- 2035/165 {liquified gases}
- 2035/1658 . . . {using gas}
- 2035/1666 {dried air}
- 2035/1675 {other than air}
- 2035/1683 {inert gas}
- 2035/1691 . . . {using gas-liquid mixtures}
- 35/18 . . Cold vulcanisation
- 37/00 Component parts, details, accessories or auxiliary operations, not covered by group [B29C 33/00](#) or [B29C 35/00](#)**
- 37/0003 . {Discharging moulded articles from the mould (constructions for removing the articles [B29C 33/44](#))}
- 37/0007 . . {using means operable from outside the mould for moving between mould parts, e.g. robots}
- 37/001 . . . {combined with means for loading preforms to be moulded or inserts, e.g. preformed layers}
- 37/0014 . . . {by flexibly or permanently deforming undercut portions of the articles}
- 37/0017 . . . {by stripping articles from mould cores}
- 37/0021 . . . {and using a rotating movement to unscrew articles (in particular used in injection moulding [B29C 45/178](#))}
- 37/0025 . {Applying surface layers, e.g. coatings, decorative layers, printed layers, to articles during shaping, e.g. in-mould printing (moulding on preformed layers as inserts [B29C 70/68](#); applying fluent material to surfaces in general [B05](#))}

- 37/0028 . . {In-mould coating, e.g. by introducing the coating material into the mould after forming the article}
- 37/0032 . . . {the coating being applied upon the mould surface before introducing the moulding compound, e.g. applying a gelcoat ([B29C 44/14](#) and [B29C 44/32](#) take precedence)}
- 2037/0035 . . . {the coating being applied as liquid, gel, paste or the like}
- 2037/0039 . . . {the coating being applied in powder or particle form}
- 2037/0042 . . . {the coating being applied in solid sheet form, e.g. as meltable sheet}
- 2037/0046 . . . {In-mould printing, in-mould transfer printing}
- 37/005 . {Compensating volume or shape change during moulding, in general}
- 37/0053 . {Moulding articles characterised by the shape of the surface, e.g. ribs, high polish ([mould construction therefor B29C 33/42](#); [surface shaping of articles B29C 59/00](#); by incorporating filler in or near the surface [B29C 70/64](#))}
- 37/0057 . . {Moulding single grooves or ribs, e.g. tear lines ([folding lines B29C 53/06](#))}
- 37/006 . {Degassing moulding material or draining off gas during moulding ([venting means in moulds B29C 33/10](#))}
- 37/0064 . . {of reinforced material}
- 37/0067 . {Using separating agents during or after moulding; Applying separating agents on preforms or articles, e.g. to prevent sticking to each other ([separating agents B29C 33/60](#))}
- 37/0071 . . {Dusting machines}
- 37/0075 . . {using release sheets}
- 37/0078 . {Measures or configurations for obtaining anchoring effects in the contact areas between layers ([surface shaping B29C 59/00](#); [B29C 66/02](#) takes precedence)}
- 37/0082 . . {Mechanical anchoring ([B29C 66/303](#) takes precedence)}
- 37/0085 . . . {by means of openings in the layers ([joining through openings B29C 66/304](#))}
- 37/0089 . {Sealing devices placed between articles and treatment installations during moulding or shaping, e.g. sealing off the entrance or exit of ovens or irradiation rooms, connections between rooms at different pressures}
- 37/0092 . {Drying moulded articles or half products, e.g. preforms, during or after moulding or cooling}
- 37/0096 . {Trouble-shooting during starting or stopping moulding or shaping apparatus ([B29C 66/872](#) takes precedence)}
- 37/02 . Deburring or deflashing ([\(thermal deburring in general B23D 79/005\)](#))}
- 37/04 . . of welded articles, e.g. deburring or deflashing in combination with welding ([\(shaping the burr B29C 66/32\)](#))}
- NOTE**
- Attention is drawn to Note (3) following the subclass title.
- 2037/80 . {Identifying, e.g. coding, dating, marking, numbering}
- 2037/90 . {Measuring, controlling or regulating}
- 2037/903 . . {by means of a computer}
- 2037/906 . . {using visualisation means or linked accessories, e.g. screens, printers}
- 2037/92 . {Lubricating}
- 2037/94 . {Safety devices}
- 2037/96 . {Filters}
- Particular shaping techniques, e.g. moulding, joining; Apparatus therefor**
- 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)**
- 39/003 . {characterised by the choice of material}
- NOTE**
- When classifying in this group, it is desirable to add the indexing codes of subclass [B29K](#) to identify the moulding materials and their properties. Documents concerning the choice of moulding materials having a particular influence on the moulding technique should be classified in this group if of interest
- 39/006 . . {Monomers or prepolymers ([by reaction injection moulding B29C 67/246](#))}
- 39/02 . for making articles of definite length, i.e. discrete articles
- 39/021 . . {by casting in several steps}
- 39/023 . . . {for making multicoloured articles}
- 39/025 . . . {for making multilayered articles}
- 39/026 . . {characterised by the shape of the surface}
- 39/028 . . {having an axis of symmetry}
- 39/04 . . using movable moulds ([B29C 41/02](#) takes precedence){not applied}
- 39/06 . . . continuously movable, e.g. along a production line
- 39/08 . . . Introducing the material into the mould by centrifugal force
- 39/10 . . incorporating preformed parts or layers, e.g. casting around inserts or for coating articles ([\(coating a surface by casting in general B05D 1/30, B29C 39/126](#) takes precedence)}
- 39/12 . . Making multilayered or multicoloured articles ([B29C 39/021](#) takes precedence)}
- 39/123 . . . {Making multilayered articles}
- 39/126 {by casting between two preformed layers, e.g. deformable layers ([between two glass layers B32B 17/10917](#))}
- 39/14 . for making articles of indefinite length ([\(by depositing material on a substrate and stripping off the shaped article B29C 41/24\)](#))}
- 39/142 . . {by casting in several steps}
- 39/144 . . . {for making multicoloured articles}
- 39/146 . . . {for making multilayered articles}
- 39/148 . . {characterised by the shape of the surface}
- 39/16 . . between endless belts
- 39/18 . . incorporating preformed parts or layers, e.g. casting around inserts or for coating articles ([B29C 39/206](#) takes precedence)}
- 39/20 . . Making multilayered or multicoloured articles ([B29C 39/142](#) takes precedence)}
- 39/203 . . . {Making multilayered articles}
- 39/206 {by casting between two preformed layers, e.g. deformable layers}

- 39/22 . . Component parts, details or accessories; Auxiliary operations
- 39/24 . . . Feeding the material into the mould
- 39/26 . . . Moulds or cores
- 39/265 . . . {comprising two large plates positioned at a small distance from each other, e.g. for making panels}
- 39/28 . . . with means to avoid flashes {(B29C 39/30 takes precedence)}
- 39/30 . . . with means for cutting the article
- 39/32 . . . with joints or the like for making the mould impervious
- 39/34 . . . for undercut articles
- 39/36 . . Removing moulded articles
- 39/38 . . Heating or cooling
- 39/40 . . Compensating volume change, e.g. retraction {(in general B29C 37/005)}
- 39/405 . . . {by applying pressure to the casting composition}
- 39/42 . . Casting under special conditions, e.g. vacuum
- 39/44 . . Measuring, controlling or regulating
- 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 {; by lay-up of reinforcement of substantial or continuous length B29C 70/30})**
- 41/003 . {characterised by the choice of material}
- NOTE**
- When classifying in this group, it is desirable to add the indexing codes of subclass B29K to identify the moulding materials and their properties. Documents concerning the choice of moulding materials having a particular influence on the moulding technique should be classified in this group if of interest
- 41/006 . {using an electrostatic field for applying the material}
- 41/02 . for making articles of definite length, i.e. discrete articles
- 41/025 . . {having hollow walls}
- 41/04 . . Rotational or centrifugal casting, i.e. coating the inside of a mould by rotating the mould
- 41/042 . . . {by rotating a mould around its axis of symmetry (for concrete B28B 21/30)}
- 41/045 {the axis being placed vertically, e.g. spin casting}
- 41/047 {the mould cavity lying totally outside the axis, e.g. toroidal moulds}
- 41/06 . . . about two or more axes
- 41/08 . . Coating a former, core or other substrate by spraying or fluidisation, e.g. spraying powder {(spray-up of reinforcing fibres B29C 70/305)}
- 41/085 . . . {by rotating the former around its axis of symmetry}
- 41/10 . . . by fluidisation
- 41/12 . . Spreading-out the material on a substrate {, e.g. on the surface of a liquid}
- 41/14 . . Dipping a core {(B29C 41/10 takes precedence)}
- 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
- 41/18 . . Slush casting, i.e. pouring moulding material into a hollow mould with excess material being poured off
- 41/20 . . incorporating preformed parts or layers, e.g. moulding inserts or for coating articles
- 41/22 . . Making multilayered or multicoloured articles
- 41/24 . for making articles of indefinite length
- 41/26 . . by depositing flowable material on a rotating drum
- 41/265 . . . {on the inside of the drum}
- 41/28 . . by depositing flowable material on an endless belt
- 41/30 . . incorporating preformed parts or layers, e.g. moulding around inserts or for coating articles
- 41/32 . . Making multilayered or multicoloured articles
- 41/34 . Component parts, details or accessories; Auxiliary operations
- 41/36 . . Feeding the material on to the mould, core or other substrate
- 41/365 . . . {Construction of spray-up equipment, e.g. spray-up guns (spraying apparatus in general B05B)}
- 41/38 . . Moulds, cores or other substrates
- 41/383 . . . {with means for cutting the article}
- 41/386 . . . {for undercut articles}
- 41/40 . . . Cores
- 41/42 . . Removing articles from moulds, cores or other substrates {(B29C 33/444 and B29C 37/0017 take precedence)}
- 41/44 . . . Articles of indefinite length
- 41/46 . . Heating or cooling
- 41/48 . . Compensating volume change, e.g. retraction
- 41/50 . . Shaping under special conditions, e.g. vacuum
- 41/52 . . Measuring, controlling or regulating
- 43/00 Compression moulding, i.e. applying external pressure to flow the moulding material; Apparatus therefor {(by liberation of internal stresses B29C 61/006)}**
- 43/003 . {characterised by the choice of material}
- NOTE**
- When classifying in this group, it is desirable to add the indexing codes of subclass B29K to identify the moulding materials and their properties. Documents concerning the choice of moulding materials having a particular influence on the moulding technique should be classified in this group if of interest
- 43/006 . {Pressing and sintering powders, granules or fibres}
- 43/02 . . of articles of definite length, i.e. discrete articles {(B29C 35/0227 takes precedence)}
- 43/021 . . {characterised by the shape of the surface}
- 2043/022 . . . {having locally depressed lines, e.g. hinges (single grooves B29C 37/0057; folding lines B29C 53/06; parting line of the mould parts B29C 33/005)}
- 2043/023 . . . {having a plurality of grooves}
- 2043/024 {forming a threaded surface}
- 2043/025 {forming a microstructure, i.e. fine patterning}
- 2043/026 . . . {having functional projections, e.g. fasteners}
- 43/027 . . {having an axis of symmetry (B29C 43/102 takes precedence)}
- 2043/028 . . . {using radial compression}

- 2043/029 . . . {using axial compression along a longitudinal axis}
- 43/04 . . using movable moulds
- 2043/043 . . . {rotating on their own axis without linear displacement}
- 2043/046 . . . {travelling between different stations, e.g. feeding, moulding, curing stations}
- 43/06 . . . continuously movable {in one direction, e.g. mounted on chains, belts}
- 43/08 with circular movement {, e.g. mounted on rolls, turntables}
- 43/085 {and material fed in a continuous form, e.g. as a band}
- 43/10 . . Isostatic pressing, i.e. using non-rigid pressure-exerting members against rigid parts or dies {(in general [B30B 11/001](#))}
- 43/102 . . . {using rigid mould parts specially adapted for moulding articles having an axis of symmetry}
- 43/104 {the mould cavity lying totally outside the axis of symmetry, e.g. toroidal moulds}
- 2043/106 . . . {using powder material}
- 2043/108 . . . {using deformable metals, e.g. flowable metals, low melting point eutectic metals, liquified metals}
- 43/12 . . . using bags surrounding the moulding material {or using membranes contacting the moulding material ([B29C 70/44 takes precedence](#); flexible cores for vulcanizing tyres [B29D 30/0654](#))}
- 43/14 . . in several steps
- 2043/141 . . . {for making single layer articles (for indefinite articles [B29C 43/26](#))}
- 2043/142 {by moving a single mould or the article progressively, i.e. portionwise}
- 2043/143 {stepwise in a vertical direction, i.e. each time modifying the thickness}
- 2043/144 {using different moulds, i.e. the layer is compressed in consecutive steps by using different moulds for each portion of the article}
- 43/145 . . . {for making multicoloured articles}
- 43/146 . . . {for making multilayered articles}
- 2043/147 {by compressing after the laying of further material}
- 2043/148 {using different moulds}
- 43/16 . . Forging
- 43/18 . . incorporating preformed parts or layers, e.g. compression moulding around inserts or for coating articles {([B29C 43/206 takes precedence](#))}
- 2043/181 . . . {encapsulated (outsert moulding [B29C 70/74](#))}
- 2043/182 {completely (completely encapsulating inserts [B29C 70/70](#))}
- 43/183 . . . {the preformed layer being a lining, e.g. shaped in the mould before compression moulding, or a preformed shell adapted to the shape of the mould}
- 43/184 {shaped by the compression of the material during moulding}
- 2043/185 . . . {using adhesives (joining using adhesives [B29C 65/48](#))}
- 2043/186 {hot-melt or heat activated adhesives (applying molten plastics [B29C 65/40](#); joining using adhesives [B29C 65/48](#))}
- 2043/187 {pressure activated or pressure sensitive adhesives}
- 2043/188 {thermosetting adhesives, e.g. polyurethane adhesives (joining by heating [B29C 65/02](#))}
- 2043/189 {the parts being joined}
- 43/20 . . Making multilayered or multicoloured articles {([B29C 43/14 takes precedence](#))}
- 43/203 . . . {Making multilayered articles}
- 43/206 {by pressing the material between two preformed layers, e.g. deformable layers}
- 43/22 . . of articles of indefinite length {(for articles with reinforcements of substantial or continuous length [B29C 70/50](#))}
- 43/222 . . {characterised by the shape of the surface}
- 43/224 . . {having a profiled section, e.g. tubes, rods}
- 43/226 . . . {having a corrugated section}
- 43/228 . . {using endless belts feeding the material between non-rotating pressure members, e.g. vibrating pressure members}
- 43/24 . . Calendering
- 43/245 . . . {Adjusting calender parameters, e.g. bank quantity}
- 43/26 . . in several steps ([B29C 43/30 takes precedence](#) {not applied})
- 43/265 . . . {for making multilayered articles}
- 43/28 . . incorporating preformed parts or layers, e.g. compression moulding around inserts or for coating articles
- 43/30 . . Making multilayered or multicoloured articles {([B29C 43/26 takes precedence](#))}
- 43/305 . . . {Making multilayered articles}
- 43/32 . . Component parts, details or accessories; Auxiliary operations
- 2043/3205 . . {particular pressure exerting means for making definite articles ([B29C 43/36 takes precedence](#))}
- 2043/3211 . . . {magnets}
- 2043/3216 . . . {deformable nets, meshes, lattices or fabrics, e.g. tubular ones}
- 2043/3222 . . . {pressurized gas, e.g. air}
- 2043/3227 {inside the material, e.g. gas injection compression moulding}
- 2043/3233 {exerting pressure on mould parts}
- 2043/3238 . . . {pressurized liquid acting directly or indirectly on the material to be formed}
- 2043/3244 . . . {retraction of an expanded member}
- 2043/325 . . . {screws}
- 2043/3255 . . . {springs}
- 2043/3261 . . . {thermal expansion}
- 2043/3266 . . . {vibrating tool means}
- 2043/3272 . . {driving means}
- 2043/3277 . . . {for rotatable supports, e.g. carousels, drums}
- 2043/3283 . . . {for moving moulds or mould parts}
- 2043/3288 {using cam drives}
- 2043/3294 {using screw drives}
- 43/34 . . Feeding the material to the mould or the compression means {([B29C 43/085 takes precedence](#))}
- 2043/3405 . . . {using carrying means}
- 2043/3411 {mounted onto arms, e.g. grippers, fingers, clamping frame, suction means}
- 2043/3416 {conveyor belts}
- 2043/3422 {rollers}

- 2043/3427 {hopper, vessel, chute, tube, conveying screw, for material in discrete form, e.g. particles, powder, fibres ([dispensing from vessels B29C 31/02](#))}
- 2043/3433 {using dispensing heads, e.g. extruders, placed over or apart from the moulds ([feeding using dispensing heads B29C 31/042](#); [applying fluent material for coatings B05D 1/26](#); [extrusion coating B05D 1/265](#))}
- 2043/3438 {moving during dispensing over the moulds, e.g. laying up ([feeding using moving dispensing heads B29C 31/044](#); [applying fluent material for coatings B05D 1/26](#); [extrusion coating B05D 1/265](#))}
- 2043/3444 {using pressurizing feeding means located into the mold, e.g. plungers, pistons ([injection-compression moulding B29C 45/561](#))}
- 2043/345 {using gas, e.g. air, to transport non liquid material}
- 2043/3455 {for particles, powder, fibres, e.g. fluidized or sprayed}
- 2043/3461 {for foils, sheets, gobs, e.g. floated}
- 2043/3466 {using rotating supports, e.g. turntables, drums ([in general B29C 31/065](#); [turntables as movable moulds B29C 43/08](#); [feeding materials to moulding presses B30B 15/302](#); [transfer turntables B65G 47/80](#))}
- 2043/3472 {using star wheels comprising arms ([transfer stars B65G 47/84](#))}
- 2043/3477 {centrally fed, e.g. feeding the material in the center of the mold turntables ([turntables as movable moulds B29C 43/08](#))}
- 2043/3483 {using band or film carriers}
- 2043/3488 {uniformly distributed into the mould}
- 2043/3494 {using vibrating means}
- 43/36 Moulds for making articles of definite length, i.e. discrete articles
- 2043/3602 {with means for positioning, fastening or clamping the material to be formed or preforms inside the mould ([moulds with incorporated means for positioning inserts B29C 33/14](#); [positioning articles in the mould for injection moulding B29C 45/14065](#))}
- 2043/3605 {vacuum}
- 43/3607 {with sealing means or the like}
- 43/361 {with pressing members independently movable of the parts for opening or closing the mould, e.g. movable pistons ([transfer moulding B29C 45/02](#); [injection-compression moulding B29C 45/561](#))}
- 2043/3613 {applying pressure locally}
- 2043/3615 {forming elements, e.g. mandrels, rams, stampers, pistons, plungers, punching devices ([ram pressing B30B 11/02](#), [B30B 11/04](#); [forming pockets in sheets B65B 47/04](#); [moulding lenses B29D 11/00413](#))}
- 2043/3618 {plurality of counteracting elements}
- 2043/3621 {a plurality of individual elements acting on the material in the same or diferent directions, e.g. making tubular T-joints, profiles}
- 2043/3623 {coupled on a support, e.g. plate}
- 2043/3626 {multi-part rams, plungers or mandrels}
- 2043/3628 {moving inside a barrel or container like sleeve}
- 2043/3631 {moving in a frame for pressing and stretching; material being subjected to compressing stretching}
- 2043/3634 {having specific surface shape, e.g. grooves, projections, corrugations}
- 2043/3636 {ultrasonically or sonically vibrating, e.g. sonotrodes}
- 2043/3639 {hand operated ([forming pockets or receptacles in or from sheets, blanks, or webs B65B 47/04](#))}
- 43/3642 {Bags, bleeder sheets or cauls for isostatic pressing ([flexible cores for vulcanizing tyres B29D 30/0654](#))}
- 2043/3644 {Vacuum bags; Details thereof, e.g. fixing or clamping ([B29C 70/544](#) takes precedence; [applying pressure through membranes B29C 51/28](#); [bladders for making tires B29D 30/0601](#); [flexible pressing means B30B 5/02](#); [membrane press B30B 9/22](#); [vacuum laminating B32B 37/1018](#))}
- 2043/3647 {membranes, diaphragms ([vacuum bagging B29C 70/44](#); [applying pressure through membranes B29C 51/28](#); [bladders for making tires B29D 30/0601](#); [vacuum laminating B32B 37/1018](#); [flexible pressing means B30B 5/02](#); [membrane press B30B 9/22](#))}
- 2043/3649 {infatable bladders using gas or fluid and related details ([vacuum bagging B29C 70/44](#); [flexible moulds B29C 33/50](#); [flexible pressing means B30B 5/02](#); [membrane press B30B 9/22](#); [deep drawing membranes B29C 51/28](#); [bladders for making tires B29D 30/0601](#); [vacuum laminating B32B 37/1018](#))}
- 2043/3652 {elastic moulds or mould parts, e.g. cores, inserts ([isostatic pressing B29C 43/10](#); [moulds in elastomer B29C 33/405](#); [plastic cores B29C 33/50](#))}
- 2043/3655 {Pressure transmitters, e.g. caul plates; Pressure pads ([B29C 70/549](#) takes precedence)}
- 2043/3657 {additional materials, e.g. permeable bleeder or breather sheets, cloths, blankets}
- 2043/366 {plates pressurized by an actuator, e.g. ram drive, screw, vulcanizing presses}
- 2043/3663 {confined in a chamber}
- 2043/3665 {cores or inserts, e.g. pins, mandrels, sliders}
- 2043/3668 {destructible or fusible ([moulds for making articles with holes B29C 33/0033](#); [lost moulds B29C 33/0016](#); [fusible cores B29C 33/52](#); [making porous articles B22F 3/11](#))}
- 2043/3671 {preforms constituting part of the cavity mould wall}
- 2043/3673 {preform constituting a mould half}
- 2043/3676 {moulds mounted on rotating supporting constuctions}
- 2043/3678 {on cylindrical supports with moulds or mould cavities provided on the periphery ([rollers for making indefinite articles B29C 43/46](#); [turntables presses B30B 11/08](#), [roller presses B30B 11/006](#))}

- 2043/3681 {opening and closing axially, i.e. parallel to the rotation axis}
- 2043/3684 {opening/closing or acting radially, i.e. vertical to the rotation axis}
- 2043/3686 {opening and closing tangential to the rotation, i.e. vertical to the rotation axis and vertical to the radius}
- 2043/3689 {on a support table, flat disk-like tables having moulds on the periphery (press rams on turntables [B30B 11/08](#), [B30B 9/042](#))}
- 2043/3692 {cooperating with non rotating parts}
- 2043/3694 {on rotating star wheels}
- 43/3697 {comprising rollers or belts cooperating with non-rotating mould parts}
- 43/38 with means to avoid flashes {([B29C 43/40](#) takes precedence)}
- 43/40 with means for cutting the article
- 2043/403 {knife blades}
- 2043/406 {laser cutting means}
- 43/42 for undercut articles
- 2043/425 {mould parts or sliders being movable independently from the mould halves for making undercut portions (collapsible cores or mandrels [B29C 33/485](#))}
- 43/44 Compression means for making articles of indefinite length
- 43/46 Rollers
- 2043/461 {the rollers having specific surface features}
- 2043/462 {smooth surface}
- 2043/463 {corrugated, patterned or embossed surface}
- 2043/464 {having projections or knives, e.g. for cutting-out or for forming local depressions}
- 2043/465 {having one or more cavities, e.g. for forming distinct products}
- 2043/466 {the rollers having specific shape, e.g. non cylindrical rollers, conical rollers}
- 2043/467 {plurality of rollers arranged in a specific manner in relation to each other ([calender configuration B29C 43/24](#))}
- 2043/468 {take-off rollers, i.e. arranged adjacent a material feeding device ([calendering B29C 43/24](#))}
- 43/48 Endless belts
- 2043/483 {cooperating with a second endless belt, i.e. double band presses}
- 2043/486 {cooperating with rollers or drums}
- 43/50 Removing moulded articles
- 2043/5007 {using cores, i.e. the cores forming part of the mould cavity}
- 2043/5015 {having undercuts or being threaded (using a rotating movement to unscrew articles [B29C 33/446](#))}
- 2043/5023 {moving away (collapsible cores or mandrels [B29C 33/485](#))}
- 2043/503 {using ejector pins, rods}
- 2043/5038 {having an annular or tubular shape}
- 2043/5046 {using vacuum}
- 2043/5053 {using pressurised gas, e.g. air}
- 2043/5061 {using means movable from outside the mould between mould parts}
- 2043/5069 {take-off members or carriers for the moulded articles, e.g. grippers}
- 2043/5076 {using belts}
- 2043/5084 {using rotary devices, e.g. turntables, carousels (blow moulding machines [B29C 49/36](#), [B29C 49/4205](#))}
- 2043/5092 {using vibrations means}
- 43/52 Heating or cooling
- 2043/522 {selectively heating a part of the mould to achieve partial heating, differential heating}
- 2043/525 {at predetermined points for local melting, curing or bonding}
- 2043/527 {selectively cooling, e.g. locally, on the surface of the material}
- 43/54 Compensating volume change, e.g. retraction
- 43/56 Compression moulding under special conditions, e.g. vacuum
- 2043/561 {under vacuum conditions ([vacuum laminating B32B 37/1018](#))}
- 2043/562 {combined with isostatic pressure, e.g. pressurising fluids, gases}
- 2043/563 {combined with mechanical pressure, i.e. mould plates, rams, stampers}
- 2043/565 {in a clean sterile environment, e.g. to avoid contamination}
- 2043/566 {in a specific gas atmosphere, with or without pressure}
- 2043/567 {in a liquid, i.e. the moulded parts being embedded in liquid}
- 2043/568 {in a magnetic or electric field}
- 43/58 Measuring, controlling or regulating {(for bank adjustment in calendering [B29C 43/245](#))}
- 2043/5808 {pressure or compressing force}
- 2043/5816 {temperature}
- 2043/5825 {dimensions or shape, e.g. size, thickness}
- 2043/5833 {movement of moulds or mould parts, e.g. opening or closing, actuating}
- 2043/5841 {for accommodating variation in mould spacing or cavity volume during moulding ([compensating shrinkage B29C 43/54](#))}
- 2043/585 {detecting defects, e.g. foreign matter between the moulds, inaccurate position, breakage}
- 2043/5858 {for preventing tilting of movable mould plate during closing or clamping}
- 2043/5866 {ejection of moulded articles}
- 2043/5875 {the material feed to the moulds or mould parts, e.g. controlling feed flow, velocity, weight, doses}
- 2043/5883 {ensuring cavity filling, e.g. providing overflow means}
- 2043/5891 {using imaging devices, e.g. cameras}
- 44/00** **Shaping by internal pressure generated in the material, e.g. swelling or foaming {; Producing porous or cellular expanded plastics articles}**
- 44/005 {Avoiding skin formation; Making foams with porous surfaces}
- 44/02 for articles of definite length, i.e. discrete articles
- 44/022 {Foaming unrestricted by cavity walls, e.g. without using moulds or using only internal cores}
- 44/025 {Foaming in open moulds, followed by closing the moulds}
- 44/027 {the foaming continuing or beginning when the mould is opened}

- 44/04 . . . consisting of at least two parts of chemically or physically different materials, e.g. having different densities
- 44/0407 . . . {by regulating the temperature of the mould or parts thereof, e.g. cold mould walls inhibiting foaming of an outer layer}
- 44/0415 . . . {by regulating the pressure of the material during or after filling of the mould, e.g. by local venting}
- 44/0423 . . . {by density separation}
- 44/043 {using a rotating mould}
- 44/0438 {using flotation}
- 44/0446 . . . {by increasing the density locally by compressing part of the foam while still in the mould}
- 44/0453 . . . {by joining the different materials using compression moulding before the foaming step}
- 44/0461 . . . {by having different chemical compositions in different places, e.g. having different concentrations of foaming agent, feeding one composition after the other}
- 44/0469 {provided with physical separators between the different materials, e.g. separating layers, mould walls}
- 44/0476 {by pouring more than one composition into an open mould}
- 44/0484 . . . {by having different solubility of the foaming agent}
- 44/0492 . . . {Devices for feeding the different materials}
- 44/06 . . . Making multilayered articles
{(B29C 44/0407 - B29C 44/0492 take precedence)}
- 44/065 {comprising at least one barrier layer}
- 44/08 . . . using several expanding {or moulding} steps
- 44/083 . . . {Increasing the size of the cavity after a first part has foamed, e.g. substituting one mould part with another}
- 44/086 {and feeding more material into the enlarged cavity}
- 44/10 . . . Applying counter-pressure during expanding
- 44/105 {the counterpressure being exerted by a fluid}
- 44/12 . . . Incorporating or moulding on preformed parts, e.g. inserts or reinforcements
- 44/1204 {and giving the material during expanding the shape of a particular article to be supported, e.g. a human body-part}
- 44/1209 . . . {by impregnating a preformed part, e.g. a porous lining}
- 44/1214 . . . {Anchoring by foaming into a preformed part, e.g. by penetrating through holes (anchoring by moulding in general B29C 37/0078; outsert moulding B29C 45/14344, B29C 70/74)}
- 44/1219 . . . {Foaming between a movable mould part and the preformed part}
- 44/1223 . . . {Joining preformed parts which have previously been filled with foam}
- 44/1228 . . . {Joining preformed parts by the expanding material}
- 44/1233 {the preformed parts being supported during expanding}
- 44/1238 {and having flexible and solid areas}
- 44/1242 {the preformed parts being concentric (B29C 44/1233 takes precedence)}
- 44/1247 {comprising dams or sealing arrangements}
- 44/1252 {Removing portions of the preformed parts after the moulding step}
- 44/1257 {Joining a preformed part and a lining, e.g. around the edges}
- 44/1261 {Avoiding impregnation of a preformed part}
- 44/1266 {the preformed part being completely encapsulated, e.g. for packaging purposes or as reinforcement}
- 44/1271 {the preformed parts being partially covered}
- 44/1276 {the preformed parts being three dimensional structures which are wholly or partially penetrated by the foam}
- 44/128 {Internally reinforcing constructional elements, e.g. beams}
- 44/1285 {the preformed part being foamed}
- 44/129 {Enhancing adhesion to the preformed part using an interlayer}
- 44/1295 {Foaming around pipe joints}
- 44/14 the preformed part being a lining
{(B29C 44/1209 takes precedence)}
- 44/141 {Hiding joints in the lining}
- 44/143 {Means for positioning the lining in the mould (in general B29C 33/12)}
- 44/145 {the lining being a laminate}
- 44/146 {Shaping the lining before foaming}
- 44/148 {Applying the foaming resin, moulding the lining or the like, with the lining turned inside out}
- 44/16 shaped by the expansion of the material
- 44/18 Filling preformed cavities {(B29C 44/1204 takes precedence)}
- 44/181 {Filling unsupported soft shells having a particular shape}
- 44/182 {Filling flexible bags not having a particular shape}
- 44/183 {the components being kept apart in different containers within the bag, and mixed upon rupture of the containers (B29C 44/184 takes precedence)}
- 44/184 {and inserting the bags into preformed cavities}
- 44/185 {Starting the expansion after rupturing or dissolving the bag}
- 44/186 {Filling multiple cavities (B29C 44/181, B29C 44/182 and B29C 44/188 takes precedence)}
- 44/187 {Filling faulty voids in the foam}
- 44/188 {Sealing off parts of the cavities}
- 44/20 . . . for articles of indefinite length
- 44/203 . . . {Expanding the moulding material in a vertical channel}
- 44/206 . . . {Using expandable particles or beads as starting material}
- 44/22 . . . consisting of at least two parts of chemically or physically different materials, e.g. having different densities
- 44/24 Making multilayered articles
- 44/26 . . . using several expanding steps
- 44/28 . . . Expanding the moulding material on continuous moving surfaces {without restricting the upwards growth of the foam}

- 44/285 . . . {Rising trough lateral side members, e.g. following the foam expansion}
- 44/30 . . Expanding the moulding material between endless belts or rollers {(B29C 44/203 takes precedence)}
- 44/302 . . . {Expanding the moulding material in flexible endless moulds}
- 44/304 . . . {Adjusting the belt or roller pressure}
- 44/306 . . . {Longitudinally shaping, e.g. the belt}
- 44/308 . . . {Thickness separators and side seals}
- 44/32 . . Incorporating or moulding on preformed parts, e.g. linings, inserts or reinforcements
- 44/321 . . . {the preformed part being a lining, e.g. a film or a support lining}
- 44/3215 {Folding devices for the lining}
- 44/322 . . . {the preformed parts being elongated inserts, e.g. cables}
- 44/324 {the preformed parts being tubular or folded to a tubular shape}
- 44/326 . . . {Joining the preformed parts, e.g. to make flat or profiled sandwich laminates}
- 44/328 . . . {the foamable components being mixed in the nip between the preformed parts}
- 44/329 . . . {the preformed parts being partially embedded}
- 44/332 . . . {the preformed parts being three-dimensional structures}
- 44/334 . . . {Filling the preformed spaces or cavities}
- 44/34 . . Auxiliary operations
- 44/3402 . . {Details of processes or apparatus for reducing environmental damage or for working-up compositions comprising inert blowing agents or biodegradable components}
- 44/3403 . . {Foaming under special conditions, e.g. in sub-atmospheric pressure, in or on a liquid}
- 44/3407 . . . {Vacuum extrusion using underwater barometric leg}
- 44/3411 . . {Relieving stresses}
- 44/3415 . . {Heating or cooling}
- 44/3419 . . . {Quick cooling}
- 44/3423 . . . {by using a heated or cooled preformed part, e.g. in the mould}
- 44/3426 . . . {Heating by introducing steam in the mould}
- 44/343 {by using pipes to direct the steam inside the mould}
- 44/3434 {by using a sheet, grid, etc. to distribute the steam in the mould}
- 44/3438 . . {Bursting the cell walls by a sudden pressure release}
- 44/3442 . . {Mixing, kneading or conveying the foamable material (mixing plastics B29B 7/00; mixing in general B01F)}
- 44/3446 . . . {Feeding the blowing agent}
- 44/3449 {through the screw}
- 44/3453 {Feeding the blowing agent to solid plastic material}
- 44/3457 {Feeding the blowing agent in solid form to the plastic material}
- 44/3461 . . {Making or treating expandable particles}
- 44/3465 . . . {by compressing particles in vacuum, followed by expansion in normal pressure}
- 44/3469 . . {Cell or pore nucleation}
- 44/3473 . . . {by shearing forces}
- 44/3476 . . . {by, e.g. compression stress}
- 44/348 . . . {by regulating the temperature and/or the pressure, e.g. suppression of foaming until the pressure is rapidly decreased}
- 44/3484 . . . {Stopping the foaming reaction until the material is heated or re-heated}
- 44/3488 . . {Vulcanizing the material before foaming}
- 44/3492 . . {Expanding without a foaming agent}
- 44/3496 . . . {The foam being compressed and later released to expand (B29C 44/3465 takes precedence)}
- 44/35 . . {Component parts; Details or accessories}
- 44/351 . . . {Means for preventing foam to leak out from the foaming device during foaming}
- 44/352 . . . {Means for giving the foam different characteristics in different directions}
- 44/353 . . . {Means for guiding the foaming in, e.g. a particular direction}
- 44/354 . . . {Means to prevent or reduce the effect of shrinking of the foamed article}
- 44/355 . . . {Characteristics of the foam, e.g. having particular surface properties or structure}
- 44/356 {having a porous surface}
- 44/357 {Auxetic foams, i.e. material with negative Poisson ratio; anti rubber; dilatational; re-entrant}
- 44/358 {Foamed of foamable fibres}
- 44/36 . . Feeding the material to be shaped {(B29C 44/0492 takes precedence)}
- 44/362 . . . {Regulating the feed w.r.t. the foam layer thickness}
- 44/365 . . . {using elongate feed conduits provided with throttle devices}
- 44/367 . . . {using spray nozzles}
- 44/38 . . . into a closed space, i.e. to make articles of definite length {(B29C 44/365 and B29C 44/367 take precedence)}
- 44/381 {Spreading the foamable material in the mould by pressing the mould halves together}
- 44/383 {using spreading devices mounted in the mould, in front of the feed opening}
- 44/385 {using manifolds or channels directing the flow in the mould}
- 44/386 {using a movable, elongate nozzle, e.g. to reach deep into the mould}
- 44/388 {into moving moulds}
- 44/40 by gravity, e.g. by casting
- 44/42 using pressure difference, e.g. by injection or by vacuum
- 44/421 {by plastizising the material into a shot cavity and injecting using a plunger}
- 44/422 {by injecting by forward movement of the plastizising screw}
- 44/424 {Details of machines}
- 44/425 {Valve or nozzle constructions; Details of injection devices}
- 44/427 {having several injection gates}
- 44/428 {Mould constructions; Mould supporting equipment}
- 44/44 {in solid form}
- 44/445 {in the form of expandable granules, particles or beads}

