

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} |

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|---|--|-----------|--|
| 31/045 | {moving along predetermined circuits or distributing the material according to predetermined patterns} | 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)} |
| 31/047 | . . . {combined with moving moulds (B29C 31/044 , B29C 31/048 take precedence)} | 33/0044 | . . {for sealing off parts of inserts projecting into the mould cavity} |
| 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} | 33/005 | . {characterised by the location of the parting line of the mould parts} |
| 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)} | 33/0055 | . {with incorporated overflow cavities (in particular in injection moulds B29C 45/2669)} |
| 31/061 | . . . {using stationary volumetric measuring chambers} | 33/0061 | . {characterised by the configuration of the material feeding channel (sprue channels for injection moulding B29C 45/27)} |
| 31/063 | {of the piston type} | 33/0066 | . . {with a subdivided channel for feeding the material to a plurality of locations} |
| 31/065 | . . . {using volumetric measuring chambers moving between a charging station and a discharge station} | 33/0072 | . . {with a configuration promoting turbulence, e.g. for after-mixing in the mould} |
| 31/066 | {using feed frames, e.g. for dry material} | 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} |
| 31/068 | {of the piston type} | 33/0083 | . {Electrical or fluid connection systems therefor} |
| 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)} | 33/0088 | . {Multi-face stack moulds} |
| NOTE | | 2033/0094 | . {Means for masking a part of the moulding surface} |
| 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 | | 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} |
| 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)} | 33/044 | . . . {in rolls calenders or drums} |
| 31/10 | . . of several materials | 33/046 | . . . {using gas} |
| 33/00 | Moulds or cores; Details thereof or accessories therefor | 33/048 | . . . {using steam} |
| 2033/0005 | . {with transparent parts, e.g. permitting visual inspection of the interior of the cavity} | 33/06 | . . using radiation {, e.g. electro-magnetic waves, induction heating} |
| 33/0011 | . {thin-walled moulds} | 33/065 | . . . {in rolls, calenders or drums} |
| 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)} | 33/08 | . . for dielectric heating |
| 33/0022 | . {Multi-cavity moulds (B29C 33/301 takes precedence)} | 33/085 | . . . {using rolls, calenders or drums} |
| 33/0027 | . . {with deep narrow cavities, e.g. for making piles (non-woven pile fabrics D04H 11/00)} | 33/10 | . with incorporated venting means |
| 33/0033 | . {constructed for making articles provided with holes} | 33/12 | . with incorporated means for positioning inserts, e.g. labels {(positioning reinforcements B29C 70/541)} |
| NOTE | | 33/123 | . . {for centering the inserts} |
| If the hole is made by cutting means associated with the mould, see the relevant moulding technique | | 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)

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|--------------|--|--------------|---|
| 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) | 35/049 | . . . {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} |
| 35/002 | . {Component parts, details or accessories; Auxiliary operations} | 2035/0811 | {using induction} |
| 2035/005 | . . {Enveloping the material to be cured, e.g. by helically winding a film around the material} | 2035/0816 | {using eddy currents} |
| 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)} | 2035/0822 | {using IR radiation} |
| | | 2035/0827 | {using UV radiation} |
| | | 2035/0833 | {using actinic light} |
| | | 2035/0838 | {using laser} |
| | | 2035/0844 | {using X-ray} |
| 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) | 2035/085 | {using gamma-ray} |
| | | 2035/0855 | {using microwave} |
| | | 2035/0861 | {using radio frequency} |
| 2035/0211 | . . {resistance heating (B29C 2035/0811 takes precedence)} | 35/0866 | . . . {using particle radiation} |
| 2035/0216 | . . {using Peltier-effect} | 2035/0872 | {using ion-radiation, e.g. alpha-rays} |
| 35/0222 | . . {the curing continuing after removal from the mould (B29C 35/0233 takes precedence)} | 2035/0877 | {using electron radiation, e.g. beta-rays} |
| 35/0227 | . . {using pressure vessels, e.g. autoclaves, vulcanising pans (B29C 35/065 takes precedence)} | 2035/0883 | {using neutron radiation} |
| | | 35/0888 | . . . {using transparant moulds} |
| 35/0233 | . . . {the curing continuing after removal from the mould} | 35/0894 | {provided with masks or diaphragms} |
| 35/0238 | . . . {Presses provided with pressure vessels, e.g. steam chambers} | 35/10 | . . . for articles of indefinite length |
| 35/0244 | . . {using fluidised bed} | 35/12 | . . Dielectric heating |
| 35/025 | . . . {for articles of indefinite length} | 35/14 | . . . for articles of indefinite length |
| 35/0255 | . . {using friction} | 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)} |
| 35/0261 | . . {using ultrasonic or sonic vibrations} | 2035/1608 | . . . {using Peltier-effect} |
| 35/0266 | . . {Local curing (for repairing B29C 73/34)} | 2035/1616 | . . . {using liquids} |
| 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)} | 2035/1625 | {other than water} |
| | | 2035/1633 | {oil} |
| 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)} | 2035/1641 | {mercury} |
| 2035/0283 | . . {Thermal pretreatment of the plastics material (thermal after-treatment B29C 71/02)} | 2035/165 | {liquified gases} |
| 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)} | 2035/1658 | . . {using gas} |
| | | 2035/1666 | . . . {dried air} |
| 35/0294 | . . . {using tempering units for temperature control of moulds or cores} | 2035/1675 | . . . {other than air} |
| 35/04 | . . using liquids, gas or steam | 2035/1683 | {inert gas} |
| 35/041 | . . . {using liquids} | 2035/1691 | . . {using gas-liquid mixtures} |
| 2035/042 | {other than water} | 35/18 | . Cold vulcanisation |
| 2035/043 | {oil} | 37/00 | Component parts, details, accessories or auxiliary operations, not covered by group B29C 33/00 or B29C 35/00 |
| 2035/044 | {mercury} | 37/0003 | . {Discharging moulded articles from the mould (constructions for removing the articles B29C 33/44)} |
| 35/045 | . . . {using gas or flames} | 37/0007 | . . {using means operable from outside the mould for moving between mould parts, e.g. robots} |
| 2035/046 | {dried air} | 37/001 | . . . {combined with means for loading preforms to be moulded or inserts, e.g. preformed layers} |
| 2035/047 | {other than air} | 37/0014 | . . {by flexibly or permanently deforming undercut portions of the articles} |
| 2035/048 | {inert gas} | 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}

WARNING

Group [B29C 39/021](#) is incomplete pending reclassification of documents from group [B29D 2009/00](#).

Groups [B29D 2009/00](#) and [B29C 39/021](#) should be considered in order to perform a complete search.

- 39/023 . . . {for making multicoloured articles}

WARNING

Group [B29C 39/023](#) is incomplete pending reclassification of documents from group [B29D 2009/00](#).

Groups [B29D 2009/00](#) and [B29C 39/023](#) should be considered in order to perform a complete search.

- 39/025 . . . {for making multilayered articles}

WARNING

Group [B29C 39/025](#) is incomplete pending reclassification of documents from group [B29D 2009/00](#).

Groups [B29D 2009/00](#) and [B29C 39/025](#) should be considered in order to perform a complete search.

- 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)}
- WARNING**
- Group [B29C 39/12](#) is incomplete pending reclassification of documents from group [B29D 2009/00](#).
- Groups [B29D 2009/00](#) and [B29C 39/12](#) should be considered in order to perform a complete search.
- 39/123 . . . {Making multilayered articles}
- WARNING**
- Group [B29C 39/123](#) is incomplete pending reclassification of documents from group [B29D 2009/00](#).
- Groups [B29D 2009/00](#) and [B29C 39/123](#) should be considered in order to perform a complete search.
- 39/126 {by casting between two preformed layers, e.g. deformable layers (between two glass layers [B32B 17/10917](#))}
- WARNING**
- Group [B29C 39/126](#) is incomplete pending reclassification of documents from group [B29D 2009/00](#).
- Groups [B29D 2009/00](#) and [B29C 39/126](#) should be considered in order to perform a complete search.
- 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 different 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 and related details, e.g. fixing, clamping (vacuum bagging [B29C 70/44](#); flexible pressing means [B30B 5/02](#); membrane press [B30B 9/22](#); applying pressure through membranes [B29C 51/28](#); bladders for making tires [B29D 30/0601](#); 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}
- 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 constructions}
- 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 calendaring [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

B29C 45/0001

(continued)