- 44/46 . . . into an open space or onto moving surfaces, i.e. to make articles of indefinite length {[\(B29C 44/365, B29C 44/367 take precedence\)](#)}
- 44/461 {dispensing apparatus, e.g. dispensing foaming resin over the whole width of the moving surface}
- 44/462 {provided with pre-foaming devices}
- 44/464 {using centrifugal force}
- 44/465 {with adjustable die gap}
- 44/467 {Foam spreading or levelling devices}
- 44/468 {in a plurality of parallel streams which unite during the foaming}
- 44/48 by gravity, e.g. casting onto, or between, moving surfaces {[\(B29C 44/468 takes precedence\)](#)}
- 44/485 {the material being spread in the nip of two cooperating rollers}
- 44/50 using pressure difference, e.g. by extrusion or by spraying {[\(B29C 44/468 takes precedence\)](#)}
- 44/505 {extruding the compound through a flat die [\(in general B29C 48/03\)](#)}
- 44/507 {extruding the compound through an annular die [\(in general B29C 48/03\)](#)}
- 44/52 between moving surfaces
- 44/54 in the form of expandable particles or beads
- 44/56 . . After-treatment of articles, e.g. for altering the shape
- 44/5609 . . . {Purging of residual gas, e.g. noxious or explosive blowing agents}
- 44/5618 . . . {Impregnating foam articles}
- 44/5627 . . . {by mechanical deformation, e.g. crushing, embossing, stretching}
- 44/5636 {with the addition of heat}
- 44/5645 {Differential deformation by differential heating}
- 44/5654 {Subdividing foamed articles to obtain particular surface properties, e.g. on multiple modules}
- 44/5663 {by perforating the foam, e.g. to open the cells}
- 44/5672 {by stretching the foam, e.g. to open the cells}
- 44/5681 . . . {Covering the foamed object with, e.g. a lining}
- 44/569 . . . {Shaping and joining components with different densities or hardness}
- 44/58 . . Moulds
- 44/581 . . . {Closure devices for pour holes}
- 44/582 . . . {for making undercut articles}
- 44/583 . . . {for making articles with cavities}
- 44/585 . . . {with adjustable size of the mould cavity}
- 44/586 . . . {with a cavity increasing in size during foaming}
- 44/587 . . . {with a membrane, e.g. for pressure control}
- 44/588 . . . {with means for venting, e.g. releasing foaming gas}
- 44/60 . . Measuring, controlling or regulating
- 44/605 . . . {Calibration following a shaping operation, e.g. extrusion}
- 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](#))**
- 45/0001 . {characterised by the choice of material}
- NOTE**
- When classifying in this group, it is desirable to add the indexing codes of subclass [B29K](#) to identify the moulding materials and their properties. Documents concerning the choice of moulding materials having a particular influence on the moulding technique should be classified in this group if of interest
- 45/0003 . {of successively moulded portions rigidly joined to each other}
- 45/0005 . {using fibre reinforcements}
- 2045/0006 . . {the fibres being oriented in a direction perpendicular to the flow direction of the moulding material into the mould}
- 2045/0008 . . . {the fibres being oriented randomly}
- 2045/001 . . . {Bulk moulding compounds [BMC]}
- 2045/0012 . . . {Skin layers without fibres or with little fibres}
- 45/0013 . {using fillers dispersed in the moulding material, e.g. metal particles}
- 2045/0015 . . . {Non-uniform dispersion of fillers}
- 45/0017 . {moulding interconnected elements which are movable with respect to one another, e.g. chains or hinges}
- 2045/0018 . . . {moulding containers with handle, e.g. buckets}
- 2045/002 . . . {using shrinkage}
- 2045/0022 . . . {using deformation of injected material to obtain interconnection}
- 2045/0024 . . . {using a mould core with a blind hole wherein the hinge shaft is moulded}
- 45/0025 . {Preventing defects on the moulded article, e.g. weld lines, shrinkage marks [\(preventing defects on the preformed parts or layers \[B29C 45/14836\]\(#\)\)](#)}
- 2045/0027 . . . {Gate or gate mark locations}
- 2045/0029 {gates on the central optical axis of lenses}
- 2045/0031 . . . {Movable mould wall parts in contact with weld lines, e.g. rotating pins for stirring the weld line}
- 2045/0032 . . . {sequential injection from multiple gates, e.g. to avoid weld lines}
- 2045/0034 . . . {Mould parting lines}
- 2045/0036 . . . {Submerged or recessed burrs}
- 2045/0037 . . . {Moulding articles or parts thereof without parting line}
- 2045/0039 . . . {intermixing the injected material front at the weld line, e.g. by applying vibrations to the melt front [\(B29C 2045/0031 takes precedence\)](#)}
- 2045/0041 . . . {preventing initial material from entering the mould cavity}
- 2045/0043 . . . {preventing shrinkage by reducing the wall thickness of the moulded article}
- 2045/0044 . . . {expelling moulding material outside the mould cavity at the weld line location [\(moulds with overflow cavities \[B29C 45/2669\]\(#\)\)](#)}
- 45/0046 . {Details relating to the filling pattern or flow paths or flow characteristics of moulding material in the mould cavity}
- 2045/0048 . . . {Laminar flow}
- 2045/0049 . . . {the injected material flowing against a mould cavity protruding part}

- 2045/0051 . . {Flow adjustment by throttles}
- 45/0053 . {combined with a final operation, e.g. shaping (injection-compression moulding [B29C 45/561](#))}
- 45/0055 . . {Shaping}
- 2045/0056 . . . {folding back undercut forming parts, e.g. tabs of closures}
- 2045/0058 . . . {removing material}
- 45/006 . . {Joining parts moulded in separate cavities}
- 45/0062 . . . {Joined by injection moulding}
- 2045/0063 . . . {facing before assembling, i.e. bringing the parts opposite to each other before assembling}
- 2045/0065 . . . {the parts being interconnected before assembling by a breaking or shearing point}
- 2045/0067 . . . {interposing an insert between the parts to be assembled}
- 2045/0068 . . . {using axially aligned and separated mould cavities}
- 2045/007 . . . {assembling a container and a handle}
- 2045/0072 . . . {the parts to be joined being moulded in a stack mould (stack moulds in general [B29C 45/32](#))}
- 2045/0074 . . . {inserting a heating tool inside the mould}
- 2045/0075 . . {curing or polymerising by irradiation}
- 2045/0077 . . {removing burrs or flashes (in general [B29C 37/02](#))}
- 2045/0079 . . {applying a coating or covering}
- 45/0081 . {of objects with parts connected by a thin section, e.g. hinge, tear line}
- 45/0082 . {Reciprocating the moulding material inside the mould cavity, e.g. push-pull injection moulding}
- 45/0084 . {General arrangement or lay-out of plants ([B29C 45/1468](#) takes precedence)}
- 2045/0086 . {Runner trees, i.e. several articles connected by a runner}
- 2045/0087 . {making hollow articles using a floating core movable in the mould cavity by fluid pressure and expelling molten excess material}
- 2045/0089 . {successive filling of parts of a mould cavity, i.e. one cavity part being filled before another part is filled (sequential filling to prevent weld lines [B29C 2045/0032](#))}
- 2045/0091 . {Pellets or granules, e.g. their structure, composition, length, height, width}
- 2045/0093 . {of articles provided with an attaching element}
- 2045/0094 . {injection moulding of small-sized articles, e.g. microarticles, ultra thin articles}
- 2045/0096 . {drying the moulding material before injection, e.g. by heating}
- 2045/0098 . {shearing of the moulding material, e.g. for obtaining molecular orientation or reducing the viscosity ([B29C 45/0082](#) takes precedence)}
- 45/02 . Transfer moulding, i.e. transferring the required volume of moulding material by a plunger from a "shot" cavity into a mould cavity
- 45/021 . . {Plunger drives; Pressure equalizing means for a plurality of transfer plungers}
- 2045/022 . . {Stationary transfer plungers}
- 2045/024 . . {Transfer plungers and pots with an oblong cross section}
- 2045/025 . . {with the transfer plunger surface forming a part of the mould cavity wall at the end of the plunger transfer movement}
- 2045/027 . . {heat insulated cold transfer moulding}
- 2045/028 . . . {using auxiliary curing or setting means}
- 45/03 . Injection moulding apparatus ([transfer moulding B29C 45/02](#))
- 2045/033 . . {horizontal injection units mounted on a mould half carrying plate}
- 45/036 . . {Injection pistols}
- 45/04 . . using movable moulds {or mould halves} ([B29C 45/08](#) takes precedence)
- 45/0408 . . . {involving at least a linear movement ([B29C 45/0433](#) takes precedence)}
- 45/0416 {co-operating with fixed mould halves}
- 2045/0425 {Book moulds, i.e. a mould half can be opened and closed like a book with regard to the other mould half, the mould halves being connected by a hinge}
- 45/0433 . . . {mounted on a conveyor belt or chain}
- 45/0441 . . . {involving a rotational movement ([B29C 45/06](#) takes precedence)}
- 45/045 {mounted on the circumference of a rotating support having a rotating axis perpendicular to the mould opening, closing or clamping direction}
- 2045/0458 {Drive means for the rotating support}
- 2045/0466 . . . {the axial movement of the mould being linked to the rotation of the mould or mould half}
- 2045/0475 . . . {continuously movable moulds}
- 2045/0483 . . . {pivotally mounted mould halves ([B29C 2045/0425](#) takes precedence)}
- 2045/0491 . . . {both mould halves being shifted to the injection unit for obtaining nozzle touch}
- 45/06 . . . {mounted} on a turntable {, i.e. on a rotating support having a rotating axis parallel to the mould opening, closing or clamping direction}
- 45/062 {carrying mould halves co-operating with fixed mould halves}
- 2045/065 {continuously rotating turntables}
- 2045/067 {one mould being openable during clamping of the other moulds}
- 45/07 . . using movable injection units
- 2045/073 . . . {pivotable horizontal injection unit with a nozzle pushed against a mould half}
- 45/076 . . . {cooperating with two or more moulds}
- 45/08 . . . moving with the mould during the injection operation
- 45/10 . . using moulds or injection units usable in different arrangements or combinations to each other
- 45/12 . . using two or more fixed moulds, e.g. in tandem ([B29C 45/076](#) takes precedence)}
- 45/125 . . . {using a material distributing system}
- 45/13 . . using two or more injection units co-operating with a single mould
- 2045/135 . . . {selectively injecting different materials in the same mould for making different articles in the same mould}
- 45/14 . . incorporating preformed parts or layers, e.g. injection moulding around inserts or for coating articles ([B29C 45/1671](#) takes precedence)}
- 45/14008 . . {Inserting articles into the mould ([B29C 45/14827](#) takes precedence)}
- 45/14016 . . . {Intermittently feeding endless articles, e.g. transfer films, to the mould ([B29C 45/14262](#) takes precedence)}
- 45/14024 {and punching or cutting a portion from the endless articles during mould closing}

- 45/14032 . . . {Transferring the inserts from a storage space inside the mould to the mould cavity}
- 2045/1404 . . . {feeding inserts cut out from an endless sheet outside the mould}
- 2045/14049 . . . {feeding inserts by a swing arm}
- 2045/14057 . . . {feeding inserts wrapped on a core}
- 45/14065 . . . {Positioning or centering articles in the mould}
- 45/14073 . . . {using means being retractable during injection}
- 2045/14081 {centering means retracted by the injection pressure}
- 2045/1409 {using control means for retraction of the centering means}
- 2045/14098 . . . {fixing or clamping inserts having variable dimensions}
- 2045/14106 . . . {using electrostatic attraction or static electricity}
- 2045/14114 . . . {using an adhesive}
- 2045/14122 . . . {using fixed mould wall projections for centering the insert}
- 2045/14131 . . . {using positioning or centering means forming part of the insert}
- 2045/14139 . . . {positioning inserts having a part extending into a positioning cavity outside the mould cavity}
- 2045/14147 . . . {using pins or needles penetrating through the insert}
- 2045/14155 . . . {using vacuum or suction}
- 2045/14163 . . . {using springs being part of the positioning means}
- 2045/14172 . . . {using light to define the position of the insert}
- 45/1418 . . . {the inserts being deformed or preformed, e.g. by the injection pressure}
- 2045/14188 . . . {trimming the article in the mould}
- 45/14196 . . . {the inserts being positioned around an edge of the injected part}
- 2045/14204 {the edges formed by an intermediate mould part}
- 2045/14213 . . . {deforming by gas or fluid pressure in the mould cavity}
- 45/14221 . . . {by tools, e.g. cutting means}
- 2045/14229 {deforming wire-like articles}
- 2045/14237 . . . {the inserts being deformed or preformed outside the mould or mould cavity}
- 2045/14245 {using deforming or preforming means outside the mould cavity}
- 2045/14254 {deforming or preforming endless articles outside the mould}
- 45/14262 . . . {Clamping or tensioning means for the insert}
- 2045/1427 {controlling the slip of the insert}
- 2045/14278 {controlling the tension of the insert}
- 2045/14286 . . . {means for heating the insert}
- 2045/14295 {the heating means being used for feeding the insert into the mould}
- 2045/14303 . . . {progressively transferring the insert from one mould wall to the other mould wall of the mould cavity}
- 45/14311 . . . {using means for bonding the coating to the articles ([B29C 45/14795](#) takes precedence)}
- 2045/14319 . . . {bonding by a fusion bond}
- 2045/14327 . . . {anchoring by forcing the material to pass through a hole in the article}
- 45/14336 . . . {Coating a portion of the article, e.g. the edge of the article ([B29C 45/14573](#) and [B29C 45/14598](#) take precedence)}
- 45/14344 {Moulding in or through a hole in the article, e.g. outsert moulding}
- 2045/14352 {injecting into blind holes}
- 2045/1436 {coating hollow articles having holes passing through the wall}
- 2045/14368 {holes with means for anchoring the injected material}
- 45/14377 . . . {using an additional insert, e.g. a fastening element}
- 45/14385 . . . {Coating a portion of a bundle of inserts, e.g. making brushes}
- 2045/14393 {preventing leakage of injected material into tuft insertion holes of the mould}
- 2045/14401 {using a hot gas for forming a knob on the tuft end}
- 45/14409 . . . {Coating profiles or strips by injecting end or corner or intermediate parts}
- 45/14418 . . . {Sealing means between mould and article}
- 45/14426 . . . {Coating the end of wire-like or rod-like or cable-like or blade-like or belt-like articles}
- 45/14434 . . . {Coating brittle material, e.g. glass ([B29C 45/14377](#), [B29C 45/14418](#) take precedence)}
- 2045/14442 . . . {injecting a grill or grid on the insert}
- 2045/1445 . . . {injecting a part onto a blow moulded object}
- 2045/14459 . . . {injecting seal elements}
- 45/14467 . . . {Joining articles or parts of a single article ([B29C 45/14377](#), [B29C 45/14385](#), [B29C 45/14581](#), [B29C 45/14614](#) and [B29C 45/006](#) take precedence)}
- 45/14475 . . . {Joining juxtaposed parts of a single article, e.g. edges of a folded container blank}
- 2045/14483 {overlapping edges of the juxtaposed parts}
- 45/14491 . . . {Injecting material between coaxial articles, e.g. between a core and an outside sleeve for making a roll}
- 2045/145 {making rolls}
- 45/14508 . . . {Joining juxtaposed sheet-like articles, e.g. for making trim panels}
- 2045/14516 {the transition area of juxtaposed parts being hidden in a groove of the moulded article}
- 2045/14524 . . . {making hollow articles}
- 2045/14532 . . . {injecting between two sheets}
- 2045/1454 . . . {injecting between inserts not being in contact with each other}
- 45/14549 . . . {Coating rod-like, wire-like or belt-like articles ([B29C 45/14426](#) takes precedence)}
- 2045/14557 . . . {coating spliced fibres or cables, e.g. optical fiber splices or junctions}
- 45/14565 . . . {at spaced locations, e.g. coaxial-cable wires}
- 45/14573 {Coating the edge of the article, e.g. for slide-fasteners}
- 45/14581 {Coating the cross-over points of articles in the form of a network}
- 45/1459 . . . {Coating annular articles}
- 45/14598 . . . {Coating tubular articles}
- 2045/14606 . . . {Mould cavity sealing means}
- 45/14614 . . . {Joining tubular articles}
- 45/14622 . . . {Lining the inner or outer surface of tubular articles}

- 45/14631 . . . {Coating reinforcements ([fibre reinforcements B29C 45/0005](#))}
- 45/14639 . . . {for obtaining an insulating effect, e.g. for electrical components}
- 45/14647 . . . {Making flat card-like articles with an incorporated IC or chip module, e.g. IC or chip cards}
- 45/14655 . . . {connected to or mounted on a carrier, e.g. lead frame}
- 2045/14663 {the mould cavity walls being lined with a film, e.g. release film}
- 2045/14672 {moulding with different depths of the upper and lower mould cavity}
- 45/1468 {Plants therefor}
- 45/14688 . . . {Coating articles provided with a decoration}
- 2045/14696 {transparent decorated inserts}
- 2045/14704 {ink decorations}
- 2045/14713 {decorations in contact with injected material}
- 2045/14721 {decorations transferred by diffusion or sublimation}
- 2045/14729 {decorations not in contact with injected material}
- 2045/14737 {decorations printed on the insert by a digital imaging technique}
- 2045/14745 {in-line printing}
- 45/14754 . . . {being in movable or releasable engagement with the coating, e.g. bearing assemblies}
- 2045/14762 {using shrinkage}
- 2045/1477 {Removable inserts, e.g. the insert being peeled off after moulding}
- 45/14778 . . . {the article consisting of a material with particular properties, e.g. porous, brittle}
- 45/14786 {Fibrous material or fibre containing material, e.g. fibre mats or fibre reinforced material}
- 45/14795 {Porous or permeable material, e.g. foam}
- 2045/14803 {the injected material entering minute pores}
- 45/14811 {Multilayered articles ([B29C 45/14827 takes precedence](#))}
- 45/14819 {the inserts being completely encapsulated}
- 45/14827 {using a transfer foil detachable from the insert}
- 45/14836 {Preventing damage of inserts during injection, e.g. collapse of hollow inserts, breakage ([B29C 45/14434 takes precedence](#))}
- 2045/14844 {Layers protecting the insert from injected material}
- 2045/14852 {incorporating articles with a data carrier, e.g. chips ([memory cards, chip cards B29L 2017/006](#))}
- 2045/1486 {Details, accessories and auxiliary operations}
- 2045/14868 {Pretreatment of the insert, e.g. etching, cleaning}
- 2045/14877 {preheating or precooling the insert for non-deforming purposes}
- 2045/14885 {by plasma treatment}
- 2045/14893 {Preventing defects relating to shrinkage of inserts or coating material}
- 2045/14901 {Coating a sheet-like insert smaller than the dimensions of the adjacent mould wall}
- 2045/14909 {the edge of the sheet-like insert being hidden, e.g. in a groove or protruding into the injected material}
- 2045/14918 {in-mould-labelling}
- 2045/14926 {multiple labels in the same cavity}
- 2045/14934 {Preventing penetration of injected material between insert and adjacent mould wall ([sealing means between mould and article B29C 45/14418](#))}
- 2045/14942 {Floating inserts, e.g. injecting simultaneously onto both sides of an insert through a pair of opposed gates}
- 2045/1495 {Coating undercut inserts}
- 2045/14959 {Flashing the injected material to the outside of the mould cavity for any purpose}
- 2045/14967 {Injecting through an opening of the insert}
- 2045/14975 {the injection nozzle penetrating through the insert}
- 2045/14983 {Bursting or breakthrough of the insert by the injection pressure}
- 2045/14991 {Submerged burrs, e.g. using protruding mould parts forming a cavity in which the burr on the insert is formed for preventing surface defects}
- 45/16 . . . Making multilayered or multicoloured articles ([B29C 45/0062 takes precedence; feeding colouring materials into the injection unit B29C 45/1816](#))}
- 2045/1601 {the injected materials not being adhered or bonded to each other ([B29C 45/0017 takes precedence](#))}
- 45/1603 {Multi-way nozzles specially adapted therefor}
- 45/1604 {using a valve urged by the injection pressure}
- 45/1606 {using a rotatable valve}
- 45/1607 {having at least three different ways}
- 2045/1609 {having independent heating or cooling means for each way}
- 2045/161 {using a hollow needle valve through which one material is injected}
- 2045/1612 {using needle valves with at least four positions}
- 2045/1614 {side-by-side flow of materials in the same channel}
- 45/1615 {The materials being injected at different moulding stations}
- 2045/1617 {using stack moulds}
- 45/1618 {using an auxiliary treatment station, e.g. for cooling or ejecting ([B29C 45/1628 takes precedence](#))}
- 45/162 {using means, e.g. mould parts, for transferring an injected part between moulding stations}
- 2045/1621 {the transfer means operating independently from the injection mould cavity, i.e. during injection the transfer means are completely outside the mould cavity}
- 2045/1623 {transfer by a slidable element forming a part of both cavities}
- 45/1625 {Injecting parison-like articles}
- 2045/1626 {using a cooling station}
- 45/1628 {using a mould carrier rotatable about an axis perpendicular to the opening and closing axis of the moulding stations}
- 2045/1629 {turrets with incorporated ejection means}
- 2045/1631 {turrets fixed with regard to the machine frame}
- 2045/1632 {injection units supported by a movable mould plate}
- 45/1634 {with a non-uniform dispersion of the moulding material in the article, e.g. resulting in a marble effect}

- 45/1635 . . {using displaceable mould parts, e.g. retractable partition between adjacent mould cavities}
- 2045/1637 . . . {the first injected part and the movable mould part being movable together}
- 45/1639 . . . {Removable partitions between adjacent mould cavity portions}
- 45/164 . . {The moulding materials being injected simultaneously}
- 45/1642 . . {having a "sandwich" structure ([B29C 45/1603 takes precedence](#))}
- 45/1643 . . . {from at least three different materials or with at least four layers}
- 45/1645 . . . {Injecting skin and core materials from the same injection cylinder, e.g. mono-sandwich moulding}
- 45/1646 . . . {Injecting parison-like articles ([B29C 45/1643 takes precedence](#))}
- 2045/1648 {the parison core layer being a barrier material}
- 2045/165 {the parison core layer comprising recycled or scrap material}
- 2045/1651 {Independent injection runners or nozzles}
- 2045/1653 {using a core injection nozzle penetrating through the skin or into the mould cavity}
- 2045/1654 {whereby the core material is penetrating through the skin}
- 2045/1656 {Injecting the skin material through the central passage of the multiway nozzle}
- 45/1657 . . {using means for adhering or bonding the layers or parts to each other ([mechanical anchoring B29C 37/0082](#))}
- 2045/1659 {Fusion bonds}
- 2045/166 {Roughened surface bonds}
- 2045/1662 {plasma roughened surface bonds}
- 2045/1664 {Chemical bonds}
- 2045/1665 {Shrinkage bonds}
- 2045/1667 {Deformation bonds}
- 2045/1668 {Penetration bonds}
- 2045/167 . . {injecting the second layer through the first layer}
- 45/1671 . . {with an insert}
- 2045/1673 {injecting the first layer, then feeding the insert, then injecting the second layer}
- 45/1675 . . {using exchangeable mould halves}
- 45/1676 . . {using a soft material and a rigid material, e.g. making articles with a sealing part}
- 2045/1678 {first moulding the soft material}
- 45/1679 . . {applying surface layers onto injection-moulded substrates inside the mould cavity, e.g. in-mould coating [IMC] ([applying surface layers after ejection B29C 45/0053](#))}
- 2045/1681 . . {one layer penetrating at one or more areas through another layer}
- 2045/1682 . . {preventing defects}
- 45/1684 . . {Injecting parison-like articles ([B29C 45/1625](#), [B29C 45/1643](#) and [B29C 45/1646 take precedence](#))}
- 2045/1685 . . {mounting of the additional injection unit}
- 2045/1687 . . {preventing leakage of second injected material from the mould cavity}
- 2045/1689 . . {injecting layers having identical injection cycle times}
- 2045/169 . . {injecting electrical circuits, e.g. one layer being made of conductive material}
- 2045/1692 . . {one layer comprising fibres}
- 2045/1693 . . . {shaping the first molding material before injecting the second molding material, e.g. by cutting, folding}
- 2045/1695 . . . {injecting ceramic powder layers and plastic material layers}
- 2045/1696 . . . {injecting metallic layers and plastic material layers}
- 2045/1698 . . . {multicoloured articles moulded in one step ([non-uniform dispersion of colours B29C 45/1634](#))}
- 45/17 . . Component parts, details or accessories; Auxiliary operations
- 45/1701 . . . {using a particular environment during moulding, e.g. moisture-free or dust-free}
- 2045/1702 {dissolving or absorbing a fluid in the plastic material}
- 45/1703 . . . {Introducing an auxiliary fluid into the mould ([B29C 45/1701 takes precedence](#))}
- 45/1704 {the fluid being introduced into the interior of the injected material which is still in a molten state, e.g. for producing hollow articles ([B29C 45/1732](#) and [B29C 45/1734 take precedence](#); [injection blow-moulding B29C 49/06](#))}
- 45/1705 {using movable mould parts}
- 45/1706 {using particular fluids or fluid generating substances}
- 2045/1707 {using a liquid, e.g. water}
- 2045/1708 {removing the liquid from the hollow}
- 2045/1709 {using a cooling fluid}
- 2045/171 {using an evaporating substance}
- 45/1711 {and removing excess material from the mould cavity by the introduced fluid, e.g. to an overflow cavity}
- 2045/1712 {plastic material flowing back into the injection unit}
- 2045/1713 {using several overflow cavities}
- 2045/1714 {overflow cavities provided with heating means}
- 2045/1715 {Filled hollows}
- 2045/1717 {Temperature controlled mould parts to control the location or configuration of the hollow}
- 2045/1718 {sealing or closing the fluid injection opening}
- 2045/1719 {making tubular articles}
- 2045/172 {making roof racks for vehicles or parts thereof}
- 2045/1721 {making wheels}
- 2045/1722 {injecting fluids containing plastic material}
- 2045/1723 {using fibre reinforcements}
- 2045/1724 {hollows used as conduits}
- 2045/1725 {making hollow seals}
- 2045/1726 {moving the fluid through the hollow using a fluid inlet and a fluid outlet}
- 2045/1727 {using short shots of moulding material}
- 2045/1728 {injecting fluid from an end of the mould cavity and in the longitudinal direction thereof}
- 2045/1729 {fluid venting means}
- 2045/173 {using a plurality of fluid injection nozzles}
- 2045/1731 {vacuum or underpressure for forming the hollow}
- 45/1732 {Control circuits therefor}
- 45/1734 {Nozzles therefor}

- 45/1735 {Nozzles for introducing the fluid through the mould gate, e.g. incorporated in the injection nozzle}
- 45/1736 {provided with small holes permitting the flow of gas therethrough, e.g. using a porous element of sintered material ([B29C 45/1735](#) takes precedence)}
- 2045/1737 {Pin-in-sleeve devices}
- 2045/1738 {using a valve mounted in movable valve sleeve}
- 2045/1739 {controlling the temperature or heat-transfer in fluid injection nozzles}
- 45/174 {Applying a pressurised fluid to the outer surface of the injected material inside the mould cavity, e.g. for preventing shrinkage marks}
- 2045/1741 {Seals preventing pressurized fluid to escape from the mould cavity ([mould seals B29C 45/2608](#))}
- 45/1742 . . {Mounting of moulds; Mould supports ([mounting of exchangeable mould inserts B29C 45/2675](#))}
- 45/1743 . . . {using mounting means projecting from the back side of the mould or from the front side of the mould support}
- 45/1744 . . . {Mould support platens}
- 2045/1745 . . . {using vacuum means}
- 2045/1746 . . . {using magnetic means}
- 45/1747 . . {Tie-rod connections}
- 45/1748 . . {Retractable tie-rods}
- 2045/175 . . . {using the movable mould plate for extracting a tie rod}
- 45/1751 . . {Adjustment means allowing the use of moulds of different thicknesses}
- 2045/1752 . . . {using the mould clamping means for displacing the rear platen}
- 45/1753 . . {Cleaning or purging, e.g. of the injection unit ([B29C 45/24](#) takes precedence)}
- 2045/1754 . . . {purging cooling channels}
- 45/1755 . . . {Means for receiving or discharging purged material; Purge shields}
- 45/1756 . . {Handling of moulds or mould parts, e.g. mould exchanging means ([moulds per se B29C 45/26](#))}
- 2045/1757 . . . {common exchange means for several injection machines}
- 2045/1758 . . . {exchanging stampers}
- 45/1759 . . {Removing sprues from sprue-channels}
- 45/176 . . {Exchanging the injection unit or parts thereof}
- 45/1761 . . {Means for guiding movable mould supports or injection units on the machine base or frame; Machine bases or frames ([B29C 45/1747](#) takes precedence)}
- 2045/1762 . . . {compensating frame distortion proportional to the mould clamping force}
- 2045/1763 . . . {preventing distortion of the machine part guiding the movable mould}
- 2045/1764 . . . {Guiding means between the movable mould plate and tie rods}
- 2045/1765 . . . {Machine bases}
- 2045/1767 {connecting means for machine base parts}
- 2045/1768 . . . {constructions of C-shaped frame elements}
- 45/1769 . . {Handling of moulded articles or runners, e.g. sorting, stacking, grinding of runners}
- 2045/177 . . . {stacking moulded articles}
- 45/1771 . . . {Means for guiding or orienting articles while dropped from the mould, e.g. guide rails or skirts}
- 2045/1772 {sorting different articles}
- 45/1773 . . {Means for adjusting or displacing the injection unit into different positions, e.g. for co-operating with different moulds ([B29C 45/1781](#) takes precedence)}
- 45/1774 . . {Display units or mountings therefor; Switch cabinets}
- 45/1775 . . {Connecting parts, e.g. injection screws, ejectors, to drive means}
- 2045/1776 . . . {magnetic connecting means}
- 45/1777 . . {Nozzle touch mechanism}
- 2045/1778 . . . {separate drive means for moving and producing the touch force}
- 2045/1779 . . . {using chains or the like as drive transmission means for the movement of the injection unit}
- 45/178 . . . {Means disposed outside the mould for unscrewing threaded articles, e.g. chuck devices ([moulds with incorporated unscrewing drive means B29C 45/262](#))}
- 45/1781 . . . {Aligning injection nozzles with the mould sprue bush}
- 45/1782 . . . {Mounting or clamping means for heating elements or thermocouples}
- 2045/1784 . . . {Component parts, details or accessories not otherwise provided for; Auxiliary operations not otherwise provided for}
- 2045/1785 . . . {Movement of a part, e.g. opening or closing movement of the mould, generating fluid pressure in a built-in fluid pressure generator}
- 2045/1786 . . . {Electric wire or cable guides, e.g. for manifolds}
- 2045/1787 . . . {Mould parts driven by pressure of injected material ([B29C 2045/14081](#) takes precedence)}
- 2045/1788 . . . {Preventing tilting of movable mould plate during closing or clamping}
- 2045/1789 {using weight compensating means for the movable mould half}
- 2045/179 . . . {Frames or machine parts made of concrete}
- 2045/1791 . . . {Means for spacing or distancing mould supporting plates, e.g. for mould exchange}
- 2045/1792 . . . {Machine parts driven by an electric motor, e.g. electric servomotor}
- 2045/1793 {by an electric linear motor ([linear motors in general H02K 41/02](#))}
- 2045/1794 {by a rotor or directly coupled electric motor, e.g. using a tubular shaft motor ([for driving axially movable screws B29C 2045/5024](#))}
- 2045/1795 . . . {Means for detecting resin leakage or drooling from the injection nozzle}
- 2045/1796 . . . {Moulds carrying mould related information or codes, e.g. bar codes, counters}
- 2045/1797 . . . {Machine parts provided with a shroud or cover or shield, e.g. for preventing oil or dust scattering ([used as safety device B29C 45/84](#); [for guiding or orienting ejected articles B29C 45/1771](#); [for obtaining a particular moulding environment B29C 45/1701](#); [for obtaining a vacuum environment B29C 45/34](#))}
- 2045/1798 . . . {Using spring tension to drive movable machine parts}

- 45/18 . . Feeding the material into the injection moulding apparatus {, i.e. feeding the non-plastified material into the injection unit}
- 45/1808 . . . {Feeding measured doses}
- 45/1816 . . . {Feeding auxiliary material, e.g. colouring material}
- 2045/1825 {feeding auxiliary material for either skin or core of the injected article}
- 2045/1833 {recycling sprues or runners}
- 2045/1841 {into runner channel or runner nozzle}
- 2045/185 {controlling the amount of auxiliary material}
- 45/1858 . . . {Changing the kind or the source of material, e.g. using a plurality of hoppers}
- 45/1866 . . . {Feeding multiple materials ([B29C 45/1816](#) takes precedence)}
- 2045/1875 . . . {Hoppers connected to a feed screw}
- 2045/1883 . . . {directly injecting moulding material from the chemical production plant into the mould without granulating}
- 2045/1891 . . . {Means for detecting presence or level of raw material inside feeding ducts, e.g. level sensors inside hoppers}
- 45/20 . . Injection nozzles {([B29C 45/1603](#) takes precedence)}
- 2045/202 . . . {Laterally adjustable nozzle or nozzle tip mountings}
- 2045/205 . . . {Elongated nozzle openings}
- 2045/207 . . . {Preventing stringing of the moulding material}
- 45/22 . . . Multiple nozzle systems
- 45/23 . . . Feed stopping equipment
- 45/231 {Needle valve systems therefor}
- 45/232 {comprising closing means disposed outside the nozzle}
- 45/234 {Valves opened by the pressure of the moulding material ([B29C 45/231](#) takes precedence)}
- 2045/235 {axially movable inclined or orthogonal valves}
- 2045/237 {two or more cooperating valve elements}
- 2045/238 {Injection nozzles extending into the sprue channel or *vice versa*}
- 45/24 . . . Cleaning equipment
- 45/26 . . Moulds
- 45/2602 . . . {Mould construction elements}
- 2045/2604 {Latching means for successive opening or closing of mould plates}
- 45/2606 {Guiding or centering means}
- 45/2608 . . . {Mould seals}
- 45/261 . . . {having tubular mould cavities}
- 45/2612 {for manufacturing tubular articles with an annular groove}
- 45/2614 {for manufacturing bent tubular articles using an undercut forming mould core}
- 45/2616 . . . {having annular mould cavities}
- 45/2618 . . . {having screw-threaded mould walls}
- 45/262 {provided with unscrewing drive means ([unscrewing means outside the mould B29C 45/178](#))}
- 45/2622 {for moulding interrupted screw threads}
- 45/2624 {provided with a multiplicity of wall-like cavities connected to a common cavity, e.g. for battery cases}
- 45/2626 {provided with a multiplicity of narrow cavities connected to a common cavity, e.g. for brushes, combs}
- 45/2628 {with mould parts forming holes in or through the moulded article, e.g. for bearing cages}
- 45/263 {with mould wall parts provided with fine grooves or impressions, e.g. for record discs}
- 45/2632 {Stampers; Mountings thereof}
- 2045/2634 {mounting layers between stamper and mould or on the rear surface of the stamper}
- 2045/2636 {insulating layers}
- 2045/2638 {Magnetic means for mounting stampers}
- 2045/264 {Holders retaining the inner periphery of the stamper}
- 45/2642 {Heating or cooling means therefor}
- 2045/2644 {for the outer peripheral ring}
- 2045/2646 {Means for adjusting the axial dimension of the mould cavity}
- 2045/2648 {Outer peripheral ring constructions}
- 2045/2651 {using a plurality of mould cavities}
- 2045/2653 {using two stampers}
- 2045/2655 {Means for adjusting the radial dimension of the mould cavity}
- 2045/2657 {Drive means for the outer peripheral ring}
- 2045/2659 {for making substrates for laminated disks}
- 2045/2661 {The thickness of the mould cavity being changeable in radial direction ([B29C 2045/2667](#) takes precedence)}
- 2045/2663 {Maintaining the axial dimension of the mould cavity during injection}
- 2045/2665 {using vacuum means for holding the disc on one of the mould walls during opening of the mould}
- 2045/2667 {Particular inner or outer peripheral portions of the substrate}
- 45/2669 {with means for removing excess material, e.g. with overflow cavities ([B29C 45/1711](#) takes precedence)}
- 2045/2671 {Resin exit gates or bleeder passages}
- 45/2673 {with exchangeable mould parts, e.g. cassette moulds ([B29C 45/1756](#) takes precedence)}
- 45/2675 {Mounting of exchangeable mould inserts}
- 2045/2677 {The exchangeable mould parts being combinable or rearrangeable in different ways}
- 2045/2679 {Simultaneously producing different products}
- 45/2681 {with rotatable mould parts}
- 2045/2683 {Plurality of independent mould cavities in a single mould}
- 2045/2685 {filled with different materials}
- 2045/2687 {controlling the filling thereof ([B29C 2045/2691](#) takes precedence)}
- 2045/2689 {separate independent mould halves mounted on one plate}
- 2045/2691 {sequentially filled}
- 2045/2693 {Mould cores with a built-in injection nozzle}
- 2045/2695 {injecting articles with varying wall thickness, e.g. for making a tear line}
- 2045/2697 {Deformed geometry of the cavity}

45/27	. . . Sprue channels {Runner channels or runner nozzles}	45/2758	. . . . {Means for preventing drooling by decompression of the moulding material}
45/2701	. . . . {Details not specific to hot or cold runner channels (B29C 45/2725 takes precedence)}	2045/2759	. . . . {Nozzle centering or guiding means}
45/2703	. . . . {Means for controlling the runner flow, e.g. runner switches, adjustable runners or gates}	2045/2761	. . . . {Seals between nozzle and mould or gate}
45/2704	. . . . . {Controlling the filling rates or the filling times of two or more mould cavities by controlling the cross section or the length of the runners or the gates}	2045/2762	. . . . {Seals between nozzle and manifold}
2045/2706	. . . . . {rotatable sprue bushings or runner channels for controlling runner flow in one cavity}	2045/2764	. . . . {Limited contact between nozzle and mould}
45/2708	. . . . . {Gates (B29C 45/2703 takes precedence)}	2045/2766	. . . . {Heat insulation between nozzle and mould}
2045/2709	. . . . . {with a plurality of mould cavity inlets in close proximity}	2045/2767	. . . . . {the heat insulation being provided with an axial opening being part of the melt flow channel}
45/2711	. . . . . {Gate inserts}	2045/2769	. . . . . {Insulating layer of injected material}
2045/2712	. . . . . {Serial gates for moulding articles in successively filled serial mould cavities}	2045/277	. . . . {Spacer means or pressure pads between manifold and mould plates}
2045/2714	. . . . . {elongated, e.g. film-like, annular}	2045/2772	. . . . {Means for fixing the nozzle to the manifold}
2045/2716	. . . . . {The gate axis being perpendicular to main injection axis, e.g. injecting into side walls of a container}	2045/2774	. . . . {The nozzle head or the collar portion and central portion being made of different parts or materials}
2045/2717	. . . . . {Reconfigurable runner channels}	2045/2775	. . . . {Nozzles or parts thereof being mountable or exchangeable from the front side of the mould half}
2045/2719	. . . . . {Fixing or locking of nozzles or sprue bushings in the mould}	2045/2777	. . . . {Means for controlling heat flow or temperature distribution in the nozzle}
2045/272	. . . . . {Part of the nozzle, bushing or runner in contact with the injected material being made from ceramic material}	2045/2779	. . . . {Nozzles with a plurality of outlets}
2045/2722	. . . . . {Nozzles or runner channels provided with a pressure sensor}	45/278	. . . . {Nozzle tips (B29C 45/2735 takes precedence)}
2045/2724	. . . . . {Preventing stringing of the moulding material}	2045/2782	. . . . . {Nozzle tips metallurgically bonded to the nozzle body}
45/2725	. . . . {Manifolds}	2045/2783	. . . . . {Nozzle tips with a non-axial outlet opening of the melt channel}
45/2727	. . . . . {Modular manifolds; Connections between spaced manifold elements}	2045/2785	. . . . . {Nozzle tips with high thermal conductivity}
2045/2729	. . . . . {with thermal expansion}	2045/2787	. . . . . {Nozzle tips made of at least 2 different materials}
2045/273	. . . . . {stacked manifolds}	2045/2788	. . . . {Nozzles having a polygonal cross section}
2045/2732	. . . . . {sealing means between them}	2045/279	. . . . {Controlling the flow of material of two or more nozzles or gates to a single mould cavity}
2045/2733	. . . . . {Inserts, plugs, bushings}	2045/2791	. . . . {Alignment means between nozzle and manifold}
45/2735	. . . . {for non-coaxial gates, e.g. for edge gates}	2045/2793	. . . . {Means for providing access to the runner system}
45/2737	. . . . {Heating or cooling means therefor (B29C 45/7331 takes precedence)}	2045/2795	. . . . {Insulated runners}
45/2738	. . . . . {specially adapted for manifolds}	2045/2796	. . . . {Axially movable nozzles or nozzle tips}
2045/274	. . . . . {Thermocouples or heat sensors}	2045/2798	. . . . . {for compensating thermal expansion}
2045/2741	. . . . . {Plurality of independent thermocouples or heat sensors}	45/28	. . . . Closure devices therefor
2045/2743	. . . . . {Electrical heating element constructions}	45/2803	. . . . . {comprising a member with an opening or the injection nozzle movable into or out of alignment with the sprue channel or mould gate}
2045/2745	. . . . . {Film-like electrical heaters}	45/2806	. . . . . {consisting of needle valve systems (B29C 45/2896 takes precedence)}
2045/2746	. . . . . {Multilayered electrical heaters}	45/281	. . . . . {Drive means therefor}
2045/2748	. . . . . {Insulating layers covering the electrical heating element}	2045/2813	. . . . . {Common drive means for several needle valves}
2045/275	. . . . . {Planar heating or cooling elements}	2045/2817	. . . . . {Several valve pin drive cylinders connected to the fluid distributor}
2045/2751	. . . . . {Electrical power supply connections}	2045/282	. . . . . {Needle valves driven by screw and nut means}
2045/2753	. . . . . {Heating means and cooling means, e.g. heating the runner nozzle and cooling the nozzle tip}	2045/2824	. . . . . {Needle valves driven by an electric motor}
2045/2754	. . . . . {Plurality of independent heating or cooling means, e.g. independently controlling the heating of several zones of the nozzle, (B29C 2045/2753 takes precedence)}	2045/2827	. . . . . {Needle valves driven by an annular piston mounted around the nozzle}
45/2756	. . . . {Cold runner channels}	2045/2831	. . . . . {Needle valves driven by a cam}