- 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}

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| 2045/2634 | | {mounting layers between stamper and mould or on the rear surface of the stamper} | 2045/2706 | | {rotatable sprue bushings or runner channels for controlling runner flow in one cavity} |
| 2045/2636 | | {insulating layers} | 45/2708 | | {Gates (B29C 45/2703 takes precedence)} |
| 2045/2638 | | {Magnetic means for mounting stampers} | 2045/2709 | | {with a plurality of mould cavity inlets in close proximity} |
| 2045/264 | | {Holders retaining the inner periphery of the stamper} | 45/2711 | | {Gate inserts} |
| 45/2642 | | {Heating or cooling means therefor} | 2045/2712 | | {Serial gates for moulding articles in successively filled serial mould cavities} |
| 2045/2644 | | {for the outer peripheral ring} | 2045/2714 | | {elongated, e.g. film-like, annular} |
| 2045/2646 | | {Means for adjusting the axial dimension of the mould cavity} | 2045/2716 | | {The gate axis being perpendicular to main injection axis, e.g. injecting into side walls of a container} |
| 2045/2648 | | {Outer peripheral ring constructions} | 2045/2717 | | {Reconfigurable runner channels} |
| 2045/2651 | | {using a plurality of mould cavities} | 2045/2719 | | {Fixing or locking of nozzles or sprue bushings in the mould} |
| 2045/2653 | | {using two stampers} | 2045/272 | | {Part of the nozzle, bushing or runner in contact with the injected material being made from ceramic material} |
| 2045/2655 | | {Means for adjusting the radial dimension of the mould cavity} | 2045/2722 | | {Nozzles or runner channels provided with a pressure sensor} |
| 2045/2657 | | {Drive means for the outer peripheral ring} | 2045/2724 | | {Preventing stringing of the moulding material} |
| 2045/2659 | | {for making substrates for laminated disks} | 45/2725 | | {Manifolds} |
| 2045/2661 | | {The thickness of the mould cavity being changeable in radial direction (B29C 2045/2667 takes precedence)} | 45/2727 | | {Modular manifolds; Connections between spaced manifold elements} |
| 2045/2663 | | {Maintaining the axial dimension of the mould cavity during injection} | 2045/2729 | | {with thermal expansion} |
| 2045/2665 | | {using vacuum means for holding the disc on one of the mould walls during opening of the mould} | 2045/273 | | {stacked manifolds} |
| 2045/2667 | | {Particular inner or outer peripheral portions of the substrate} | 2045/2732 | | {sealing means between them} |
| 45/2669 | | {with means for removing excess material, e.g. with overflow cavities (B29C 45/1711 takes precedence)} | 2045/2733 | | {Inserts, plugs, bushings} |
| 2045/2671 | | {Resin exit gates or bleeder passages} | 45/2735 | | {for non-coaxial gates, e.g. for edge gates} |
| 45/2673 | | {with exchangeable mould parts, e.g. cassette moulds (B29C 45/1756 takes precedence)} | 45/2737 | | {Heating or cooling means therefor (B29C 45/7331 takes precedence)} |
| 45/2675 | | {Mounting of exchangeable mould inserts} | 45/2738 | | {specially adapted for manifolds} |
| 2045/2677 | | {The exchangeable mould parts being combinable or rearrangeable in different ways} | 2045/274 | | {Thermocouples or heat sensors} |
| 2045/2679 | | {Simultaneously producing different products} | 2045/2741 | | {Plurality of independent thermocouples or heat sensors} |
| 45/2681 | | {with rotatable mould parts} | 2045/2743 | | {Electrical heating element constructions} |
| 2045/2683 | | {Plurality of independent mould cavities in a single mould} | 2045/2745 | | {Film-like electrical heaters} |
| 2045/2685 | | {filled with different materials} | 2045/2746 | | {Multilayered electrical heaters} |
| 2045/2687 | | {controlling the filling thereof (B29C 2045/2691 takes precedence)} | 2045/2748 | | {Insulating layers covering the electrical heating element} |
| 2045/2689 | | {separate independent mould halves mounted on one plate} | 2045/275 | | {Planar heating or cooling elements} |
| 2045/2691 | | {sequentially filled} | 2045/2751 | | {Electrical power supply connections} |
| 2045/2693 | | {Mould cores with a built-in injection nozzle} | 2045/2753 | | {Heating means and cooling means, e.g. heating the runner nozzle and cooling the nozzle tip} |
| 2045/2695 | | {injecting articles with varying wall thickness, e.g. for making a tear line} | 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)} |
| 2045/2697 | | {Deformed geometry of the cavity} | 45/2756 | | {Cold runner channels} |
| 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} |
| | | | 2045/2764 | | {Limited contact between nozzle and mould} |
| | | | 2045/2766 | | {Heat insulation between nozzle and mould} |
| | | | 2045/2767 | | {the heat insulation being provided with an axial opening being part of the melt flow channel} |

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| 2045/2769 | | {Insulating layer of injected material} | 2045/2855 | | {intersecting the nozzle or runner channel} |
| 2045/277 | | {Spacer means or pressure pads between manifold and mould plates} | 2045/2858 | | {Materials or coatings therefor} |
| 2045/2772 | | {Means for fixing the nozzle to the manifold} | 2045/2862 | | {being tubular} |
| 2045/2774 | | {The nozzle head or the collar portion and central portion being made of different parts or materials} | 2045/2865 | | {having position detecting means} |
| 2045/2775 | | {Nozzles or parts thereof being mountable or exchangeable from the front side of the mould half} | 2045/2868 | | {with an incorporated heat pipe} |
| 2045/2777 | | {Means for controlling heat flow or temperature distribution in the nozzle} | 2045/2872 | | {with at least three positions, e.g. two different open positions to control the melt flow} |
| 2045/2779 | | {Nozzles with a plurality of outlets} | 2045/2875 | | {Preventing rotation of the needle valve} |
| 45/278 | | {Nozzle tips (B29C 45/2735 takes precedence)} | 2045/2879 | | {Back flow of material into nozzle channel} |
| 2045/2782 | | {Nozzle tips metallurgically bonded to the nozzle body} | 2045/2882 | | {closing by a movement in the counterflow direction} |
| 2045/2783 | | {Nozzle tips with a non-axial outlet opening of the melt channel} | 2045/2886 | | {closing at a distance from the gate} |
| 2045/2785 | | {Nozzle tips with high thermal conductivity} | 2045/2889 | | {Sealing guide bushings therefor} |
| 2045/2787 | | {Nozzle tips made of at least 2 different materials} | 2045/2893 | | {Multiple coaxial needle valves} |
| 2045/2788 | | {Nozzles having a polygonal cross section} | 45/2896 | | {extending in or through the mould cavity, e.g. valves mounted opposite the sprue channel} |
| 2045/279 | | {Controlling the flow of material of two or more nozzles or gates to a single mould cavity} | 45/30 | | Flow control means disposed within the sprue channel, e.g. "torpedo" construction |
| 2045/2791 | | {Alignment means between nozzle and manifold} | 2045/302 | | {Torpedoes in the sprue channel for heating the melt of cross-linkable material} |
| 2045/2793 | | {Means for providing access to the runner system} | 2045/304 | | {Adjustable torpedoes} |
| 2045/2795 | | {Insulated runners} | 2045/306 | | {Movable torpedoes} |
| 2045/2796 | | {Axially movable nozzles or nozzle tips} | 2045/308 | | {Mixing or stirring devices} |
| 2045/2798 | | {for compensating thermal expansion} | 45/32 | | having several axially spaced mould cavities {, i.e. for making several separated articles} |
| 45/28 | | Closure devices therefor | 45/322 | | {Runner systems for distributing the moulding material to the stacked mould cavities} |
| 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} | 2045/324 | | {Linked ejection means} |
| 45/2806 | | {consisting of needle valve systems (B29C 45/2896 takes precedence)} | 2045/326 | | {Supporting means for the central mould plate} |
| 45/281 | | {Drive means therefor} | 2045/328 | | {having a movable mould plate between two fixed mould plates} |
| 2045/2813 | | {Common drive means for several needle valves} | 45/33 | | having transversely, e.g. radially, movable mould parts |
| 2045/2817 | | {Several valve pin drive cylinders connected to the fluid distributor} | 45/332 | | {Mountings or guides therefor; Drives therefor} |
| 2045/282 | | {Needle valves driven by screw and nut means} | 2045/334 | | {several transversely movable mould parts driven by a single drive means} |
| 2045/2824 | | {Needle valves driven by an electric motor} | 2045/336 | | {Cam drives} |
| 2045/2827 | | {Needle valves driven by an annular piston mounted around the nozzle} | 2045/338 | | {Mould parts with combined axial and transversal movements} |
| 2045/2831 | | {Needle valves driven by a cam} | 45/34 | | having venting means |
| 2045/2834 | | {Needle valves driven by a lever} | 45/345 | | {using a porous mould wall or a part thereof, e.g. made of sintered metal} |
| 2045/2837 | | {Needle valves driven by rack and pinion} | 45/36 | | having means for locating or centering cores |
| 2045/2841 | | {Needle valves driven by a plurality of coaxial pistons} | 2045/363 | | {using a movable core or core part} |
| 2045/2844 | | {Needle valves driven by racks only} | 2045/366 | | {using retractable pins} |
| 2045/2848 | | {having an adjustable stroke length} | 45/37 | | Mould cavity walls {, i.e. the inner surface forming the mould cavity, e.g. linings} |
| 2045/2851 | | {Lateral movement between drive piston and needle valve} | 45/372 | | {provided with means for marking or patterning, e.g. numbering articles} |
| | | | 45/374 | | {for displaying altering indicia, e.g. data, numbers} |
| | | | 45/376 | | {adjustable (B29C 45/374 takes precedence)} |
| | | | 2045/378 | | {built by a stack of modular elements} |

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| 45/38 | | Cutting-off equipment for sprues or ingates | 2045/4414 | | {Flexible undercut parts divided into segments} |
| 45/382 | | {disposed outside the mould} | 45/4421 | | {using expansible or collapsible cores} |
| 2045/384 | | {cutting the sprue by a plunger movable into the runner channel} | 2045/4428 | | {driven by the moulded article during ejection thereof} |
| 2045/386 | | {returning the cutted sprue into the injection nozzle} | 45/4435 | | {using inclined, tiltable or flexible undercut forming elements driven by the ejector means} |
| 2045/388 | | {Locking pins for retaining the sprue} | 2045/4442 | | {Flexible undercut forming elements} |
| 45/40 | | Removing or ejecting moulded articles | 2045/445 | | {using the movable undercut forming element for ejection of the moulded article} |
| 45/4005 | | {Ejector constructions; Ejector operating mechanisms (B29C 45/44 takes precedence) } | 45/4457 | | {using fusible, soluble or destructible cores} |
| 45/401 | | {Ejector pin constructions or mountings} | 2045/4464 | | {injecting the core and the undercut article in separate cavities} |
| 2045/4015 | | {Ejector pins provided with sealing means} | 45/4471 | | {using flexible or pivotable undercut forming elements (B29C 45/4435 takes precedence) } |
| 2045/4021 | | {Adjustable ejector pins} | 45/4478 | | {using non-rigid undercut forming elements, e.g. elastic or resilient} |
| 2045/4026 | | {Ejectors with internal cooling} | 2045/4485 | | {the undercut forming mould part being rotatable into the space made available by the translation movement of another mould part} |
| 2045/4031 | | {driven by a lever} | 2045/4492 | | {preventing damage or deformation of undercut articles during ejection} |
| 2045/4036 | | {driven by a screw and nut mechanism} | 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)} |
| 2045/4042 | | {driven by rack and pinion means} | 45/461 | | {Injection of measured doses} |
| 2045/4047 | | {driven by a crank or eccentric} | 45/462 | | {Injection of preformed charges of material} |
| 2045/4052 | | {Ejector boxes} | 45/463 | | {using packaged or wrapped charges} |
| 2045/4057 | | {the ejecting surface being large with regard to the surface of the article} | 45/464 | | {using a rotating plasticising or injection disc} |
| 2045/4063 | | {preventing damage to articles caused by the ejector} | 2045/465 | | {using pumps for injecting the material into the mould} |
| 2045/4068 | | {using an auxiliary mould part carrying the moulded article and removing it from the mould} | 2045/466 | | {supplying the injection unit directly by a compounder} |
| 2045/4073 | | {Ejection devices located outside the injection moulding machine} | 2045/467 | | {injecting material into the mould by sudden expansion of compressed material in the injection unit} |
| 2045/4078 | | {using stripping means} | 2045/468 | | {using a fluid as directly acting injection means} |
| 2045/4084 | | {Progressive ejection} | 45/47 | | using screws (B29C 45/54 takes precedence) |
| 2045/4089 | | {Hollow articles retained in the female mould during mould opening} | 45/48 | | Plasticising screw and injection screw {comprising two separate screws} |
| 2045/4094 | | {Ejectors located on the fixed mould half} | 45/50 | | Axially movable screw |
| 45/42 | | using means movable from outside the mould between mould parts {, e.g. robots} | 2045/5004 | | {the forward screw end provided with an injection ram} |
| 45/4208 | | {and driven by the movable mould part} | 45/5008 | | {Drive means therefor} |
| 2045/4216 | | {releasable drive connections between the robot and the movable mould} | 2045/5012 | | {screws axially driven by a toggle mechanism} |
| 45/4225 | | {Take-off members or carriers for the moulded articles, e.g. grippers} | 2045/5016 | | {screws axially driven by a lever mechanism} |
| 2045/4233 | | {loading or holding moulded articles in take-off member by fluid ejection} | 2045/502 | | {screws axially driven by a crank or eccentric mechanism} |
| 2045/4241 | | {Auxiliary means for removing moulded articles from the robot} | 2045/5024 | | {screws rotated by the coaxial rotor of an electric motor} |
| 2045/425 | | {Single device for unloading moulded articles and loading inserts into the mould} | 2045/5028 | | {screws axially driven by the coaxial rotor of an electric motor} |
| 2045/4258 | | {Article removing means movable into a closed mould} | 2045/5032 | | {using means for detecting injection or back pressures} |
| 2045/4266 | | {Robot grippers movable along three orthogonal axes} | 2045/5036 | | {back pressure obtaining means} |
| 2045/4275 | | {Related movements between the robot gripper and the movable mould or ejector} | 2045/504 | | {electric motors for rotary and axial movement of the screw being coaxial with the screw} |
| 2045/4283 | | {Means for coupling robots to the injection moulding machine} | | | |
| 2045/4291 | | {Robots mounted on a tie rod} | | | |
| 45/43 | | using fluid under pressure | | | |
| 45/435 | | {introduced between a mould core and a hollow resilient undercut article, e.g. bellows} | | | |
| 45/44 | | for undercut articles | | | |
| 45/4407 | | {by flexible movement of undercut portions of the articles} | | | |

| | | | | | |
|-----------|-----------|--|-----------|-----------|--|
| 2045/5044 | | {screws axially driven by rack and pinion means} | 2045/545 | | {alternately operating injection plungers} |
| 2045/5048 | | {screws axially driven and rotated by a drive shaft having a screw threaded part and spline part} | 2045/547 | | {continuously rotating plasticising screw cooperating with a single injection plunger (B29C 45/542 takes precedence)} |
| 2045/5052 | | {screws axially driven by a rotatable nut cooperating with a fixed screw shaft} | 2045/548 | | {Reciprocating plasticising screws} |
| 2045/5056 | | {screws axially driven by a rotatable screw shaft cooperating with a fixed nut} | 45/56 | | using mould parts movable during or after injection, e.g. injection-compression moulding {(B29C 45/1705 and B29C 45/572 take precedence)} |
| 2045/506 | | {using a hydraulic transmission between drive motor and the axially movable screw} | 45/5605 | | {Rotatable mould parts} |
| 2045/5064 | | {coupling means between rotation motor and rectilinear drive motor} | 45/561 | | {Injection-compression moulding} |
| 2045/5068 | | {mechanical drive means in series with hydraulic drive means for axially movable screw} | 2045/5615 | | {Compression stroke, e.g. length thereof} |
| 2045/5072 | | {using a drive screw comprising screw parts having opposite thread directions} | 2045/562 | | {Velocity profiles of the compression stroke} |
| 2045/5076 | | {using a single drive motor for rotary and for axial movements of the screw} | 2045/5625 | | {Closing of the feed opening before or during compression} |
| 2045/508 | | {idle or dead stroke elements between injection screw and drive means} | 2045/563 | | {Enlarging the mould cavity during injection} |
| 2045/5084 | | {screws axially driven by roller elements} | 2045/5635 | | {Mould integrated compression drive means} |
| 2045/5088 | | {screws axially and rotatably driven by a piston} | 2045/564 | | {Compression drive means acting independently from the mould closing and clamping means} |
| 45/5092 | | {Intrusion moulding, i.e. the screw rotates during injection} | 2045/5645 | | {Resilient compression means} |
| 2045/5096 | | {decompression of the moulding material by retraction or opposite rotation of the screw} | 2045/565 | | {Closing of the mould during injection} |
| 45/52 | | Non-return devices | 2045/5655 | | {using a screw mechanism as compression drive means} |
| 2045/522 | | {Spring biased check rings} | 2045/566 | | {Reducing compression pressure during cooling of the moulded material} |
| 2045/524 | | {Flexible valves} | 2045/5665 | | {Compression by transversely movable mould parts (transversely movable mould parts in general B29C 45/33)} |
| 2045/526 | | {Abrasion resistant means in the screw head or non-return device} | 2045/567 | | {Expelling resin through the gate} |
| 2045/528 | | {Mixing means forming part of or in close proximity to the non-return valve} | 45/5675 | | {for making orifices in or through the moulded article} |
| 45/53 | | using injection ram or piston | 45/568 | | {Applying vibrations to the mould parts} |
| 45/531 | | {Drive means therefor} | 2045/5685 | | {for eliminating internal voids in the moulding material} |
| 45/532 | | {using a hollow injection ram co-operating with a coaxial screw} | 2045/569 | | {using a mould part for decreasing and a mould part for increasing the volume of the mould cavity} |
| 2045/533 | | {using a continuously rotating plasticising screw} | 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} |
| 45/535 | | {using two or more cooperating injection rams, e.g. coaxially or alternately operating rams} | 45/57 | | Exerting after-pressure on the moulding material {(B29C 45/174 takes precedence)} |
| 2045/536 | | {rotatable injection plungers} | 45/572 | | {using movable mould wall or runner parts} |
| 2045/537 | | {the injection plunger cooperating with a coaxial hollow transfer plunger} | 2045/575 | | {preventing backflow of moulding material to the injection means during after-pressure} |
| 2045/538 | | {the plunger being part of the mould cavity wall after injection} | 2045/577 | | {pushing the material in the runner channel until a pin or slider reaches the mould cavity wall} |
| 45/54 | | and plasticising screw {(B29C 45/532 takes precedence)} | 45/58 | | Details |
| 45/541 | | {using a hollow plasticising screw co-operating with a coaxial injection ram} | 45/581 | | {Devices for influencing the material flow, e.g. "torpedo constructions" or mixing devices} |
| 45/542 | | {using an accumulator between plasticising and injection unit, e.g. for a continuously operating plasticising screw} | 2045/583 | | {Mixing devices connected to drive means} |
| 45/544 | | {the plasticising unit being connected to a transfer chamber in the injection unit at the upstream side of the injection piston} | 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} | 45/6771 | | {the connection being provided within the clamping cylinder} |
| 45/60 | | Screws | 45/6778 | | {Stroke adjusting or limiting means} |
| 2045/605 | | {comprising a zone or shape enhancing the degassing of the plastic material} | 2045/6785 | | {interconnecting two cylinders to supply fluid from one cylinder to the other during movement of the pistons} |
| 45/62 | | Barrels or cylinders | 2045/6792 | | {Combined pneumatic-hydraulic cylinders} |
| 2045/623 | | {Cylinders and inner linings having different thermal expansion coefficients} | 45/68 | | hydro-mechanical |
| 2045/626 | | {Cylinders and inner linings having similar thermal expansion coefficients} | 45/681 | | {using a toggle mechanism as mould clamping device} |
| 45/63 | | Venting or degassing means | 45/683 | | {using both a toggle mechanism as mould closing device and another mechanism as mould clamping device} |
| 45/64 | | Mould opening, closing or clamping devices {(combined with means for plasticising or homogenising B29C 45/70)} | 2045/685 | | {using mechanical drive means for mould closing to obtain the hydraulic clamping pressure} |
| 45/641 | | {Clamping devices using means for straddling or interconnecting the mould halves, e.g. jaws, straps, latches} | 2045/686 | | {using a screw and nut mechanism for mould closing and a mould clamping ram acting on another nut} |
| 2045/642 | | {using coupling rods for clamping} | 2045/688 | | {using tie rods as separate elements for clamping} |
| 2045/644 | | {mould clamping by nozzle touch pressure} | 45/70 | | Means for plasticising or homogenising the moulding material or forcing it into the mould, combined with mould opening, closing or clamping devices |
| 2045/645 | | {using magnetic means} | 2045/703 | | {using clamping and injection pressures that are proportional to each other} |
| 2045/647 | | {using magnetostriction} | 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} |
| 2045/648 | | {Rack and pinion means for mould opening and closing a pair of mould halves} | 45/72 | | Heating or cooling |
| 45/66 | | mechanical | 45/7207 | | {of the moulded articles} |
| 45/661 | | {using a toggle mechanism for mould clamping} | 2045/7214 | | {Preform carriers for cooling preforms} |
| 2045/662 | | {using toggles directly connected or linked to the fixed platen and indirectly to the movable platen} | 2045/7221 | | {Means for ejecting the preforms} |
| 2045/664 | | {using mould clamping means operating independently from the mould closing means} | 2045/7228 | | { turret-like} |
| 2045/665 | | {using a screw or screws having differently threaded parts arranged in series} | 2045/7235 | | {Mechanical retaining means for preform ends} |
| 2045/667 | | {Cam drive for mould closing or clamping} | 2045/7242 | | {Alignment means for preforms} |
| 2045/668 | | {using tilting elements for obtaining mould clamping} | 2045/725 | | {Cooling circuits within the preform carriers} |
| 45/67 | | hydraulic | 2045/7257 | | {Cooling or heating pins with temperature adjustment enhancing surface structure} |
| 45/6707 | | {without relative movement between the piston and the cylinder of the clamping device during the mould opening or closing movement} | 2045/7264 | | {Cooling or heating the neck portion of preforms} |
| 45/6714 | | {using a separate element transmitting the mould clamping force from the clamping cylinder to the mould} | 2045/7271 | | {Cooling of drive motors} |
| 45/6721 | | {the separate element being displaceable with respect to the mould or the clamping cylinder} | 2045/7278 | | {Heating by friction of the moulding material} |
| 45/6728 | | {the separate element consisting of coupling rods} | 2045/7285 | | {using hydraulic oil as tempering medium} |
| 2045/6735 | | {Rotatable means coaxial with the coupling rod for locking the coupling rod to the mould platen} | 2045/7292 | | {Recovering waste heat} |
| 2045/6742 | | {the coupling rods facilitating access between the mould halves} | 45/73 | | of the mould {(B29C 45/2642 and B29C 45/2737 take precedence)} |
| 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} | 45/7306 | | {Control circuits therefor} |
| 2045/6757 | | {Hydraulic locking means} | 45/7312 | | {Construction of heating or cooling fluid flow channels} |
| 45/6764 | | {using hydraulically connectable chambers of the clamping cylinder during the mould opening and closing movement} | 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