2045/2834	. . . . .	{Needle valves driven by a lever}	45/37	. . .	Mould cavity walls {, i.e. the inner surface forming the mould cavity, e.g. linings}
2045/2837	. . . . .	{Needle valves driven by rack and pinion}	45/372	. . . .	{provided with means for marking or patterning, e.g. numbering articles}
2045/2841	. . . . .	{Needle valves driven by a plurality of coaxial pistons}	45/374	. . . . .	{for displaying altering indicia, e.g. data, numbers}
2045/2844	. . . . .	{Needle valves driven by racks only}	45/376	. . . . .	{adjustable (B29C 45/374 takes precedence)}
2045/2848	. . . . .	{having an adjustable stroke length}	2045/378	. . . . .	{built by a stack of modular elements}
2045/2851	. . . . .	{Lateral movement between drive piston and needle valve}	45/38	. .	Cutting-off equipment for sprues or ingates
2045/2855	. . . . .	{intersecting the nozzle or runner channel}	45/382	. . .	{disposed outside the mould}
2045/2858	. . . . .	{Materials or coatings therefor}	2045/384	. . .	{cutting the sprue by a plunger movable into the runner channel}
2045/2862	. . . . .	{being tubular}	2045/386	. . . . .	{returning the cutted sprue into the injection nozzle}
2045/2865	. . . . .	{having position detecting means}	2045/388	. . .	{Locking pins for retaining the sprue}
2045/2868	. . . . .	{with an incorporated heat pipe}	45/40	. .	Removing or ejecting moulded articles
2045/2872	. . . . .	{with at least three positions, e.g. two different open positions to control the melt flow}	45/4005	. . .	{Ejector constructions; Ejector operating mechanisms (B29C 45/44 takes precedence)}
2045/2875	. . . . .	{Preventing rotation of the needle valve}	45/401	. . . . .	{Ejector pin constructions or mountings}
2045/2879	. . . . .	{Back flow of material into nozzle channel}	2045/4015	. . . . .	{Ejector pins provided with sealing means}
2045/2882	. . . . .	{closing by a movement in the counterflow direction}	2045/4021	. . . . .	{Adjustable ejector pins}
2045/2886	. . . . .	{closing at a distance from the gate}	2045/4026	. . . . .	{Ejectors with internal cooling}
2045/2889	. . . . .	{Sealing guide bushings therefor}	2045/4031	. . . . .	{driven by a lever}
2045/2893	. . . . .	{Multiple coaxial needle valves}	2045/4036	. . . . .	{driven by a screw and nut mechanism}
45/2896	. . . . .	{extending in or through the mould cavity, e.g. valves mounted opposite the sprue channel}	2045/4042	. . . . .	{driven by rack and pinion means}
45/30	. . . . .	Flow control means disposed within the sprue channel, e.g. "torpedo" construction	2045/4047	. . . . .	{driven by a crank or eccentric}
2045/302	. . . . .	{Torpedoes in the sprue channel for heating the melt of cross-linkable material}	2045/4052	. . . . .	{Ejector boxes}
2045/304	. . . . .	{Adjustable torpedoes}	2045/4057	. . . . .	{the ejecting surface being large with regard to the surface of the article}
2045/306	. . . . .	{Movable torpedoes}	2045/4063	. . . . .	{preventing damage to articles caused by the ejector}
2045/308	. . . . .	{Mixing or stirring devices}	2045/4068	. . . . .	{using an auxiliary mould part carrying the moulded article and removing it from the mould}
45/32	. . .	having several axially spaced mould cavities {, i.e. for making several separated articles}	2045/4073	. . . . .	{Ejection devices located outside the injection moulding machine}
45/322	. . . . .	{Runner systems for distributing the moulding material to the stacked mould cavities}	2045/4078	. . . . .	{using stripping means}
2045/324	. . . . .	{Linked ejection means}	2045/4084	. . . . .	{Progressive ejection}
2045/326	. . . . .	{Supporting means for the central mould plate}	2045/4089	. . . . .	{Hollow articles retained in the female mould during mould opening}
2045/328	. . . . .	{having a movable mould plate between two fixed mould plates}	2045/4094	. . . . .	{Ejectors located on the fixed mould half}
45/33	. . .	having transversely, e.g. radially, movable mould parts	45/42	. . . . .	using means movable from outside the mould between mould parts {, e.g. robots}
45/332	. . . . .	{Mountings or guides therefor; Drives therefor}	45/4208	. . . . .	{and driven by the movable mould part}
2045/334	. . . . .	{several transversely movable mould parts driven by a single drive means}	2045/4216	. . . . .	{releasable drive connections between the robot and the movable mould}
2045/336	. . . . .	{Cam drives}	45/4225	. . . . .	{Take-off members or carriers for the moulded articles, e.g. grippers}
2045/338	. . . . .	{Mould parts with combined axial and transversal movements}	2045/4233	. . . . .	{loading or holding moulded articles in take-off member by fluid ejection}
45/34	. . .	having venting means	2045/4241	. . . . .	{Auxiliary means for removing moulded articles from the robot}
45/345	. . . . .	{using a porous mould wall or a part thereof, e.g. made of sintered metal}	2045/425	. . . . .	{Single device for unloading moulded articles and loading inserts into the mould}
45/36	. . .	having means for locating or centering cores	2045/4258	. . . . .	{Article removing means movable into a closed mould}
2045/363	. . . . .	{using a movable core or core part}	2045/4266	. . . . .	{Robot grippers movable along three orthogonal axes}
2045/366	. . . . .	{using retractable pins}	2045/4275	. . . . .	{Related movements between the robot gripper and the movable mould or ejector}

2045/4283	. . . . .	{Means for coupling robots to the injection moulding machine}	2045/5024	. . . . .	{screws rotated by the coaxial rotor of an electric motor}
2045/4291	. . . . .	{Robots mounted on a tie rod}	2045/5028	. . . . .	{screws axially driven by the coaxial rotor of an electric motor}
45/43	. . . . .	using fluid under pressure	2045/5032	. . . . .	{using means for detecting injection or back pressures}
45/435	. . . . .	{introduced between a mould core and a hollow resilient undercut article, e.g. bellows}	2045/5036	. . . . .	{back pressure obtaining means}
45/44	. . . . .	for undercut articles	2045/504	. . . . .	{electric motors for rotary and axial movement of the screw being coaxial with the screw}
45/4407	. . . . .	{by flexible movement of undercut portions of the articles}	2045/5044	. . . . .	{screws axially driven by rack and pinion means}
2045/4414	. . . . .	{Flexible undercut parts divided into segments}	2045/5048	. . . . .	{screws axially driven and rotated by a drive shaft having a screw threaded part and spline part}
45/4421	. . . . .	{using expansible or collapsible cores}	2045/5052	. . . . .	{screws axially driven by a rotatable nut cooperating with a fixed screw shaft}
2045/4428	. . . . .	{driven by the moulded article during ejection thereof}	2045/5056	. . . . .	{screws axially driven by a rotatable screw shaft cooperating with a fixed nut}
45/4435	. . . . .	{using inclined, tiltable or flexible undercut forming elements driven by the ejector means}	2045/506	. . . . .	{using a hydraulic transmission between drive motor and the axially movable screw}
2045/4442	. . . . .	{Flexible undercut forming elements}	2045/5064	. . . . .	{coupling means between rotation motor and rectilinear drive motor}
2045/445	. . . . .	{using the movable undercut forming element for ejection of the moulded article}	2045/5068	. . . . .	{mechanical drive means in series with hydraulic drive means for axially movable screw}
45/4457	. . . . .	{using fusible, soluble or destructible cores}	2045/5072	. . . . .	{using a drive screw comprising screw parts having opposite thread directions}
2045/4464	. . . . .	{injecting the core and the undercut article in separate cavities}	2045/5076	. . . . .	{using a single drive motor for rotary and for axial movements of the screw}
45/4471	. . . . .	{using flexible or pivotable undercut forming elements (B29C 45/4435 takes precedence)}	2045/508	. . . . .	{idle or dead stroke elements between injection screw and drive means}
45/4478	. . . . .	{using non-rigid undercut forming elements, e.g. elastic or resilient}	2045/5084	. . . . .	{screws axially driven by roller elements}
2045/4485	. . . . .	{the undercut forming mould part being rotatable into the space made available by the translation movement of another mould part}	2045/5088	. . . . .	{screws axially and rotatably driven by a piston}
2045/4492	. . . . .	{preventing damage or deformation of undercut articles during ejection}	45/5092	. . . . .	{Intrusion moulding, i.e. the screw rotates during injection}
45/46	. . . . .	Means for plasticising or homogenising the moulding material or forcing it into the mould {(combined with mould opening, closing or clamping devices B29C 45/70)}	2045/5096	. . . . .	{decompression of the moulding material by retraction or opposite rotation of the screw}
45/461	. . . . .	{Injection of measured doses}	45/52	. . . . .	Non-return devices
45/462	. . . . .	{Injection of preformed charges of material}	2045/522	. . . . .	{Spring biased check rings}
45/463	. . . . .	{using packaged or wrapped charges}	2045/524	. . . . .	{Flexible valves}
45/464	. . . . .	{using a rotating plasticising or injection disc}	2045/526	. . . . .	{Abrasion resistant means in the screw head or non-return device}
2045/465	. . . . .	{using pumps for injecting the material into the mould}	2045/528	. . . . .	{Mixing means forming part of or in close proximity to the non-return valve}
2045/466	. . . . .	{supplying the injection unit directly by a compounder}	45/53	. . . . .	using injection ram or piston
2045/467	. . . . .	{injecting material into the mould by sudden expansion of compressed material in the injection unit}	45/531	. . . . .	{Drive means therefor}
2045/468	. . . . .	{using a fluid as directly acting injection means}	45/532	. . . . .	{using a hollow injection ram co-operating with a coaxial screw}
45/47	. . . . .	using screws (B29C 45/54 takes precedence)	2045/533	. . . . .	{using a continuously rotating plasticising screw}
45/48	. . . . .	Plasticising screw and injection screw {comprising two separate screws}	45/535	. . . . .	{using two or more cooperating injection rams, e.g. coaxially or alternately operating rams}
45/50	. . . . .	Axially movable screw	2045/536	. . . . .	{rotatable injection plungers}
2045/5004	. . . . .	{the forward screw end provided with an injection ram}	2045/537	. . . . .	{the injection plunger cooperating with a coaxial hollow transfer plunger}
45/5008	. . . . .	{Drive means therefor}	2045/538	. . . . .	{the plunger being part of the mould cavity wall after injection}
2045/5012	. . . . .	{screws axially driven by a toggle mechanism}			
2045/5016	. . . . .	{screws axially driven by a lever mechanism}			
2045/502	. . . . .	{screws axially driven by a crank or eccentric mechanism}			

- 45/54 and plasticising screw {[\(B29C 45/532 takes precedence\)](#)}
- 45/541 {using a hollow plasticising screw co-operating with a coaxial injection ram}
- 45/542 {using an accumulator between plasticising and injection unit, e.g. for a continuously operating plasticising screw}
- 45/544 {the plasticising unit being connected to a transfer chamber in the injection unit at the upstream side of the injection piston}
- 2045/545 {alternately operating injection plungers}
- 2045/547 {continuously rotating plasticising screw cooperating with a single injection plunger [\(B29C 45/542 takes precedence\)](#)}
- 2045/548 {Reciprocating plasticising screws}
- 45/56 using mould parts movable during or after injection, e.g. injection-compression moulding {[\(B29C 45/1705 and B29C 45/572 take precedence\)](#)}
- 45/5605 {Rotatable mould parts}
- 45/561 {Injection-compression moulding}
- 2045/5615 {Compression stroke, e.g. length thereof}
- 2045/562 {Velocity profiles of the compression stroke}
- 2045/5625 {Closing of the feed opening before or during compression}
- 2045/563 {Enlarging the mould cavity during injection}
- 2045/5635 {Mould integrated compression drive means}
- 2045/564 {Compression drive means acting independently from the mould closing and clamping means}
- 2045/5645 {Resilient compression means}
- 2045/565 {Closing of the mould during injection}
- 2045/5655 {using a screw mechanism as compression drive means}
- 2045/566 {Reducing compression pressure during cooling of the moulded material}
- 2045/5665 {Compression by transversely movable mould parts [\(transversely movable mould parts in general B29C 45/33\)](#)}
- 2045/567 {Expelling resin through the gate}
- 45/5675 {for making orifices in or through the moulded article}
- 45/568 {Applying vibrations to the mould parts}
- 2045/5685 {for eliminating internal voids in the moulding material}
- 2045/569 {using a mould part for decreasing and a mould part for increasing the volume of the mould cavity}
- 2045/5695 {using a movable mould part for continuously increasing the volume of the mould cavity to its final dimension during the whole injection step}
- 45/57 Exerting after-pressure on the moulding material {[\(B29C 45/174 takes precedence\)](#)}
- 45/572 {using movable mould wall or runner parts}
- 2045/575 {preventing backflow of moulding material to the injection means during after-pressure}
- 2045/577 {pushing the material in the runner channel until a pin or slider reaches the mould cavity wall}
- 45/58 Details
- 45/581 {Devices for influencing the material flow, e.g. "torpedo constructions" or mixing devices}
- 2045/583 {Mixing devices connected to drive means}
- 45/585 {Vibration means for the injection unit or parts thereof}
- 45/586 {Injection or transfer plungers}
- 2045/588 {Means for retaining sprues on the end surface of the plunger}
- 45/60 Screws
- 2045/605 {comprising a zone or shape enhancing the degassing of the plastic material}
- 45/62 Barrels or cylinders
- 2045/623 {Cylinders and inner linings having different thermal expansion coefficients}
- 2045/626 {Cylinders and inner linings having similar thermal expansion coefficients}
- 45/63 Venting or degassing means
- 45/64 Mould opening, closing or clamping devices {[\(combined with means for plasticising or homogenising B29C 45/70\)](#)}
- 45/641 {Clamping devices using means for straddling or interconnecting the mould halves, e.g. jaws, straps, latches}
- 2045/642 {using coupling rods for clamping}
- 2045/644 {mould clamping by nozzle touch pressure}
- 2045/645 {using magnetic means}
- 2045/647 {using magnetostriction}
- 2045/648 {Rack and pinion means for mould opening and closing a pair of mould halves}
- 45/66 mechanical
- 45/661 {using a toggle mechanism for mould clamping}
- 2045/662 {using toggles directly connected or linked to the fixed platen and indirectly to the movable platen}
- 2045/664 {using mould clamping means operating independently from the mould closing means}
- 2045/665 {using a screw or screws having differently threaded parts arranged in series}
- 2045/667 {Cam drive for mould closing or clamping}
- 2045/668 {using tilting elements for obtaining mould clamping}
- 45/67 hydraulic
- 45/6707 {without relative movement between the piston and the cylinder of the clamping device during the mould opening or closing movement}
- 45/6714 {using a separate element transmitting the mould clamping force from the clamping cylinder to the mould}
- 45/6721 {the separate element being displaceable with respect to the mould or the clamping cylinder}
- 45/6728 {the separate element consisting of coupling rods}
- 2045/6735 {Rotatable means coaxial with the coupling rod for locking the coupling rod to the mould platen}
- 2045/6742 {the coupling rods facilitating access between the mould halves}

- 2045/675 {Rotatable means coaxial with the tie rod for locking the movable platen to the tie rod, e.g. bayonet couplings using teeth or splines interrupted by longitudinal grooves}
- 2045/6757 {Hydraulic locking means}
- 45/6764 {using hydraulically connectable chambers of the clamping cylinder during the mould opening and closing movement}
- 45/6771 {the connection being provided within the clamping cylinder}
- 45/6778 {Stroke adjusting or limiting means}
- 2045/6785 {interconnecting two cylinders to supply fluid from one cylinder to the other during movement of the pistons}
- 2045/6792 {Combined pneumatic-hydraulic cylinders}
- 45/68 . . . hydro-mechanical
- 45/681 {using a toggle mechanism as mould clamping device}
- 45/683 {using both a toggle mechanism as mould closing device and another mechanism as mould clamping device}
- 2045/685 {using mechanical drive means for mould closing to obtain the hydraulic clamping pressure}
- 2045/686 {using a screw and nut mechanism for mould closing and a mould clamping ram acting on another nut}
- 2045/688 {using tie rods as separate elements for clamping}
- 45/70 . . Means for plasticising or homogenising the moulding material or forcing it into the mould, combined with mould opening, closing or clamping devices
- 2045/703 . . . {using clamping and injection pressures that are proportional to each other}
- 45/706 . . . {using a single drive system providing both the mould closing and clamping pressure and also the injection pressure, e.g. using a fixed injection piston}
- 45/72 . . Heating or cooling
- 45/7207 . . . {of the moulded articles}
- 2045/7214 {Preform carriers for cooling preforms}
- 2045/7221 {Means for ejecting the preforms}
- 2045/7228 {turret-like}
- 2045/7235 {Mechanical retaining means for preform ends}
- 2045/7242 {Alignment means for preforms}
- 2045/725 {Cooling circuits within the preform carriers}
- 2045/7257 {Cooling or heating pins with temperature adjustment enhancing surface structure}
- 2045/7264 {Cooling or heating the neck portion of preforms}
- 2045/7271 . . . {Cooling of drive motors}
- 2045/7278 . . . {Heating by friction of the moulding material}
- 2045/7285 . . . {using hydraulic oil as tempering medium}
- 2045/7292 . . . {Recovering waste heat}
- 45/73 . . . of the mould {(B29C 45/2642 and B29C 45/2737 take precedence)}
- 45/7306 {Control circuits therefor}
- 45/7312 {Construction of heating or cooling fluid flow channels}
- 2045/7318 {multilayered fluid channel constructions}
- 2045/7325 {Mould cavity linings for covering fluid channels or provided therewith}
- 45/7331 {Heat transfer elements, e.g. heat pipes}
- 45/7337 {using gas or steam (B29C 45/7331 takes precedence)}
- 2045/7343 {heating or cooling different mould parts at different temperatures}
- 2045/735 {heating a mould part and cooling another mould part during moulding}
- 2045/7356 {the temperature of the mould being near or higher than the melting temperature or glass transition temperature of the moulding material}
- 2045/7362 {turbulent flow of heating or cooling fluid}
- 2045/7368 {combining a heating or cooling fluid and non-fluid means}
- 2045/7375 {heating a mould surface by a heated gas}
- 2045/7381 {heating by gas combustion}
- 2045/7387 {jetting a cooling fluid onto the moulded article while still in the mould}
- 2045/7393 {alternately heating and cooling}
- 45/74 . . . of the injection unit
- 45/76 . . Measuring, controlling or regulating {(measuring in general G01; controlling or regulating in general G05)}
- NOTE**
- In groups B29C 45/76 - B29C 45/80 it is desirable to add the indexing codes of B29C 2945/76 relating to measuring, controlling or regulating in injection moulding
- 2045/7606 . . . {Controlling or regulating the display unit}
- 45/7613 . . . {the termination of flow of material into the mould}
- 45/762 . . . {the sequence of operations of an injection cycle}
- 45/7626 . . . {the ejection or removal of moulded articles}
- 2045/7633 {Take out or gripping means}
- 2045/764 {detecting or preventing overload of an ejector (controlling overload in general G01L 5/0071)}
- 45/7646 . . . {viscosity}
- 45/7653 . . . {mould clamping forces}
- 45/766 . . . {the setting or resetting of moulding conditions, e.g. before starting a cycle}
- 45/7666 . . . {of power or energy, e.g. integral function of force}
- 2045/7673 {Recovering energy or power from drive motors}
- 45/768 . . . {Detecting defective moulding conditions (B29C 45/84 takes precedence)}
- 45/7686 . . . {the ejected articles, e.g. weight control}
- 45/7693 . . . {using rheological models of the material in the mould, e.g. finite elements method}
- 45/77 . . . of velocity or pressure of moulding material
- 2045/773 {Zero point correction}
- 2045/776 {determining the switchover point to the holding pressure}
- 45/78 . . . of temperature
- 45/80 . . . of relative position of mould parts
- 45/82 . . . Hydraulic {or pneumatic} circuits
- 2045/822 {Pneumatic circuits}
- 2045/824 {Accumulators}

- 2045/826 {Plurality of hydraulic actuators driven by one hydraulic pump}
- 2045/828 {Bidirectional pumps}
- 45/83 . . Lubricating means
- 2045/835 . . . {for ball screws or ball nuts}
- 45/84 . . Safety devices {[\(B29C 45/7626 takes precedence\)](#)}
- 45/842 . . . {Detection of insert defects, e.g. inaccurate position, breakage}
- 45/844 . . . {Preventing damage caused by obstructions or foreign matter caught between mould halves during mould closing, e.g. moulded parts or runners}
- 2045/846 . . . {Windable safety screens}
- 2045/848 . . . {detecting or preventing overload of an injection plunger [\(controlling overload in general G01L 5/0071\)](#)}
- 48/00 Extrusion moulding, i.e. expressing the moulding material through a die or nozzle which imparts the desired form; Apparatus therefor** [\(extrusion blow-moulding B29C 49/04\)](#)
- 48/001 . {Combinations of extrusion moulding with other shaping operations}
- 48/0011 . . {combined with compression moulding}
- 48/0012 . . {combined with shaping by internal pressure generated in the material, e.g. foaming}
- 48/0013 . . {Extrusion moulding in several steps, i.e. components merging outside the die [\(B29C 48/15 takes precedence\)](#)}
- 48/0014 . . . {producing flat articles having components brought in contact outside the extrusion die}
- 48/0015 . . . {producing hollow articles having components brought in contact outside the extrusion die}
- 48/0016 {using a plurality of extrusion dies}
- 48/0017 . . {combined with blow-moulding or thermoforming}
- 48/0018 . . {combined with shaping by orienting, stretching or shrinking, e.g. film blowing [\(B29C 48/0017 takes precedence\)](#)}
- 48/0019 . . {combined with shaping by flattening, folding or bending}
- 48/002 . . {combined with surface shaping}
- 48/0021 . . {combined with joining, lining or laminating}
- 48/0022 . . {combined with cutting}
- 48/0023 . . {combined with printing or marking}
- 48/02 . Small extruding apparatus, e.g. handheld, toy or laboratory extruders
- 48/022 . {characterised by the choice of material}
- NOTE**
- When classifying in this group, it is desirable to add the indexing codes of subclass [B29K](#) to identify the moulding materials and their properties. Documents concerning the choice of moulding materials having a particular influence on the moulding technique should be classified in this group if of interest.
- 48/023 . . {Extruding materials comprising incompatible ingredients}
- 48/025 . . General arrangement or layout of plant
- 48/0255 . . {for extruding parallel streams of material, e.g. several separate parallel streams of extruded material forming separate articles [\(B29C 48/0013, B29C 48/345 takes precedence\)](#)}
- 48/03 . characterised by the shape of the extruded material at extrusion
- 48/04 . . Particle-shaped [\(making granules B29B 9/00\)](#)
- 48/05 . . Filamentary, e.g. strands
- 48/06 . . Rod-shaped
- 48/07 . . Flat, e.g. panels
- 48/08 . . . flexible, e.g. films
- 48/09 . . Articles with cross-sections having partially or fully enclosed cavities, e.g. pipes or channels
- 48/10 . . . flexible, e.g. blown foils
- 48/11 . . . comprising two or more partially or fully enclosed cavities, e.g. honeycomb-shaped
- 48/12 . . Articles with an irregular circumference when viewed in cross-section, e.g. window profiles
- 48/13 . . Articles with a cross-section varying in the longitudinal direction, e.g. corrugated pipes
- 48/131 . . {Curved articles}
- 48/14 . characterised by the particular extruding conditions, e.g. in a modified atmosphere or by using vibration
- 48/141 . . {extruding in a clean room}
- 48/142 . . {using force fields, e.g. gravity or electrical fields [\(B29C 48/9165 takes precedence\)](#)}
- 48/143 . . {at a location before or in the feed unit, e.g. influencing the material in the hopper}
- 48/144 . . {at the plasticising zone}
- 48/145 . . {at a venting zone}
- 48/146 . . {in the die}
- 48/147 . . {after the die nozzle}
- 48/1472 . . . {at the die nozzle exit zone}
- 48/1474 . . . {at a calibration zone}
- 48/1476 . . . {at a conveyor}
- 48/1478 . . . {at a storing zone}
- 48/15 . incorporating preformed parts or layers, e.g. extrusion moulding around inserts
- 48/151 . . Coating hollow articles
- 48/152 . . . the inner surfaces thereof
- 48/153 Coating both inner and outer surfaces
- 48/154 . . Coating solid articles, i.e. non-hollow articles
- 48/155 . . . Partial coating thereof
- 48/156 . . Coating two or more articles simultaneously
- 48/157 . . Coating linked inserts, e.g. chains
- 48/16 . Articles comprising two or more components, e.g. co-extruded layers
- 48/17 . . the components having different colours
- 48/175 . . . {comprising a multi-coloured single component, e.g. striated, marbled or wood-like patterned}
- 48/18 . . the components being layers
- 48/185 . . . {comprising six or more components, i.e. each component being counted once for each time it is present, e.g. in a layer}
- 48/19 . . . the layers being joined at their edges
- 48/20 . . . one of the layers being a strip, e.g. a partially embedded strip
- 48/21 . . . the layers being joined at their surfaces
- 48/22 . . . with means connecting the layers, e.g. tie layers or undercuts
- 48/23 . . . with means for avoiding adhesion of the layers, e.g. for forming peelable layers

- 48/25 . . . Component parts, details or accessories; Auxiliary operations
- 48/251 . . . {Design of extruder parts, e.g. by modelling based on mathematical theories or experiments}
- 48/2511 . . . {by modelling material flow, e.g. melt interaction with screw and barrel}
- 48/2513 {in the plasticising zone}
- 48/2515 {in the die zone}
- 48/2517 . . . {of intermeshing screws}
- 48/2519 . . . {by modelling of mechanical strength}
- 48/252 . . . {Drive or actuation means; Transmission means; Screw supporting means}
- 48/2522 {Shaft or screw supports, e.g. bearings}
- 48/2526 {Direct drives or gear boxes}
- 48/2528 {Drive or actuation means for non-plasticising purposes, e.g. dosing unit}
- 48/254 . . . {Sealing means}
- 48/2545 {for filters}
- 48/255 . . . Flow control means, e.g. valves ([flow dividers B29C 48/695](#))
- 48/2552 {provided in the feeding, melting, plasticising or pumping zone, e.g. screw, barrel, gear-pump or ram}
- 48/2554 {provided in or in the proximity of filter devices}
- 48/2556 {provided in or in the proximity of dies ([B29C 48/302](#), [B29C 48/31](#), [B29C 48/325](#) take precedence)}
- 48/256 . . . {Exchangeable extruder parts ([B29C 48/691](#) takes precedence)}
- 48/2561 {Mounting or handling of the screw}
- 48/2562 {Mounting or handling of the die}
- 48/2563 {Mounting or handling of the hopper or feeder}
- 48/2564 {Screw parts}
- 48/2565 {Barrel parts}
- 48/2566 {Die parts}
- 48/2567 {Hopper or feeder parts}
- 48/2568 {Inserts}
- 48/25682 {for screws}
- 48/25684 {for barrels}
- 48/25686 {for dies}
- 48/265 . . . Support structures or bases for apparatus, e.g. frames
- 48/266 . . . {Means for allowing relative movements between the apparatus parts, e.g. for twisting the extruded article or for moving the die along a surface to be coated}
- 48/2665 {allowing small relative movement, e.g. adjustments for aligning the apparatus parts or for compensating for thermal expansion}
- 48/267 . . . {Intermediate treatments, e.g. relaxation, annealing or decompression step for the melt ([B29C 48/76](#) takes precedence)}
- 48/268 . . . {Throttling of the flow, e.g. for cooperating with plasticising elements or for degassing ([flow control means B29C 48/255](#))}
- 48/269 . . . {Extrusion in non-steady condition, e.g. start-up or shut-down}
- 48/2692 {Material change}
- 48/2694 {Intermittent extrusion}
- 48/27 . . . Cleaning; Purging; Avoiding contamination
- 48/271 {of feeding units}
- 48/2715 {of plasticising units}
- 48/272 {of dies}
- 48/2725 {of filters}
- 48/273 {using back flow}
- 48/2735 {using scrapers}
- 48/274 {of the extruded articles}
- 48/275 . . . Recovery or reuse of energy or materials
- 48/276 {of energy}
- 48/277 {of materials}
- 48/278 {of additives or processing aids}
- 48/28 . . . Storing of extruded material, e.g. by winding up or stacking
- 48/285 . . . Feeding the extrusion material to the extruder
- 48/286 {Raw material dosing}
- 48/287 {Raw material pre-treatment while feeding ([B29C 48/78](#) takes precedence)}
- 48/288 {in solid form, e.g. powder or granules}
- 48/2883 {of preformed parts, e.g. inserts fed and transported generally uninfluenced through the extruder or inserts fed directly to the die}
- 48/2886 {of fibrous, filamentary or filling materials, e.g. thin fibrous reinforcements or fillers}
- 48/2888 {in band or in strip form, e.g. rubber strips}
- 48/29 in liquid form
- 48/295 in gaseous form
- 48/297 {at several locations, e.g. using several hoppers or using a separate additive feeding}
- 48/298 {in a location other than through a barrel, e.g. through a screw}
- 48/30 . . . Extrusion nozzles or dies ([extrusion characterised by the shape or cross-section of the extruded article B29C 48/03](#))
- 48/3001 {characterised by the material or their manufacturing process}
- 48/3003 {Materials, coating or lining therefor}
- 48/301 {having reciprocating, oscillating or rotating parts}
- 48/302 {being adjustable, i.e. having adjustable exit sections}
- 48/303 {using dies or die parts movable in a closed circuit, e.g. mounted on movable endless support ([B29C 48/35](#) takes precedence)}
- 48/304 {specially adapted for bringing together components, e.g. melts within the die}
- 48/305 having a wide opening, e.g. for forming sheets
- 48/307 {specially adapted for bringing together components, e.g. melts within the die}
- 48/31 {being} adjustable {, i.e. having adjustable exit sections}
- 48/313 {by positioning the die lips}
- 48/315 with parts oscillating relative to each other
- 48/32 with annular openings, e.g. for forming tubular articles
- 48/325 {being} adjustable {, i.e. having adjustable exit sections}
- 48/327 {with centering means}
- 48/33 with parts rotatable relative to each other
- 48/335 Multiple annular extrusion nozzles in coaxial arrangement, e.g. for making multi-layered tubular articles
- 48/336 {the components merging one by one down streams in the die}
- 48/3363 {using a layered die, e.g. stacked discs}

- 48/336 {using a die with concentric parts, e.g. rings, cylinders}
- 48/337 {the components merging at a common location}
- 48/338 {using a die with concentric parts, e.g. rings, cylinders}
- 48/34 Cross-head annular extrusion nozzles, i.e. for simultaneously receiving moulding material and the preform to be coated
- 48/345 Extrusion nozzles comprising two or more adjacently arranged ports, for simultaneously extruding multiple strands, e.g. for pelletising
- 48/35 with rollers
- 48/355 Conveyors for extruded articles
- 48/36 Means for plasticising or homogenising the moulding material or forcing it through the nozzle or die
- 48/361 {with the barrel or with a part thereof rotating}
- 48/362 {using static mixing devices}
- 48/363 {using non-actuated dynamic mixing devices}
- 48/365 using pumps, e.g. piston pumps
- 48/37 Gear pumps
- 48/375 Plasticisers, homogenisers or feeders comprising two or more stages
- 48/38 using two or more serially arranged screws in the same barrel
- 48/385 using two or more serially arranged screws in separate barrels
- 48/387 {using a screw extruder and a gear pump}
- 48/388 {using a screw extruder and a ram or piston}
- 48/39 a first extruder feeding the melt into an intermediate location of a second extruder
- 48/395 using screws surrounded by a cooperating barrel, e.g. single screw extruders
- 48/397 {using a single screw}
- 48/40 using two or more parallel screws {or at least two parallel non-intermeshing screws}, e.g. twin screw extruders
- 48/402 {the screws having intermeshing parts}
- 48/404 {the screws having non-intermeshing parts}
- 48/405 Intermeshing co-rotating screws
- 48/41 Intermeshing counter-rotating screws
- 48/415 and having partially non-intermeshing screws
- 48/42 Non-identical or non-mirrored screws
- 48/425 using three or more screws (serially arranged screws [B29C 48/38](#), [B29C 48/385](#))
- 48/43 Ring extruders
- 48/435 Sub-screws
- 48/44 Planetary screws
- 48/445 Coaxially arranged screws, i.e. one within the other
- 48/45 Axially movable screws
- 48/455 Screws arranged to convey material towards each other, e.g. separate screws arranged after each other and feeding in opposite directions
- 48/46 using vanes
- 48/465 using rollers
- 48/467 {using single rollers, e.g. provided with protrusions, closely surrounded by a housing with movement of the material in the axial direction}
- 48/468 {Cavity transfer mixing devices, i.e. a roller and surrounding barrel both provided with cavities; Barrels and rollers therefor}
- 48/47 using discs, e.g. plasticising the moulding material by passing it between a fixed and a rotating disc that are coaxially arranged
- 48/475 using pistons, accumulators or press rams
- 48/48 Two or more rams or pistons
- 48/485 Hydrostatic extrusion
- 48/49 using two or more extruders to feed one die or nozzle
- 48/495 Feed-blocks (extrusion moulding of multi-component articles [B29C 48/16](#))
- 48/50 Details of extruders
- 48/501 {Extruder feed section}
- 48/503 {Extruder machines or parts thereof characterised by the material or by their manufacturing process ([B29C 48/256](#) takes precedence)}
- 48/505 Screws
- 48/507 {characterised by the material or their manufacturing process}
- 48/509 {Materials, coating or lining therefor}
- 48/51 with internal flow passages, e.g. for molten material
- 48/515 for auxiliary fluids, e.g. foaming agents
- 48/52 with an outer diameter varying along the longitudinal axis, e.g. for obtaining different thread clearance
- 48/525 Conical screws
- 48/53 having a varying channel depth, e.g. varying the diameter of the longitudinal screw trunk
- 48/535 with thread pitch varying along the longitudinal axis
- 48/54 with additional forward-feeding elements
- 48/55 having reverse-feeding elements
- 48/56 having grooves or cavities other than the thread or the channel
- 48/565 having projections other than the thread, e.g. pins
- 48/57 provided with kneading disc-like elements, e.g. with oval-shaped elements
- 48/575 provided with elements of a generally circular cross-section for shearing the melt, i.e. shear-ring elements
- 48/58 provided with seal ring elements, i.e. elements of generally circular and tapered shape for preventing the back flow of the melt
- 48/585 provided with gears interacting with the flow
- 48/59 characterised by details of the thread, i.e. the shape of a single thread of the material-feeding screw
- 48/595 the thread having non-uniform width
- 48/60 Thread tops
- 48/605 the thread being discontinuous
- 48/61 Threads having wavy profiles

- 48/615 Threads having varying helix angles
- 48/62 characterised by the shape of the thread channel, e.g. U-shaped
- 48/625 characterised by the ratio of the threaded length of the screw to its outside diameter [L/D ratio]
- 48/63 having sections without mixing elements or threads, i.e. having cylinder shaped sections
- 48/635 Eccentrically rotating screws; Screws revolving around an axis other than their central axis
- 48/64 Screws with two or more threads
- 48/645 neighbouring threads and channels having identical configurations
- 48/65 neighbouring threads or channels having different configurations, e.g. one thread being lower than its neighbouring thread
- 48/655 having three or more threads
- 48/66 Barrier threads, i.e. comprising primary and secondary threads whereby the secondary thread provides clearance to the barrel for material movement
- 48/67 having incorporated mixing devices not provided for in groups [B29C 48/52](#) - [B29C 48/66](#)
- 48/68 Barrels or cylinders
- 48/6801 {characterised by the material or their manufacturing process}
- 48/6803 {Materials, coating or lining therefor}
- 48/681 {for single screws}
- 48/682 {for twin screws}
- 48/683 {for more than two screws}
- 48/684 {having adaptable feed or discharge locations, e.g. for varying the amount of kneading by changing hopper position or discharge exit}
- 48/685 characterised by their inner surfaces, e.g. having grooves, projections or threads
- 48/686 {having grooves or cavities}
- 48/687 {having projections with a short length in the barrel direction, e.g. pins}
- 48/688 {having threads}
- 48/69 Filters or screens for the moulding material
- 48/691 Arrangements for replacing filters, e.g. with two parallel filters for alternate use
- 48/6912 {the filters being fitted on a single rectilinearly reciprocating slide ([B29C 48/692](#) takes precedence)}
- 48/6914 {the filters being fitted on a rotatable or pivotable disc or on the circumference of a rotatable or pivotable cylinder}
- 48/6916 {Continuously rotating cylindrical filters}
- 48/692 in the form of webs displaceable for using adjacent areas consecutively
- 48/693 Substantially flat filters mounted at the end of an extruder screw perpendicular to the feed axis
- 48/694 Cylindrical or conical filters
- 48/6945 {surrounding a rotating screw}
- 48/695 Flow dividers, e.g. breaker plates
- 48/70 comprising means for dividing, distributing and recombining melt flows
- 48/705 {in the die zone, e.g. to create flow homogeneity}
- 48/71 for layer multiplication ([extrusion of multi-component articles B29C 48/16](#))
- 48/72 Feedback means, i.e. part of the molten material being fed back into upstream stages of the extruder
- 48/725 {for plasticising or homogenising devices}
- 48/74 Bypassing means, i.e. part of the molten material being diverted into downstream stages of the extruder
- 48/745 {for plasticising or homogenising devices}
- 48/76 Venting {, drying} means; Degassing means
- 48/761 {the vented material being in liquid form}
- 48/762 {Vapour stripping}
- 48/763 {Vent constructions, e.g. venting means avoiding melt escape}
- 48/765 {in the extruder apparatus}
- 48/766 {in screw extruders}
- 48/767 {through a degassing opening of a barrel}
- 48/768 {outside the apparatus, e.g. after the die}
- 48/78 Thermal treatment of the extrusion moulding material or of preformed parts or layers, e.g. by heating or cooling
- 48/79 of preformed parts or layers
- 48/793 upstream of the plasticising zone, e.g. heating in the hopper
- 48/797 Cooling
- 48/80 at the plasticising zone, e.g. by heating cylinders
- 48/802 {Heating}
- 48/82 Cooling ([B29C 48/84](#) takes precedence)
- 48/83 {Heating or cooling the cylinders}
- 48/832 {Heating}
- 48/834 {Cooling}
- 48/84 by heating or cooling the feeding screws ([for hollow screws B29C 48/515](#))
- 48/845 {Heating}
- 48/85 Cooling
- 48/86 at the nozzle zone
- 48/865 {Heating}
- 48/87 Cooling
- 48/872 {characterised by differential heating or cooling}
- 48/873 {in the direction of the stream of the material}
- 48/875 for achieving a non-uniform temperature distribution, e.g. using barrels having both cooling and heating zones
- 48/88 Thermal treatment of the stream of extruded material, e.g. cooling
- NOTE**
- When classifying in this group, forms or shapes of products are further classified in groups [B29C 48/03](#) - [B29C 48/13](#)
- 48/885 External treatment, e.g. by using air rings for cooling tubular films
- 48/89 Internal treatment, e.g. by applying an internal cooling fluid stream