WARNING

Group [B29C 48/03](#) is incomplete pending reclassification of documents from group [B29C 48/30](#).

Groups [B29C 48/30](#) and [B29C 48/03](#) should be considered in order to perform a complete search.

- 48/04 . . Particle-shaped ([making granules B29B 9/00](#))

WARNING

Group [B29C 48/04](#) is incomplete pending reclassification of documents from group [B29C 48/30](#).

Groups [B29C 48/30](#) and [B29C 48/04](#) should be considered in order to perform a complete search.

- 48/05 . . Filamentary, e.g. strands

WARNING

Group [B29C 48/05](#) is incomplete pending reclassification of documents from group [B29C 48/30](#).

Groups [B29C 48/30](#) and [B29C 48/05](#) should be considered in order to perform a complete search.

- 48/06 . . Rod-shaped

WARNING

Group [B29C 48/06](#) is incomplete pending reclassification of documents from group [B29C 48/30](#).

Groups [B29C 48/30](#) and [B29C 48/06](#) should be considered in order to perform a complete search.

- 48/07 . . Flat, e.g. panels

WARNING

Group [B29C 48/07](#) is incomplete pending reclassification of documents from group [B29C 48/30](#).

Groups [B29C 48/30](#) and [B29C 48/07](#) should be considered in order to perform a complete search.

- 48/08 . . . flexible, e.g. films

WARNING

Group [B29C 48/08](#) is incomplete pending reclassification of documents from group [B29C 48/30](#).

Groups [B29C 48/30](#) and [B29C 48/08](#) should be considered in order to perform a complete search.

- 48/09 . . Articles with cross-sections having partially or fully enclosed cavities, e.g. pipes or channels

WARNING

Group [B29C 48/09](#) is incomplete pending reclassification of documents from group [B29C 48/30](#).

Groups [B29C 48/30](#) and [B29C 48/09](#) should be considered in order to perform a complete search.

- 48/10 . . . flexible, e.g. blown foils

WARNING

Group [B29C 48/10](#) is incomplete pending reclassification of documents from group [B29C 48/30](#).

Groups [B29C 48/30](#) and [B29C 48/10](#) should be considered in order to perform a complete search.

- 48/11 . . . comprising two or more partially or fully enclosed cavities, e.g. honeycomb-shaped

WARNING

Group [B29C 48/11](#) is incomplete pending reclassification of documents from group [B29C 48/30](#).

Groups [B29C 48/30](#) and [B29C 48/11](#) should be considered in order to perform a complete search.

- 48/12 . . Articles with an irregular circumference when viewed in cross-section, e.g. window profiles

WARNING

Group [B29C 48/12](#) is incomplete pending reclassification of documents from group [B29C 48/30](#).

Groups [B29C 48/30](#) and [B29C 48/12](#) should be considered in order to perform a complete search.

- 48/13 . . Articles with a cross-section varying in the longitudinal direction, e.g. corrugated pipes

WARNING

Group [B29C 48/13](#) is incomplete pending reclassification of documents from group [B29C 48/30](#).

Groups [B29C 48/30](#) and [B29C 48/13](#) should be considered in order to perform a complete search.

- 48/131 . . {Curved articles}

WARNING

Group [B29C 48/131](#) is incomplete pending reclassification of documents from group [B29C 48/30](#).

Groups [B29C 48/30](#) and [B29C 48/131](#) should be considered in order to perform a complete search.

- 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

WARNING

Group [B29C 48/16](#) is incomplete pending reclassification of documents from groups [B29C 48/255](#) and [B29C 48/49](#).

Groups [B29C 48/255](#), [B29C 48/49](#) and [B29C 48/16](#) should be considered in order to perform a complete search.

- 48/17 . . the components having different colours

WARNING

Group [B29C 48/17](#) is incomplete pending reclassification of documents from groups [B29C 48/255](#) and [B29C 48/49](#).

Groups [B29C 48/255](#), [B29C 48/49](#) and [B29C 48/17](#) should be considered in order to perform a complete search.

- 48/175 . . . {comprising a multi-coloured single
component, e.g. striated, marbled or wood-like
patterned}

WARNING

Group [B29C 48/175](#) is incomplete pending reclassification of documents from groups [B29C 48/255](#) and [B29C 48/49](#).

Groups [B29C 48/255](#), [B29C 48/49](#) and [B29C 48/175](#) should be considered in order to perform a complete search.

- 48/18 . . the components being layers

WARNING

Group [B29C 48/18](#) is incomplete pending reclassification of documents from groups [B29C 48/255](#) and [B29C 48/49](#).

Groups [B29C 48/255](#), [B29C 48/49](#) and [B29C 48/18](#) should be considered in order to perform a complete search.

- 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}

WARNING

Group [B29C 48/185](#) is incomplete pending reclassification of documents from groups [B29C 48/255](#) and [B29C 48/49](#).

Groups [B29C 48/255](#), [B29C 48/49](#) and [B29C 48/185](#) should be considered in order to perform a complete search.

- 48/19 . . . the layers being joined at their edges

WARNING

Group [B29C 48/19](#) is incomplete pending reclassification of documents from groups [B29C 48/255](#) and [B29C 48/49](#).

Groups [B29C 48/255](#), [B29C 48/49](#) and [B29C 48/19](#) should be considered in order to perform a complete search.

- 48/20 . . . one of the layers being a strip, e.g. a partially
embedded strip

WARNING

Group [B29C 48/20](#) is incomplete pending reclassification of documents from groups [B29C 48/255](#) and [B29C 48/49](#).