- 48/90 . . . with calibration or sizing, i.e. combined with fixing or setting of the final dimensions of the extruded article
- 48/901 {of hollow bodies}
- 48/902 {internally}
- 48/903 {externally}
- 48/904 {using dry calibration, i.e. no quenching tank, e.g. with water spray for cooling or lubrication}
- 48/905 {using wet calibration, i.e. in a quenching tank}
- 48/906 {using roller calibration}
- 48/907 {using adjustable calibrators, e.g. the dimensions of the calibrator being changeable}
- 48/908 {characterised by calibrator surface, e.g. structure or holes for lubrication, cooling or venting}
- 48/91 . . . Heating, e.g. for cross linking
- 48/9105 {of hollow articles}
- 48/911 . . . {Cooling}
- 48/9115 {of hollow articles}
- 48/912 {of tubular films}
- 48/9125 {internally}
- 48/913 {externally}
- 48/9135 {of flat articles, e.g. using specially adapted supporting means}
- 48/914 {cooling drums}
- 48/9145 {Endless cooling belts}
- 48/915 {with means for improving the adhesion to the supporting means}
- 48/9155 {Pressure rollers}
- 48/916 {using vacuum}
- 48/9165 {Electrostatic pinning}
- 48/917 {by applying pressurised gas to the surface of the flat article}
- 48/9175 {by interposing a fluid layer between the supporting means and the flat article}
- 48/918 . . . {characterized by differential heating or cooling}
- 48/9185 {in the direction of the stream of the material}
- 48/919 . . . {using a bath, e.g. extruding into an open bath to coagulate or cool the material}
- 48/92 . . Measuring, controlling or regulating
- NOTE**
- When classifying in group [B29C 48/92](#) it is desirable to add the indexing codes of [B29C 2948/00](#) relating to measuring, controlling or regulating in extrusion moulding
- 48/94 . . Lubricating
- 48/95 . . . by adding lubricant to the moulding material
- 48/96 . . Safety devices
- 48/965 . . . {Personnel safety, e.g. safety for the operator}
- 49/00 Blow-moulding, i.e. blowing a preform or parison to a desired shape within a mould; Apparatus therefor** [{\(extrusion moulding of tubular films B29C 48/10; enlarging tube ends using pressure difference B29C 57/08\)}](#)
- 49/0005 . . {characterised by the choice of material}
- NOTE**
- When classifying in this group, it is desirable to add the indexing codes of subclass [B29K](#) to identify the moulding materials and their properties. Documents concerning the choice of moulding materials having a particular influence on the moulding technique should be classified in this group if of interest
- 2049/001 . . {The material comprising particles or additives to induce special properties in the preform}
- 49/0015 . . {for making articles of indefinite length, e.g. corrugated tubes}
- 49/0021 . . {using moulds or mould parts movable in a closed path, e.g. mounted on movable endless supports}
- 49/0026 . . . {using independent mould parts, i.e. the mould parts not being interconnected, e.g. for speeding up the transfer of the moulds to the beginning of the moulding area}
- 49/0031 . . {for making articles having hollow walls}
- 2049/0036 . . {by ballooning the parison in an open mould}
- 49/0042 . . {without using a mould}
- 49/0047 . . {Sheet blow-moulding, i.e. using at least two parallel sheets or a folded sheet as a preform}
- 2049/0052 . . {using a folded sheet as a preform}
- 2049/0057 . . {using two parallel sheets as a preform}
- 2049/0063 . . {whereby the folded sheets or the two parallel sheets are separated from each other at least at one place, e.g. to allow inserting of a blowing means}
- 2049/0068 . . {Means for avoiding the sheets to stick together before or during the blow moulding operation}
- 49/0073 . . {characterised by the parison configuration, e.g. nestable [\(B29C 49/22 takes precedence\)](#)}
- 49/0078 . . {Parisons having internal or external ribs}
- 49/0084 . . . {the internal ribs being connected to the opposite wall, e.g. forming an internal separating wall}
- 2049/0089 . . {the parison being a tube, e.g. a tube which has to be reheated before blow moulding}
- 2049/0094 . . {Blow moulding plants, e.g. using at least two blow moulding apparatuses at the same time}
- 49/02 . . Combined blow-moulding and manufacture of the preform or the parison
- 2049/021 . . {the preform or parison being made out of several parts, e.g. by welding or gluing parts together}
- 49/022 . . {the parison being partly injected and partly extruded}
- 2049/023 . . {using inherent heat of the preform, i.e. 1 step blow moulding}
- 2049/024 . . {not using inherent heat of the preform, i.e. 2 step blow moulding}
- 2049/025 . . {the preform or parison being made of powder}
- 2049/026 . . {Coating a preform or parison, e.g. with reinforcing material}
- 2049/027 . . . {on the inside}
- 2049/028 . . {Compression blow-moulding}
- 49/04 . . Extrusion blow-moulding
- 49/041 . . . {using an accumulator head}
- 2049/042 {disclosing the push out speed}
- 2049/044 . . . {extruding the material continuously}

- 2049/045 {with means to move the extruder head up and down, e.g. to continue extruding the next parison while blow moulding the previous parison in the blow mould}
- 2049/047 . . . {extruding the material discontinuously}
- 2049/048 . . . {extruding several parisons parallel to each other at the same time}
- 49/06 . . Injection blow-moulding **{(introducing a fluid into the interior of the injected material which is still in a molten state [B29C 45/1704](#))}**
- 49/061 . . . {with parison holding means displaceable between injection and blow stations}
- 49/062 {following an arcuate path, e.g. rotary or oscillating-type}
- 49/063 {with the parison axis held in the plane of rotation}
- 49/064 {following a rectilinear path, e.g. shuttle-type}
- 2049/065 . . . {Means to compensate or avoid the shrinking of the preforms, e.g. in the injection mould or outside the injection mould}
- 2049/066 . . . {One injection moulding station supplies several blow moulding stations with preforms}
- 2049/067 . . . {Several injection moulding stations supply one blow moulding station with preforms}
- 2049/068 . . . {Moving the injection mould cavity and blow mould cavity to the geometrically fixed injection core mould}
- 2049/069 . . . {using a porous core}
- 49/08 . . Biaxial stretching during blow-moulding {with or without prestretching}
- 49/085 . . {without prestretching}
- 49/10 . . using mechanical means {for prestretching}
- 49/12 . . . Stretching rods
- 2049/1204 {Means for fixing the stretching rod to the driving means, e.g. clamping means or bayonet connections}
- 2049/1209 {rotating during stretching of the preform}
- 2049/1214 {Using at least two stretching rods for stretching different parts of the preform}
- 2049/1219 {Using additional means to clamp the preform bottom while stretching the preform}
- 2049/1223 {Stretching rod configuration, e.g. geometry; Stretching rod material}
- 2049/1228 {the stretching rod comprises at least one opening on the surface through which compressed air is blown into the preform to expand the same}
- 2049/1233 {the opening being at the end where it touches the preform, e.g. to avoid direct contact between the preform and the stretching rod}
- 2049/1238 {Geometry of the stretching rod, e.g. specific stretching rod end shape}
- 2049/1242 {Material for parts or the whole stretching rod, e.g. heat insulating material}
- 2049/1247 {to stretch heated tubes}
- 2049/1252 {Drive means therefore}
- 2049/1257 {Pneumatic}
- 2049/1261 {Hydraulic}
- 2049/1266 {Mechanical}
- 2049/1271 {being a cam mechanism}
- 2049/1276 {adaptable to different sized stretching rods}
- 2049/128 {being a toggle mechanism}
- 2049/1285 {being a spindle nut mechanism}
- 2049/129 {Electric direct drives, e.g. linear motors}
- 2049/1295 {Magnetic}
- 49/14 . . . Clamps
- 49/16 . . using pressure difference {for prestretching}, e.g. pre-blowing **{([B29C 49/649](#) takes precedence)}**
- 2049/165 . . . {pre-blowing without using a mould}
- 49/18 . . using several blowing steps **([B29C 49/16](#) takes precedence)**
- 49/185 . . {in different mould cavities}
- 49/20 . . of articles having inserts or reinforcements {; Handling of inserts or reinforcements}
- 2049/2004 . . {with a specific location of the inserts or reinforcements in or on the final article}
- 2049/2008 . . . {Inside}
- 2049/2013 {Connecting opposite walls, e.g. baffles in a fuel tank}
- 2049/2017 . . . {Outside}
- 2049/2021 . . {Particular inserts}
- 2049/2026 . . . {Neck portions}
- 2049/203 . . . {Carpets}
- 2049/2034 . . . {Attachments, e.g. hooks to hold or hang the blown article}
- 2049/2039 {Handles, e.g. handles or grips on bottles}
- 2049/2043 . . . {comprising threads, e.g. screws or nuts}
- 2049/2047 . . . {Tubular inserts, e.g. tubes}
- 2049/2052 . . . {having means to avoid that the preform or parison gets into contact with parts of the insert}
- 2049/2056 . . . {being constructed in such a way that opposite preform or parison walls do not touch each other during extrusion or mould closing}
- 2049/206 . . . {being constructed in such a way that the joining between the insert and the preform or parison is avoided}
- 2049/2065 . . . {for reinforcing specific areas of the final blow moulded article}
- 2049/2069 . . . {being injection moulded, e.g. in the same mould before or after blow moulding}
- 2049/2073 . . {Means for feeding the inserts into the mould, preform or parison, e.g. grippers}
- 2049/2078 . . . {being retractable during or after blow moulding}
- 2049/2082 . . . {Feeding the insert and the preform at the same time, e.g. using the same feeding means for the insert and the preform}
- 2049/2086 . . {Means for verifying the position of insert}
- 2049/2091 . . {Means for avoiding cooling of the inserts where the inserts touch the preform or the mould}
- 2049/2095 . . {Means for heating the inserts}
- 49/22 . . using multilayered preforms or parisons
- 49/221 . . {at least one layer being injected **(injection moulding of multilayered parisons [B29C 45/1643](#), [B29C 45/1646](#))}**}
- 2049/222 . . {only parts of the preforms or parisons are layered}
- 2049/224 . . . {neck portion}
- 2049/225 . . . {body portion}
- 2049/227 . . {with particular bonding between the layers}
- 2049/228 . . {at least one layer has a variable thickness}

- 49/24 . . Lining or labelling
- 2049/2402 . . {lining articles}
- 2049/2404 . . . {on their inside surface, e.g. the inside of a bottle or box}
- 2049/2406 {the lining being used to line a previously coated mould}
- 49/2408 . . {Inserting labels or films into blow-moulds, e.g. in-mould-labellers}
- 2049/241 . . {In-mould labelling}
- 2049/2412 . . . {the label being on the outside surface of the blow moulded article, e.g. bottle with a label on its outside surface}
- 2049/2414 . . {Particular linings or labels, e.g. specific geometry, multilayered; Pretreatment thereof}
- 2049/2416 . . . {Specific shapes or geometries}
- 2049/2418 {Double folded labels}
- 2049/242 {Labels have round edges}
- 2049/2422 {Cylindrical labels}
- 2049/2425 {Perforated labels}
- 2049/2427 {Corrugated or embossed labels}
- 2049/2429 . . . {Multilayered labels}
- 2049/2431 . . . {Pretreatment or preshaping of labels}
- 2049/2433 {Applying glue}
- 2049/2435 {in a specific pattern}
- 2049/2437 {Cutting}
- 2049/2439 {by means in the mould cavity}
- 2049/2441 {Preshaping while in the mould cavity}
- 2049/2443 . . {Means for inserting the linings or labels into the mould}
- 2049/2445 . . . {holding the labels or linings by magnetic force}
- 2049/2447 . . . {holding the labels or linings by electrostatic force}
- 2049/2449 . . . {holding the labels or linings by vacuum}
- 2049/2452 . . . {being a transfer foil}
- 2049/2454 . . . {for placing labels at the same time in two opposite mould cavities}
- 2049/2456 . . . {and removing with the same means the final article}
- 2049/2458 . . . {Driving means}
- 2049/246 {Cams}
- 2049/2462 {Conveyor belt}
- 2049/2464 . . {Means for positioning labels (moulds with incorporated means for positioning inserts in general [B29C 33/12](#))}
- 2049/2466 . . . {using electrostatic force}
- 2049/2468 . . . {using magnetic force}
- 2049/247 . . . {using needles}
- 2049/2472 . . . {using vacuum}
- 2049/2474 . . . {using adhesive}
- 2049/2477 . . {Deforming linings or the labels during blow moulding}
- 2049/2479 . . {Label or lining movements}
- 2049/2481 . . . {vertical only}
- 2049/2483 . . . {horizontal only}
- 2049/2485 . . . {multidirectional}
- 2049/2487 . . . {comprising a rotary movement}
- 2049/2489 . . {Folding the label around the edges of the final blow moulded article, e.g. via mould closing or via additional means}
- 2049/2491 . . {Label materials}
- 2049/2493 . . . {using identical material for the label and the preform}
- 2049/2495 {using different material for the label and the preform}
- 2049/2497 {Labels comprising data carriers or detection means, e.g. chips, RFIDs, antennas}
- 49/26 . . . inner lining of tubes
- 49/28 . . Blow-moulding apparatus
- 2049/283 . . . {configured to easily exchange modules, e.g. heating or feeding module}
- 2049/286 . . . {using several moulds whereby at least one mould is different from a plurality of identical moulds in at least one feature, e.g. size or shape}
- 49/30 . . . having movable moulds or mould parts
- 49/32 moving "to and fro"
- 2049/325 {by using guide rails}
- 49/34 the mould parts moving "hand-over-hand"
- 49/36 rotatable about one axis
- 49/38 mounted on movable endless supports
{[B29C 49/0021](#) takes precedence}
- 49/40 on co-operating drums
- 49/42 . . Component parts, details or accessories; Auxiliary operations
- 49/4205 . . . {Handling means, e.g. transfer, loading or discharging means ([handling of inserts or reinforcements B29C 49/20](#); [handling of labels B29C 49/2408](#))}
- 49/421 {for blown articles}
- 49/4215 {for increasing the space between preforms, e.g. in order to perform the blow moulding step}
- 2049/4221 {for transferring at least two preforms to the mould}
- 2049/4226 {for orienting preforms in the mould, e.g. depending on their heat profile}
- 2049/4231 {for aligning disorderly arranged preforms}
- 49/4236 . . . {Drive means}
- 49/4242 . . . {Means for deforming the parison prior to the blowing operation ([B29C 49/08](#) takes precedence)}
- 49/4247 {Spreading or extending means}
- 49/4252 . . . {Auxiliary operations prior to the blow moulding operation, e.g. cutting ([B29C 49/64](#), [B29C 49/76](#), [B29C 49/78](#) take precedence)}
- 2049/4257 {Means for heating the mould cavity surface from the side of the cavity, e.g. putting an external heating member between the mould halves}
- 2049/4263 {using flames}
- 49/4268 . . . {Auxiliary operations during the blow moulding operation ([B29C 49/64](#), [B29C 49/76](#), [B29C 49/78](#) take precedence)}
- 49/4273 . . . {Auxiliary operations after the blow moulding operation ([B29C 49/64](#), [B29C 49/70](#), [B29C 49/72](#), [B29C 49/76](#), [B29C 49/78](#) take precedence)}
- 49/4278 {Cutting, rearranging and joining the cut parts}
- 49/4284 . . . {Means for recycling or reusing auxiliaries or materials, e.g. blowing fluids or energy}
- 49/4289 . . . {Valve constructions or configurations, e.g. arranged to reduce blowing fluid consumption}
- 2049/4294 . . . {Sealing means, i.e. for avoiding blowing air to escape}
- 49/44 . . . for applying pressure through the walls of an inflated bag
- 2049/445 {having wall areas with different elasticity}

- 49/46 . . . characterised by using a particular environment or blow fluids other than air
- 2049/4602 . . . {Blowing fluids}
- 2049/4605 {containing an inert gas, e.g. helium}
- 2049/4608 {Nitrogen}
- 2049/4611 {containing a reactive gas}
- 2049/4614 {Chlorine}
- 2049/4617 {Fluor}
- 2049/462 {Oxygen}
- 2049/4623 {the gas containing sulfur, e.g. sulfur trioxide}
- 2049/4626 {containing carbon dioxide}
- 2049/4629 {containing a polar gas}
- 2049/4632 {being filtered air}
- 2049/4635 {being sterile}
- 2049/4638 {being a hot gas, i.e. gas with a temperature higher than ambient temperature}
- 2049/4641 {being a cooled gas, i.e. gas with a temperature lower than ambient temperature}
- 2049/4644 {created by evaporating material, e.g. solid powder}
- 2049/4647 {created by an explosive gas mixture}
- 2049/465 {being incompressible}
- 2049/4652 {hot liquids}
- 2049/4655 {water}
- 2049/4658 {oil}
- 2049/4661 {solid media, e.g. powder
([B29C 2049/4644](#) takes precedence)}
- 2049/4664 {staying in the final article}
- 2049/4667 {being foamable}
- 2049/467 {created by thermal expansion of enclosed amount of gas, e.g. heating enclosed air in preforms or parisons}
- 2049/4673 {Particular environments}
- 2049/4676 {being dry air to surround or flush parts of the blow moulding apparatus, e.g. blow mould, preforms or parisons}
- 2049/4679 {being sterile gas to surround or flush parts of the blow moulding apparatus, e.g. blowing means, preforms or parisons}
- 2049/4682 {surrounding or flushing preforms or parisons, e.g. flushing the inside of extruded parisons}
- 2049/4685 {after blow moulding}
- 2049/4688 {using reactive gas}
- 2049/4691 {using steam during blow moulding, e.g. to expand foamable beads}
- 2049/4694 {purging or cleaning the blow moulding apparatus or parts of it, e.g. cleaning blow moulds ([cleaning moulds in general B29C 33/72](#))}
- 2049/4697 {Clean room}
- 49/48 . . . Moulds
- 49/4802 {with means for locally compressing part(s) of the parison in the main blowing cavity}
- 2049/4805 {by closing the mould halves}
- 2049/4807 {by movable mould parts in the mould halves}
- 2049/481 {the movable mould parts moving outwardly, e.g. the mould size being increased due to the movement of the movable mould parts}
- 2049/4812 {and welding opposite wall parts of the parisons or preforms to each other}
- 49/4815 {by means of movable mould parts}
- 49/4817 {with means for closing off parison ends}
- 49/482 {with means for moulding parts of the parisons in an auxiliary cavity, e.g. moulding a handle}
- 49/4823 {with incorporated heating or cooling means}
- 2049/4825 {for cooling moulds or mould parts
([B29C 2049/5889](#) takes precedence)}
- 2049/4828 {for cooling mould parts}
- 2049/483 {in different areas of the mould at different temperatures, e.g. neck, shoulder or bottom}
- 2049/4833 {the cooling means being connected to an external heat exchanger}
- 2049/4835 {releasing the blowing fluid via the cooling channels of the moulds}
- 2049/4838 {for heating moulds or mould parts}
- 2049/4841 {for heating mould parts}
- 2049/4843 {for heating the bottom, e.g. heating the bottom part independently}
- 2049/4846 {in different areas of the mould at different temperatures, e.g. neck, shoulder or bottom}
- 2049/4848 {Bottom}
- 2049/4851 {Side walls}
- 2049/4853 {having additional means for improving heat transfer between the mould cavity and the parisons or preforms ([in general B29C 33/30](#))}
- 2049/4856 {Mounting, exchanging or centering moulds or parts thereof ([B29C 2049/5893](#) takes precedence; [in general B29C 33/30](#))}
- 2049/4858 {Exchanging mould parts, e.g. for changing the mould size or geometry for making different products in the same mould}
- 2049/4861 {Neck portions of bottle producing moulds}
- 2049/4864 {Fixed by a special construction to the mould half carriers, e.g. using insulating material between the mould and the mould half carrier}
- 2049/4866 {center the moulds with the mould half carriers}
- 2049/4869 {containing more than one mould cavity}
- 2049/4871 {having different sizes or shapes mould cavities, e.g. for producing different sized bottles with the same mould}
- 2049/4874 {Moulds made of at least two different materials, e.g. a hard material and a soft material, materials having different thermal conductivities}
- 2049/4876 {one material being heat insulating material}
- 2049/4879 {defined by special mould configurations}
- 2049/4882 {Having a special mould cavity geometry}
- 2049/4884 {Mould halves are made of one piece}
- 2049/4887 {Mould halves consisting of an independent neck and main part}
- 2049/4889 {Mould halves consisting of an independent neck, main and bottom part}
- 2049/4892 {Mould halves consisting of an independent main and bottom part}
- 2049/4894 {With at least a part of the mould cavity formed by a cylindrical mould}

- 2049/4897 . . . {characterised by the manufacturing process (in general [B29C 33/38](#))}
- 49/50 . . . having cutting or deflashing means
- 2049/503 {being independently movable during the mould closing}
- 2049/506 {being heated}
- 49/52 . . . having decorating or printing means
- 49/54 . . . for undercut articles
- 49/541 {having a recessed undersurface}
- 2049/542 {having means to facilitate the removal of the blow moulded articles (in general [B29C 33/44](#))}
- 2049/543 {at the neck portion}
- 2049/545 {by rotationally actuating an auxiliary mould part while the mould is still in a closed position}
- 2049/546 {by translatorily actuating an auxiliary mould part while the mould is still in a closed position}
- 2049/547 {which are self actuated during the removing of the blow moulded articles, e.g. the means are spring loaded or flexible}
- 2049/548 {the movement of the mould parts during opening of the mould are interlinked}
- 49/56 . . . Opening, closing or clamping means
- 2049/563 . . . {Clamping means}
- 2049/566 . . . {Locking means}
- 49/58 . . . Blowing means ([B29C 45/1734](#) takes precedence)
- 2049/5803 . . . {Constructional features}
- 2049/5806 {Means for fixing the blowing means with the mould}
- 2049/581 {Mechanical, e.g. fingers or toothed wheels}
- 2049/5813 {Hydraulic}
- 2049/5817 {Pneumatic}
- 2049/582 {Magnetic, e.g. permanent magnets}
- 2049/5824 {Electromagnetic means, e.g. electromagnets}
- 2049/5827 {Blowing means not touching the preform}
- 2049/5831 {Diaphragms or bellows protecting the blowing means against contamination}
- 2049/5834 {Lost blowing means}
- 2049/5837 {Plural independent blowing means}
- 2049/5841 {Plural independent blowing paths}
- 2049/5844 {Compacting means, e.g. to compact the neck portion of the blown article with the blowing means}
- 2049/5848 {Cutting means, e.g. to cut parts of the preform or parison with the blowing means}
- 2049/5851 {Means to avoid clogging of the blowing paths}
- 2049/5855 {allowing injecting additional cooling medium during the blowing operation, e.g. water droplets}
- 2049/5858 {Connecting means, e.g. to allow connection of fluid supply lines to the blowing means}
- 2049/5862 . . . {Drive means therefore}
- 2049/5865 {Pneumatic}
- 2049/5868 {Hydraulic}
- 2049/5872 {Mechanical}
- 2049/5875 {Electric direct drives, e.g. linear electric motor}
- 2049/5879 {Magnetic means, e.g. permanent magnets}
- 2049/5882 {Electromagnetic means, e.g. electromagnets}
- 2049/5886 {for introducing from below into the extruded parison, e.g. for reducing contamination of the preforms or parisons}
- 2049/5889 {being cooled}
- 2049/5893 {Mounting, exchanging or centering blowing means}
- 2049/5896 {Centering means therefore}
- 49/60 . . . Blow-needles
- 2049/6009 {Constructional features}
- 2049/6018 {related to the air outlet}
- 2049/6027 {Having several air outlets, e.g. for directing the blowing fluid in different directions}
- 2049/6036 {the air outlet being located distant from the end of the needle}
- 2049/6045 {The air outlet being open and closable}
- 2049/6054 {Means for avoiding blowing fluid leakage between the blow needle and parisons or preforms}
- 2049/6063 {having means which facilitate the puncturing of the parison}
- 2049/6072 {being movable, e.g. blow needles move to pierce the parison}
- 2049/6081 {being rotatable}
- 2049/609 {being at least two}
- 49/62 . . . Venting means
- 2049/622 {Air gaps between closed mould halves}
- 2049/625 {by using spacing means between the mould halves}
- 2049/627 {Vacuum means}
- 49/64 . . . Heating or cooling preforms, parisons or blown articles
- 49/6409 {Thermal conditioning of preforms ([B29C 49/68](#) takes precedence)}
- 49/6418 {by reheating cold preforms in a single stage ([B29C 49/6436](#) takes precedence)}
- 49/6427 {by cooling hot or molten preforms in a single stage ([B29C 49/6436](#) takes precedence)}
- 49/6436 {producing a temperature differential}
- 49/6445 {through the preform length}
- 49/6454 {along the preform thickness}
- 49/6463 {Mandrels or cores specially adapted for heating or cooling preforms}
- 49/6472 {in several stages ([B29C 49/6409](#) takes precedence)}
- 49/6481 {using several mould cavities for each article}
- 49/649 {at least one stage being a heating stage used for shrinking of a preform prior to a subsequent blowing stage}
- 49/66 . . . Cooling by refrigerant introduced into the blown article
- 2049/6607 {Flushing blown articles}
- 2049/6615 {and exhausting through the blowing means}
- 2049/6623 {and exhausting through an opening in the blown article}

- 2049/663 {against ambient pressure}
- 2049/6638 {against a pressure higher than ambient pressure}
- 2049/6646 {while keeping the final blowing pressure in the article}
- 2049/6653 {the refrigerant being other than cooled air}
- 2049/6661 {the refrigerant being water}
- 2049/6669 {the refrigerant being gas with water droplets}
- 2049/6676 {the refrigerant being oriented towards special areas of the blown article}
- 2049/6684 {Neck area}
- 2049/6692 {Bottom area}
- 49/68 . . . Ovens specially adapted for heating preforms or parisons
- 49/70 . . Removing or ejecting blown articles from the mould
- 2049/701 . . . {Ejecting means}
- 2049/702 {Air pressure}
- 2049/704 {Pins}
- 2049/705 {Driving means therefore}
- 2049/707 {Hydraulic}
- 2049/708 {Pneumatic}
- 49/72 . . Deflashing outside the mould
- 2049/725 . . . {Means for removing the deflashed parts from the deflashing area, e.g. burrs being removed from the deflashing area by a conveyor}
- 49/74 . . . Deflashing the neck portion
- 49/76 . . Neck calibration
- 49/78 . . Measuring, controlling or regulating
- 49/783 . . . {the blowing pressure}
- 49/786 . . . {the temperature}
- 49/80 . . . Testing, e.g. for leaks
- 51/00 Shaping by thermoforming {, i.e. shaping sheets or sheet like preforms after heating}, e.g. shaping sheets in matched moulds or by deep-drawing; Apparatus therefor {(blow moulding of tubular preforms [B29C 49/00](#), deforming of tubular or hollow preforms [B29C 67/0014](#))}**
- 51/002 . . {characterised by the choice of material}
- NOTE**
- When classifying in this group, it is desirable to add the indexing codes of subclass [B29K](#) to identify the moulding materials and their properties. Documents concerning the choice of moulding materials having a particular influence on the moulding technique should be classified in this group if of interest
- 51/004 . . {Textile or other fibrous material made from plastics fibres (combined with plastic layers [B29C 51/145](#); compression moulding of reinforced plastic articles in matched moulds [B29C 70/46](#); using pressure difference [B29C 70/44](#))}
- 51/006 . . {for making articles having hollow walls}
- 51/008 . . {without using a mould, e.g. ballooning (as prestretching step [B29C 51/06](#))}
- 51/02 . . Combined thermoforming and manufacture of the preform
- 51/04 . . Combined thermoforming and prestretching, e.g. biaxial stretching
- 51/06 . . using pressure difference {for prestretching}
- 51/08 . . Deep drawing or matched-mould forming, i.e. using mechanical means only
- 51/082 . . {by shaping between complementary mould parts}
- 51/085 . . . {with at least one of the shaping surfaces being made of resilient material, e.g. rubber}
- 51/087 . . . {with at least one of the mould parts comprising independently movable sections ([B29C 51/32](#) and [B29C 51/34](#) take precedence)}
- 51/10 . . Forming by pressure difference, e.g. vacuum
- 51/105 . . {Twin sheet thermoforming, i.e. deforming two parallel opposing sheets or foils at the same time by using one common mould cavity and without welding them together during thermoforming ([B29C 51/267](#), [B29C 49/0047](#) take precedence)}
- 51/12 . . of articles having inserts or reinforcements
- 51/14 . . using multilayered preforms or sheets
- 51/145 . . {having at least one layer of textile or fibrous material combined with at least one plastics layer}
- 51/16 . . Lining or labelling
- 51/162 . . {of deep containers or boxes}
- 51/165 . . {combined with the feeding or the shaping of the lining or the labels (by injection moulding [B29C 45/14008](#), [B29C 45/1418](#))}
- 51/167 . . . {of a continuous strip}
- 51/18 . . Thermoforming apparatus
- 51/20 . . having movable moulds or mould parts
- 51/22 . . . rotatable about an axis
- 51/225 {mounted on a vacuum drum (for surface shaping [B29C 59/06](#))}
- 51/24 . . . mounted on movable endless supports
- 51/26 . . Component parts, details or accessories; Auxiliary operations
- 51/261 . . {Handling means, e.g. transfer means, feeding means ([B29C 51/44](#) takes precedence)}
- 51/262 . . . {Clamping means for the sheets, e.g. clamping frames}
- 51/263 . . {characterised by using a particular environment, e.g. sterile}
- 51/264 . . {Auxiliary operations prior to the thermoforming operation, e.g. cutting ([B29C 51/42](#), [B29C 51/46](#) take precedence)}
- 51/265 . . {Auxiliary operations during the thermoforming operation ([B29C 51/42](#), [B29C 51/46](#) take precedence)}
- 51/266 . . {Auxiliary operations after the thermoforming operation ([B29C 51/42](#), [B29C 51/44](#), [B29C 51/46](#) take precedence)}
- 51/267 . . . {Two sheets being thermoformed in separate mould parts and joined together while still in the mould ([B29C 49/0047](#) takes precedence)}
- 51/268 . . . {Cutting, rearranging and joining the cut parts}
- 51/28 . . for applying pressure through the wall of an inflated bag or diaphragm
- 51/30 . . Moulds
- 51/303 . . . {with sealing means or the like}
- 51/306 . . . {with means for forming a rim (combined with cutting [B29C 51/325](#); rim rolling *per se* [B29C 53/34](#))}
- 51/32 . . . having cutting means
- 51/325 {combined with means for forming a rim}
- 51/34 . . . for undercut articles

- 51/343 {having recessed undersurfaces}
- 51/346 {specially adapted to facilitate the destacking of nestable containers}
- 51/36 . . . specially adapted for vacuum forming {, Manufacture thereof}
- 51/365 {Porous moulds}
- 51/38 . . . Opening, closing or clamping means
- 51/40 . . . Venting means
- 51/42 . . Heating or cooling
- 51/421 . . . {of preforms, specially adapted for thermoforming (preheating sheets in general [B29B 13/023](#); [B29C 51/427](#) takes precedence)}
- 51/422 {to produce a temperature differential ([B29C 51/426](#) takes precedence)}
- 51/423 {through the thickness of the preform}
- 51/424 {using a heated fluid}
- 51/425 {using movable heating devices}
- 51/426 . . . {Producing specific thermal regimes during thermoforming to obtain particular properties}
- 51/427 . . . {Cooling of the material with a fluid blast}
- 51/428 . . . {of moulds or mould parts}
- 51/44 . . Removing or ejecting moulded articles
- 51/445 . . . {from a support after moulding, e.g. by cutting}
- 51/46 . . Measuring, controlling or regulating
- 53/00 Shaping by bending, folding, twisting, straightening or flattening; Apparatus therefor** ([B29C 61/10](#) takes precedence)
- 53/005 . {characterised by the choice of material ([B29C 53/36](#) and [B29C 53/56](#) take precedence)}
- NOTE**
When classifying in this group, it is desirable to add the indexing codes of subclass [B29K](#) to identify the moulding materials and their properties. Documents concerning the choice of moulding materials having a particular influence on the moulding technique should be classified in this group if of interest
- 53/02 . Bending or folding ([B29C 53/22](#), [B29C 53/34](#), [B29C 53/36](#), [B29C 53/56](#) take precedence)
- 53/025 . . {using a folding bag}
- 53/04 . . of plates or sheets {([B29C 63/04](#) takes precedence; bending or folding paper [B31F 1/0003](#); folding films [B65H 45/00](#))}
- 53/043 . . . {using rolls or endless belts}
- 53/046 . . . {using centrifugal force}
- 53/06 . . . Forming folding lines by pressing or scoring
- 53/063 {combined with folding}
- 53/066 {and joining the sides of the folding line, e.g. "Abkantschweissen"}
- 53/08 . . of tubes {or other profiled members}
- 53/083 . . . {bending longitudinally, i.e. modifying the curvature of the tube axis}
- 53/086 . . . {bending radially, i.e. deforming the cross-section of the tube}
- 53/10 . . of blown tubular films, e.g. gusseting {(flattening blown films during extrusion moulding [B29C 48/03](#))}
- 53/12 . . helically, e.g. for making springs {(for textile fibres [D02G 1/00](#))}
- 53/14 . Twisting {(for textile fibres [D01H](#))}
- 53/16 . Straightening or flattening
- 53/18 . . of plates or sheets
- 53/20 . . of tubes
- 53/22 . Corrugating
- 53/24 . . of plates or sheets
- 53/26 . . . parallel with direction of feed
- 53/265 {using rolls or endless bands}
- 53/28 . . . transverse to direction of feed
- 53/285 {using rolls or endless bands}
- 53/30 . . of tubes ([by blow-moulding B29C 49/00](#))
- 53/305 . . . {using a cording process}
- 53/32 . Coiling ([B29C 53/56](#) takes precedence)
- 53/34 . Rim rolling (of tube ends [B29C 57/12](#))
- 53/36 . Bending and joining, e.g. for making hollow articles ([B29C 53/56](#) takes precedence)
- 2053/362 . . {for making hems}
- 2053/365 . . . {provided with a string}
- 2053/367 . . . {provided with a strip}
- 53/38 . . by bending sheets or strips at right angles to the longitudinal axis of the article being formed and joining the edges
- 53/382 . . . {using laminated sheets}
- 53/385 . . . {using several sheets to form the circumference}
- 53/387 . . . {the joining being done from the inside}
- 53/40 . . . for articles of definite length, i.e. discrete articles
- 53/42 using internal forming surfaces, e.g. mandrels
- 53/44 rotatable about the axis of the article
- 53/46 using external forming surfaces, e.g. sleeves
- 53/48 . . . for articles of indefinite length, i.e. bending a strip progressively
- 53/50 using internal forming surfaces, e.g. mandrels
- 53/52 using external forming surfaces, e.g. sleeves
- 53/54 Guiding, aligning or shaping edges
- 53/56 . Winding and joining, e.g. winding spirally {(winding in general [B65H](#))}
- 53/562 . . {spirally}
- 53/564 . . {for making non-tubular articles (for winding of reinforced articles having a non-circular cross-section followed by compression [B29C 70/347](#))}
- 53/566 . . {for making tubular articles followed by compression}
- 53/568 . . {without using a forming surface}
- 53/58 . . helically
- 53/581 . . . {using sheets or strips consisting principally of plastics material (using profiled sheets or strips [B29C 53/78](#))}
- 53/582 {comprising reinforcements, e.g. wires, threads}
- 53/583 . . . {for making tubular articles with particular features}
- 53/584 {having a non-circular cross-section}
- 53/585 {the cross-section varying along their axis, e.g. tapered, with ribs, or threads, with socket-ends}
- 53/586 {having corrugations}
- 53/587 {having a non-uniform wall-structure, e.g. with inserts, perforations, locally concentrated reinforcements}
- 53/588 {having a non-linear axis, e.g. elbows, toroids}