Groups [B29C 48/255](#), [B29C 48/49](#) and [B29C 48/20](#) should be considered in order to perform a complete search.

- 48/21 . . . the layers being joined at their surfaces

WARNING

Group [B29C 48/21](#) is incomplete pending reclassification of documents from groups [B29C 48/255](#) and [B29C 48/49](#).

Groups [B29C 48/255](#), [B29C 48/49](#) and [B29C 48/21](#) should be considered in order to perform a complete search.

- 48/22 . . . with means connecting the layers, e.g. tie layers
or undercuts

WARNING

Group [B29C 48/22](#) is incomplete pending reclassification of documents from groups [B29C 48/255](#) and [B29C 48/49](#).

Groups [B29C 48/255](#), [B29C 48/49](#) and [B29C 48/22](#) should be considered in order to perform a complete search.

- 48/23 . . . with means for avoiding adhesion of the layers,
e.g. for forming peelable layers

WARNING

Group [B29C 48/23](#) is incomplete pending reclassification of documents from groups [B29C 48/255](#) and [B29C 48/49](#).

Groups [B29C 48/255](#), [B29C 48/49](#) and [B29C 48/23](#) should be considered in order to perform a complete search.

- 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](#))

WARNING

Group [B29C 48/255](#) is impacted by reclassification into groups [B29C 48/695](#), [B29C 48/70](#), [B29C 48/705](#), [B29C 48/71](#), [B29C 48/16](#), [B29C 48/17](#), [B29C 48/175](#), [B29C 48/18](#), [B29C 48/185](#), [B29C 48/19](#), [B29C 48/20](#), [B29C 48/21](#), [B29C 48/22](#), and [B29C 48/23](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 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

WARNING

Group [B29C 48/28](#) is impacted by reclassification into group [B29C 48/355](#).

Groups [B29C 48/28](#) and [B29C 48/355](#) should be considered in order to perform a complete search.

- 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](#))

WARNING

Group [B29C 48/30](#) is impacted by reclassification into groups [B29C 48/03](#), [B29C 48/04](#), [B29C 48/05](#), [B29C 48/06](#), [B29C 48/07](#), [B29C 48/08](#), [B29C 48/09](#), [B29C 48/10](#), [B29C 48/11](#), [B29C 48/12](#), [B29C 48/13](#), and [B29C 48/131](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 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}
- 48/3366 . . . {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

WARNING

Group [B29C 48/355](#) is incomplete pending reclassification of documents from group [B29C 48/28](#).

Groups [B29C 48/28](#) and [B29C 48/355](#) should be considered in order to perform a complete search.

- 48/36 . . Means for plasticising or homogenising the moulding material or forcing it through the nozzle or die

WARNING

Group [B29C 48/36](#) is impacted by reclassification into group [B29C 48/365](#).

Groups [B29C 48/36](#) and [B29C 48/365](#) should be considered in order to perform a complete search.

- 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

WARNING

Group [B29C 48/365](#) is incomplete pending reclassification of documents from group [B29C 48/36](#).

Groups [B29C 48/36](#) and [B29C 48/365](#) should be considered in order to perform a complete search.

- 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

WARNING

Group [B29C 48/38](#) is incomplete pending reclassification of documents from group [B29C 48/425](#).

Groups [B29C 48/425](#) and [B29C 48/38](#) should be considered in order to perform a complete search.

- 48/385 . . . using two or more serially arranged screws in separate barrels

WARNING

Group [B29C 48/385](#) is incomplete pending reclassification of documents from group [B29C 48/425](#).

Groups [B29C 48/425](#) and [B29C 48/385](#) should be considered in order to perform a complete search.

- 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

WARNING

Group [B29C 48/40](#) is impacted by reclassification into groups [B29C 48/405](#), [B29C 48/41](#) and [B29C 48/415](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 48/402 . . . {the screws having intermeshing parts}
- 48/404 . . . {the screws having non-intermeshing parts}
- 48/405 . . . Intermeshing co-rotating screws

WARNING

Group [B29C 48/405](#) is incomplete pending reclassification of documents from group [B29C 48/40](#).

Groups [B29C 48/40](#) and [B29C 48/405](#) should be considered in order to perform a complete search.

48/41 Intermeshing counter-rotating screws

WARNING

Group [B29C 48/41](#) is incomplete pending reclassification of documents from group [B29C 48/40](#).

Groups [B29C 48/40](#) and [B29C 48/41](#) should be considered in order to perform a complete search.

48/415 and having partially non-intermeshing screws

WARNING

Group [B29C 48/415](#) is incomplete pending reclassification of documents from group [B29C 48/40](#).

Groups [B29C 48/40](#) and [B29C 48/415](#) should be considered in order to perform a complete search.

48/42 Non-identical or non-mirrored screws

48/425 using three or more screws (serially arranged screws [B29C 48/38](#), [B29C 48/385](#))

WARNING

Group [B29C 48/425](#) is impacted by reclassification into groups [B29C 48/38](#), [B29C 48/385](#), [B29C 48/43](#), [B29C 48/435](#) and [B29C 48/44](#).

All groups listed in this Warning should be considered in order to perform a complete search.

48/43 Ring extruders

WARNING

Group [B29C 48/43](#) is incomplete pending reclassification of documents from group [B29C 48/425](#).

Groups [B29C 48/425](#) and [B29C 48/43](#) should be considered in order to perform a complete search.

48/435 Sub-screws

WARNING

Group [B29C 48/435](#) is incomplete pending reclassification of documents from group [B29C 48/425](#).

Groups [B29C 48/425](#) and [B29C 48/435](#) should be considered in order to perform a complete search.

48/44 Planetary screws

WARNING

Group [B29C 48/44](#) is incomplete pending reclassification of documents from group [B29C 48/425](#).

Groups [B29C 48/425](#) and [B29C 48/44](#) should be considered in order to perform a complete search.

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

WARNING

Group [B29C 48/46](#) is impacted by reclassification into group [B29C 48/47](#).

Groups [B29C 48/46](#) and [B29C 48/47](#) should be considered in order to perform a complete search.

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

WARNING

Group [B29C 48/47](#) is incomplete pending reclassification of documents from group [B29C 48/46](#).

Groups [B29C 48/46](#) and [B29C 48/47](#) should be considered in order to perform a complete search.

48/475 . . . using pistons, accumulators or press rams

WARNING

Group [B29C 48/475](#) is impacted by reclassification into groups [B29C 48/48](#) and [B29C 48/485](#).

Groups [B29C 48/475](#), [B29C 48/48](#), and [B29C 48/485](#) should be considered in order to perform a complete search.

48/48 Two or more rams or pistons

WARNING

Group [B29C 48/48](#) is incomplete pending reclassification of documents from group [B29C 48/475](#).

Groups [B29C 48/475](#) and [B29C 48/48](#) should be considered in order to perform a complete search.

48/485 Hydrostatic extrusion

WARNING

Group [B29C 48/485](#) is incomplete pending reclassification of documents from group [B29C 48/475](#).

Groups [B29C 48/475](#) and [B29C 48/485](#) should be considered in order to perform a complete search.

48/49 using two or more extruders to feed one die or nozzle

WARNING

Group [B29C 48/49](#) is impacted by reclassification into groups [B29C 48/495](#), [B29C 48/16](#), [B29C 48/17](#), [B29C 48/175](#), [B29C 48/18](#), [B29C 48/185](#), [B29C 48/19](#), [B29C 48/20](#), [B29C 48/21](#), [B29C 48/22](#), and [B29C 48/23](#).

All groups listed in this Warning should be considered in order to perform a complete search.

48/495 Feed-blocks (extrusion moulding of multi-component articles [B29C 48/16](#))

WARNING

Group [B29C 48/495](#) is incomplete pending reclassification of documents from group [B29C 48/49](#).

Groups [B29C 48/49](#) and [B29C 48/495](#) should be considered in order to perform a complete search.

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

WARNING

Group [B29C 48/505](#) is impacted by reclassification into groups [B29C 48/58](#) and [B29C 48/635](#).

Groups [B29C 48/505](#), [B29C 48/58](#), and [B29C 48/635](#) should be considered in order to perform a complete search.

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

WARNING

Group [B29C 48/51](#) is impacted by reclassification into group [B29C 48/515](#).

Groups [B29C 48/51](#) and [B29C 48/515](#) should be considered in order to perform a complete search.

48/515 for auxiliary fluids, e.g. foaming agents

WARNING

Group [B29C 48/515](#) is incomplete pending reclassification of documents from groups [B29C 48/51](#) and [B29C 48/82](#).

Groups [B29C 48/51](#), [B29C 48/82](#), and [B29C 48/515](#) should be considered in order to perform a complete search.

48/52 with an outer diameter varying along the longitudinal axis, e.g. for obtaining different thread clearance

WARNING

Group [B29C 48/52](#) is impacted by reclassification into group [B29C 48/525](#).

Groups [B29C 48/52](#) and [B29C 48/525](#) should be considered in order to perform a complete search.

48/525 Conical screws

WARNING

Group [B29C 48/525](#) is incomplete pending reclassification of documents from group [B29C 48/52](#).

Groups [B29C 48/52](#) and [B29C 48/525](#) should be considered in order to perform a complete search.

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

WARNING

Group [B29C 48/58](#) is incomplete pending reclassification of documents from group [B29C 48/505](#).