- 53/60 . . . using internal forming surfaces, e.g. mandrels
- 53/602 {for tubular articles having closed or nearly closed ends, e.g. vessels, tanks, containers}
- 53/605 {by polar winding}
- 53/607 {having driving means for advancing the wound articles, e.g. belts, rolls ([B29C 53/74](#) takes precedence)}
- 53/62 rotatable about the winding axis
- 53/64 and moving axially
- 53/66 with axially movable winding feed member {, e.g. lathe type winding}
- 53/665 {Coordinating the movements of the winding feed member and the mandrel}
- 53/68 with rotatable winding feed member
- 53/70 and moving axially
- 53/72 . . . using external forming surfaces
- 53/74 . . . using a forming surface in the shape of an endless belt which is recycled after the forming operation
- 53/76 . . . about more than one axis {, e.g. T-pieces, balls}
- 53/78 . . . using profiled sheets or strips
- 53/785 {with reinforcements}
- 53/80 . Component parts, details or accessories; Auxiliary operations
- 53/8008 . . {specially adapted for winding and joining}
- 53/8016 . . . {Storing, feeding or applying winding materials, e.g. reels, thread guides, tensioners}
- 2053/8025 {tensioning}
- 2053/8033 {fixing the trailing edge of winding materials}
- 53/8041 . . . {Measuring, controlling or regulating ([B29C 53/665](#) takes precedence)}
- 53/805 . . . {Applying axial reinforcements}
- 53/8058 {continuously}
- 53/8066 . . . {Impregnating (impregnating as pretreatment [B29B 15/10](#))}
- 53/8075 {on the forming surfaces}
- 53/8083 . . . {Improving bonding of wound materials or layers}
- 53/8091 . . . {Cutting the ends, surface finishing}
- 53/82 . . Cores or mandrels
- 53/821 . . . {Mandrels especially adapted for winding and joining}
- 53/822 {Single use mandrels, e.g. destructible, becoming part of the wound articles ([B29C 53/825](#) takes precedence)}
- 53/824 {collapsible, e.g. elastic or inflatable; with removable parts, e.g. for regular shaped, straight tubular articles ([B29C 53/825](#) takes precedence)}
- 53/825 {for continuous winding}
- 53/827 {formed by several elements rotating about their own axes}
- 53/828 {Arrangements comprising a plurality of cores or mandrels, e.g. to increase production speed ([B29C 53/827](#) takes precedence)}
- 53/84 . . Heating or cooling
- 53/845 . . . {especially adapted for winding and joining}
- 55/00 Shaping by stretching, e.g. drawing through a die; Apparatus therefor ([B29C 61/08](#) takes precedence)**
- 55/005 . . {characterised by the choice of materials}
- NOTE**
- When classifying in this group, it is desirable to add the indexing codes of subclass [B29K](#) to identify the moulding materials and their properties. Documents concerning the choice of moulding materials having a particular influence on the moulding technique should be classified in this group if of interest
- 55/02 . . of plates or sheets
- 55/023 . . {using multilayered plates or sheets}
- 55/026 . . . {of preformed plates or sheets coated with a solution, a dispersion or a melt of thermoplastic material}
- 55/04 . . uniaxial, e.g. oblique
- 55/045 . . . {in a direction which is not parallel or transverse to the direction of feed, e.g. oblique}
- 55/06 . . . parallel with the direction of feed
- 55/065 {in several stretching steps}
- 55/08 . . . transverse to the direction of feed
- 55/085 {in several stretching steps}
- 55/10 . . multiaxial
- 55/12 . . . biaxial
- 55/14 successively
- 55/143 {firstly parallel to the direction of feed and then transversely thereto}
- 55/146 {firstly transversely to the direction of feed and then parallel thereto}
- 55/16 simultaneously
- 55/165 {Apparatus therefor}
- 55/18 . . by squeezing between surfaces, e.g. rollers
- 55/20 . . Edge clamps
- 55/22 . of tubes ([B29C 61/08](#) takes precedence)}
- 55/24 . . radial
- 55/26 . . biaxial
- 55/28 . of blown tubular films, e.g. by inflation {(extrusion moulding of tubular films [B29C 48/03](#))}
- 55/285 . . {by using internal mechanical means}
- 55/30 . Drawing through a die {(pultrusion [B29C 70/52](#))}
- 57/00 Shaping of tube ends, e.g. flanging, bellling or closing; Apparatus therefor {, e.g. collapsible mandrels}**
- 57/005 . {the end of an internal lining (fixing the end of the lining [B29C 63/346](#))}
- 57/02 . Belling or enlarging, e.g. combined with forming a groove
- 57/025 . . {combined with the introduction of a sealing ring, e.g. using the sealing element as forming element}
- 57/04 . . using mechanical means {([B29C 57/025](#) takes precedence)}
- 57/045 . . . {rotating}
- 57/06 . . . elastically deformable
- 57/08 . . using pressure difference
- 57/10 . Closing
- 57/12 . Rim rolling
- 57/125 . . {using tools with helical grooves}

- 59/00** **Surface shaping {of articles}, e.g. embossing; Apparatus therefor** {(in-mould printing [B29C 37/0025](#); by using liquids [B29C 71/0009](#); by using gases without chemical reaction [B29C 71/0009](#); for decorating in general [B44](#); abrasive blasting [B24C](#); chemical aspects [C08J 7/00](#))}
- 59/002 . {Component parts, details or accessories; Auxiliary operations}
- 59/005 . {characterised by the choice of material}
- NOTE**
- Documents in which moulding materials are mentioned are indexed using indexing codes of subclass [B29K](#). However, when, for example, documents concerning the choice of moulding material having a particular influence on the moulding technique cannot be satisfactorily indexed, the documents may be classified in this group if of interest
- 59/007 . {Forming single grooves or ribs, e.g. tear lines, weak spots (by moulding [B29C 37/0057](#); folding lines [B29C 53/06](#); in metal articles [B21D 17/00](#); by cutting [B26D 3/08](#))}
- 59/02 . by mechanical means, e.g. pressing {([B29C 59/007](#) takes precedence; embossing expanded porous articles [B29C 44/5627](#))}
- 59/021 . . {of profiled articles, e.g. hollow or tubular articles, beams}
- 59/022 . . {characterised by the disposition or the configuration, e.g. dimensions, of the embossments or the shaping tools therefor}
- 2059/023 . . . {Microembossing}
- 59/025 . . . {Fibrous surfaces with piles or similar fibres substantially perpendicular to the surface}
- 59/026 . . {of layered or coated substantially flat surfaces}
- 2059/027 . . {Grinding; Polishing}
- 2059/028 . . {Incorporating particles by impact in the surface, e.g. using fluid jets or explosive forces to implant particles}
- 59/04 . . using rollers or endless belts
- 59/043 . . . {for profiled articles}
- 59/046 . . . {for layered or coated substantially flat surfaces}
- 59/06 . . using vacuum drums {(for thermoforming [B29C 51/225](#))}
- 59/08 . by flame treatment {; using hot gases}
- 59/085 . . {of profiled articles, e.g. hollow or tubular articles}
- 59/10 . by electric discharge treatment
- 59/103 . . {of profiled articles, e.g. hollow or tubular articles}
- 59/106 . . {the electrodes being placed on the same side of the material to be treated}
- 59/12 . . in an environment other than air
- 59/14 . by plasma treatment {(plasma tubes per se [H01J](#))}
- 59/142 . . {of profiled articles, e.g. hollow or tubular articles}
- 2059/145 . . {Atmospheric plasma}
- 2059/147 . . {Low pressure plasma; Glow discharge plasma}
- 59/16 . by wave energy or particle radiation {, e.g. infra-red heating ([B29C 59/007](#) takes precedence)}
- 59/165 . . {of profiled articles, e.g. hollow or tubular articles}
- 59/18 . by liberation of internal stresses, e.g. plastic memory
- 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](#) {; for packaging [B65B 53/00](#); connecting arrangements or other fittings for plastics pipes using shrink-down material [F16L 47/22](#), electrical connections insulated using heat shrinking insulating sleeves [H01R 4/72](#); cable junctions protected by sleeves [H02G 15/18](#))}
- 61/003 . {characterised by the choice of material}
- NOTE**
- When classifying in this group, it is desirable to add the indexing codes of subclass [B29K](#) to identify the moulding materials and their properties. Documents concerning the choice of moulding materials having a particular influence on the moulding technique should be classified in this group if of interest
- 61/006 . {the force created by the liberation of the internal stresses being used for compression moulding or for pressing preformed material}
- 61/02 . Thermal shrinking
- 61/025 . . {for the production of hollow or tubular articles}
- 61/04 . Thermal expansion
- 61/06 . Making preforms having internal stresses, e.g. plastic memory
- 61/0608 . . {characterised by the configuration or structure of the preforms}
- 61/0616 . . . {layered or partially layered preforms, e.g. preforms with layers of adhesive or sealing compositions ([B29C 61/0625](#) and [B29C 61/065](#) take precedence)}
- 61/0625 . . . {Preforms comprising incorporated or associated heating means}
- 61/0633 . . . {Preforms comprising reinforcing elements ([B29C 61/0625](#) takes precedence)}
- 61/0641 . . . {Clips for dividing preforms or forming branch-offs (clips in general [F16B 2/20](#))}
- 61/065 . . . {Preforms held in a stressed condition by means of a removable support; Supports therefor}
- 61/0658 . . . {consisting of fibrous plastics material, e.g. woven}
- 61/0666 . . . {comprising means indicating that the shrinking temperature is reached}
- 2061/0675 {the means being a material exuding outside the preform when the temperature is reached}
- 2061/0683 {the means being a thermochromic painting or coating}
- 2061/0691 {the means being protrusions on the preform surface disappearing when the temperature is reached}
- 61/08 . . by stretching tubes {(in general [B29C 55/22](#), [B29C 55/28](#))}
- 61/10 . . by bending plates or sheets {(in general [B29C 53/36](#))}

- 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)**
- 63/0004 . . {Component parts, details or accessories; Auxiliary operations}
- 2063/0008 . . {Registering, centering the lining material on the substrate}
- 63/0013 . . {Removing old coatings}
- 63/0017 . {characterised by the choice of the material}
- NOTE**
- When classifying in this group, it is desirable to add the indexing codes of subclass [B29K](#) to identify the moulding materials and their properties. Documents concerning the choice of moulding materials having a particular influence on the moulding technique should be classified in this group if of interest
- 63/0021 . . {with coherent impregnated reinforcing layers}
- 63/0026 . {an edge face with strip material, e.g. a panel edge (securing a veneer strip to a panel edge [B27D 5/003](#))}
- 63/003 . . {continuously}
- 63/0034 . . {the strip material being folded}
- 63/0039 . . . {continuously}
- 63/0043 . {Fixing the layers by electrostatic charges, by the use of structured surfaces or by mechanical means}
- 63/0047 . {Preventing air-inclusions}
- 63/0052 . {Testing, e.g. testing for the presence of pinholes}
- 63/0056 . {Provisional sheathings}
- 2063/006 . {of surfaces having irregularities or roughness}
- 63/0065 . {Heat treatment}
- 63/0069 . . {of tubular articles}
- 63/0073 . {of non-flat surfaces, e.g. curved, profiled ([B29C 63/042](#) takes precedence)}
- 63/0078 . . {having local protrusions, e.g. rivet heads}
- 63/0082 . {Finishing the edges of holes or perforations in the lined product}
- 63/0086 . . {and removing the portion of the lining covering the holes}
- 63/0091 . {in particular atmospheres}
- 63/0095 . {using a provisional carrier}
- 63/02 . using sheet or web-like material ([B29C 63/26](#) {and [B29C 63/38](#)} take precedence)
- 2063/021 . . {characterized by the junction of material sections}
- 2063/022 . . . {the junction being located in a groove}
- 63/024 . . {the sheet or web-like material being supported by a moving carriage}
- 63/025 . . {applied by a die matching with the profile of the surface of resilient articles, e.g. cushions, seat pads}
- 2063/027 . . {applied by a squeegee}
- 2063/028 . . {applied by a fluid jet}
- 63/04 . . by folding, winding, bending or the like
- 63/042 . . . {of L- or Z- shaped surfaces, e.g. for counter-tops}
- 63/044 . . . {continuously ([B29C 63/065](#), [B29C 63/105](#) take precedence)}
- 63/046 . . . {using a folding shoulder}
- 63/048 . . . {specially adapted for articles having local protrusions, e.g. tubes having a bead weld}
- 63/06 . . . around tubular articles
- 63/065 {continuously}
- 63/08 . . . by winding helically
- 63/10 around tubular articles
- 63/105 {continuously}
- 63/12 . . . by winding spirally
- 63/14 around tubular articles
- 63/145 {the tubular articles being mounted on transfer means}
- 63/16 . . applied by "rubber" bag or diaphragm
- 63/18 . using tubular layers or sheathings ([B29C 63/26](#) {and [B29C 63/38](#)} take precedence; {placing tubular labels around rigid containers [B65C 3/065](#)})
- 63/182 . . {applied by a "rubber" bag or diaphragm}
- 63/185 . . {by turning inside-out or by derolling}
- 63/187 . . {by removing a shirred or pleated hose from a support}
- 63/20 . . using pressure difference, e.g. vacuum
- 63/22 . using layers or sheathings having a shape adapted to the shape of the article ([B29C 63/26](#) {and [B29C 63/38](#)} take precedence)
- 63/24 . using threads
- 63/26 . Lining or sheathing of internal surfaces ([B29C 63/38](#) takes precedence)
- 63/28 . . applied by "rubber" bag or diaphragm
- 63/30 . . using sheet or web-like material
- 63/32 . . . by winding helically
- 63/34 . . using tubular layers or sheathings
- 63/341 . . . {pressed against the wall by mechanical means}
- 63/343 . . . {the tubular sheathing having a deformed non-circular cross-section prior to introduction}
- 63/345 . . . {whilst rotating the article}
- 63/346 . . . {Fixing the end of the lining (shaping tube ends [B29C 57/005](#))}
- 2063/348 . . . {combined with reducing the diameter of the substrate to be lined}
- 63/36 . . . being turned inside out {(for plastic tubes in general [B29C 67/0018](#))}
- 63/38 . by liberation of internal stresses
- 63/40 . . using sheet or web-like material
- 63/42 . . using tubular layers or sheathings
- 63/423 . . . {specially applied to the mass-production of externally coated articles, e.g. bottles}
- 63/426 {in combination with the *in situ* shaping of the external tubular layer}
- 63/44 . . the shape of the layers or sheathings being adapted to the shape of the articles
- 63/46 . . of internal surfaces
- 63/48 . Preparation of the surfaces
- 63/481 . . {mechanically}
- 2063/483 . . {by applying a liquid}
- 2063/485 . . . {the liquid being an adhesive}
- 63/486 . . {of metal surfaces ([B29C 63/481](#) takes precedence)}
- 2063/488 . . {providing the surface with fixing elements on which the plastic liner is bonded}
- 64/00 Additive manufacturing, i.e. manufacturing of three-dimensional [3D] objects by additive deposition, additive agglomeration or additive layering, e.g. by 3D printing, stereolithography or selective laser sintering**
- 64/10 . Processes of additive manufacturing

- 64/106 . . . using only liquids or viscous materials, e.g. depositing a continuous bead of viscous material
- 64/112 . . . using individual droplets, e.g. from jetting heads
- 64/118 . . . using filamentary material being melted, e.g. fused deposition modelling [FDM]
- 64/124 . . . using layers of liquid which are selectively solidified
- 64/129 characterised by the energy source therefor, e.g. by global irradiation combined with a mask
- 64/135 the energy source being concentrated, e.g. scanning lasers or focused light sources
- 64/141 . . . using only solid materials
- 64/147 . . . using sheet material, e.g. laminated object manufacturing [LOM] or laminating sheet material precut to local cross sections of the 3D object
- 64/153 . . . using layers of powder being selectively joined, e.g. by selective laser sintering or melting
- 64/159 . . . using only gaseous substances, e.g. vapour deposition
- 64/165 . . . using a combination of solid and fluid materials, e.g. a powder selectively bound by a liquid binder, catalyst, inhibitor or energy absorber
- 64/171 . . . specially adapted for manufacturing multiple 3D objects
- 64/176 Sequentially
- 64/182 in parallel batches
- 64/188 . . . involving additional operations performed on the added layers, e.g. smoothing, grinding or thickness control ([surface shaping B29C 59/00](#); [after-treatment of articles without altering their shape B29C 71/00](#))
- 64/194 during lay-up
- 64/20 . . . Apparatus for additive manufacturing; Details thereof or accessories therefor
- 64/205 . . . Means for applying layers
- 64/209 Heads; Nozzles
- 64/214 Doctor blades
- 64/218 Rollers
- 64/223 Foils or films, e.g. for transferring layers of building material from one working station to another
- 64/227 . . . Driving means
- 64/232 for motion along the axis orthogonal to the plane of a layer
- 64/236 for motion in a direction within the plane of a layer
- 64/241 for rotary motion
- 64/245 . . . Platforms or substrates ([support structures intended to be sacrificed after manufacture B29C 64/40](#))
- 64/25 . . . Housings, e.g. machine housings
- 64/255 . . . Enclosures for the building material, e.g. powder containers
- 64/259 Interchangeable
- 64/264 . . . Arrangements for irradiation
- 64/268 using laser beams; using electron beams [EB]
- 64/273 pulsed; frequency modulated
- 64/277 using multiple radiation means, e.g. micromirrors or multiple light-emitting diodes [LED]
- 64/282 of the same type, e.g. using different energy levels
- 64/286 Optical filters, e.g. masks
- 64/291 for operating globally, e.g. together with selectively applied activators or inhibitors
- 64/295 . . . Heating elements
- 64/30 . . . Auxiliary operations or equipment
- 64/307 . . . Handling of material to be used in additive manufacturing
- 64/314 Preparation
- 64/321 Feeding
- 64/329 using hoppers
- 64/336 of two or more materials
- 64/343 Metering
- 64/35 . . . Cleaning
- 64/357 . . . Recycling
- 64/364 . . . Conditioning of environment
- 64/371 using an environment other than air, e.g. inert gas
- 64/379 . . . Handling of additively manufactured objects, e.g. using robots
- 64/386 . . . Data acquisition or data processing for additive manufacturing
- 64/393 for controlling or regulating additive manufacturing processes
- 64/40 . . . Structures for supporting 3D objects during manufacture and intended to be sacrificed after completion thereof
- 65/00** **Joining {or sealing} of preformed parts {, e.g. welding of plastics materials}; Apparatus therefor** {(general aspects of processes or apparatus for joining preformed parts [B29C 66/00](#); using porous material formed by internal pressure generated therein for joining preformed parts [B29C 44/1228](#), [B29C 44/326](#))}
- 65/002 . . . {Joining methods not otherwise provided for}
- 65/004 . . . {Cold joining}
- 65/006 . . . {Diffusion joining (measures for intermixing the material of the joint interlayer [B29C 66/341](#))}
- 65/008 . . . {making use of electrostatic charges (holding means using electrostatic forces to hold at least one of the parts to be joined [B29C 65/7852](#))}
- 65/02 . . . by heating, with or without pressure
- 65/022 . . . {Particular heating or welding methods not otherwise provided for}
- 65/024 {making use of combustible material, i.e. the combustible material is in contact with the material to be joined}
- 65/026 {making use of hot liquids, i.e. the liquid is in direct contact with the material to be joined}
- 65/028 {making use of inherent heat, i.e. the heat for the joining comes from the moulding process of one of the parts to be joined}
- 65/04 . . . Dielectric heating, e.g. high-frequency welding {, i.e. radio frequency welding of plastic materials having dielectric properties, e.g. PVC}
- 65/06 . . . using friction, e.g. spin welding {(non-plastics elements to plastic elements [B29C 65/645](#))}
- 65/0609 {characterised by the movement of the parts to be joined ([B29C 65/0672](#) takes precedence)}
- 65/0618 {Linear}
- 65/0627 {Angular, i.e. torsional ([B29C 65/082](#) takes precedence)}

- 65/0636 {Orbital}
- 65/0645 {Circular}
- 65/0654 {Elliptical}
- 65/0663 {Other specific orbital movements not provided for in [B29C 65/0645](#) - [B29C 65/0654](#), e.g. Lissajous}
- 65/0672 . . . {Spin welding}
- 65/0681 . . . {created by a tool}
- 65/069 . . . {the welding tool cooperating with specially formed features of at least one of the parts to be joined, e.g. cooperating with holes or ribs of at least one of the parts to be joined}
- 65/08 . . . using ultrasonic vibrations [{\(non-plastics element to plastics elements \[B29C 65/645\]\(#\)\)}](#)
- 65/081 . . . {having a component of vibration not perpendicular to the welding surface}
- 65/082 {Angular, i.e. torsional ultrasonic welding}
- 65/083 . . . {using a rotary sonotrode or a rotary anvil}
- 65/085 {using a rotary sonotrode}
- 65/086 {using a rotary anvil}
- 65/087 {using both a rotary sonotrode and a rotary anvil}
- 65/088 . . . {using several cooperating sonotrodes, i.e. interacting with each other, e.g. for realising the same joint}
- 65/10 . . . using hot gases [{\(e.g. combustion gases\) or flames coming in contact with at least one of the parts to be joined}](#)
- 65/103 . . . {direct heating both surfaces to be joined}
- 65/106 . . . {using flames coming in contact with at least one of the parts to be joined}
- 65/12 . . . and welding bar
- 65/125 {characterised by the composition of the welding bar}
- 65/14 . . . using wave energy [{, i.e. electromagnetic radiation,} or particle radiation \[{\\(using mechanical waves \\[B29C 65/06\\]\\(#\\); using ultrasonic waves \\[B29C 65/08\\]\\(#\\); pressing means transparent to electromagnetic radiation \\[B29C 66/81267\\]\\(#\\)\\)}\]\(#\)](#)
- 65/1403 . . . {characterised by the type of electromagnetic or particle radiation [\(B29C 65/1603 takes precedence\)}](#)
- 65/1406 {Ultraviolet [UV] radiation}
- 65/1409 {Visible light radiation}
- 65/1412 {Infrared [IR] radiation}
- 65/1416 {Near-infrared radiation [NIR]}
- 65/1419 {Mid-infrared radiation [MIR]}
- 65/1422 {Far-infrared radiation [FIR]}
- 65/1425 {Microwave radiation}
- 65/1429 . . . {characterised by the way of heating the interface [\(B29C 65/1629 takes precedence\)}](#)
- 65/1432 {direct heating of the surfaces to be joined}
- 65/1435 {at least passing through one of the parts to be joined, i.e. transmission welding}
- 65/1438 {focusing the wave energy or particle radiation on the interface}
- 65/1441 {making use of a reflector on the opposite side, e.g. a polished mandrel or a mirror [\(pressing means reflective to electromagnetic radiation \[B29C 66/81268\]\(#\)\)}](#)
- 65/1445 {heating both sides of the joint}
- 65/1448 {radiating the edges of the parts to be joined, e.g. for curing a layer of adhesive placed between two flat parts to be joined, e.g. for making CDs or DVDs}
- 65/1451 {radiating the edges of holes or perforations}
- 65/1454 {scanning at least one of the parts to be joined}
- 65/1458 {once, i.e. contour welding}
- 65/1461 {repeatedly, i.e. quasi-simultaneous welding}
- 65/1464 {making use of several radiators}
- 65/1467 {at the same time, i.e. simultaneous welding}
- 65/1477 . . . {making use of an absorber or impact modifier [\(B29C 65/1677 takes precedence\)}](#)
- 65/148 {placed at the interface}
- 65/1483 {coated on the article}
- 65/1487 . . . {making use of light guides [\(B29C 65/1687 takes precedence\)}](#)
- 65/149 {being a part of the joined article}
- 65/1493 {in the form of a cavity}
- 65/1496 . . . {making use of masks [\(B29C 65/1696 takes precedence\)}](#)
- 65/16 Laser beams
- 65/1603 {characterised by the type of electromagnetic radiation}
- 65/1606 {Ultraviolet [UV] radiation, e.g. by ultraviolet excimer lasers}
- 65/1609 {Visible light radiation, e.g. by visible light lasers}
- 65/1612 {Infrared [IR] radiation, e.g. by infrared lasers}
- 65/1616 {Near infrared radiation [NIR], e.g. by YAG lasers}
- 65/1619 {Mid infrared radiation [MIR], e.g. by CO or CO₂ lasers}
- 65/1622 {Far infrared radiation [FIR], e.g. by FIR lasers}
- 65/1629 {characterised by the way of heating the interface}
- 65/1632 {direct heating the surfaces to be joined}
- 65/1635 {at least passing through one of the parts to be joined, i.e. laser transmission welding}
- 65/1638 {focusing the laser beam on the interface}
- 65/1641 {making use of a reflector on the opposite side, e.g. a polished mandrel or a mirror [\(pressing means reflective to electromagnetic radiation \[B29C 66/81268\]\(#\)\)}](#)
- 65/1645 {heating both sides of the joint, e.g. by using two lasers or a split beam}
- 65/1648 {radiating the edges of the parts to be joined}
- 65/1651 {radiating the edges of holes or perforations}
- 65/1654 {scanning at least one of the parts to be joined}
- 65/1658 {scanning once, e.g. contour laser welding}
- 65/1661 {scanning repeatedly, e.g. quasi-simultaneous laser welding}

- 65/1664 {making use of several radiators}
- 65/1667 {at the same time, i.e. simultaneous laser welding}
- 65/167 {using laser diodes}
- 65/1674 {making use of laser diodes ([B29C 65/167](#) takes precedence)}
- 65/1677 {making use of an absorber or impact modifier}
- 65/168 {placed at the interface}
- 65/1683 {coated on the article}
- 65/1687 {making use of light guides}
- 65/169 {being a part of the joined article}
- 65/1693 {in the form of a cavity}
- 65/1696 {making use of masks}
- 65/18 . . . using heated tools
- 65/20 . . . with direct contact, e.g. using "mirror"
- 65/2007 {characterised by the type of welding mirror}
- 65/2015 {being a single welding mirror comprising several separate heating surfaces in different planes, e.g. said heating surfaces having different temperatures}
- 65/2023 {said welding mirror comprising several sectors}
- 65/203 {being several single mirrors, e.g. not mounted on the same tool}
- 65/2038 {being a wire}
- 65/2046 {using a welding mirror which also cuts the parts to be joined, e.g. for sterile welding}
- 65/2053 {characterised by special ways of bringing the welding mirrors into position}
- 65/2061 {by sliding}
- 65/2069 {with an angle with respect to the plane comprising the parts to be joined}
- 65/2076 {perpendicularly to the plane comprising the parts to be joined}
- 65/2084 {by pivoting}
- 65/2092 {and involving the use of a facer}
- 65/22 . . . Heated wire {resistive ribbon, resistive band or resistive strip ([electrical insulating support therefor B29C 66/81871](#))}
- 65/221 {characterised by the type of heated wire, resistive ribbon, band or strip ([specific electrical or thermal properties also to be classified in B29C 66/81262 or B29C 66/81261](#))}
- 65/222 {comprising at least a single heated wire}
- 65/223 {comprising several heated wires}
- 65/224 {being a resistive ribbon, a resistive band or a resistive strip}
- 65/225 {being a coating or being printed, e.g. being applied as a paint or forming a printed circuit}
- 65/226 {characterised by the cross-section of said heated wire, resistive ribbon, resistive band or resistive strip, e.g. being triangular}
- 65/227 {said cross-section being hollow}
- 65/228 {characterised by the means for electrically connecting the ends of said heated wire, resistive ribbon, resistive band or resistive strip}
- 65/229 {characterised by the means for tensioning said heated wire, resistive ribbon, resistive band or resistive strip ([means for compensating for the thermal expansion of welding jaws in general B29C 66/8185](#))}
- 65/24 . . . characterised by the means for heating the tool {(by impulse heating [B29C 65/38](#))}
- NOTES**
1. Classification is made in groups [B29C 65/24](#) - [B29C 65/32](#) only if the details or adaptations of the heating means are of interest.
 2. When classifying in this group, heated tools are additionally classified in groups [B29C 65/18](#), [B29C 65/20](#) or [B29C 65/22](#)
- 65/242 {the heat transfer being achieved by contact, i.e. a heated tool being brought into contact with the welding tool and afterwards withdrawn from it}
- 65/245 {the heat transfer being achieved contactless, e.g. by radiation ([B29C 65/32](#) takes precedence)}
- 65/247 {the heat resulting from a chemical reaction}
- 65/26 Hot fluid
- 65/28 Flame or combustible material
- 65/30 Electrical means {([B29C 65/38](#) takes precedence)}
- 65/305 {involving the use of cartridge heaters}
- 65/32 Induction
- 65/34 . . . using heated elements which remain in the joint, e.g. "verlorenes Schweisselement"
- 65/3404 {characterised by the type of heated elements which remain in the joint ([B29C 65/3604](#) takes precedence)}
- 65/3408 {comprising single particles, e.g. fillers or discontinuous fibre-reinforcements}
- 65/3412 {comprising fillers}
- 65/3416 {comprising discontinuous fibre-reinforcements}
- 65/342 {comprising at least a single wire, e.g. in the form of a winding}
- 65/3424 {said at least a single wire having the form of a coil spring}
- 65/3428 {said at least a single wire having a waveform, e.g. a sinusoidal form}
- 65/3432 {comprising several wires, e.g. in the form of several independent windings ([B29C 65/3436](#), [B29C 65/344](#) take precedence)}
- 65/3436 {comprising independent continuous fibre-reinforcements}
- 65/344 {being a woven or non-woven fabric or being a mesh}
- 65/3444 {being a ribbon, band or strip}
- 65/3448 {said ribbon, band or strip being perforated}
- 65/3452 {forming a sleeve, e.g. a wrap-around sleeve}
- 65/3456 {being a layer of a multilayer part to be joined, e.g. for joining plastic-metal laminates}

- 65/346 {being a coating or being printed, e.g. being applied as a paint or forming a printed circuit}
- 65/3464 {characterised by the cross-section of said heated elements which remain in the joint or by the cross-section of their coating, e.g. being triangular}
- 65/3468 . . . {characterised by the means for supplying heat to said heated elements which remain in the joint, e.g. special electrical connectors of windings ([B29C 65/3668](#) takes precedence)}
- 65/3472 . . . {characterised by the composition of the heated elements which remain in the joint ([B29C 65/3672](#) takes precedence)}
- 65/3476 {being metallic}
- 65/348 {with a polymer coating}
- 65/3484 {being non-metallic}
- 65/3488 {being an electrically conductive polymer}
- 65/3492 {being carbon}
- 65/3496 {with a coating, e.g. a metallic or a carbon coating}
- 65/36 . . . heated by induction
- 65/3604 {characterised by the type of elements heated by induction which remain in the joint}
- 65/3608 {comprising single particles, e.g. fillers or discontinuous fibre-reinforcements}
- 65/3612 {comprising fillers}
- 65/3616 {comprising discontinuous fibre-reinforcements}
- 65/362 {comprising at least a single wire, e.g. in the form of a winding}
- 65/3624 {said at least a single wire having the form of a coil spring}
- 65/3628 {said at least a single wire having a waveform, e.g. a sinusoidal form}
- 65/3632 {comprising several wires, e.g. in the form of several independent windings ([B29C 65/364](#) takes precedence)}
- 65/3636 {comprising independent continuous fibre-reinforcements}
- 65/364 {being a woven or non-woven fabric or being a mesh}
- 65/3644 {being a ribbon, band or strip}
- 65/3648 {said strip being perforated}
- 65/3652 {forming a sleeve, e.g. a wrap-around sleeve}
- 65/3656 {being a layer of a multilayer part to be joined, e.g. for joining plastic-metal laminates}
- 65/366 {being a coating or being printed, e.g. being applied as a paint or forming a printed circuit}
- 65/3668 {characterised by the means for supplying heat to said heated elements which remain in the joint, e.g. special induction coils}
- 65/3672 {characterised by the composition of the elements heated by induction which remain in the joint}
- 65/3676 {being metallic}
- 65/368 {with a polymer coating}
- 65/3684 {being non-metallic}
- 65/3696 {with a coating}
- 65/38 . . . Impulse heating
- NOTE**
- When classifying in this group, heated tools are additionally classified in the relevant groups, e.g. [B29C 65/22](#)
- 65/40 . . . Applying molten plastics, e.g. hot melt ([using welding bar {combined with hot gases} B29C 65/12; by moulding B29C 65/70](#))
- 65/405 . . . {characterised by the composition of the applied molten plastics ([B29C 65/425](#) takes precedence)}
- 65/42 . . . between pre-assembled parts ([B29C 65/605](#) takes precedence)}
- 65/425 {characterised by the composition of the molten plastics applied between pre-assembled parts}
- 65/44 . . . Joining a heated non plastics element to a plastics element
- NOTE**
- When classifying in this group, compositions of the non-plastics element are additionally classified in the relevant groups, i.e. in [B29C 66/74](#) and subgroups
- 65/46 . . . heated by induction
- NOTE**
- When classifying in this group, compositions of the non-plastics element are additionally classified in the relevant groups, i.e. in [B29C 66/74](#) and subgroups
- 65/48 . . . using adhesives {, i.e. using supplementary joining material; solvent bonding}
- NOTE**
- When classifying in this group, heat-activated adhesives are further classified in group [B29C 65/02](#). When classifying in this group, applying molten plastics is further classified in group [B29C 65/40](#).
- 65/4805 . . {characterised by the type of adhesives}
- 65/481 . . . {Non-reactive adhesives, e.g. physically hardening adhesives}
- 65/4815 {Hot melt adhesives, e.g. thermoplastic adhesives}
- 65/482 {Drying adhesives, e.g. solvent based adhesives}
- 65/4825 {Pressure sensitive adhesives}
- 65/483 . . . {Reactive adhesives, e.g. chemically curing adhesives}
- 65/4835 {Heat curing adhesives}
- 65/484 {Moisture curing adhesives}
- 65/4845 {Radiation curing adhesives, e.g. UV light curing adhesives}
- 65/485 {Multi-component adhesives, i.e. chemically curing as a result of the mixing of said multi-components}
- 65/4855 . . {characterised by their physical properties, e.g. being electrically-conductive}
- 65/486 . . {characterised by their physical form being non-liquid, e.g. in the form of granules or powders ([B29C 65/50](#) takes precedence)}

- 65/4865 . . {containing additives ([C09J 11/00](#) and subgroups take precedence)}
- 65/487 . . . {characterised by their shape, e.g. being fibres or being spherical}
- 65/4875 {being spherical, e.g. particles or powders}
- 65/488 {being longitudinal, e.g. fibres}
- 65/4885 . . . {characterised by their composition being non-plastics}
- 65/489 {being metals}
- 65/4895 . . {Solvent bonding, i.e. the surfaces of the parts to be joined being treated with solvents, swelling or softening agents, without adhesives}
- 65/50 . . using adhesive tape {, e.g. thermoplastic tape; using threads or the like ([B29C 65/3444](#) takes precedence)}
- 65/5007 . . . {characterised by the structure of said adhesive tape, threads or the like}
- 65/5014 {being fibre-reinforced ([B29C 65/5028](#) takes precedence)}
- 65/5021 {being multi-layered}
- 65/5028 {being textile in woven or non-woven form}
- 65/5035 {being in thread form, i.e. in the form of a single filament, e.g. in the form of a single coated filament}
- 65/5042 . . . {covering both elements to be joined}
- 65/505 {and placed in a recess formed in the parts to be joined, e.g. in order to obtain a continuous surface}
- 65/5057 . . . {positioned between the surfaces to be joined ([B29C 65/5035](#) takes precedence)}
- 65/5064 . . . {of particular form, e.g. being C-shaped, T-shaped}
- 65/5071 {and being composed by one single element}
- 65/5078 {and being composed by several elements}
- 65/5085 {and comprising grooves, e.g. being E-shaped, H-shaped}
- 65/5092 . . . {characterised by the tape handling mechanisms, e.g. using vacuum}
- 65/52 . . {characterised by the way of} applying the adhesive {([B29C 65/50](#) takes precedence; apparatus for applying liquids in general [B05C](#); processes for applying liquids in general [B05D](#))}
- 65/521 . . . {by spin coating}
- 65/522 . . . {by spraying, e.g. by flame spraying}
- 65/523 . . . {by dipping}
- 65/524 . . . {by applying the adhesive from an outlet device in contact with, or almost in contact with, the surface of the part to be joined}
- 65/525 {by extrusion coating}
- 65/526 . . . {by printing or by transfer from the surfaces of elements carrying the adhesive, e.g. using brushes, pads, rollers, stencils or silk screens}
- 65/527 . . . {by gravity only, e.g. by pouring}
- 65/528 . . . {by CVD or by PVD, i.e. by chemical vapour deposition or by physical vapour deposition}
- 65/54 . . . between pre-assembled parts
- 65/542 {by injection}
- 65/544 {by suction}
- 65/546 {by gravity, e.g. by pouring}
- 65/548 {by capillarity}
- 65/56 . . using mechanical means {or mechanical connections, e.g. form-fits}
- 65/561 . . {using screw-threads being integral at least to one of the parts to be joined}
- 65/562 . . {using extra joining elements, i.e. which are not integral with the parts to be joined (using plastic snap elements [B29C 65/58](#); using plastic rivets [B29C 65/601](#))}
- 65/564 . . . {hidden in the joint, e.g. dowels or Z-pins ([B29C 65/603](#) takes precedence)}
- 65/565 . . {involving interference fits, e.g. force-fits or press-fits ([B29C 65/66](#) takes precedence)}
- 65/567 . . {using a tamping or a swaging operation, i.e. at least partially deforming the edge or the rim of a first part to be joined to clamp a second part to be joined}
- 65/568 . . . {using a swaging operation, i.e. totally deforming the edge or the rim of a first part to be joined to clamp a second part to be joined}
- 65/58 . . Snap connection
- 65/60 . . Riveting {or staking}
- 65/601 . . . {using extra riveting elements, i.e. the rivets being non-integral with the parts to be joined}
- 65/602 {using hollow rivets ([B29C 65/607](#) takes precedence)}
- 65/603 {the rivets being pushed in blind holes}
- 65/604 {in both parts}
- 65/605 {the rivets being molded in place, e.g. by injection}
- 65/606 . . . {the rivets being integral with one of the parts to be joined, i.e. staking}
- 65/607 {the integral rivets being hollow}
- 65/608 {the integral rivets being pushed in blind holes}
- 65/609 {the integral rivets being plunge-formed}
- 65/62 . . Stitching
- 65/64 . . Joining a non-plastics element to a plastics element, e.g. by force ([B29C 65/44](#) takes precedence)
- NOTE**
- When classifying in this group, compositions of the non-plastics element are additionally classified in the relevant groups, i.e. in [B29C 66/74](#) and subgroups
- 65/645 . . . {using friction or ultrasonic vibrations}
- NOTE**
- When classifying in this group, compositions of the non-plastics element are additionally classified in the relevant groups, i.e. in [B29C 66/74](#) and subgroups
- 65/66 . . by liberation of internal stresses, e.g. shrinking of one of the parts to be joined
- 65/665 . . {using shrinking during cooling}
- 65/68 . . using auxiliary shrinkable elements
- 65/70 . . by moulding (using a particular moulding technique, see the relevant technique {, e.g. by injection [B29C 45/14467](#))}
- NOTE**
- This group covers only techniques involving the use of a mould
- 65/72 . . by combined operations {or combined techniques}, e.g. welding and stitching

- 65/74 . . . by welding and severing {, or by joining and severing, the severing being performed in the area to be joined, next to the area to be joined, in the joint area or next to the joint area}
- NOTE**
- When classifying in this group, joining techniques are additionally classified in the relevant groups, e.g. in [B29C 65/02](#) and subgroups
- 65/741 . . . {characterised by the relationships between the joining step and the severing step ([cutting as mechanical pre-treatment B29C 66/02241](#); [cutting as thermal pre-treatment B29C 66/0246](#); [cutting as mechanical after-treatment B29C 66/0326](#); [cutting as thermal after-treatment B29C 66/0346](#))}
- 65/7411 . . . {characterised by the temperature relationship between the joining step and the severing step}
- 65/7412 . . . {the joining step and the severing step being performed at different temperatures}
- 65/7415 . . . {characterised by the pressure relationship between the joining step and the severing step}
- 65/7416 . . . {the joining step and the severing step being performed at different pressures}
- 65/7419 . . . {characterised by the time relationship between the joining step and the severing step, said joining step and said severing step being performed by the same tool but at different times}
- 65/743 . . . {using the same tool for both joining and severing, said tool being monobloc or formed by several parts mounted together and forming a monobloc ([B29C 65/2046 takes precedence](#))}
- 65/7433 . . . {the tool being a wire}
- 65/7435 . . . {the tool being a roller}
- 65/7437 . . . {the tool being a perforating tool ([perforating as mechanical pre-treatment B29C 66/02242](#))}
- 65/7439 . . . {for continuously and longitudinally welding and severing webs ([B29C 65/7435 takes precedence](#))}
- 65/7441 . . . {for making welds and cuts of other than simple rectilinear form}
- 65/7443 . . . {by means of ultrasonic vibrations}
- 65/745 . . . {using a single unit having both a severing tool and a welding tool}
- 65/7451 . . . {the severing tool and the welding tool being movable with respect to one-another}
- 65/7453 . . . {the severing tool being a wire}
- 65/7455 . . . {the unit being a roller}
- 65/7457 . . . {comprising a perforating tool}
- 65/7459 . . . {for continuously and longitudinally welding and severing webs ([B29C 65/7455 takes precedence](#))}
- 65/7461 . . . {for making welds and cuts of other than simple rectilinear form}
- 65/747 . . . {using other than mechanical means}
- 65/7471 . . . {using a fluid, e.g. hot gases}
- 65/7473 . . . {using radiation, e.g. laser, for simultaneously welding and severing}
- 65/749 . . . {Removing scrap ([deburring welded articles B29C 37/04](#))}
- 65/76 . . . Making non-permanent or releasable joints
- 65/78 . . . Means for handling the parts to be joined, e.g. for making containers or hollow articles {, e.g. means for handling sheets, plates, web-like materials, tubular articles, hollow articles or elements to be joined therewith; Means for discharging the joined articles from the joining apparatus}
- WARNING**
- Subgroups of [B29C 65/78](#) are not complete, pending a reorganisation; see also this group and its subgroups and [B29C 65/20](#) and its subgroups
- 65/7802 . . . {Positioning the parts to be joined, e.g. aligning, indexing or centring}
- 65/7805 . . . {the parts to be joined comprising positioning features}
- 65/7808 . . . {in the form of holes or slots ([B29C 65/7814 takes precedence](#); holding or clamping means cooperating with specially formed features of at least one of the parts to be joined [B29C 65/7844](#))}
- 65/7811 . . . {for centring purposes}
- 65/7814 . . . {in the form of inter-cooperating positioning features (holding or clamping means cooperating with specially formed features of at least one of the parts to be joined [B29C 65/7844](#)), e.g. tenons and mortises (tenon and mortise joints [B29C 66/126](#); tongue and groove joints [B29C 66/124](#))}
- 65/7817 . . . {in the form of positioning marks}
- 65/782 . . . {by setting the gap between the parts to be joined (controlling or regulating the gap between the joining tools [B29C 66/92611](#))}
- 65/7823 . . . {by using distance pieces, i.e. by using spacers positioned between the parts to be joined and forming a part of the joint}
- 65/7826 . . . {said distance pieces being non-integral with the parts to be joined, e.g. particles}
- 65/7829 . . . {said distance pieces being integral with at least one of the parts to be joined}
- 65/7832 . . . {by setting the overlap between the parts to be joined, e.g. the overlap between sheets, plates or web-like materials}
- 65/7835 . . . {by using stops ([B29C 65/7823](#), [B29C 66/92651 take precedence](#); tongue and groove joints [B29C 66/124](#); tenon and mortise joints [B29C 66/126](#))}
- 65/7838 . . . {from the inside, e.g. of tubular or hollow articles ([B29C 66/3242 takes precedence](#))}
- 65/7841 . . . {Holding or clamping means for handling purposes (clamping means for the purpose of applying pressure on the parts to be joined, in the area to be joined [B29C 66/81](#); work holders in general [B25B](#); devices for holding or positioning work for welding metal [B23K 37/04](#))}

- 65/7844 . . . {cooperating with specially formed features of at least one of the parts to be joined, e.g. cooperating with holes or ribs of at least one of the parts to be joined (parts to be joined comprising holes or slots for the purpose of positioning said parts [B29C 65/7808](#); parts to be joined comprising inter-cooperating positioning features [B29C 65/7814](#); welding using friction, the welding tool cooperating with specially formed features of at least one of the parts to be joined, e.g. cooperating with holes or ribs of at least one of the parts to be joined [B29C 65/069](#))}
- 65/7847 . . . {using vacuum to hold at least one of the parts to be joined (vacuum work holders in general [B25B 11/005](#))}
- 65/785 . . . {using magnetic forces to hold at least one of the parts to be joined (magnetic work holders in general [B25B 11/002](#))}
- 65/7852 . . . {using electrostatic forces to hold at least one of the parts to be joined}
- 65/7855 . . {Provisory fixing}
- 65/7858 . . {characterised by the feeding movement of the parts to be joined}
- 65/7861 . . . {In-line machines, i.e. feeding, joining and discharging are in one production line ([B29C 65/7879](#), [B29C 65/7888](#) take precedence)}
- 65/7864 {using a feeding table which moves to and fro (oscillating around an axis [B29C 65/7876](#))}
- 65/7867 {using carriers, provided with holding means, said carriers moving in a closed path}
- 65/787 {using conveyor belts or conveyor chains ([B29C 66/83421](#), [B29C 66/83521](#), [B29C 66/83531](#) take precedence)}
- 65/7873 {using cooperating conveyor belts or cooperating conveyor chains ([B29C 66/83423](#), [B29C 66/83523](#), [B29C 66/83533](#) take precedence)}
- 65/7876 . . . {oscillating around an axis ([B29C 65/7888](#) takes precedence)}
- 65/7879 . . . {said parts to be joined moving in a closed path, e.g. a rectangular path ([B29C 65/7888](#) takes precedence)}
- 65/7882 {said parts to be joined moving in a circular path}
- 65/7885 {Rotary turret joining machines, i.e. having several joining tools moving around an axis}
- WARNING**
- Group [B29C 65/7885](#) is incomplete pending reclassification of documents from [B29C 65/0672](#).
- Groups [B29C 65/0672](#) and [B29C 65/7885](#) should be considered in order to perform a complete search.
- 65/7888 . . . {Means for handling of moving sheets or webs}
- 65/7891 {of discontinuously moving sheets or webs}
- 65/7894 {of continuously moving sheets or webs}
- 65/7897 . . {Means for discharging the joined articles from the joining apparatus ([B29C 66/005](#) takes precedence; discharging moulded articles from moulds [B29C 37/0003](#))}
- 65/80 . . . Rotatable transfer means {for loading or unloading purposes, i.e. turret transfer means ([B29C 65/7879](#) takes precedence; in-line machines using carriers, provided with holding means, said carriers moving in a closed path [B29C 65/7867](#); in-line machines using conveyor belts or conveyor chains [B29C 65/787](#))}
- 65/82 . . Testing the joint
- 65/8207 . . {by mechanical methods}
- 65/8215 . . . {Tensile tests}
- 65/8223 . . . {Peel tests}
- 65/823 . . . {Bend tests}
- 65/8238 . . . {Impact tests}
- 65/8246 . . . {Pressure tests, e.g. hydrostatic pressure tests}
- 65/8253 . . {by the use of waves or particle radiation, e.g. visual examination, scanning electron microscopy, or X-rays ([B29C 65/8292](#) takes precedence)}
- 65/8261 . . {by the use of thermal means}
- 65/8269 . . {by the use of electric or magnetic means}
- 65/8276 . . . {by the use of electric means}
- 65/8284 . . . {by the use of magnetic means}
- 65/8292 . . {by the use of ultrasonic, sonic or infrasonic waves}
- 66/00** **{General aspects of processes or apparatus for joining preformed parts (means for handling the parts to be joined [B29C 65/78](#); testing the joint [B29C 65/82](#))}**
- 66/001 . {Joining in special atmospheres}
- WARNING**
- Subgroups of [B29C 66/001](#) are not complete, pending a reorganisation; see also this group
- 66/0012 . . {characterised by the type of environment}
- 66/0014 . . . {Gaseous environments}
- 66/00141 {Protective gases}
- 66/00143 {Active gases}
- 66/00145 {Vacuum, e.g. partial vacuum}
- 66/0016 . . . {Liquid environments, i.e. the parts to be joined being submerged in a liquid}
- 66/0018 . . . {being sterile}
- 66/002 . {Removing toxic gases}
- 66/003 . {Protecting areas of the parts to be joined from overheating ([B29C 66/348](#), [B29C 66/8744](#) take precedence)}
- 66/004 . {Preventing sticking together, e.g. of some areas of the parts to be joined}
- 66/0042 . . {of the joining tool and the parts to be joined ([B29C 66/0046](#) takes precedence; joining tool characterized by its composition [B29C 66/8122](#); joining tool characterized by its microstructure [B29C 66/8124](#))}
- 66/0044 . . . {using a separating sheet, e.g. fixed on the joining tool}
- 66/00441 {movable, e.g. mounted on reels}
- 66/0046 . . {by the use of a lubricant, e.g. fluid, powder}
- 66/00461 . . . {being liquid, e.g. oil based}
- 66/00463 . . . {being solid, e.g. a powder}
- 66/005 . {Detaching the article from the joining tool}

- 66/006 . . . {Preventing damaging, e.g. of the parts to be joined ([B29C 66/003](#), [B29C 66/004](#), [B29C 66/348](#) take precedence)}
- WARNING**
- Group [B29C 66/006](#) and subgroups are not complete, pending a reorganisation; see also [B29C 65/00](#) and subgroups
- 66/0062 . . . {of the joining tool, e.g. avoiding wear of the joining tool}
- 66/01 . . . {General aspects dealing with the joint area or with the area to be joined ([B29C 65/76](#), [B29C 65/82](#) take precedence)}
- 66/02 . . . {Preparation of the material, in the area to be joined, prior to joining or welding ([B29C 66/32](#) takes precedence)}
- 66/022 . . . {Mechanical pre-treatments, e.g. reshaping}
- 66/0222 {without removal of material, e.g. cleaning by air blowing or using brushes}
- 66/0224 {with removal of material}
- 66/02241 {Cutting, e.g. by using waterjets, or sawing (using heat [B29C 66/0246](#); cutting-off or cutting-out a part of a strip-like or sheet-like material, transferring that part and fixing it to an article [B29C 69/005](#))}
- 66/02242 {Perforating or boring}
- 66/02245 {Abrading, e.g. grinding, sanding, sandblasting or scraping}
- 66/024 {Thermal pre-treatments}
- 66/0242 {Heating, or preheating, e.g. drying ([B29C 66/3464](#) takes precedence)}
- 66/0244 {Cooling}
- 66/0246 {Cutting or perforating, e.g. burning away by using a laser or using hot air (simultaneously welding and severing using a fluid [B29C 65/7471](#); simultaneously welding and severing using radiation [B29C 65/7473](#); cutting-off or cutting-out a part of a strip-like or sheet-like material, transferring that part and fixing it to an article [B29C 69/005](#))}
- 66/026 {Chemical pre-treatments ([B29C 66/028](#) takes precedence)}
- 66/028 {Non-mechanical surface pre-treatments, i.e. by flame treatment, electric discharge treatment, plasma treatment, wave energy or particle radiation ([B29C 65/14](#) takes precedence; non-mechanical surface treatment of plastics in general [B29C 59/08](#) - [B29C 59/16](#))}
- 66/03 . . . {After-treatments in the joint area ([B29C 66/3262](#) takes precedence)}
- 66/032 {Mechanical after-treatments (deburring welded articles [B29C 37/04](#))}
- 66/0322 {Post-pressing without reshaping, i.e. keeping the joint under pressure after joining}
- 66/0324 {Reforming or reshaping the joint, e.g. folding over (reshaping the burr [B29C 66/326](#))}
- 66/03241 {Flattening}
- 66/03242 {of sheets being positioned in abutment, e.g. after folding open of an overlap joint}
- 66/0326 {Cutting, e.g. by using waterjets, or perforating (using heat [B29C 66/0346](#))}
- WARNING**
- Not complete, pending a reorganisation; see also [B29C 66/032](#)
- 66/034 {Thermal after-treatments}
- 66/0342 {Cooling, e.g. transporting through welding and cooling zone}
- 66/0344 {Annealing}
- WARNING**
- Not complete, pending a reorganisation; see also [B29C 66/034](#)
- 66/0346 {Cutting or perforating, e.g. burning away by using a laser or using hot air (simultaneously joining and severing using a fluid [B29C 65/7471](#); simultaneously welding and severing using radiation [B29C 65/7473](#))}
- WARNING**
- Not complete, pending a reorganisation; see also [B29C 66/034](#)
- 66/038 {Covering the joint by a coating material}
- 66/0382 {the coating material being in liquid or paste form (joining by applying molten plastics [B29C 65/40](#))}
- 66/0384 {the coating material being in tape, strip or band form (joining using adhesive tapes covering both elements to be joined [B29C 65/5042](#))}
- 66/05 . . . {Particular design of joint configurations}
- NOTE**
- In this group the possible supplementary joining material, e.g. adhesive or adhesive tape, is not taken into account for the joint configuration. The use of supplementary joining material, e.g. adhesive or adhesive tape, has to be additionally classified as such, e.g. in [B29C 65/48](#) and subgroups or [B29C 65/50](#) and subgroups
- WARNING**
- Group [B29C 66/05](#) and subgroups are not complete, pending a reorganisation; see also [B29C 65/00](#) and its subgroups
- 66/10 {particular design of the joint cross-sections}
- NOTE**
- The scope of the subgroups is defined by the drawings in the Definitions
- 66/11 {Joint cross-sections comprising a single joint-segment, i.e. one of the parts to be joined comprising a single joint-segment in the joint cross-section ([B29C 66/12](#) and subgroups take precedence)}
- 66/112 {Single lapped joints}
- 66/1122 {Single lap to lap joints, i.e. overlap joints ([B29C 66/45](#), [B29C 66/472](#), [B29C 66/52272](#) take precedence)}
- 66/114 {Single butt joints}

66/1142	. . . . .	{Single butt to butt joints}	66/1282	. . . . .	{comprising at least one overlap joint-segment}
66/116	. . . . .	{Single bevelled joints, i.e. one of the parts to be joined being bevelled in the joint area}	66/12821	. . . . .	{comprising at least two overlap joint-segments}
66/1162	. . . . .	{Single bevel to bevel joints, e.g. mitre joints}	66/12822	. . . . .	{comprising at least three overlap joint-segments}
66/118	. . . . .	{Single monotone curved joints}	66/1284	. . . . .	{comprising at least one butt joint-segment}
66/1182	. . . . .	{the joint being C-shaped}	66/12841	. . . . .	{comprising at least two butt joint-segments}
66/12	. . . . .	{Joint cross-sections combining only two joint-segments; Tongue and groove joints; Tenon and mortise joints; Stepped joint cross-sections}	66/12842	. . . . .	{comprising at least three butt joint-segments}
66/122	. . . . .	{Joint cross-sections combining only two joint-segments, i.e. one of the parts to be joined comprising only two joint-segments in the joint cross-section (B29C 66/124 takes precedence)}	66/1286	. . . . .	{comprising at least one bevelled joint-segment}
66/1222	. . . . .	{comprising at least a lapped joint-segment}	66/12861	. . . . .	{comprising at least two bevelled joint-segments}
66/12221	. . . . .	{the two joint-segments being lapped}	66/12862	. . . . .	{comprising at least three bevelled joint-segments}
66/1224	. . . . .	{comprising at least a butt joint-segment}	66/1288	. . . . .	{comprising at least one monotone curved joint-segment}
66/12241	. . . . .	{the two joint-segments being butt}	66/12881	. . . . .	{comprising at least two monotone curved joint-segments}
66/1226	. . . . .	{comprising at least one bevelled joint-segment}	66/12882	. . . . .	{comprising at least three monotone curved joint-segments}
66/12261	. . . . .	{the two joint-segments being bevelled, e.g. the two joint-segments forming a V}	66/13	. . . . .	{Single flanged joints; Fin-type joints; Single hem joints; Edge joints; Interpenetrating fingered joints; Other specific particular designs of joint cross-sections not provided for in groups B29C 66/11 - B29C 66/12 }
66/1228	. . . . .	{comprising at least one monotone curved joint-segment}	66/131	. . . . .	{Single flanged joints, i.e. one of the parts to be joined being rigid and flanged in the joint area}
66/12281	. . . . .	{the two joint-segments being monotone curved}	66/1312	. . . . .	{Single flange to flange joints, the parts to be joined being rigid (the parts to be joined being flexible B29C 66/133)}
66/124	. . . . .	{Tongue and groove joints}	66/133	. . . . .	{Fin-type joints, the parts to be joined being flexible (the parts to be joined being rigid B29C 66/1312)}
66/1242	. . . . .	{comprising interlocking undercuts}	66/135	. . . . .	{Single hemmed joints, i.e. one of the parts to be joined being hemmed in the joint area}
66/12421	. . . . .	{Teardrop-like, waterdrop-like or mushroom-like interlocking undercuts}	66/1352	. . . . .	{Single hem to hem joints}
66/12423	. . . . .	{Dovetailed interlocking undercuts}	66/137	. . . . .	{Beaded-edge joints or bead seals (for sealing or securing package folds or closures B65B 51/24)}
66/12425	. . . . .	{Other specific interlocking undercuts not provided for in B29C 66/12421 - B29C 66/12423 }	66/139	. . . . .	{Interpenetrating fingered joints}
66/1244	. . . . .	{characterised by the male part, i.e. the part comprising the tongue}	66/14	. . . . .	{the joint having the same thickness as the thickness of the parts to be joined (B29C 66/1142 takes precedence)}
66/12441	. . . . .	{being a single wall}	66/20	. . . . .	{particular design of the joint lines, e.g. of the weld lines}
66/12443	. . . . .	{having the tongue substantially in the middle}			NOTE
66/12445	. . . . .	{having the tongue on the side}			The scope of the subgroups is defined by the drawings in the Definitions
66/12449	. . . . .	{being asymmetric (B29C 66/12445 takes precedence)}	66/21	. . . . .	{said joint lines being formed by a single dot or dash or by several dots or dashes, i.e. spot joining or spot welding}
66/1246	. . . . .	{characterised by the female part, i.e. the part comprising the groove}	66/22	. . . . .	{said joint lines being in the form of recurring patterns (B29C 66/234 takes precedence)}
66/12461	. . . . .	{being rounded, i.e. U-shaped or C-shaped}	66/221	. . . . .	{being in the form of a sinusoidal wave (B29C 66/2272 takes precedence)}
66/12463	. . . . .	{being tapered}			
66/12464	. . . . .	{being V-shaped}			
66/12469	. . . . .	{being asymmetric}			
66/1248	. . . . .	{Interpenetrating groove joints (interpenetrating fingered joints B29C 66/139)}			
66/126	. . . . .	{Tenon and mortise joints (tenons and mortises for positioning purposes B29C 65/7814)}			
66/128	. . . . .	{Stepped joint cross-sections}			

- 66/223 {being in the form of a triangle wave or of a sawtooth wave, e.g. zigzagged}
- 66/225 {being castellated, e.g. in the form of a square wave or of a rectangular wave ([B29C 66/2276](#) takes precedence)}
- 66/227 {being in the form of repetitive interlocking undercuts, e.g. in the form of puzzle cuts (tongue and groove joints or tenon and mortise joints comprising interlocking undercuts [B29C 66/1242](#))}
- 66/2272 {Teardrop-like, waterdrop-like or mushroom-like interlocking undercuts (tongue and groove joints or tenon and mortise joints comprising teardrop-like, waterdrop-like or mushroom-like interlocking undercuts [B29C 66/12421](#))}
- 66/2274 {Dovetailed interlocking undercuts (tongue and groove joints or tenon and mortise joints comprising dovetailed interlocking undercuts [B29C 66/12423](#))}
- 66/2276 {Other specific local geometries of interlocking undercuts not provided for in [B29C 66/2272](#) - [B29C 66/2274](#) (tongue and groove joints or tenon and mortise joints comprising other specific interlocking undercuts [B29C 66/12425](#))}
- 66/229 {Other specific patterns not provided for in [B29C 66/221](#) - [B29C 66/227](#)}
- 66/23 {said joint lines being multiple and parallel or being in the form of tessellations}
- 66/232 {said joint lines being multiple and parallel, i.e. the joint being formed by several parallel joint lines}
- 66/234 {said joint lines being in the form of tessellations}
- 66/24 {said joint lines being closed or non-straight}
- 66/242 {said joint lines being closed, i.e. forming closed contours}
- 66/2422 {being circular, oval or elliptical}
- 66/24221 {being circular ([B29C 66/51](#) takes precedence)}
- 66/24223 {being oval}
- 66/24225 {being elliptical}
- 66/2424 {being a closed polygonal chain}
- 66/24241 {forming a triangle}
- 66/24243 {forming a quadrilateral}
- 66/24244 {forming a rectangle}
- 66/24245 {forming a square}
- 66/24249 {forming a specific polygon not provided for in [B29C 66/24241](#) - [B29C 66/24243](#)}
- 66/244 {said joint lines being non-straight, e.g. forming non-closed contours}
- 66/2442 {in the form of a single arc of circle}
- 66/246 {said joint lines forming figures, e.g. animals, flowers, hearts}
- 66/301 {Three-dimensional joints, i.e. the joined area being substantially non-flat ([B29C 66/5223](#), [B29C 66/5224](#), [B29C 66/5225](#) take precedence)}
- 66/302 {the area to be joined comprising melt initiators}
- 66/3022 {said melt initiators being integral with at least one of the parts to be joined}
- 66/30221 {said melt initiators being point-like}
- 66/30223 {said melt initiators being rib-like}
- 66/3024 {said melt initiators being non-integral with the parts to be joined}
- 66/303 {the joint involving an anchoring effect ([B29C 66/341](#), [B29C 65/56](#) and subgroups take precedence)}
- 66/3032 {making use of protusions or cavities belonging to at least one of the parts to be joined ([B29C 66/3034](#) takes precedence)}
- 66/30321 {making use of protusions belonging to at least one of the parts to be joined}
- 66/30322 {in the form of rugosity}
- 66/30325 {making use of cavities belonging to at least one of the parts to be joined}
- 66/30326 {in the form of porosity}
- 66/3034 {making use of additional elements, e.g. meshes}
- 66/30341 {non-integral with the parts to be joined, e.g. making use of extra elements ([B29C 65/562](#) takes precedence)}
- 66/304 {Joining through openings in an intermediate part of the article ([B29C 66/3034](#) takes precedence)}
- 66/305 {Decorative or coloured joints (optical properties of the material of the parts to be joined [B29C 66/733](#))}
- 66/306 {Applying a mark during joining}
- 66/3062 {in the form of letters or numbers}
- 66/30621 {in the form of letters}
- 66/30623 {in the form of numbers}
- 66/32 {Measures for keeping the burr form under control; Avoiding burr formation; Shaping the burr (deburring welded articles [B29C 37/04](#))}
- 66/322 {Providing cavities in the joined article to collect the burr}
- 66/324 {Avoiding burr formation}
- 66/3242 {on the inside of a tubular or hollow article}
- 66/326 {Shaping the burr, e.g. by the joining tool}
- 66/3262 {as after-treatment, e.g. by a separate tool}
- 66/328 {Leaving the burrs unchanged for providing particular properties to the joint, e.g. as decorative effect}
- 66/3282 {for reinforcing the joint}
- 66/3284 {for weakening the joint}
- 66/341 {Measures for intermixing the material of the joint interlayer}
- 66/342 {Preventing air-inclusions}
- 66/343 {Making tension-free or wrinkle-free joints}
- 66/3432 {by holding the material loose or tension-free during joining}
- 66/344 {Stretching or tensioning the joint area during joining}
- 66/345 {Progressively making the joint, e.g. starting from the middle ([B29C 66/8341](#), [B29C 65/12](#), [B29C 65/14](#), [B29C 65/16](#) take precedence)}
- 66/3452 {Making complete joints by combining partial joints}

- 66/346 . . . {Making joints having variable thicknesses in the joint area, e.g. by using jaws having an adapted configuration}
- 66/3462 . . . {by differentially heating the zones of different thickness}
- 66/3464 . . . {by preheating}
- 66/347 . . . {using particular temperature distributions or gradients; using particular heat distributions or gradients}
- 66/3472 . . . {in the plane of the joint, e.g. along the joint line in the plane of the joint or perpendicular to the joint line in the plane of the joint}
- 66/3474 . . . {perpendicular to the plane of the joint}
- 66/348 . . . {Avoiding melting or weakening of the zone directly next to the joint area, e.g. by cooling}
- 66/349 . . . {Cooling the welding zone on the welding spot}
- WARNING**
- Subgroups of [B29C 66/349](#) are not complete, pending a reorganisation; see also this group
- 66/3492 . . . {by means placed on the side opposed to the welding tool}
- 66/3494 . . . {while keeping the welding zone under pressure}
- 66/40 . . . {General aspects of joining substantially flat articles, e.g. plates, sheets or web-like materials; Making flat seams in tubular or hollow articles; Joining single elements to substantially flat surfaces}
- 66/41 . . . {Joining substantially flat articles ([B29C 66/47](#) and subgroups take precedence); Making flat seams in tubular or hollow articles ([B29C 66/51](#) and subgroups take precedence)}
- 66/43 . . . {Joining a relatively small portion of the surface of said articles ([B29C 66/45](#) takes precedence)}
- 66/431 {Joining the articles to themselves ([B29C 66/4322](#) and [B29C 66/4332](#) take precedence)}
- 66/4312 {for making flat seams in tubular or hollow articles, e.g. transversal seams}
- 66/43121 {Closing the ends of tubular or hollow single articles, e.g. closing the ends of bags (closing tube ends [B29C 57/10](#))}
- 66/43122 {Closing the top of gable top containers (gable top containers [B65D 5/067](#))}
- 66/43123 {Closing the ends of squeeze tubes, e.g. for toothpaste or cosmetics (producing flexible squeeze tubes by combined operations [B29D 23/20](#); collapsible tubes [B65D 35/00](#))}
- 66/43129 {said flat seams being transversal but non-orthogonal with respect to the tubular or hollow articles, i.e. oblique}
- 66/432 {for making tubular articles or closed loops, e.g. by joining several sheets ([B29C 66/547](#) takes precedence; bending and joining sheets at right angles to the longitudinal axis of the article being formed and joining the edges [B29C 53/38](#)); for making hollow articles or hollow preforms}
- 66/4322 {by joining a single sheet to itself ([B29C 66/4332](#) takes precedence)}
- 66/4324 {for making closed loops, e.g. belts}
- 66/4326 {for making hollow articles or hollow preforms, e.g. half-shells}
- 66/4329 {the joint lines being transversal but non-orthogonal with respect to the axis of said tubular articles, i.e. being oblique}
- 66/433 {Casing-in, i.e. enclosing an element between two sheets by an outlined seam (for bookbinding [B42C 11/06](#); for packaging [B65B](#); by laminating [B32B 37/00](#); enclosing tubular articles between substantially flat elements [B29C 66/53261](#))}
- 66/4332 {by folding a sheet over}
- 66/434 {Joining substantially flat articles for forming corner connections, fork connections or cross connections}
- 66/4342 {Joining substantially flat articles for forming corner connections, e.g. for making V-shaped pieces}
- 66/43421 {with a right angle, e.g. for making L-shaped pieces}
- 66/4344 {Joining substantially flat articles for forming fork connections, e.g. for making Y-shaped pieces}
- 66/43441 {with two right angles, e.g. for making T-shaped pieces, H-shaped pieces}
- 66/4346 {Joining substantially flat articles for forming cross connections, e.g. for making X-shaped pieces}
- 66/43461 {with four right angles, e.g. for making +-shaped pieces}
- 66/435 {Making large sheets by joining smaller ones or strips together}
- 66/436 {Joining sheets for making articles comprising cushioning or padding materials, the weld being performed through the cushioning material, e.g. car seats (joining through openings [B29C 66/304](#))}
- 66/437 {Joining plastics plates for making venetian blinds (making venetian blinds in general [E06B 9/266](#))}
- 66/438 {Joining sheets for making hollow-walled, channelled structures or multi-tubular articles}
- 66/439 {Joining sheets for making inflated articles without using a mould}
- 66/45 {Joining of substantially the whole surface of the articles (methods or apparatus for laminating [B32B 37/00](#))}
- 66/452 {the article having a disc form, e.g. making CDs or DVDs}
- 66/47 {Joining single elements to sheets, plates or other substantially flat surfaces ([B29C 66/5326](#) takes precedence)}
- 66/472 {said single elements being substantially flat}
- 66/4722 {Fixing strips to surfaces other than edge faces (fixing strips to edge faces [B29C 63/0026](#))}
- 66/4724 {said single elements being appliques, e.g. in the form of a text or drawing}
- 66/474 {said single elements being substantially non-flat}
- 66/4742 {said single elements being spouts}
- 66/47421 {said spouts comprising flanges}

- 66/49 . . . {Internally supporting the, e.g. tubular, article during joining ([B29C 66/63 takes precedence](#))}
- 66/492 . . . {using a fluid}
- 66/494 . . . {using an inflatable core}
- 66/496 . . . {using a support which remains in the joined object}
- 66/50 . . . {General aspects of joining tubular articles; General aspects of joining long products, i.e. bars or profiled elements; General aspects of joining single elements to tubular articles, hollow articles or bars; General aspects of joining several hollow-preforms to form hollow or tubular articles}
- WARNING**
- Group [B29C 66/50](#) and subgroups are not complete, pending a reorganisation; see also [B29C 65/00](#) and its subgroups
- 66/51 . . . {Joining tubular articles, profiled elements or bars; Joining single elements to tubular articles, hollow articles or bars; Joining several hollow-preforms to form hollow or tubular articles}
- 66/52 . . . {Joining tubular articles, bars or profiled elements}
- 66/522 {Joining tubular articles ([B29C 66/53241 takes precedence](#))}
- 66/5221 {for forming coaxial connections, i.e. the tubular articles to be joined forming a zero angle relative to each other}
- 66/52211 {for making endless tubular articles, e.g. endless inner tubes}
- 66/5223 {for forming corner connections or elbows, e.g. for making V-shaped pieces}
- 66/52231 {with a right angle, e.g. for making L-shaped pieces}
- 66/5224 {for forming fork-shaped connections, e.g. for making Y-shaped pieces}
- 66/52241 {with two right angles, e.g. for making T-shaped pieces}
- 66/5225 {for forming cross-shaped connections, e.g. for making X-shaped pieces}
- 66/52251 {with four right angles, e.g. for making +-shaped pieces}
- 66/5227 {for forming multi-tubular articles by longitudinally joining elementary tubular articles wall-to-wall (e.g. joining the wall of a first tubular article to the wall of a second tubular article) or for forming multilayer tubular articles}
- 66/52271 {one tubular article being placed inside the other}
- 66/52272 {concentrically, e.g. for forming multilayer tubular articles}
- 66/5229 {involving the use of a socket}
- 66/52291 {said socket comprising a stop}
- 66/52292 {said stop being internal}
- 66/52293 {said stop being external}
- 66/52294 {said stop being heated}
- 66/52295 {said socket comprising reinforcements}
- 66/52296 {said socket comprising sealing elements, e.g. gaskets}
- 66/52297 {said socket comprising slip-off prevention means ([B29C 66/52296 takes precedence](#))}
- 66/52298 {said socket being composed by several elements}
- 66/524 {Joining profiled elements}
- 66/5241 {for forming coaxial connections, i.e. the profiled elements to be joined forming a zero angle relative to each other}
- 66/5243 {for forming corner connections, e.g. for making window frames or V-shaped pieces ([welded corner joints for window frames E06B 3/9604](#))}
- 66/52431 {with a right angle, e.g. for making L-shaped pieces}
- 66/5244 {for forming fork-shaped connections, e.g. for making window frames or Y-shaped pieces}
- 66/52441 {with two right angles, e.g. for making T-shaped pieces}
- 66/5245 {for forming cross-shaped connections, e.g. for making window frames or X-shaped pieces}
- 66/52451 {with four right angles, e.g. for making +-shaped pieces}
- 66/526 {Joining bars}
- 66/5261 {for forming coaxial connections, i.e. the bars to be joined forming a zero angle relative to each other}
- 66/5263 {for forming corner connections, e.g. for making V-shaped pieces}
- 66/52631 {with a right angle, e.g. for making L-shaped pieces}
- 66/5264 {for forming fork-shaped connections, e.g. for making Y-shaped pieces}
- 66/52641 {with two right angles, e.g. for making T-shaped pieces}
- 66/5265 {for forming cross-shaped connections, e.g. for making X-shaped pieces}
- 66/52651 {with four right angles, e.g. for making +-shaped pieces}
- 66/5268 {characterised by their solid cross sections being non-circular, e.g. being elliptical, square or rectangular}
- 66/53 {Joining single elements to tubular articles, hollow articles or bars}
- 66/532 {Joining single elements to the wall of tubular articles, hollow articles or bars}
- 66/5324 {said single elements being substantially annular, i.e. of finite length ([B29C 66/5326 takes precedence](#))}
- 66/53241 {said articles being tubular and said substantially annular single elements being of finite length relative to the infinite length of said tubular articles ([making T-shaped pieces by joining tubular articles B29C 66/52241](#))}
- 66/53242 {said single elements being spouts, e.g. joining spouts to tubes}
- 66/53243 {said spouts comprising flanges}
- 66/53245 {said articles being hollow}
- 66/53246 {said single elements being spouts, e.g. joining spouts to containers}
- 66/53247 {said spouts comprising flanges}
- 66/5326 {said single elements being substantially flat}

- 66/53261 {Enclosing tubular articles between substantially flat elements}
- 66/53262 {Enclosing spouts between the walls of bags, e.g. of medical bags}
- 66/53263 {said spouts comprising wings, e.g. said spouts being of ship-like or canoe-like form to avoid leaks in the corners}
- 66/534 {Joining single elements to open ends of tubular or hollow articles or to the ends of bars}
- 66/5342 {a substantially flat extra element being placed between and clamped by the joined single elements and the end of said tubular or hollow articles}
- 66/53421 {said substantially flat extra element being flexible, e.g. a membrane ([B29C 66/53425](#) takes precedence)}
- 66/53423 {said substantially flat extra element being rigid, e.g. a plate ([B29C 66/53425](#) takes precedence)}
- 66/53425 {said substantially flat extra element being perforated, e.g. a screen}
- 66/5344 {said single elements being substantially annular, i.e. of finite length, e.g. joining flanges to tube ends ([B29C 66/5346](#) takes precedence)}
- 66/5346 {said single elements being substantially flat}
- 66/53461 {joining substantially flat covers and/or substantially flat bottoms to open ends of container bodies}
- 66/53462 {joining substantially flat covers and substantially flat bottoms to open ends of container bodies}
- 66/53465 {said single flat elements being provided with holes facing the tube ends, e.g. for making heat-exchangers}
- 66/536 {Joining substantially flat single elements to hollow articles to form tubular articles}
- 66/54 {Joining several hollow-preforms, e.g. half-shells, to form hollow articles, e.g. for making balls, containers; Joining several hollow-preforms, e.g. half-cylinders, to form tubular articles}
- 66/541 {a substantially flat extra element being placed between and clamped by the joined hollow-preforms}
- 66/5412 {said substantially flat extra element being flexible, e.g. a membrane ([B29C 66/5416](#) takes precedence)}
- 66/5414 {said substantially flat extra element being rigid, e.g. a plate ([B29C 66/5416](#) takes precedence)}
- 66/5416 {said substantially flat extra element being perforated, e.g. a screen}
- 66/542 {joining hollow covers or hollow bottoms to open ends of container bodies}
- 66/543 {joining more than two hollow-preforms to form said hollow articles}
- 66/5432 {joining hollow covers and hollow bottoms to open ends of container bodies}
- 66/545 {one hollow-preform being placed inside the other}
- 66/5452 {joining hollow bottoms to bottom of bottles}
- 66/547 {Joining several hollow-preforms, e.g. half-cylinders, to form tubular articles, e.g. endless tubes}
- 66/5472 {for making elbows or V-shaped pieces}
- 66/54721 {for making L-shaped pieces}
- 66/5474 {for making fork-shaped pieces, i.e. with 3 branches, e.g. Y-shaped pieces}
- 66/54741 {for making T-shaped pieces}
- 66/5476 {for making cross-shaped pieces, e.g. with 4 branches, e.g. X-shaped pieces}
- 66/54761 {for making +-shaped pieces}
- 66/549 {said hollow-preforms being interconnected during their moulding process, e.g. by a hinge}
- 66/55 {sealing elements being incorporated into the joints, e.g. gaskets ([B29C 66/52296](#) takes precedence)}
- 66/61 {Joining from or joining on the inside (for making tubes by bending sheets and joining from the inside [B29C 53/387](#))}
- 66/612 {Making circumferential joints}
- 66/63 {Internally supporting the article during joining ([B29C 66/49](#) takes precedence)}
- 66/632 {using a fluid}
- 66/634 {using an inflatable core}
- 66/636 {using a support which remains in the joined object}
- 66/65 {with a relative motion between the article and the welding tool ([B29C 65/10](#), [B29C 65/12](#) take precedence)}
- 66/652 {moving the welding tool around the fixed article}
- 66/69 {General aspects of joining filaments (bundling articles [B65B 13/00](#); interconnecting successive lengths of material [B65H 69/00](#))}
- 66/70 {characterised by the composition, physical properties or the structure of the material of the parts to be joined; Joining with non-plastics material (chemical aspects [C08J 5/12](#), [C09J](#))}
- 66/71 {characterised by the composition of the plastics material of the parts to be joined (welding bar compositions [B29C 65/125](#))}
- 66/712 {the composition of one of the parts to be joined being different from the composition of the other part}
- 66/72 {characterised by the structure of the material of the parts to be joined}
- 66/721 {Fibre-reinforced materials ([B29C 66/729](#) takes precedence)}
- 66/7212 {characterised by the composition of the fibres}
- 66/7214 {characterised by the length of the fibres}
- 66/72141 {Fibres of continuous length}
- 66/72143 {Fibres of discontinuous lengths}
- 66/723 {being multi-layered ([B29C 66/7292](#), [B29C 66/72941](#) take precedence)}
- 66/7232 {comprising a non-plastics layer}
- 66/72321 {consisting of metals or their alloys}
- 66/72322 {consisting of elements other than metals, e.g. boron}
- 66/72323 {Carbon}