Groups [B29C 48/505](#) and [B29C 48/58](#) should be considered in order to perform a complete search.

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

WARNING

Group [B29C 48/59](#) is impacted by reclassification into groups [B29C 48/595](#), [B29C 48/60](#), [B29C 48/605](#), [B29C 48/61](#), and [B29C 48/615](#).

All groups listed in this Warning should be considered in order to perform a complete search.

48/595 the thread having non-uniform width

WARNING

Group [B29C 48/595](#) is incomplete pending reclassification of documents from group [B29C 48/59](#).

Groups [B29C 48/59](#) and [B29C 48/595](#) should be considered in order to perform a complete search.

48/60 Thread tops

WARNING

Group [B29C 48/60](#) is incomplete pending reclassification of documents from group [B29C 48/59](#).

Groups [B29C 48/59](#) and [B29C 48/60](#) should be considered in order to perform a complete search.

48/605 the thread being discontinuous

WARNING

Group [B29C 48/605](#) is incomplete pending reclassification of documents from group [B29C 48/59](#).

Groups [B29C 48/59](#) and [B29C 48/605](#) should be considered in order to perform a complete search.

48/61 Threads having wavy profiles

WARNING

Group [B29C 48/61](#) is incomplete pending reclassification of documents from group [B29C 48/59](#).

Groups [B29C 48/59](#) and [B29C 48/61](#) should be considered in order to perform a complete search.

48/615 Threads having varying helix angles

WARNING

Group [B29C 48/615](#) is incomplete pending reclassification of documents from group [B29C 48/59](#).

Groups [B29C 48/59](#) and [B29C 48/615](#) should be considered in order to perform a complete search.

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

WARNING

Group [B29C 48/635](#) is incomplete pending reclassification of documents from group [B29C 48/505](#).

Groups [B29C 48/505](#) and [B29C 48/635](#) should be considered in order to perform a complete search.

48/64 Screws with two or more threads

WARNING

Group [B29C 48/64](#) is impacted by reclassification into group [B29C 48/66](#).

Groups [B29C 48/64](#) and [B29C 48/66](#) should be considered in order to perform a complete search.

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
- WARNING**
- Group [B29C 48/66](#) is incomplete pending reclassification of documents from group [B29C 48/64](#).
- Groups [B29C 48/64](#) and [B29C 48/66](#) should be considered in order to perform a complete search.
- 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
- WARNING**
- Group [B29C 48/691](#) is impacted by reclassification into groups [B29C 48/693](#) and [B29C 48/694](#).
- Groups [B29C 48/691](#), [B29C 48/693](#), and [B29C 48/694](#) should be considered in order to perform a complete search.
- 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
- WARNING**
- Group [B29C 48/693](#) is incomplete pending reclassification of documents from group [B29C 48/691](#).
- Groups [B29C 48/691](#) and [B29C 48/693](#) should be considered in order to perform a complete search.
- 48/694 Cylindrical or conical filters
- WARNING**
- Group [B29C 48/694](#) is incomplete pending reclassification of documents from group [B29C 48/691](#).
- Groups [B29C 48/691](#) and [B29C 48/694](#) should be considered in order to perform a complete search.
- 48/6945 {surrounding a rotating screw}
- 48/695 Flow dividers, e.g. breaker plates
- WARNING**
- Group [B29C 48/695](#) is incomplete pending reclassification of documents from group [B29C 48/255](#).
- Groups [B29C 48/255](#) and [B29C 48/695](#) should be considered in order to perform a complete search.
- 48/70 comprising means for dividing, distributing and recombining melt flows
- WARNING**
- Group [B29C 48/70](#) is incomplete pending reclassification of documents from group [B29C 48/255](#).
- Groups [B29C 48/255](#) and [B29C 48/70](#) should be considered in order to perform a complete search.
- 48/705 {in the die zone, e.g. to create flow homogeneity}
- WARNING**
- Group [B29C 48/705](#) is incomplete pending reclassification of documents from group [B29C 48/255](#).
- Groups [B29C 48/255](#) and [B29C 48/705](#) should be considered in order to perform a complete search.

48/71 for layer multiplication ([extrusion of multi-component articles B29C 48/16](#))

WARNING

Group [B29C 48/71](#) is incomplete pending reclassification of documents from group [B29C 48/255](#).

Groups [B29C 48/255](#) and [B29C 48/71](#) should be considered in order to perform a complete search.

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](#))

WARNING

Group [B29C 48/82](#) is impacted by reclassification into groups [B29C 48/515](#), [B29C 48/84](#), [B29C 48/845](#) and [B29C 48/85](#).

All groups listed in this Warning should be considered in order to perform a complete search.

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](#))

WARNING

Groups [B29C 48/84](#), [B29C 48/845](#) and [B29C 48/85](#) are incomplete pending reclassification of documents from group [B29C 48/82](#).

All groups listed in this Warning should be considered in order to perform a complete search.

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](#)

WARNING

Group [B29C 48/88](#) is impacted by reclassification into groups [B29C 48/885](#) and [B29C 48/89](#).

Groups [B29C 48/88](#), [B29C 48/885](#), and [B29C 48/89](#) should be considered in order to perform a complete search.

48/885 External treatment, e.g. by using air rings for cooling tubular films

WARNING

Group [B29C 48/885](#) is incomplete pending reclassification of documents from group [B29C 48/88](#).

Groups [B29C 48/88](#) and [B29C 48/885](#) should be considered in order to perform a complete search.

48/89 Internal treatment, e.g. by applying an internal cooling fluid stream

WARNING

Group [B29C 48/89](#) is incomplete pending reclassification of documents from group [B29C 48/88](#).

Groups [B29C 48/88](#) and [B29C 48/89](#) should be considered in order to perform a complete search.

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

WARNING

Group [B29C 48/94](#) is impacted by reclassification into group [B29C 48/95](#). Groups [B29C 48/94](#) and [B29C 48/95](#) should be considered in order to perform a complete search.

- 48/95 . . . by adding lubricant to the moulding material

WARNING

Group [B29C 48/95](#) is incomplete pending reclassification of documents from group [B29C 48/94](#).

Groups [B29C 48/94](#) and [B29C 48/95](#) should be considered in order to perform a complete search.

- 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} | | on the moulding technique should be classified in this group if of interest |
| 49/6472 | . . . {in several stages (B29C 49/6409 takes precedence)} | 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)} |
| 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} | 51/006 | . {for making articles having hollow walls} |
| 49/66 | . . . Cooling by refrigerant introduced into the blown article | 51/008 | . {without using a mould, e.g. ballooning (as prestretching step B29C 51/06)} |
| 2049/6607 | {Flushing blown articles} | 51/02 | . Combined thermoforming and manufacture of the preform |
| 2049/6615 | {and exhausting through the blowing means} | 51/04 | . Combined thermoforming and prestretching, e.g. biaxial stretching |
| 2049/6623 | {and exhausting through an opening in the blown article} | 51/06 | . . using pressure difference {for prestretching} |
| 2049/663 | {against ambient pressure} | 51/08 | . Deep drawing or matched-mould forming, i.e. using mechanical means only |
| 2049/6638 | {against a pressure higher than ambient pressure} | 51/082 | . . {by shaping between complementary mould parts} |
| 2049/6646 | {while keeping the final blowing pressure in the article} | 51/085 | . . . {with at least one of the shaping surfaces being made of resilient material, e.g. rubber} |
| 2049/6653 | {the refrigerant being other than cooled air} | 51/087 | . . . {with at least one of the mould parts comprising independently movable sections (B29C 51/32 and B29C 51/34 take precedence)} |
| 2049/6661 | {the refrigerant being water} | | |
| 2049/6669 | {the refrigerant being gas with water droplets} | 51/10 | . Forming by pressure difference, e.g. vacuum |
| 2049/6676 | {the refrigerant being oriented towards special areas of the blown article} | 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)} |
| 2049/6684 | {Neck area} | 51/12 | . of articles having inserts or reinforcements |
| 2049/6692 | {Bottom area} | 51/14 | . using multilayered preforms or sheets |
| 49/68 | . . . Ovens specially adapted for heating preforms or parisons | 51/145 | . . {having at least one layer of textile or fibrous material combined with at least one plastics layer} |
| 49/70 | . . Removing or ejecting blown articles from the mould | 51/16 | . Lining or labelling |
| 2049/701 | . . . {Ejecting means} | 51/162 | . . {of deep containers or boxes} |
| 2049/702 | {Air pressure} | 51/165 | . . {combined with the feeding or the shaping of the lining or the labels (by injection moulding B29C 45/14008 , B29C 45/1418)} |
| 2049/704 | {Pins} | 51/167 | . . . {of a continuous strip} |
| 2049/705 | {Driving means therefore} | 51/18 | . Thermoforming apparatus |
| 2049/707 | {Hydraulic} | 51/20 | . . having movable moulds or mould parts |
| 2049/708 | {Pneumatic} | 51/22 | . . . rotatable about an axis |
| 49/72 | . . Deflashing outside the mould | 51/225 | {mounted on a vacuum drum (for surface shaping B29C 59/06)} |
| 2049/725 | . . . {Means for removing the deflashed parts from the deflashing area, e.g. burrs being removed from the deflashing area by a conveyor} | 51/24 | . . . mounted on movable endless supports |
| 49/74 | . . . Deflashing the neck portion | 51/26 | . Component parts, details or accessories; Auxiliary operations |
| 49/76 | . . Neck calibration | 51/261 | . . {Handling means, e.g. transfer means, feeding means (B29C 51/44 takes precedence)} |
| 49/78 | . . Measuring, controlling or regulating | 51/262 | . . . {Clamping means for the sheets, e.g. clamping frames} |
| 49/783 | . . . {the blowing pressure} | 51/263 | . . {characterised by using a particular environment, e.g. sterile} |
| 49/786 | . . . {the temperature} | 51/264 | . . {Auxiliary operations prior to the thermoforming operation, e.g. cutting (B29C 51/42 , B29C 51/46 take precedence)} |
| 49/80 | . . . Testing, e.g. for leaks | 51/265 | . . {Auxiliary operations during the thermoforming operation (B29C 51/42 , B29C 51/46 take precedence)} |
| 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 | | | |