- 66/72324 {consisting of inorganic materials not provided for in [B29C 66/72321](#) - [B29C 66/72322](#)}
- 66/72325 {Ceramics}
- 66/72326 {Glass}
- 66/72327 {consisting of natural products or their composites, not provided for in [B29C 66/72321](#) - [B29C 66/72324](#)}
- 66/72328 {Paper}
- 66/72329 {Wood}
- 66/7234 {comprising a barrier layer}
- 66/72341 {for gases}
- 66/72343 {for liquids}
- 66/725 {being hollow-walled or honeycombs}
- 66/7252 {hollow-walled}
- 66/72521 {comprising corrugated cores}
- 66/72523 {multi-channelled or multi-tubular ([B29C 66/438](#), [B29C 66/5227](#) take precedence)}
- 66/72525 {comprising honeycomb cores}
- 66/7254 {honeycomb structures}
- 66/727 {being porous, e.g. foam}
- 66/729 {Textile or other fibrous material made from plastics}
- 66/7292 {coated ([B29C 66/72941](#) takes precedence)}
- 66/7294 {Non woven mats, e.g. felt}
- 66/72941 {coated}
- 66/73 {characterised by the intensive physical properties of the material of the parts to be joined, by the optical properties of the material of the parts to be joined, by the extensive physical properties of the parts to be joined, by the state of the material of the parts to be joined or by the material of the parts to be joined being a thermoplastic or a thermoset}
- 66/731 {characterised by the intensive physical properties of the material of the parts to be joined}
- 66/7311 {Thermal properties}
- 66/73111 {Thermal expansion coefficient}
- 66/73112 {of different thermal expansion coefficient, i.e. the thermal expansion coefficient of one of the parts to be joined being different from the thermal expansion coefficient of the other part}
- 66/73113 {Thermal conductivity}
- 66/73114 {of different thermal conductivity, i.e. the thermal conductivity of one of the parts to be joined being different from the thermal conductivity of the other part}
- 66/73115 {Melting point}
- 66/73116 {of different melting point, i.e. the melting point of one of the parts to be joined being different from the melting point of the other part}
- 66/73117 {T_g, i.e. glass transition temperature}
- 66/73118 {of different glass transition temperature, i.e. the glass transition temperature of one of the parts to be joined being different from the glass transition temperature of the other part}
- 66/7312 {Rheological properties}
- 66/73121 {Viscosity}
- 66/73122 {of different viscosity, i.e. the viscosity of one of the parts to be joined being different from the viscosity of the other part}
- 66/7313 {Density}
- 66/73132 {of different density, i.e. the density of one of the parts to be joined being different from the density of the other part}
- 66/7314 {Electrical and dielectric properties}
- 66/73141 {Electrical conductivity}
- 66/73143 {Dielectric properties}
- 66/7315 {Mechanical properties}
- 66/73151 {Hardness}
- 66/73152 {of different hardness, i.e. the hardness of one of the parts to be joined being different from the hardness of the other part}
- 66/7316 {Surface properties}
- 66/73161 {Roughness or rugosity}
- 66/73162 {of different roughness or rugosity, i.e. the roughness or rugosity of the surface of one of the parts to be joined being different from the roughness or rugosity of the surface of the other part}
- 66/7317 {Hydrophilicity or hydrophobicity}
- 66/73171 {Hydrophilicity}
- 66/73172 {of different hydrophilicity, i.e. the hydrophilicity of one of the parts to be joined being different from the hydrophilicity of the other part}
- 66/73175 {Hydrophobicity}
- 66/73176 {of different hydrophobicity, i.e. the hydrophobicity of one of the parts to be joined being different from the hydrophobicity of the other part}
- 66/7318 {Permeability to gases or liquids}
- 66/73181 {permeable}
- 66/73182 {to gases}
- 66/73183 {to liquids}
- 66/73185 {non-permeable}
- 66/73186 {to gases}
- 66/73187 {to liquids}
- 66/733 {characterised by the optical properties of the material of the parts to be joined, e.g. fluorescence, phosphorescence}
- 66/7332 {at least one of the parts to be joined being coloured}
- 66/73321 {both parts to be joined being coloured}
- 66/73322 {both parts to be joined having a different colour}
- 66/7334 {at least one of the parts to be joined being glossy or matt, reflective or refractive}
- 66/73341 {at least one of the parts to be joined being glossy or reflective}
- 66/73343 {at least one of the parts to be joined being matt or refractive}
- 66/7336 {at least one of the parts to be joined being opaque, transparent or translucent to visible light}
- 66/73361 {at least one of the parts to be joined being opaque to visible light}
- 66/73362 {both parts to be joined being opaque to visible light}

- 66/73365 {at least one of the parts to be joined being transparent or translucent to visible light}
- 66/73366 {both parts to be joined being transparent or translucent to visible light}
- 66/7338 {at least one of the parts to be joined being polarising}
- 66/735 {characterised by the extensive physical properties of the parts to be joined}
- 66/7352 {Thickness, e.g. very thin}
- 66/73521 {of different thickness, i.e. the thickness of one of the parts to be joined being different from the thickness of the other part}
- 66/737 {characterised by the state of the material of the parts to be joined}
- 66/7371 {oriented or heat-shrinkable}
- 66/73711 {oriented}
- 66/73712 {mono-axially}
- 66/73713 {bi-axially or multi-axially}
- 66/73715 {heat-shrinkable}
- 66/7373 {Joining soiled or oxidised materials}
- 66/7375 {uncured, partially cured or fully cured}
- 66/73751 {the to-be-joined area of at least one of the parts to be joined being uncured, i.e. non cross-linked, non vulcanized}
- 66/73752 {the to-be-joined areas of both parts to be joined being uncured}
- 66/73753 {the to-be-joined area of at least one of the parts to be joined being partially cured, i.e. partially cross-linked, partially vulcanized}
- 66/73754 {the to-be-joined areas of both parts to be joined being partially cured}
- 66/73755 {the to-be-joined area of at least one of the parts to be joined being fully cured, i.e. fully cross-linked, fully vulcanized}
- 66/73756 {the to-be-joined areas of both parts to be joined being fully cured}
- 66/7377 {amorphous, semi-crystalline or crystalline}
- 66/73771 {the to-be-joined area of at least one of the parts to be joined being amorphous}
- 66/73772 {the to-be-joined areas of both parts to be joined being amorphous}
- 66/73773 {the to-be-joined area of at least one of the parts to be joined being semi-crystalline}
- 66/73774 {the to-be-joined areas of both parts to be joined being semi-crystalline}
- 66/73775 {the to-be-joined area of at least one of the parts to be joined being crystalline}
- 66/73776 {the to-be-joined areas of both parts to be joined being crystalline}
- 66/7379 {degradable}
- 66/73791 {biodegradable}
- 66/73793 {soluble, e.g. water-soluble}
- 66/739 {characterised by the material of the parts to be joined being a thermoplastic or a thermoset}
- 66/7392 {characterised by the material of at least one of the parts being a thermoplastic}
- 66/73921 {characterised by the materials of both parts being thermoplastics}
- 66/7394 {characterised by the material of at least one of the parts being a thermoset}
- 66/73941 {characterised by the materials of both parts being thermosets}
- 66/74 {Joining plastics material to non-plastics material}
- NOTE**
- When classifying in this group, joining techniques are additionally classified in the relevant groups, i.e. in [B29C 65/44](#) and subgroups or in [B29C 65/64](#) and subgroups
- 66/742 {to metals or their alloys}
- 66/7422 {Aluminium or alloys of aluminium}
- 66/7424 {Lead or alloys of lead}
- 66/7426 {Tin or alloys of tin}
- 66/7428 {Transition metals or their alloys}
- 66/74281 {Copper or alloys of copper}
- 66/74283 {Iron or alloys of iron, e.g. steel}
- 66/74285 {Noble metals, e.g. silver, gold, platinum or their alloys}
- 66/744 {to elements other than metals}
- 66/7442 {Boron}
- 66/7444 {Carbon}
- 66/746 {to inorganic materials not provided for in groups [B29C 66/742](#) - [B29C 66/744](#)}
- 66/7461 {Ceramics}
- 66/74611 {Carbides; Nitrides}
- 66/7463 {Concrete}
- 66/7465 {Glass}
- 66/7467 {Mica}
- 66/7469 {Asbestos}
- 66/748 {to natural products or their composites, not provided for in groups [B29C 66/742](#) - [B29C 66/746](#)}
- 66/7481 {Cork}
- 66/7482 {Linoleum}
- 66/7483 {Bone, horn, ivory}
- 66/7484 {Leather}
- 66/7485 {Natural fibres, e.g. wool, cotton}
- 66/7486 {Paper, e.g. cardboard}
- 66/7487 {Wood}
- 66/80 {General aspects of machine operations or constructions and parts thereof}
- 66/81 {General aspects of the pressing elements, i.e. the elements applying pressure on the parts to be joined in the area to be joined, e.g. the welding jaws or clamps ([holding or clamping means for handling purposes B29C 65/7841](#))}
- 66/812 {characterised by the composition, by the structure, by the intensive physical properties or by the optical properties of the material constituting the pressing elements, e.g. constituting the welding jaws or clamps}
- 66/8122 {characterised by the composition of the material constituting the pressing elements, e.g. constituting the welding jaws or clamps}
- 66/8124 {characterised by the structure of the material constituting the pressing elements, e.g. constituting the welding jaws or clamps}
- 66/81241 {being porous or sintered}
- 66/8126 {characterised by the intensive physical properties or by the optical properties of the material constituting the pressing elements, e.g. constituting the welding jaws or clamps}

- 66/81261 {Thermal properties, e.g. thermal conductivity, thermal expansion coefficient}
- 66/81262 {Electrical and dielectric properties, e.g. electrical conductivity}
- 66/81263 {Dielectric properties}
- 66/81264 {Mechanical properties, e.g. hardness}
- 66/81265 {Surface properties, e.g. surface roughness or rugosity}
- 66/81266 {Optical properties, e.g. transparency, reflectivity}
- 66/81267 {Transparent to electromagnetic radiation, e.g. to visible light}
- 66/81268 {Reflective to electromagnetic radiation, e.g. to visible light}
- 66/814 {characterised by the design of the pressing elements, e.g. of the welding jaws or clamps}
- 66/8141 {characterised by the surface geometry of the part of the pressing elements, e.g. welding jaws or clamps, coming into contact with the parts to be joined}
- 66/81411 {characterised by its cross-section, e.g. transversal or longitudinal, being non-flat}
- 66/81413 {being non-symmetrical
([B29C 66/81415](#) takes precedence)}
- 66/81415 {being bevelled}
- 66/81417 {being V-shaped}
- 66/81419 {and flat}
- 66/81421 {being convex or concave}
- 66/81422 {being convex}
- 66/81423 {being concave}
- 66/81425 {being stepped, e.g. comprising a shoulder}
- 66/81427 {comprising a single ridge, e.g. for making a weakening line; comprising a single tooth}
- 66/81429 {comprising a single tooth}
- 66/81431 {comprising a single cavity, e.g. a groove}
- 66/81433 {being toothed, i.e. comprising several teeth or pins ([comprising a single tooth B29C 66/81429](#)), or being patterned}
- 66/81435 {comprising several parallel ridges, e.g. for crimping ([comprising a single ridge B29C 66/81427](#))}
- 66/8145 {characterised by the constructional aspects of the pressing elements, e.g. of the welding jaws or clamps ([B29C 66/816](#) and [B29C 66/818](#) take precedence; adaptable for making articles or joints of different dimensions [B29C 66/841](#))}
- 66/81451 {being adaptable to the surface of the joint ([B29C 66/81453](#), [B29C 66/81455](#), [B29C 66/81457](#), [B29C 66/81459](#), [B29C 66/81461](#) take precedence)}
- 66/81453 {being made of flexible slats, flexible fins, flexible bristles or springs, e.g. coiled springs}
- 66/81455 {being a fluid inflatable bag or bladder, a diaphragm or a vacuum bag for applying isostatic pressure ([inflatable element positioned between the joining tool and a backing-up part B29C 66/82421](#))}
- 66/81457 {comprising a block or layer of deformable material, e.g. sponge, foam, rubber ([pressing elements supported or backed-up by resilient material B29C 66/8161](#))}
- 66/81459 {being a filled deformable bladder, e.g. bladder filled with oil, with granules or with a meltable solid material ([B29C 66/81455](#) takes precedence)}
- 66/81461 {being multi-lamellar or segmented, i.e. comprising a plurality of strips, plates or stacked elements}
- 66/81463 {comprising a plurality of single pressing elements, e.g. a plurality of sonotrodes, or comprising a plurality of single counter-pressing elements, e.g. a plurality of anvils, said plurality of said single elements being suitable for making a single joint}
- 66/81465 {one placed behind the other in a single row in the feed direction}
- 66/81467 {arranged in an offset pattern}
- 66/81469 {one placed next to the other in a single line transverse to the feed direction, e.g. shoulder to shoulder sonotrodes}
- 66/81471 {being a wrap-around tape or band}
- 66/816 {characterised by the mounting of the pressing elements, e.g. of the welding jaws or clamps}
- 66/8161 {said pressing elements being supported or backed-up by springs or by resilient material}
- 66/81611 {by resilient material}
- 66/8163 {Self-aligning to the joining plane, e.g. mounted on a ball and socket}
- 66/8165 {Carrier plates for mounting joining tool parts, e.g. for re-arranging the tool parts to make other forms}
- 66/8167 {Quick change joining tools or surfaces}
- 66/8169 {the mounting of said pressing elements being laterally movable, e.g. adjustable ([B29C 66/836](#), [B29C 66/841](#), [B29C 66/863](#) take precedence)}
- 66/818 {characterised by the cooling constructional aspects, or by the thermal or electrical insulating or conducting constructional aspects of the welding jaws or of the clamps ([characterised by the heating means B29C 65/24](#)); comprising means for compensating for the thermal expansion of the welding jaws or of the clamps}
- 66/8181 {characterised by the cooling constructional aspects}
- 66/81811 {of the welding jaws}
- 66/81812 {the welding jaws being cooled from the outside, e.g. by blowing a gas or spraying a liquid}
- 66/81815 {of the clamps}
- 66/8182 {characterised by the thermal insulating constructional aspects}
- 66/81821 {of the welding jaws}
- 66/81825 {of the clamps}
- 66/8183 {characterised by the thermal conducting constructional aspects}
- 66/81831 {of the welding jaws}
- 66/81835 {of the clamps}

- 66/8185 {comprising means for compensating for the thermal expansion of the welding jaws or of the clamps (means for tensioning resistive elements [B29C 65/229](#))}
- 66/8187 {characterised by the electrical insulating constructional aspects}
- 66/81871 {of the welding jaws}
- 66/81875 {of the clamps}
- 66/8188 {characterised by the electrical conducting constructional aspects}
- 66/81881 {of the welding jaws}
- 66/81885 {of the clamps}
- 66/82 . . {Pressure application arrangements, e.g. transmission or actuating mechanisms for joining tools or clamps}
- WARNING**
- Group [B29C 66/82](#) and subgroups are not complete, pending a reorganisation; see also [B29C 65/00](#) and its subgroups
- 66/822 . . . {Transmission mechanisms}
- 66/8221 {Scissor or lever mechanisms, i.e. involving a pivot point}
- 66/8222 {Pinion or rack mechanisms}
- 66/8223 {Worm or spindle mechanisms}
- 66/8224 {Chain or sprocket drives}
- 66/8225 {Crank mechanisms}
- 66/8226 {Cam mechanisms; Wedges; Eccentric mechanisms}
- 66/82261 {Wedges}
- 66/82263 {Follower pin or roller cooperating with a groove}
- 66/82265 {Eccentric mechanisms}
- 66/8227 {using springs}
- 66/824 . . . {Actuating mechanisms}
- 66/8242 {Pneumatic or hydraulic drives (using fluid pressure directly acting on the parts to be joined [B29C 66/8266](#))}
- 66/82421 {using an inflatable element positioned between the joining tool and a backing-up part}
- 66/82423 {using vacuum (using vacuum directly acting on the parts to be joined [B29C 66/82661](#))}
- 66/8244 {magnetically driven}
- 66/8246 {Servomechanisms, e.g. servomotors}
- 66/8248 {Pressure application by weights (by the own weight of the joining tool [B29C 66/8282](#))}
- 66/826 . . . {without using a separate pressure application tool, e.g. the own weight of the parts to be joined ([B29C 65/66](#) takes precedence)}
- 66/8262 {using "pressure means" which are associated with at least one of the parts to be joined and remain in or on it}
- 66/8264 {using the thermal expansion of the parts to be joined}
- 66/8266 {using fluid pressure directly acting on the parts to be joined}
- 66/82661 {by means of vacuum}
- 66/828 . . . {Other pressure application arrangements}
- 66/8282 {using the own weight of the joining tool}
- 66/8284 {using the thermal expansion of the joining tool}
- 66/8286 {Hand placed clamps (wrap-around tapes or bands [B29C 66/81471](#))}
- 66/83 . . . {characterised by the movement of the joining or pressing tools}
- 66/832 {Reciprocating joining or pressing tools ([B29C 66/834](#) takes precedence)}
- 66/8322 {Joining or pressing tools reciprocating along one axis}
- 66/83221 {cooperating reciprocating tools, each tool reciprocating along one axis}
- 66/8324 {Joining or pressing tools pivoting around one axis (scissor or lever transmission mechanisms [B29C 66/8221](#); tools self-aligning to the joining plane [B29C 66/8163](#))}
- 66/83241 {cooperating pivoting tools}
- 66/834 . . . {moving with the parts to be joined}
- 66/8341 {Roller, cylinder or drum types; Band or belt types; Ball types ([B29C 66/8351](#) takes precedence)}
- 66/83411 {Roller, cylinder or drum types ([B29C 66/83431](#) takes precedence; rollers, cylinders or drums moving relative to and tangentially to the parts to be joined [B29C 66/8362](#))}
- 66/83413 {cooperating rollers, cylinders or drums}
- 66/83415 {the contact angle between said rollers, cylinders or drums and said parts to be joined being a non-zero angle ([B29C 66/83433](#) takes precedence)}
- 66/83417 {said rollers, cylinders or drums being hollow}
- 66/83421 {band or belt types ([B29C 66/83431](#) takes precedence)}
- 66/83423 {cooperating bands or belts}
- 66/83431 {rollers, cylinders or drums cooperating with bands or belts}
- 66/83433 {the contact angle between said rollers, cylinders or drums and said bands or belts being a non-zero angle}
- 66/83435 {said rollers, cylinders or drums being hollow}
- 66/83441 {Ball types}
- 66/8351 {Jaws mounted on rollers, cylinders, drums, bands, belts or chains; Flying jaws}
- 66/83511 {jaws mounted on rollers, cylinders or drums}
- 66/83513 {cooperating jaws mounted on rollers, cylinders or drums and moving in a closed path}
- 66/83517 {said rollers, cylinders or drums being hollow}
- 66/83521 {jaws mounted on bands or belts}
- 66/83523 {Cooperating jaws mounted on cooperating bands or belts and moving in a closed path}
- 66/83531 {jaws mounted on chains}
- 66/83533 {Cooperating jaws mounted on cooperating chains and moving in a closed path}
- 66/83541 {flying jaws, e.g. jaws mounted on crank mechanisms or following a hand over hand movement}
- 66/83543 {cooperating flying jaws}

- 66/836 . . . {Moving relative to and tangentially to the parts to be joined, e.g. transversely to the displacement of the parts to be joined, e.g. using a X-Y table ([B29C 66/65](#) takes precedence)}
- 66/8362 {Rollers, cylinders or drums moving relative to and tangentially to the parts to be joined}
- 66/84 . . {Specific machine types or machines suitable for specific applications}
- 66/841 . . . {Machines or tools adaptable for making articles of different dimensions or shapes or for making joints of different dimensions}
- 66/8412 {of different length, width or height}
- 66/84121 {of different width}
- 66/84123 {of different height}
- 66/8414 {of different diameter}
- 66/8416 {of different thickness}
- 66/843 . . . {Machines for making separate joints at the same time in different planes; Machines for making separate joints at the same time mounted in parallel or in series}
- 66/8432 {Machines for making separate joints at the same time mounted in parallel or in series}
- 66/845 . . . {C-clamp type or sewing machine type}
- 66/847 . . . {Drilling standard machine type}
- 66/849 . . . {Packaging machines}
- 66/8491 {welding through a filled container, e.g. tube or bag}
- 66/851 . . . {Bag or container making machines}
- 66/8511 {Bag making machines}
- 66/853 . . . {Machines for changing web rolls or filaments, e.g. for joining a replacement web to an expiring web}
- 66/855 . . . {Belt splicing machines}
- 66/857 . . . {Medical tube welding machines}
- 66/861 . . . {Hand-held tools}
- 66/8612 {Ironing tool type}
- 66/8614 {Tongs, pincers or scissors}
- 66/8616 {Pen or pencil like}
- 66/8618 {being battery operated}
- 66/863 . . . {Robotised, e.g. mounted on a robot arm}
- 66/865 . . . {Independently movable welding apparatus, e.g. on wheels}
- 66/8652 {being pushed by hand or being self-propelling}
- 66/86521 {being self-propelling}
- 66/86523 {the traction being made on the seam}
- 66/86531 {being guided}
- 66/86533 {by rails}
- 66/86535 {by the edge of one of the parts to be joined or by a groove between the parts to be joined, e.g. using a roller}
- 66/87 . . {Auxiliary operations or devices}
- 66/872 . . . {Starting or stopping procedures}
- 66/874 . . . {Safety measures or devices}
- 66/8742 {for operators ([B29C 66/002](#) takes precedence)}
- 66/8744 {Preventing overheating of the parts to be joined, e.g. if the machine stops or slows down}
- 66/87441 {by lowering or shutting down the power supply}
- 66/87443 {by withdrawing the heating tools}
- 66/87445 {by introducing protection shields}
- 66/8746 {Detecting the absence of the articles to be joined}
- 66/8748 {involving the use of warnings}
- 66/876 . . . {Maintenance or cleaning}
- 66/8762 {Cleaning of the joining tools}
- 66/90 . {Measuring or controlling the joining process}
- 66/91 . . {by measuring or controlling the temperature, the heat or the thermal flux}
- 66/912 . . . {by measuring the temperature, the heat or the thermal flux}
- 66/9121 {by measuring the temperature}
- 66/91211 {with special temperature measurement means or methods}
- 66/91212 {involving measurement means being part of the welding jaws, e.g. integrated in the welding jaws}
- 66/91213 {and measuring the electrical resistance of a resistive element belonging to said welding jaws, said element being, e.g. a thermistor}
- 66/91214 {by measuring the electrical resistance of a resistive element belonging to one of the parts to be welded, said element acting, e.g. as a thermistor}
- 66/91216 {enabling contactless temperature measurements, e.g. using a pyrometer}
- 66/91218 {using colour change, e.g. using separate colour indicators}
- 66/91221 {of the parts to be joined}
- 66/91231 {of the joining tool}
- 66/9131 {by measuring the heat or the thermal flux, i.e. the heat flux}
- 66/91311 {by measuring the heat generated by Joule heating or induction heating}
- 66/91313 {by measuring the voltage, i.e. the electric potential difference or electric tension}
- 66/91315 {by measuring the current intensity}
- 66/91317 {by measuring the electrical resistance}
- 66/914 . . . {by controlling or regulating the temperature, the heat or the thermal flux}
- 66/9141 {by controlling or regulating the temperature}
- 66/91411 {of the parts to be joined, e.g. the joining process taking the temperature of the parts to be joined into account}
- 66/91413 {the parts to be joined having different temperatures}
- 66/91421 {of the joining tools}
- 66/91423 {using joining tools having different temperature zones or using several joining tools with different temperatures}
- 66/91431 {the temperature being kept constant over time}
- 66/91441 {the temperature being non-constant over time}
- 66/91443 {following a temperature-time profile ([B29C 65/38](#) takes precedence)}
- 66/91445 {by steps}
- 66/9161 {by controlling or regulating the heat or the thermal flux, i.e. the heat flux}

- 66/91631 {the heat or the thermal flux being kept constant over time}
- 66/91641 {the heat or the thermal flux being non-constant over time}
- 66/91643 {following a heat-time profile (B29C 65/38 takes precedence)}
- 66/91645 {by steps}
- 66/91651 {by controlling or regulating the heat generated by Joule heating or induction heating}
- 66/91653 {by controlling or regulating the voltage, i.e. the electric potential difference or electric tension}
- 66/91655 {by controlling or regulating the current intensity}
- 66/919 . . . {characterised by specific temperature, heat or thermal flux values or ranges (specific electrical resistance values B29C 66/81262)}
- 66/9192 {in explicit relation to another variable, e.g. temperature diagrams}
- 66/91921 {in explicit relation to another temperature, e.g. to the softening temperature or softening point, to the thermal degradation temperature or to the ambient temperature}
- 66/91931 {in explicit relation to the fusion temperature or melting point of the material of one of the parts to be joined}
- 66/91933 {higher than said fusion temperature}
- 66/91935 {lower than said fusion temperature}
- 66/91941 {in explicit relation to T_g, i.e. the glass transition temperature, of the material of one of the parts to be joined}
- 66/91943 {higher than said glass transition temperature}
- 66/91945 {lower than said glass transition temperature}
- 66/91951 {in explicit relation to time, e.g. temperature-time diagrams}
- 66/92 . . {by measuring or controlling the pressure, the force, the mechanical power or the displacement of the joining tools}
- 66/922 . . . {by measuring the pressure, the force, the mechanical power or the displacement of the joining tools}
- 66/9221 {by measuring the pressure, the force or the mechanical power}
- 66/92211 {with special measurement means or methods}
- 66/9231 {by measuring the displacement of the joining tools}
- 66/92311 {with special measurement means or methods}
- 66/924 . . . {by controlling or regulating the pressure, the force, the mechanical power or the displacement of the joining tools}
- 66/9241 {by controlling or regulating the pressure, the force or the mechanical power}
- 66/92431 {the pressure, the force or the mechanical power being kept constant over time (B29C 66/92613 takes precedence)}
- 66/92441 {the pressure, the force or the mechanical power being non-constant over time}
- 66/92443 {following a pressure-time profile}
- 66/92445 {by steps}
- 66/92451 {using joining tools having different pressure zones or using several joining tools with different pressures}
- 66/9261 {by controlling or regulating the displacement of the joining tools}
- 66/92611 {by controlling or regulating the gap between the joining tools}
- 66/92613 {the gap being kept constant over time}
- 66/92615 {the gap being non-constant over time}
- 66/92651 {by using stops}
- 66/92653 {said stops being adjustable}
- 66/92655 {by using several stops}
- 66/929 . . . {characterized by specific pressure, force, mechanical power or displacement values or ranges}
- 66/9292 {in explicit relation to another variable, e.g. pressure diagrams}
- 66/92921 {in specific relation to time, e.g. pressure-time diagrams}
- 66/93 . . {by measuring or controlling the speed}
- 66/932 . . . {by measuring the speed}
- 66/9321 {with special speed measurement means or methods}
- 66/934 . . . {by controlling or regulating the speed}
- 66/93411 {the parts to be joined having different speeds}
- 66/93431 {the speed being kept constant over time}
- 66/93441 {the speed being non-constant over time}
- 66/93451 {by controlling or regulating the rotational speed, i.e. the speed of revolution}
- 66/939 . . . {characterised by specific speed values or ranges}
- 66/9392 {in explicit relation to another variable, e.g. speed diagrams}
- 66/94 . . {by measuring or controlling the time}
- 66/942 . . . {by measuring the time}
- 66/9421 {with special time measurement means or methods}
- 66/944 . . . {by controlling or regulating the time}
- 66/9441 {the time being controlled or regulated as a function of another parameter}
- 66/949 . . . {characterised by specific time values or ranges}
- 66/9492 {in explicit relation to another variable}
- 66/95 . . {by measuring or controlling specific variables not covered by groups (B29C 66/91 - B29C 66/94)}
- 66/951 . . . {by measuring or controlling the vibration frequency and/or the vibration amplitude of vibrating joining tools, e.g. of ultrasonic welding tools}
- 66/9511 {by measuring their vibration frequency}
- 66/9512 {by controlling their vibration frequency}
- 66/9513 {characterised by specific vibration frequency values or ranges}
- 66/9515 {by measuring their vibration amplitude}
- 66/9516 {by controlling their vibration amplitude}
- 66/9517 {characterised by specific vibration amplitude values or ranges}
- 66/952 . . . {by measuring or controlling the wavelength}
- 66/953 . . . {by measuring or controlling the humidity}

- 66/9532 {of the parts to be joined, i.e. taking the humidity of the parts to be joined into account}
- 66/9534 {of the atmosphere, i.e. taking the ambient humidity into account}
- 66/954 {by measuring or controlling the thickness of the parts to be joined}
- 66/959 {characterised by specific values or ranges of said specific variables}
- 66/9592 {in explicit relation to another variable, e.g. X-Y diagrams}
- 66/96 . . . {characterised by the method for implementing the controlling of the joining process}
- 66/961 . . . {involving a feedback loop mechanism, e.g. comparison with a desired value}
- 66/962 . . . {using proportional controllers, e.g. PID controllers [proportional–integral–derivative controllers]}
- 66/963 . . . {using stored or historical data sets, e.g. using expert systems}
- 66/964 . . . {involving trial and error}
- 66/965 . . . {using artificial neural networks}
- 66/966 . . . {using fuzzy logic}
- 66/967 . . . {involving special data inputs or special data outputs, e.g. for monitoring purposes}
- 66/9672 {involving special data inputs, e.g. involving barcodes, RFID tags}
- 66/9674 {involving special data outputs, e.g. special data display means (B29C 66/8748 takes precedence)}
- 66/97 . . . {Checking completion of joining or correct joining by using indications on at least one of the joined parts}
- 66/972 . . . {by extrusion of molten material}
- 66/974 . . . {by checking the bead or burr form}
- 66/976 . . . {by the use of an indicator pin, e.g. being integral with one of the parts to be joined}
- 66/98 . . . {Determining the joining area by using markings on at least one of the parts to be joined}
- 67/00 Shaping techniques not covered by groups B29C 39/00 - B29C 65/00, B29C 70/00 or B29C 73/00**
- 67/0003 . . . {Moulding articles between moving mould surfaces, e.g. turning surfaces}
- 67/0007 . . . {Manufacturing coloured articles not otherwise provided for, e.g. by colour change}
- 67/0011 . . . {for shaping plates or sheets}
- 67/0014 . . . {for shaping tubes or blown tubular films}
- 67/0018 . . . {Turning tubes inside out (for lining internal surfaces B29C 63/36)}
- 67/0022 . . . {using an internal mandrel}
- 67/0025 . . . {and pressure difference}
- 67/0029 . . . {Cold deforming of thermoplastics material (B29C 43/16, B29C 59/00 take precedence)}
- 67/0033 . . . {by shock-waves}
- 67/0037 . . . {Forming articles from a moulding composition enclosed in a deformable bag (making moulds composed of particles enclosed in a bag B29C 33/3821; from expandable material in flexible bags B29C 44/182; with reinforcements placed in a covering element B29C 70/542)}
- 67/004 . . . {Closing perforations or small holes, e.g. using additional moulding material}
- 67/0044 . . . {for shaping edges or extremities (B29C 57/00 takes precedence)}
- 67/0048 . . . {Local deformation of formed objects}
- 67/02 . . . Moulding by agglomerating {(B29C 67/20 takes precedence)}
- 67/04 . . . Sintering (combined with compression B29C 43/00)
- 67/06 . . . Coagulating
- 67/08 . . . Screen moulding, e.g. forcing the moulding material through a perforated screen on to a moulding surface
- 67/20 . . . for porous or cellular articles, e.g. of foam plastics, coarse-pored {(chemical aspects of working up macro-molecular substances to porous or cellular articles C08J 9/00)}
- 67/202 . . . {comprising elimination of a solid or a liquid ingredient}
- 67/205 . . . {comprising surface fusion, and bonding of particles to form voids, e.g. sintering}
- 67/207 . . . {comprising impregnating expanded particles or fragments with a binder}
- 67/24 . . . characterised by the choice of material
- 67/241 . . . {Moulding wax}
- 67/242 . . . {Moulding mineral aggregates bonded with resin, e.g. resin concrete (shaping ceramic compositions without binder or water-setting cementitious material B28B; compositions per se C04B)}
- 67/243 {for making articles of definite length}
- 67/244 {by vibrating the composition before or during moulding}
- 67/245 {for making articles of indefinite length}
- 67/246 . . . {Moulding high reactive monomers or prepolymers, e.g. by reaction injection moulding [RIM], liquid injection moulding [LIM] (casting monomers B29C 39/006, mixing construction B29B 7/74)}
- 67/247 . . . {Moulding polymers or prepolymers containing ingredients in a frangible packaging, e.g. microcapsules (expandable components kept in frangible containers within a flexible bag B29C 44/183)}
- 67/248 . . . {Moulding mineral fibres or particles bonded with resin, e.g. for insulating or roofing board (articles from wood or lignocellulosic material with binding agents B27N; mineral aggregates bonded with resin B29C 67/242; thermal insulation in general F16L 59/00)}
- 67/249 {for making articles of indefinite length}
- 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 therefore {(B29C 48/001 takes precedence)}**
- 69/001 . . . {a shaping technique combined with cutting, e.g. in parts or slices combined with rearranging and joining the cut parts (for reinforced material B29C 70/545; B29C 49/4278, B29C 51/268 take precedence)}
- 69/002 . . . {Winding (cutting of individual length B26D)}
- 69/003 {and cutting longitudinally, e.g. for making O-rings; chain links, insulation tubes}

- 69/004 . . {making articles by joining parts moulded in separate cavities, said parts being in said separate cavities during said joining ([B29C 45/006](#), [B29C 51/267](#) take precedence)}
- 69/005 . . {cutting-off or cutting-out a part of a strip-like or sheet-like material, transferring that part and fixing it to an article (if labeling see [B65C](#), in combination with box-making [B31B 50/81](#); labelling in general [B65C](#))}
- 69/006 . . {rotating transfer means}
- 69/007 . . {Lining or sheathing in combination with forming the article to be lined}
- 69/008 . . {of tubular articles}
- 69/02 . . of moulding techniques only
- 69/025 . . {Deforming articles in a simpler intermediate shape without internal stresses for packaging transporting or storage and reshaping and fixing the original configuration on the place of use (shaping by liberation of internal stresses [B29C 61/00](#))}
- 70/00 Shaping composites, i.e. plastics material comprising reinforcements, fillers or preformed parts, e.g. inserts**
- NOTE**
- 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.
- WARNING**
- Group [B29C 70/00](#) is impacted by reclassification into groups [B29C 70/003](#) – [B29C 70/0035](#).
- Groups [B29C 70/00](#) and [B29C 70/003](#) – [B29C 70/0035](#) should be considered in order to perform a complete search.
- 70/003 . . {characterised by the matrix material, e.g. material composition or physical properties}
- WARNING**
- Group [B29C 70/003](#) is incomplete pending reclassification of documents from group [B29C 70/00](#).
- Groups [B29C 70/00](#) and [B29C 70/003](#) should be considered in order to perform a complete search.
- 70/0035 . . {comprising two or more matrix materials}
- WARNING**
- Group [B29C 70/0035](#) is incomplete pending reclassification of documents from group [B29C 70/00](#).
- Groups [B29C 70/00](#) and [B29C 70/0035](#) should be considered in order to perform a complete search.
- 70/02 . . comprising combinations of reinforcements, {e.g. non-specified reinforcements, fibrous reinforcing inserts} and fillers, {e.g. particulate fillers}, incorporated in matrix material, forming one or more layers and with or without non-reinforced or non-filled layers {(combinations of fibrous reinforcement only [B29C 70/04](#); combinations of fillers only [B29C 70/58](#); combinations with non reinforcing inserts, e.g. foam blocks, [B29C 70/68](#))}
- 70/021 . . {Combinations of fibrous reinforcement and non-fibrous material}
- 70/023 . . . {with reinforcing inserts}
- 70/025 . . . {with particular filler}
- 70/026 . . {and with one or more layers of pure plastics material, e.g. foam layers (applying a non-preformed coating, e.g. a gel-coat [B29C 37/0025](#); with foam blocks [B29C 70/86](#))}
- 70/028 . . {and with one or more layers of non-plastics material or non-specified material, e.g. supports}
- 70/04 . . comprising reinforcements only, e.g. self-reinforcing plastics
- 70/06 . . Fibrous reinforcements only
- 70/08 . . . comprising combinations of different forms of fibrous reinforcements incorporated in matrix material, forming one or more layers, and with or without non-reinforced layers
- 70/081 {Combinations of fibres of continuous or substantial length and short fibres}
- 70/083 {Combinations of continuous fibres or fibrous profiled structures oriented in one direction and reinforcements forming a two dimensional structure, e.g. mats ([B29D 24/00](#), [B29D 99/001](#) take precedence)}
- 70/085 {the structure being deformed in a three dimensional configuration ([B29C 53/805](#) takes precedence)}
- 70/086 {and with one or more layers of pure plastics material, e.g. foam layers (applying a non-preformed coating, e.g. a gel-coat, [B29C 37/0025](#); with foam blocks [B29C 70/86](#))}
- 70/088 {and with one or more layers of non-plastics material or non-specified material, e.g. supports}
- 70/10 . . . characterised by the structure of fibrous reinforcements {, e.g. hollow fibres}
- 70/12 using fibres of short length, e.g. in the form of a mat {(non-woven fabrics per se [D04H 1/00](#))}
- 70/14 oriented
- 70/16 using fibres of substantial or continuous length {(non-woven fabrics per se [D04H 3/00](#))}