- 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. deformig 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

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| 53/581 | . . . {using sheets or strips consisting principally of plastics material (using profiled sheets or strips B29C 53/78)} | 53/822 | {Single use mandrels, e.g. destructible, becoming part of the wound articles (B29C 53/825 takes precedence)} |
| 53/582 | {comprising reinforcements, e.g. wires, threads} | 53/824 | {collapsible, e.g. elastic or inflatable; with removable parts, e.g. for regular shaped, straight tubular articles (B29C 53/825 takes precedence)} |
| 53/583 | . . . {for making tubular articles with particular features} | 53/825 | {for continuous winding} |
| 53/584 | {having a non-circular cross-section} | 53/827 | {formed by several elements rotating about their own axes} |
| 53/585 | {the cross-section varying along their axis, e.g. tapered, with ribs, or threads, with socket-ends} | 53/828 | {Arrangements comprising a plurality of cores or mandrels, e.g. to increase production speed (B29C 53/827 takes precedence)} |
| 53/586 | {having corrugations} | 53/84 | . . Heating or cooling |
| 53/587 | {having a non-uniform wall-structure, e.g. with inserts, perforations, locally concentrated reinforcements} | 53/845 | . . . {especially adapted for winding and joining} |
| 53/588 | {having a non-linear axis, e.g. elbows, toroids} | 55/00 | Shaping by stretching, e.g. drawing through a die; Apparatus therefor (B29C 61/08 takes precedence) |
| 53/60 | . . . using internal forming surfaces, e.g. mandrels | 55/005 | . {characterised by the choice of materials} |
| 53/602 | {for tubular articles having closed or nearly closed ends, e.g. vessels, tanks, containers} | | NOTE |
| 53/605 | {by polar winding} | | 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 |
| 53/607 | {having driving means for advancing the wound articles, e.g. belts, rolls (B29C 53/74 takes precedence)} | | |
| 53/62 | rotatable about the winding axis | 55/02 | . of plates or sheets |
| 53/64 | and moving axially | 55/023 | . . {using multilayered plates or sheets} |
| 53/66 | with axially movable winding feed member {, e.g. lathe type winding} | 55/026 | . . . {of preformed plates or sheets coated with a solution, a dispersion or a melt of thermoplastic material} |
| 53/665 | {Coordinating the movements of the winding feed member and the mandrel} | 55/04 | . . uniaxial, e.g. oblique |
| 53/68 | with rotatable winding feed member | 55/045 | . . . {in a direction which is not parallel or transverse to the direction of feed, e.g. oblique} |
| 53/70 | and moving axially | 55/06 | . . . parallel with the direction of feed |
| 53/72 | . . . using external forming surfaces | 55/065 | {in several stretching steps} |
| 53/74 | . . . using a forming surface in the shape of an endless belt which is recycled after the forming operation | 55/08 | . . . transverse to the direction of feed |
| 53/76 | . . . about more than one axis {, e.g. T-pieces, balls} | 55/085 | {in several stretching steps} |
| 53/78 | . . . using profiled sheets or strips | 55/10 | . . multiaxial |
| 53/785 | {with reinforcements} | 55/12 | . . . biaxial |
| 53/80 | . Component parts, details or accessories; Auxiliary operations | 55/14 | successively |
| 53/8008 | . . {specially adapted for winding and joining} | 55/143 | {firstly parallel to the direction of feed and then transversely thereto} |
| 53/8016 | . . . {Storing, feeding or applying winding materials, e.g. reels, thread guides, tensioners} | 55/146 | {firstly transversely to the direction of feed and then parallel thereto} |
| 2053/8025 | {tensioning} | 55/16 | simultaneously |
| 2053/8033 | {fixing the trailing edge of winding materials} | 55/165 | {Apparatus therefor} |
| 53/8041 | . . . {Measuring, controlling or regulating (B29C 53/665 takes precedence)} | 55/18 | . . by squeezing between surfaces, e.g. rollers |
| 53/805 | . . . {Applying axial reinforcements} | 55/20 | . . Edge clamps |
| 53/8058 | {continuously} | 55/22 | . of tubes (B29C 61/08 takes precedence)} |
| 53/8066 | . . . {Impregnating (impregnating as pretreatment B29B 15/10)} | 55/24 | . . radial |
| 53/8075 | {on the forming surfaces} | 55/26 | . . biaxial |
| 53/8083 | . . . {Improving bonding of wound materials or layers} | 55/28 | . of blown tubular films, e.g. by inflation (extrusion moulding of tubular films B29C 48/03)} |
| 53/8091 | . . . {Cutting the ends, surface finishing} | 55/285 | . . {by using internal mechanical means} |
| 53/82 | . . Cores or mandrels | 55/30 | . Drawing through a die (pultrusion B29C 70/52)} |
| 53/821 | . . . {Mandrels especially adapted for winding and joining} | 57/00 | Shaping of tube ends, e.g. flanging, belling 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)} |

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| 57/02 | • Belling or enlarging, e.g. combined with forming a groove | 59/103 | • • {of profiled articles, e.g. hollow or tubular articles} |
| 57/025 | • • {combined with the introduction of a sealing ring, e.g. using the sealing element as forming element} | 59/106 | • • {the electrodes being placed on the same side of the material to be treated} |
| 57/04 | • • using mechanical means {(B29C 57/025 takes precedence)} | 59/12 | • • in an environment other than air |
| 57/045 | • • • {rotating} | 59/14 | • by plasma treatment {(plasma tubes per se H01J)} |
| 57/06 | • • • elastically deformable | 59/142 | • • {of profiled articles, e.g. hollow or tubular articles} |
| 57/08 | • • using pressure difference | 2059/145 | • • {Atmospheric plasma} |
| 57/10 | • Closing | 2059/147 | • • {Low pressure plasma; Glow discharge plasma} |
| 57/12 | • Rim rolling | 59/16 | • by wave energy or particle radiation {, e.g. infra-red heating (B29C 59/007 takes precedence)} |
| 57/125 | • • {using tools with helical grooves} | 59/165 | • • {of profiled articles, e.g. hollow or tubular articles} |
| 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 71/009; for decorating in general B44; abrasive blasting B24C; chemical aspects C08J 7/00)} | 59/18 | • by liberation of internal stresses, e.g. plastic memory |
| 59/002 | • {Component parts, details or accessories; Auxiliary operations} | 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)) |
| 59/005 | • {characterised by the choice of material} | 61/003 | • {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 | | 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 |
| 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)} | 61/006 | • {the force created by the liberation of the internal stresses being used for compression moulding or for pressing preformed material} |
| 59/02 | • by mechanical means, e.g. pressing {(B29C 59/007 takes precedence; embossing expanded porous articles B29C 44/5627)} | 61/02 | • Thermal shrinking |
| 59/021 | • • {of profiled articles, e.g. hollow or tubular articles, beams} | 61/025 | • • {for the production of hollow or tubular articles} |
| 59/022 | • • {characterised by the disposition or the configuration, e.g. dimensions, of the embossments or the shaping tools therefor} | 61/04 | • Thermal expansion |
| 2059/023 | • • • {Microembossing} | 61/06 | • Making preforms having internal stresses, e.g. plastic memory |
| 59/025 | • • • {Fibrous surfaces with piles or similar fibres substantially perpendicular to the surface} | 61/0608 | • • {characterised by the configuration or structure of the preforms} |
| 59/026 | • • {of layered or coated substantially flat surfaces} | 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)} |
| 2059/027 | • • {Grinding; Polishing} | 61/0625 | • • • {Preforms comprising incorporated or associated heating means} |
| 2059/028 | • • {Incorporating particles by impact in the surface, e.g. using fluid jets or explosive forces to implant particles} | 61/0633 | • • • {Preforms comprising reinforcing elements (B29C 61/0625 takes precedence)} |
| 59/04 | • • using rollers or endless belts | 61/0641 | • • • {Clips for dividing preforms or forming branch-offs (clips in general F16B 2/20)} |
| 59/043 | • • • {for profiled articles} | 61/065 | • • • {Preforms held in a stressed condition by means of a removable support; Supports therefor} |
| 59/046 | • • • {for layered or coated substantially flat surfaces} | 61/0658 | • • • {consisting of fibrous plastics material, e.g. woven} |
| 59/06 | • • using vacuum drums {(for thermoforming B29C 51/225)} | 61/0666 | • • • {comprising means indicating that the shrinking temperature is reached} |
| 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 | | |

- 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**
- WARNING**
- Group [B29C 64/00](#) is impacted by reclassification into groups [B29C 64/10](#) - [B29C 64/379](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 64/10 . Processes of additive manufacturing
- WARNING**
- Group [B29C 64/10](#) is incomplete pending reclassification of documents from group [B29C 64/00](#).
- Groups [B29C 64/10](#) and [B29C 64/00](#) should be considered in order to perform a complete search.
- 64/106 . . using only liquids or viscous materials, e.g. depositing a continuous bead of viscous material
- WARNING**
- Group [B29C 64/106](#) is impacted by reclassification into group [B29C 64/118](#).
- Groups [B29C 64/106](#) and [B29C 64/118](#) should be considered in order to perform a complete search.
- 64/112 . . . using individual droplets, e.g. from jetting heads
 - 64/118 . . . using filamentary material being melted, e.g. fused deposition modelling [FDM]
- WARNING**
- Group [B29C 64/118](#) is incomplete pending reclassification of documents from group [B29C 64/106](#).
- Groups [B29C 64/106](#) and [B29C 64/118](#) should be considered in order to perform a complete search.
- 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

WARNING

Group [B29C 64/141](#) is impacted by reclassification into group [B29C 64/147](#).