- 70/18 in the form of a mat, e.g. sheet moulding compound [SMC]
- 70/20 oriented in a single direction, e.g. roofing or other parallel fibres ([B29C 70/083](#), [B29C 70/226](#) take precedence)
- 70/202 {arranged in parallel planes or structures of fibres crossing at substantial angles, e.g. cross-moulding compound [XMC] ([B29C 70/207](#) takes precedence)}
- 70/205 {the structure being shaped to form a three-dimensional configuration}
- 70/207 {arranged in parallel planes of fibres crossing at substantial angles}
- 70/22 oriented in at least two directions forming a two dimensional structure ([woven fabrics per se D03D](#); [knitted fabrics per se D04D](#); [braid per se D04C](#))}
- 70/222 {the structure being shaped to form a three dimensional configuration}
- 70/224 {the structure being a net ([B29C 70/688](#) takes precedence)}
- 70/226 {the structure comprising mainly parallel filaments interconnected by a small number of cross threads}
- 70/228 {the structure being stacked in parallel layers with fibres of adjacent layers crossing at substantial angles}
- 70/24 oriented in at least three directions forming a three dimensional structure
- 70/26 . . Non-fibrous reinforcements only ([B29C 35/0272](#), [B29C 61/0625](#), [B29C 70/887](#) take precedence; combined with fibres [B29C 70/023](#))}
- 70/28 . . Shaping operations therefor
- NOTES**
1. This group covers:
- the shaping of a coherent fibrous reinforcements which are pre-impregnated or without binder; or of non-coherent reinforcements of fibres 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
- WARNING**
- Group [B29C 70/30](#) is impacted by reclassification into groups [B29C 70/302](#) – [B29C 70/304](#).
- Groups [B29C 70/30](#) and [B29C 70/302](#) – [B29C 70/304](#) should be considered in order to perform a complete search.
- 70/302 {Details of the edges of fibre composites, e.g. edge finishing or means to avoid delamination}
- WARNING**
- Group [B29C 70/302](#) is incomplete pending reclassification of documents from group [B29C 70/30](#).
- Groups [B29C 70/30](#) and [B29C 70/302](#) should be considered in order to perform a complete search.
- 70/304 {In-plane lamination by juxtaposing or interleaving of plies, e.g. scarf joining}
- WARNING**
- Group [B29C 70/304](#) is incomplete pending reclassification of documents from group [B29C 70/30](#).
- Groups [B29C 70/30](#) and [B29C 70/304](#) should be considered in order to perform a complete search.
- 70/305 {Spray-up of reinforcing fibres with or without matrix to form a non-coherent mat in or on a mould ([B29C 41/365](#), [B29C 70/32](#), [B29C 70/34](#), [B29C 70/502](#), [B29C 70/508](#) take precedence; coating a former by spraying plastics [B29C 41/08](#))}
- 70/32 on a rotating mould, former or core
- 70/323 {on the inner surface of a rotating mould}
- 70/326 {by rotating the mould around its axis of symmetry}
- 70/34 and shaping or impregnating by compression {, i.e. combined with compressing after the lay-up operation}
- 70/342 {using isostatic pressure}
- 70/345 {using matched moulds}
- 70/347 {combined with compressing after the winding of lay-ups having a non-circular cross-section, e.g. flat spiral windings}
- 70/36 and impregnating by casting, e.g. vacuum casting
- 70/38 Automated lay-up, e.g. using robots, laying filaments according to predetermined patterns {(application heads for tyres [B29D 30/28](#))}
- 70/382 {Automated fiber placement [AFP]}
- 70/384 {Fiber placement heads, e.g. component parts, details or accessories}
- 70/386 {Automated tape laying [ATL]}
- 70/388 {Tape placement heads, e.g. component parts, details or accessories}

- 70/40 . . . Shaping or impregnating by compression
([B29C 70/34](#) takes precedence){not applied}
- 70/42 for producing articles of definite length, i.e. discrete articles
- 70/44 using isostatic pressure, e.g. pressure difference-moulding, vacuum bag-moulding, autoclave-moulding or expanding rubber-moulding
- 70/443 {and impregnating by vacuum or injection}
- 70/446 {Moulding structures having an axis of symmetry or at least one channel, e.g. tubular structures, frames}
- 70/46 using matched moulds, e.g. for deforming sheet moulding compounds [SMC] or prepregs
- WARNING**
- Group [B29C 70/46](#) is impacted by reclassification into group [B29C 70/461](#).
- Groups [B29C 70/46](#) and [B29C 70/461](#) should be considered in order to perform a complete search.
- 70/461 {Rigid movable compressing mould parts acting independently from opening or closing action of the main mould}
- WARNING**
- Group [B29C 70/461](#) is incomplete pending reclassification of documents from group [B29C 70/46](#).
- Groups [B29C 70/46](#) and [B29C 70/461](#) should be considered in order to perform a complete search.
- 70/462 {Moulding structures having an axis of symmetry or at least one channel, e.g. tubular structures, frames}
- 70/465 {and impregnating by melting a solid material, e.g. sheets, powders of fibres}
- 70/467 {and impregnating the reinforcements during mould closing ([B29C 70/465](#) takes precedence)}
- 70/48 and impregnating the reinforcements in the closed mould, e.g. resin transfer moulding [RTM] {, e.g. by vacuum}
- 70/50 for producing articles of indefinite length, e.g. prepregs, sheet moulding compounds [SMC] or cross moulding compounds [XMC]
- 70/502 {by first forming a mat composed of short fibres}
- 70/504 {using rollers or pressure bands (for corrugating [B29C 53/22](#))}
- 70/506 {and impregnating by melting a solid material, e.g. sheet, powder, fibres ([B29C 70/508](#) takes precedence)}
- 70/508 {and first forming a mat composed of short fibres}
- 70/52 Pultrusion, i.e. forming and compressing by continuously pulling through a die
- 70/521 {and impregnating the reinforcement before the die}
- 70/522 {the transport direction being vertical}
- 70/523 {and impregnating the reinforcement in the die}
- 70/524 {the transport direction being vertical}
- 70/525 {Component parts, details or accessories; Auxiliary operations}
- 70/526 {Pultrusion dies, e.g. dies with moving or rotating parts ([B29C 70/523](#) takes precedence)}
- 70/527 {Pulling means}
- 70/528 {Heating or cooling}
- 70/54 Component parts, details or accessories; Auxiliary operations {, e.g. feeding or storage of prepregs or SMC after impregnation or during ageing}
- WARNING**
- Group [B29C 70/54](#) is impacted by reclassification into groups [B29C 70/544](#) and [B29C 70/549](#).
- Groups [B29C 70/54](#), [B29C 70/544](#) and [B29C 70/549](#) should be considered in order to perform a complete search.
- 70/541 {Positioning reinforcements in a mould, e.g. using clamping means for the reinforcement (positioning inserts in moulds [B29C 33/12](#); lay-up on a mould [B29C 70/30](#))}
- 70/542 {Placing or positioning the reinforcement in a covering or packaging element before or during moulding, e.g. drawing in a sleeve}
- 70/543 {Fixing the position or configuration of fibrous reinforcements before or during moulding (for non-woven fabrics [D04H 3/08](#))}
- 70/544 {Details of vacuum bags, e.g. materials or shape}
- WARNING**
- Group [B29C 70/544](#) is incomplete pending reclassification of documents from group [B29C 70/54](#).
- Groups [B29C 70/54](#) and [B29C 70/544](#) should be considered in order to perform a complete search.
- 70/545 {Perforating, cutting or machining during or after moulding}
- 70/546 {Measures for feeding or distributing the matrix material in the reinforcing structure}
- 70/547 {using channels or porous distribution layers incorporated in or associated with the product}
- 70/548 {using distribution constructions, e.g. channels incorporated in or associated with the mould}

- 70/549 {Details of caul plates, e.g. materials or shape}
- WARNING**
- Group [B29C 70/549](#) is incomplete pending reclassification of documents from group [B29C 70/54](#).
- Groups [B29C 70/54](#) and [B29C 70/549](#) should be considered in order to perform a complete search.
- 70/56 Tensioning reinforcements before or during shaping
- 70/58 comprising fillers only {, e.g. particles, powder, beads, flakes, spheres ([B29C 70/025](#) takes precedence, agglomerating hollow spheres to produce synthetic foam [B29C 70/66](#); compounding ingredients *per se* [C08K](#))}
- NOTE**
- Moulding of plastics matrix material mixed with fillers by a single technique is classified in the appropriate place for that technique.
- 70/585 . . {incorporation of light reflecting filler, e.g. lamellae to obtain pearlescent effect (partially embedding reflective elements into the surface of or support [B29D 11/00615](#))}
- 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
- 70/603 . . . {and with one or more layers of pure plastics material, e.g. foam layers (applying a non-preformed coating, e.g. a gel-coat [B29C 37/0025](#); with foam blocks [B29C 70/86](#))}
- 70/606 . . . {and with one or more layers of non-plastics material or non-specified material, e.g. supports}
- 70/62 . . the filler being oriented during moulding (for short fibres [B29C 70/14](#))
- 70/64 . . the filler influencing the surface characteristics of the material, e.g. by concentrating near the surface or by incorporating in the surface by force
- 70/66 . . the filler comprising hollow constituents, e.g. syntactic foam
- 70/68 . . by incorporating or moulding on preformed parts, e.g. inserts or layers {, e.g. foam blocks (mould constructions therefor [B29C 33/12](#); joining preformed parts by moulding [B29C 65/70](#))}
- NOTE**
- 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](#)
- 70/681 . . {Component parts, details or accessories; Auxiliary operations}
- 70/682 . . . {Preformed parts characterised by their structure, e.g. form}
- 70/683 . . . {Pretreatment of the preformed part, e.g. insert}
- 70/685 . . {by laminating inserts between two plastic films or plates}
- 70/686 . . . {the inserts being sheets or documents, e.g. ID cards}
- 70/687 . . . {the inserts being oriented, e.g. nets or meshes}
- 70/688 . . {the inserts being meshes or lattices ([B29C 70/82](#), [B29C 70/683](#) take precedence)}
- 70/70 . . Completely encapsulating inserts {([B29C 70/86](#) takes precedence)}
- 70/72 . . Encapsulating inserts having non-encapsulated projections, e.g. extremities or terminal portions of electrical components {([B29C 70/742](#) takes precedence)}
- 70/74 . . Moulding material on a relatively small portion of the preformed part, e.g. outsert moulding {([B29C 70/845](#) takes precedence)}
- 70/742 . . . {Forming a hollow body around the preformed part}
- 70/745 . . . {Filling cavities in the preformed part (for joining [B29C 70/84](#))}
- 70/747 . . . {Applying material, e.g. foam, only in a limited number of places or in a pattern, e.g. to create a decorative effect}
- 70/76 . . . Moulding on edges or extremities of the preformed part
- 70/763 {the edges being disposed in a substantial flat plane}
- 70/766 {on the end part of a tubular article}
- 70/78 . . Moulding material on one side only of the preformed part
- 70/80 . . . Moulding sealing material into closure members {(placing sealings in closures [B21D 51/46](#))}
- 70/82 . . Forcing wires, nets or the like partially or completely into the surface of an article, e.g. by cutting and pressing
- 70/84 . . by moulding material on preformed parts to be joined {(joining plastic parts by moulding [B29C 65/70](#))}
- 70/845 . . . {by moulding material on a relative small portion of the preformed parts}
- 70/86 . . Incorporated in coherent impregnated reinforcing layers, {e.g. by winding}
- 70/865 . . . {completely encapsulated}
- 70/88 . . characterised primarily by possessing specific properties, e.g. electrically conductive or locally reinforced
- 70/882 . . {partly or totally electrically conductive, e.g. for EMI shielding (conductive floors or floor coverings [H05F 3/025](#); EMI shielding in general [H05K 9/00](#))}
- 70/885 . . . {with incorporated metallic wires, nets, films or plates (as lost heating elements [B29C 35/0272](#), [B29C 61/0625](#))}
- 70/887 . . {locally reinforced, e.g. by fillers (filler concentrated near the surface [B29C 70/64](#))}
- 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](#) {; for joined or sealed parts [B29C 66/03](#); after-treatment specially adapted for vulcanising tyres [B29D 30/0633](#))}**

- 71/0009 . . {using liquids, e.g. solvents, swelling agents (spectacle cases, e.g. for cleaning contact lenses [A45C 11/04](#); disinfecting or sterilising contact lenses [A61L 12/00](#), using liquid substances [A61L 2/20](#); cleaning involving the use of liquid in general [B08B 3/00](#); for hydrating contact lenses [B29D 11/00067](#))}
 - 2071/0018 . . {Absorbing ingredients, e.g. drugs, flavourings, UV screeners, embedded in the articles}
 - 2071/0027 . . {Removing undesirable residual components, e.g. solvents, unreacted monomers (of material to be shaped [B29B 9/16](#), [B29B 13/00](#))}
 - 2071/0036 . . {Extracting, degassing, removing gases from moulded articles}
 - 2071/0045 . . {Washing using non-reactive liquids}
 - 2071/0054 . . {Supercritical fluid treatment, i.e. using a liquid in which distinct liquid and gas phases do not exist}
 - 71/0063 . . {for changing crystallisation}
 - 71/0072 . . {for changing orientation}
 - 71/0081 . . {using an electric field, e.g. for electrostatic charging (electrostatic pinning of extruded material [B29C 48/9165](#); fixing linings by electrostatic charges [B29C 63/0043](#))}
 - 71/009 . . {using gases without chemical reaction ([C08J 7/12](#) takes precedence; in combination with blow-moulding [B29C 49/46](#); surface treatment using plasma [B29C 59/14](#), ionised gas [B29C 59/16](#))}
 - 71/02 . . Thermal after-treatment {([B29C 71/0063](#) and [B29C 71/0072](#) take precedence)}
 - 2071/022 . . {Annealing}
 - 2071/025 . . {Quenching, i.e. rapid cooling of an object}
 - 2071/027 . . {Tempering, i.e. heating an object to a high temperature and quenching it}
 - 71/04 . . by wave energy or particle radiation {, e.g. for curing or vulcanising preformed articles (during moulding, e.g. in a mould [B29C 35/08](#))}
 - 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](#) ({linings for tyres acting locally [B60C 5/142](#);} retreading tyres [B29D 30/54](#); devices for covering leaks in pipes or hoses [F16L 55/16](#))**
 - 73/02 . . using liquid or paste-like material ([B29C 73/16](#) takes precedence)
 - 73/025 . . {fed under pressure}
 - 73/04 . . using preformed elements
 - 73/06 . . using plugs sealing in the hole
 - 73/063 . . . {expandable}
 - 73/066 {by mechanical means provided on the plug}
 - 73/08 . . . Apparatus therefor, e.g. for inserting
 - 73/10 . . using patches sealing on the surface of the article ([B29C 73/14](#) takes precedence)
 - 73/105 . . . {provided with a centering element}
 - 73/12 . . . Apparatus therefor, e.g. for applying ([B29C 73/30](#) takes precedence)
 - 73/14 . . using elements composed of two parts joined together after having been placed one on each side of the article
 - 73/16 . . Auto-repairing or self-sealing arrangements or agents {(incorporating auto-repairing or self-sealing arrangements or agents on or into tyres [B29D 30/0685](#))}
 - 73/163 . . {Sealing compositions or agents, e.g. combined with propellant agents}
 - 73/166 . . {Devices or methods for introducing sealing compositions into articles}
 - 73/18 . . the article material itself being self-sealing, e.g. by compression
 - 73/20 . . . the article material only consisting in part of a deformable sealing material
 - 73/22 . . the article containing elements including a sealing composition, e.g. powder being liberated when the article is damaged
 - 73/24 . . Apparatus or accessories not otherwise provided for
 - 73/245 . . {for removing the element having caused the damage}
 - 73/26 . . for mechanical pretreatment
 - 2073/262 . . . {for polishing, roughening, buffing or sanding the area to be repaired}
 - 2073/264 . . . {for cutting out or grooving the area to be repaired}
 - 2073/266 . . . {for cutting out an undercut for anchoring the repairing material}
 - 2073/268 . . . {for drilling holes in the area to be repaired}
 - 73/28 . . for clamping and stretching flexible material, e.g. inner tubes
 - 73/30 . . for local pressing or local heating
 - 73/305 . . . {specially adapted for toroidal articles, e.g. tyres ([B29C 73/325](#) takes precedence)}
 - 73/32 . . . using an elastic element, e.g. inflatable bag
 - 73/325 {specially adapted for toroidal articles, e.g. tyres}
 - 73/34 . . . for local heating
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- 2791/00** **Shaping characteristics in general**
- 2791/001 . . Shaping in several steps
 - 2791/002 . . Making articles of definite length, i.e. discrete articles ([B29C 53/40](#) takes precedence)
 - 2791/003 . . Making articles of indefinite length ([B29C 53/48](#) takes precedence)
 - 2791/004 . . Shaping under special conditions
 - 2791/005 . . Using a particular environment, e.g. sterile fluids other than air
 - 2791/006 . . Using vacuum
 - 2791/007 . . Using fluid under pressure
 - 2791/008 . . Using vibrations during moulding
 - 2791/009 . . Using laser (curing using laser [B29C 2035/0838](#), welding using laser beams [B29C 65/16](#))
- Particular articles**
- NOTE**
- Parts of specified articles are indexed with the same indexing codes as the articles
- 2793/00** **Shaping techniques involving a cutting or machining operation**
- 2793/0009 . . Cutting out
 - 2793/0018 . . for making a hole
 - 2793/0027 . . Cutting off
 - 2793/0036 . . Slitting
 - 2793/0045 . . Perforating
 - 2793/0054 . . partially cutting through the material
 - 2793/0063 . . Cutting longitudinally

2793/0072	. combined with rearranging and joining the cut parts	2945/76163	. . . Errors, malfunctioning
2793/0081	. before shaping	2945/76167	. . . Presence, absence of objects
2793/009	. after shaping	2945/7617	. . . Sequence, e.g. the order in which operations are conducted
2795/00	Printing on articles made from plastics or substances in a plastic state	2945/76177	. . Location of measurement
2795/002	. before shaping	2945/7618	. . . Injection unit
2795/005	. during shaping	2945/76183	. . . . hopper
2795/007	. after shaping	2945/76187	. . . . screw
2945/00	Indexing scheme relating to injection moulding, i.e. forcing the required volume of moulding material through a nozzle into a closed mould	2945/7619	. . . . barrel
2945/76	. Measuring, controlling or regulating	2945/76193	. . . . . barrel-chamber
2945/76003	. . Measured parameter	2945/76197	. . . . . screw ante-chamber
2945/76006	. . . Pressure	2945/762	. . . . injection piston
2945/7601	. . . . derivative, change thereof	2945/76204	. . . . injection piston cylinder
2945/76013	. . . . Force	2945/76207	. . . . accumulators
2945/76016	. . . . derivative, change thereof	2945/7621	. . . . nozzle
2945/7602	. . . . Torque	2945/76214	. . . . drive means
2945/76023	. . . . derivative, change thereof	2945/76217	. . . . nozzle-touch mechanism
2945/76026	. . . . Energy, power	2945/76224	. . . Closure or clamping unit
2945/7603	. . . . Power	2945/76227	. . . . mould platen
2945/76033	. . . . Electric current or voltage	2945/7623	. . . . clamping or closing drive means
2945/76036	. . . . Frequency	2945/76234	. . . . tie-bars
2945/7604	. . . . Temperature	2945/7624	. . . Ejection unit
2945/76043	. . . . derivative, change thereof	2945/76244	. . . . ejectors
2945/76046	. . . . Heat flux, heat transfer	2945/76247	. . . . . drive means thereof
2945/7605	. . . . Viscosity	2945/76254	. . . . Mould
2945/76053	. . . . derivative, change thereof	2945/76257	. . . . cavity
2945/76056	. . . . Flow rate	2945/7626	. . . . . cavity walls
2945/7606	. . . . derivative, change thereof	2945/76264	. . . . . movable
2945/76063	. . . . MFI, MFR	2945/76267	. . . . non-cavity forming parts
2945/76066	. . . . Time	2945/7627	. . . . . movable
2945/7607	. . . . start	2945/76274	. . . . runners, nozzles
2945/76073	. . . . termination	2945/76277	. . . . . nozzles
2945/76076	. . . . duration	2945/7628	. . . . . manifolds
2945/7608	. . . . pause, wilful interruption	2945/76287	. . . Moulding material
2945/76083	. . . . Position	2945/7629	. . . Moulded articles
2945/76086	. . . . Start position	2945/76294	. . . Inserts
2945/7609	. . . . End position	2945/76297	. . . Fluids
2945/76093	. . . . Angular position	2945/76301	. . . . auxiliary fluids introduced into the cavity
2945/76096	. . . . Distance	2945/76304	. . . . temperature control fluids
2945/761	. . . Dimensions, e.g. thickness	2945/76307	. . . . hydraulic fluids
2945/76103	. . . . shrinkage, dilation, dimensional change, warpage	2945/76311	. . . . environment
2945/76107	. . . . volume	2945/76314	. . . Auxiliary devices
2945/7611	. . . Velocity	2945/76317	. . . . robots, grippers
2945/76113	. . . . linear movement	2945/76321	. . . . conveyors
2945/76117	. . . . . derivative, change thereof	2945/76324	. . . . pre-treatment devices
2945/7612	. . . . rotational movement	2945/76327	. . . . post-treatment devices
2945/76123	. . . . . derivative, change thereof	2945/76331	. . . . raw material feeding devices
2945/76127	. . . . Density	2945/76334	. . . . auxiliary fluid supplying devices
2945/7613	. . . . Weight	2945/76344	. . Phase or stage of measurement
2945/76133	. . . Crystallinity	2945/76347	. . . Pre-treatment
2945/76137	. . . Degree of crosslinking, solidification	2945/76351	. . . Feeding
2945/7614	. . . Humidity, moisture	2945/76354	. . . . raw materials
2945/76143	. . . Volatiles	2945/76357	. . . . inserts
2945/76147	. . . Contaminants	2945/76361	. . . . auxiliary fluids, e.g. gas, liquid
2945/7615	. . . Electrical properties	2945/76367	. . . Metering
2945/76153	. . . Optical properties	2945/76371	. . . Intrusion
2945/76157	. . . Magnetic properties	2945/76374	. . . Pre-compression prior to injection
2945/7616	. . . Surface properties	2945/76377	. . . De-compression after injection
		2945/76381	. . . Injection
		2945/76384	. . . Holding, dwelling
		2945/76387	. . . Mould closing

2945/76391 . . . Mould clamping, compression of the cavity	2945/76602 derivative, change thereof
2945/76394 . . . Mould opening	2945/76605 rotational movement
2945/76397 . . . Switch-over	2945/76608 derivative, change thereof
2945/76401 metering-injection	2945/76612 . . . Density
2945/76404 injection-holding	2945/76615 . . . Weight
2945/76408 holding-metering	2945/76618 . . . Crystallinity
2945/76414 . . . Solidification, setting phase	2945/76622 . . . Degree of crosslinking, solidification
2945/76418 . . . Ejection	2945/76625 . . . Humidity, moisture
2945/76421 . . . Removing or handling ejected articles	2945/76628 . . . Volatiles
2945/76424 . . . After-treatment	2945/76632 . . . Contaminants
2945/76428 . . . Purging	2945/76635 . . . Electrical properties
2945/76431 . . . Calibration, e.g. zero-point correction	2945/76638 . . . Optical properties
2945/76434 . . . Parameter setting	2945/76642 . . . Magnetic properties
2945/76438 . . . Start up	2945/76645 . . . Surface properties
2945/76441 . . . Shut down	2945/76648 . . . Sequence, e.g. the order in which operations are conducted
2945/76444 in case of emergency	2945/76655 . . Location of control
2945/76451 . . Measurement means	2945/76658 . . . Injection unit
2945/76454 . . . Electrical, e.g. thermocouples	2945/76662 hopper
2945/76458 piezo-electric	2945/76665 screw
2945/76461 . . . Optical, e.g. laser	2945/76668 barrel
2945/76464 cameras	2945/76672 barrel-chamber
2945/76468 . . . Manual	2945/76675 screw ante-chamber
2945/76471 . . . Acoustic	2945/76678 injection piston
2945/76474 . . . Ultrasonic	2945/76682 injection piston cylinder
2945/76478 . . . Mechanical	2945/76685 accumulators
2945/76481 . . . Strain gauges	2945/76688 nozzle
2945/76484 . . . Fluid type	2945/76692 drive means
2945/76488 . . . Magnetic, electro-magnetic	2945/76695 nozzle-touch mechanism
2945/76494 . . Controlled parameter	2945/76702 . . . Closure or clamping device
2945/76498 . . . Pressure	2945/76705 mould platen
2945/76501 derivative, change thereof	2945/76709 clamping or closing drive means
2945/76505 . . . Force	2945/76712 tie-bars
2945/76508 derivative, change thereof	2945/76719 . . . Ejection unit
2945/76511 . . . Torque	2945/76722 ejectors
2945/76515 derivative, change thereof	2945/76725 drive means thereof
2945/76518 . . . Energy, power	2945/76732 . . . Mould
2945/76521 power	2945/76735 cavity
2945/76525 . . . Electric current or voltage	2945/76739 cavity walls
2945/76528 . . . Frequency	2945/76742 movable
2945/76531 . . . Temperature	2945/76745 non-cavity forming parts
2945/76535 derivative, change thereof	2945/76749 movable
2945/76538 . . . Viscosity	2945/76752 runners, nozzles
2945/76541 derivative, change thereof	2945/76755 nozzles
2945/76545 . . . Flow rate	2945/76759 manifolds
2945/76548 derivative, change thereof	2945/76765 . . . Moulding material
2945/76551 . . . Time	2945/76769 . . . Moulded articles
2945/76555 start	2945/76772 . . . Inserts
2945/76558 termination	2945/76775 . . . Fluids
2945/76561 duration	2945/76779 auxiliary fluids introduced into the cavity
2945/76565 pause, wilful interruption	2945/76782 temperature control fluids
2945/76568 . . . Position	2945/76785 hydraulic fluids
2945/76571 start position	2945/76789 environment
2945/76575 end position	2945/76792 . . . Auxiliary devices
2945/76578 angular position	2945/76795 robots, grippers
2945/76581 distance	2945/76799 conveyors
2945/76585 . . . Dimensions, e.g. thickness	2945/76802 pre-treatment devices
2945/76588 shrinkage, dilation, dimensional change, warpage	2945/76806 post-treatment devices
2945/76591 volume	2945/76809 raw material feeding devices
2945/76595 . . . Velocity	2945/76812 Auxiliary fluid supplying devices
2945/76598 linear movement	2945/76822 . . Phase or stage of control

- 2945/76826 . . . Pre-treatment
- 2945/76829 . . . Feeding
- 2945/76832 raw materials
- 2945/76836 inserts
- 2945/76839 auxiliary fluids, e.g. gas, liquid
- 2945/76846 . . . Metering
- 2945/76849 . . . Intrusion
- 2945/76852 . . . Pre-compression prior to injection
- 2945/76856 . . . De-compression after injection
- 2945/76859 . . . Injection
- 2945/76862 . . . Holding, dwelling
- 2945/76866 . . . Mould closing
- 2945/76869 . . . Mould clamping, compression of the cavity
- 2945/76872 . . . Mould opening
- 2945/76876 . . . Switch-over
- 2945/76879 metering-injection
- 2945/76882 injection-holding
- 2945/76886 holding-metering
- 2945/76892 . . . Solidification, setting phase
- 2945/76896 . . . Ejection
- 2945/76899 . . . Removing or handling ejected articles
- 2945/76903 . . . After-treatment
- 2945/76906 . . . Purging
- 2945/76909 . . . Calibration, e.g. zero-point correction
- 2945/76913 . . . Parameter setting
- 2945/76916 . . . Start up
- 2945/76919 . . . Shut down
- 2945/76923 in case of emergency
- 2945/76929 . . Controlling method
- 2945/76933 . . . The operating conditions are corrected immediately, during the same phase or cycle
- 2945/76936 . . . The operating conditions are corrected in the next phase or cycle
- 2945/76939 . . . Using stored or historical data sets
- 2945/76943 compare with thresholds
- 2945/76946 using an expert system, i.e. the system possesses a database in which human experience is stored, e.g. to help interfering the possible cause of a fault
- 2945/76949 using a learning system, i.e. the system accumulates experience from previous occurrences, e.g. adaptive control
- 2945/76953 . . . Distributed, i.e. several control units perform different tasks
- 2945/76956 . . . Proportional
- 2945/76959 and derivative, i.e. PD regulation
- 2945/76963 using a second derivative, e.g. determination of inflexion points
- 2945/76966 and integral, i.e. PI regulation
- 2945/76969 derivative and integral, i.e. PID regulation
- 2945/76973 . . . By counting
- 2945/76976 . . . By trial and error, trial tests
- 2945/76979 . . . Using a neural network
- 2945/76983 . . . Using fuzzy logic
- 2945/76986 . . . Interpolating
- 2945/76989 . . . Extrapolating
- 2945/76993 . . . Remote, e.g. LAN, wireless LAN
- 2948/00 Indexing scheme relating to extrusion moulding**
- 2948/92 . . Measuring, controlling or regulating
- 2948/92009 . . Measured parameter
- 2948/92019 . . . Pressure
- 2948/92028 . . . Force; Tension
- 2948/92038 . . . Torque
- 2948/92047 . . . Energy, power, electric current or voltage
- 2948/92057 . . . Frequency
- 2948/92066 . . . Time, e.g. start, termination, duration or interruption
- 2948/92076 . . . Position, e.g. linear or angular
- 2948/92085 . . . Velocity
- 2948/92095 Angular velocity
- 2948/92104 Flow or feed rate
- 2948/92114 . . . Dimensions
- 2948/92123 Diameter or circumference
- 2948/92133 Width or height
- 2948/92142 Length
- 2948/92152 Thickness
- 2948/92161 Volume or quantity
- 2948/92171 Distortion, shrinkage, dilatation, swell or warpage
- 2948/9218 . . . Weight
- 2948/9219 . . . Density, e.g. per unit length or area
- 2948/922 . . . Viscosity; Melt flow index [MFI]; Molecular weight
- 2948/92209 . . . Temperature
- 2948/92219 . . . Degree of crosslinking, solidification, crystallinity or homogeneity
- 2948/92228 . . . Content, e.g. percentage of humidity, volatiles, contaminants or degassing
- 2948/92238 . . . Electrical properties
- 2948/92247 . . . Optical properties
- 2948/92257 Colour
- 2948/92266 . . . Mechanical properties
- 2948/92276 . . . Magnetic properties
- 2948/92285 . . . Surface properties
- 2948/92295 . . . Errors or malfunctioning, e.g. for quality control
- 2948/92304 . . . Presence or absence; Sequence; Counting
- 2948/92314 . . . Particular value claimed
- 2948/92323 . . Location or phase of measurement
- 2948/92333 . . . Raw material handling or dosing, e.g. active hopper or feeding device
- 2948/92342 . . . Raw material pre-treatment, e.g. drying or cleaning
- 2948/92352 . . . Inserts
- 2948/92361 . . . Extrusion unit
- 2948/92371 Inlet shaft or slot, e.g. passive hopper; Injector, e.g. injector nozzle on barrel
- 2948/9238 Feeding, melting, plasticising or pumping zones, e.g. the melt itself
- 2948/9239 Screw or gear
- 2948/924 Barrel or housing
- 2948/92409 Die; Nozzle zone
- 2948/92419 Degassing unit
- 2948/92428 . . . Calibration, after-treatment, or cooling zone
- 2948/92438 . . . Conveying, transporting or storage of articles
- 2948/92447 . . . Moulded article
- 2948/92457 . . . Drive section, e.g. gearbox, motor or drive fluids
- 2948/92466 . . . Auxiliary unit, e.g. for external melt filtering, re-combining or transfer between units
- 2948/92476 . . . Fluids, e.g. for temperature control or of environment

- 2948/92485 . . . Start-up, shut-down or parameter setting phase; Emergency shut-down; Material change; Test or laboratory equipment or studies
- 2948/92495 . . . Treatment of equipment, e.g. purging, cleaning, lubricating or filter exchange
- 2948/92504 . . . Controlled parameter
- 2948/92514 . . . Pressure
- 2948/92523 . . . Force; Tension
- 2948/92533 . . . Torque
- 2948/92542 . . . Energy, power, electric current or voltage
- 2948/92552 . . . Frequency
- 2948/92561 . . . Time, e.g. start, termination, duration or interruption
- 2948/92571 . . . Position, e.g. linear or angular
- 2948/9258 . . . Velocity
- 2948/9259 Angular velocity
- 2948/926 Flow or feed rate
- 2948/92609 . . . Dimensions
- 2948/92619 Diameter or circumference
- 2948/92628 Width or height
- 2948/92638 Length
- 2948/92647 Thickness
- 2948/92657 Volume or quantity
- 2948/92666 Distortion, shrinkage, dilatation, swell or warpage
- 2948/92676 . . . Weight
- 2948/92685 . . . Density, e.g. per unit length or area
- 2948/92695 . . . Viscosity; Melt flow index [MFI]; Molecular weight
- 2948/92704 . . . Temperature
- 2948/92714 . . . Degree of crosslinking, solidification, crystallinity or homogeneity
- 2948/92723 . . . Content, e.g. percentage of humidity, volatiles, contaminants or degassing
- 2948/92733 . . . Electrical properties
- 2948/92742 . . . Optical properties
- 2948/92752 Colour
- 2948/92761 . . . Mechanical properties
- 2948/92771 . . . Magnetic properties
- 2948/9278 . . . Surface properties
- 2948/9279 . . . Errors or malfunctioning, e.g. for quality control
- 2948/928 . . . Presence or absence; Sequence; Counting
- 2948/92809 . . . Particular value claimed
- 2948/92819 . . Location or phase of control
- 2948/92828 . . . Raw material handling or dosing, e.g. active hopper or feeding device
- 2948/92838 . . . Raw material pre-treatment, e.g. drying or cleaning
- 2948/92847 . . . Inserts
- 2948/92857 . . . Extrusion unit
- 2948/92866 Inlet shaft or slot, e.g. passive hopper; Injector, e.g. injector nozzle on barrel
- 2948/92876 Feeding, melting, plasticising or pumping zones, e.g. the melt itself
- 2948/92885 Screw or gear
- 2948/92895 Barrel or housing
- 2948/92904 Die; Nozzle zone
- 2948/92914 Degassing unit
- 2948/92923 . . . Calibration, after-treatment or cooling zone
- 2948/92933 . . . Conveying, transporting or storage of articles
- 2948/92942 . . . Moulded article
- 2948/92952 . . . Drive section, e.g. gearbox, motor or drive fluids
- 2948/92961 . . . Auxiliary unit, e.g. for external melt filtering, re-combining or transfer between units
- 2948/92971 . . . Fluids, e.g. for temperature control or of environment
- 2948/9298 . . . Start-up, shut-down or parameter setting phase; Emergency shut-down; Material change; Test or laboratory equipment or studies
- 2948/9299 . . . Treatment of equipment, e.g. purging, cleaning, lubricating or filter exchange
- 2949/00 Blow moulding, i.e. blowing a preform or parison to a desired shape within a mould**
- 2949/78 . . Measuring, controlling or regulating
- 2949/78008 . . Measuring
- 2949/78016 . . . Measured parameter
- 2949/78025 Pressure
- 2949/78033 Energy, power, electric current or voltage
- 2949/78042 Time, e.g. start, termination, duration or interruption
- 2949/7805 Position, e.g. start, end or actual position
- 2949/78058 Velocity
- 2949/78067 Dimension
- 2949/78075 Diameter
- 2949/78084 Length
- 2949/78092 Thickness
- 2949/781 of individual layers of multilayered objects
- 2949/78109 Volume or quantity
- 2949/78117 Dimensional change, e.g. distortion or shrinkage
- 2949/78126 Weight
- 2949/78134 Density, e.g. per unit length or area
- 2949/78142 Viscosity
- 2949/78151 Temperature
- 2949/78159 Electrical properties
- 2949/78168 Optical properties
- 2949/78176 Colour, e.g. transparency
- 2949/78184 Mechanical properties
- 2949/78193 Magnetic properties
- 2949/78201 Surface properties
- 2949/7821 Errors or malfunctioning
- 2949/78218 Presence or absence, e.g. of preforms or parisons
- 2949/78226 . . . Location or phase of measurement
- 2949/78235 Injection phase or unit
- 2949/78243 Extrusion phase or unit
- 2949/78252 Die; Nozzle zone
- 2949/7826 Handling phase or unit, e.g. feeding device
- 2949/78268 of blow moulded articles
- 2949/78277 of inserts
- 2949/78285 of labels
- 2949/78294 Blow moulding phase
- 2949/78302 Closure, opening or clamping phase or unit
- 2949/7831 during opening phase
- 2949/78319 during clamping phase
- 2949/78327 Ejection phase or unit
- 2949/78336 Mould
- 2949/78344 cavity
- 2949/78352 non cavity forming parts

2949/78361	core of the injection blow moulding machine, e.g. core transporting preform to blow moulding machine	2949/78806	Blow moulding phase
2949/78369	Stretching phase or unit	2949/78815	Closure, opening or clamping phase or unit
2949/78378	Blowing means, pressurized phase	2949/78823	during opening phase
2949/78386	Preform or parison	2949/78831	during clamping phase
2949/78394	Moulded articles	2949/7884	Ejection phase or unit
2949/78403	Inserts	2949/78848	Mould
2949/78411	Fluids	2949/78857	cavity
2949/7842	introduced into the preform, parison or blown article	2949/78865	non cavity forming parts
2949/78428	for temperature control	2949/78873	core of the injection blow moulding machine, e.g. core transporting preform to blow moulding machine
2949/78436	Temperature control fluids, i.e. to regulate the temperature in the blow mould	2949/78882	Stretching phase or unit
2949/78445	Driving means, e.g. motor or drive fluids	2949/7889	Blowing means, pressurized phase
2949/78453	Auxiliary phases or units	2949/78899	Preform or parison
2949/78462	Pre-treatment phase or devices	2949/78907	Moulded articles
2949/7847	Post-treatment phases or devices	2949/78915	Inserts
2949/78478	Start-up, shut-down phase; Emergency shut down	2949/78924	Fluids
2949/78487	Measurement means	2949/78932	introduced into the preform, parison or blown article
2949/78495	Electrical, e.g. thermocouples	2949/78941	for temperature control
2949/78504	Optical, e.g. laser	2949/78949	Temperature control fluids, i.e. to regulate the temperature in the blow mould
2949/78512	Cameras	2949/78957	Driving means, e.g. motor or drive fluids
2949/78521	Controlling or regulating	2949/78966	Auxiliary phases or units
2949/78529	Controlled parameter	2949/78974	Pre-treatment phases or devices
2949/78537	Pressure	2949/78983	Post-treatment phases or devices
2949/78546	Energy, power, electric current or voltage	2949/78991	Start-up, shut-down phase; Emergency shut down
2949/78554	Time, e.g. start, termination, duration or interruption		
2949/78563	Position, e.g. start, end or actual position		
2949/78571	Velocity		
2949/78579	Dimension		
2949/78588	Diameter		
2949/78596	Length		
2949/78605	Thickness		
2949/78613	of individual layers of multilayered objects		
2949/78621	Volume or quantity		
2949/7863	Dimensional change, e.g. distortion or shrinkage		
2949/78638	Weight		
2949/78647	Density, e.g. per unit length or area		
2949/78655	Viscosity		
2949/78663	Temperature		
2949/78672	Electrical properties		
2949/7868	Optical properties		
2949/78689	Colour, e.g. transparency		
2949/78697	Mechanical properties		
2949/78705	Magnetic properties		
2949/78714	Surface properties		
2949/78722	Errors or malfunctioning		
2949/78731	Presence or absence, e.g. of preforms or parisons		
2949/78739	Location or phase of control		
2949/78747	Injection phase or unit		
2949/78756	Extrusion phase or unit		
2949/78764	Die; Nozzle zone		
2949/78773	Handling phase or unit, e.g. feeding device		
2949/78781	of blow moulded articles		
2949/78789	of inserts		
2949/78798	of labels		