Groups [B29C 64/141](#) and [B29C 64/147](#) should be considered in order to perform a complete search.

- 64/147 . . . using sheet material, e.g. laminated object manufacturing [LOM] or laminating sheet material precut to local cross sections of the 3D object

WARNING

Group [B29C 64/147](#) is incomplete pending reclassification of documents from group [B29C 64/141](#).

Groups [B29C 64/141](#) and [B29C 64/147](#) should be considered in order to perform a complete search.

- 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

WARNING

Group [B29C 64/159](#) is incomplete pending reclassification of documents from group [B29C 64/00](#).

Groups [B29C 64/00](#) and [B29C 64/159](#) should be considered in order to perform a complete search.

- 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

WARNING

Group [B29C 64/171](#) – [B29C 64/182](#) are incomplete pending reclassification of documents from group [B29C 64/00](#).

Groups [B29C 64/00](#) and [B29C 64/171](#) – [B29C 64/182](#) should be considered in order to perform a complete search.

- 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](#))

WARNING

Group [B29C 64/188](#) and [B29C 64/194](#) are incomplete pending reclassification of documents from group [B29C 64/00](#).

Groups [B29C 64/00](#), [B29C 64/188](#) and [B29C 64/194](#) should be considered in order to perform a complete search.

- 64/194 . . . during lay-up

- 64/20 . Apparatus for additive manufacturing; Details thereof or accessories therefor

WARNING

Group [B29C 64/20](#) is impacted by reclassification into groups [B29C 64/205](#) - [B29C 64/379](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 64/205 . . Means for applying layers

WARNING

Groups [B29C 64/205](#) - [B29C 64/223](#) are incomplete pending reclassification of documents from group [B29C 64/20](#).

Groups [B29C 64/20](#) and [B29C 64/205](#) - [B29C 64/223](#) should be considered in order to perform a complete search.

- 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

WARNING

Groups [B29C 64/227](#) - [B29C 64/241](#) are incomplete pending reclassification of documents from group [B29C 64/20](#).

Groups [B29C 64/20](#) and [B29C 64/227](#) - [B29C 64/241](#) should be considered in order to perform a complete search.

- 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](#))

WARNING

Group [B29C 64/245](#) is incomplete pending reclassification of documents from group [B29C 64/20](#).

Groups [B29C 64/20](#) and [B29C 64/245](#) should be considered in order to perform a complete search.

- 64/25 . . Housings, e.g. machine housings

WARNING

Group [B29C 64/25](#) is incomplete pending reclassification of documents from group [B29C 64/20](#).

Groups [B29C 64/20](#) and [B29C 64/25](#) should be considered in order to perform a complete search.

- 64/255 . . Enclosures for the building material, e.g. powder containers

WARNING

Group [B29C 64/255](#) and [B29C 64/259](#) are incomplete pending reclassification of documents from group [B29C 64/20](#).

Groups [B29C 64/20](#), [B29C 64/255](#) and [B29C 64/259](#) should be considered in order to perform a complete search.

- 64/259 . . . Interchangeable
 64/264 . . Arrangements for irradiation

WARNING

Groups [B29C 64/264](#) - [B29C 64/291](#) are incomplete pending reclassification of documents from group [B29C 64/20](#).

Groups [B29C 64/20](#) and [B29C 64/264](#) - [B29C 64/291](#) should be considered in order to perform a complete search.

- 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

WARNING

Group [B29C 64/295](#) is incomplete pending reclassification of documents from group [B29C 64/20](#).

Groups [B29C 64/20](#) and [B29C 64/295](#) should be considered in order to perform a complete search.

- 64/30 . Auxiliary operations or equipment

WARNING

Groups [B29C 64/30](#) - [B29C 64/343](#) are incomplete pending reclassification of documents from groups [B29C 64/00](#) and [B29C 64/20](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 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
WARNING
Group [B29C 64/35](#) is impacted by reclassification into group [B29C 64/357](#).
Groups [B29C 64/35](#) and [B29C 64/357](#) should be considered in order to perform a complete search.
- 64/357 . . . Recycling
WARNING
Group [B29C 64/357](#) is incomplete pending reclassification of documents from group [B29C 64/35](#).
Groups [B29C 64/20](#) and [B29C 64/357](#) should be considered in order to perform a complete search.
- 64/364 . . . Conditioning of environment
WARNING
Groups [B29C 64/364](#) and [B29C 64/371](#) are incomplete pending reclassification of documents from groups [B29C 64/00](#) and [B29C 64/20](#).
All groups listed in this Warning should be considered in order to perform a complete search.
- 64/371 . . . using an environment other than air, e.g. inert gas
- 64/379 . . . Handling of additively manufactured objects, e.g. using robots
WARNING
Group [B29C 64/379](#) is incomplete pending reclassification of documents from groups [B29C 64/00](#) and [B29C 64/20](#).
Groups [B29C 64/00](#), [B29C 64/20](#), and [B29C 64/379](#) should be considered in order to perform a complete search.
- 64/386 . . . Data acquisition or data processing for additive manufacturing
WARNING
Group [B29C 64/386](#) is impacted by reclassification into group [B29C 64/393](#).
Groups [B29C 64/386](#) and [B29C 64/393](#) should be considered in order to perform a complete search.
- 64/393 . . . for controlling or regulating additive manufacturing processes
WARNING
Group [B29C 64/393](#) is incomplete pending reclassification of documents from group [B29C 64/386](#).
Groups [B29C 64/386](#) and [B29C 64/393](#) should be considered in order to perform a complete search.
- 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 join, 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](#))}
- 66/034 . . . {Thermal after-treatments}
- 66/0342 {Cooling, e.g. transporting through welding and cooling zone}
- 66/0344 {Annealing}
- 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](#))}
- 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}
- 66/116 {Single bevelled joints, i.e. one of the parts to be joined being bevelled in the joint area}
- 66/1162 {Single bevel to bevel joints, e.g. mitre joints}
- 66/118 {Single monotone curved joints}
- 66/1182 {the joint being C-shaped}
- 66/12 {Joint cross-sections combining only two joint-segments; Tongue and groove joints; Tenon and mortise joints; Stepped joint cross-sections}
- 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)}
- 66/1222 {comprising at least a lapped joint-segment}
- 66/12221 {the two joint-segments being lapped}
- 66/1224 {comprising at least a butt joint-segment}
- 66/12241 {the two joint-segments being butt}
- 66/1226 {comprising at least one bevelled joint-segment}
- 66/12261 {the two joint-segments being bevelled, e.g. the two joint-segments forming a V}
- 66/1228 {comprising at least one monotone curved joint-segment}
- 66/12281 {the two joint-segments being monotone curved}
- 66/124 {Tongue and groove joints}
- 66/1242 {comprising interlocking undercuts}
- 66/12421 {Teardrop-like, waterdrop-like or mushroom-like interlocking undercuts}
- 66/12423 {Dovetailed interlocking undercuts}
- 66/12425 {Other specific interlocking undercuts not provided for in [B29C 66/12421](#) - [B29C 66/12423](#)}
- 66/1244 {characterised by the male part, i.e. the part comprising the tongue}

| | | | | | |
|----------|-----------|---|--|-----------|--|
| 66/12441 | | {being a single wall} | 66/137 | | {Beaded-edge joints or bead seals (for sealing or securing package folds or closures B65B 51/24)} |
| 66/12443 | | {having the tongue substantially in the middle} | 66/139 | | {Interpenetrating fingered joints} |
| 66/12445 | | {having the tongue on the side} | 66/14 | | {the joint having the same thickness as the thickness of the parts to be joined (B29C 66/1142 takes precedence)} |
| 66/12449 | | {being asymmetric (B29C 66/12445 takes precedence)} | 66/20 | . . . | {particular design of the joint lines, e.g. of the weld lines} |
| 66/1246 | | {characterised by the female part, i.e. the part comprising the groove} | NOTE | | |
| 66/12461 | | {being rounded, i.e. U-shaped or C-shaped} | The scope of the subgroups is defined by the drawings in the Definitions | | |
| 66/12463 | | {being tapered} | 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} |
| 66/12464 | | {being V-shaped} | 66/22 | | {said joint lines being in the form of recurring patterns (B29C 66/234 takes precedence)} |
| 66/12469 | | {being asymmetric} | 66/221 | | {being in the form of a sinusoidal wave (B29C 66/2272 takes precedence)} |
| 66/1248 | | {Interpenetrating groove joints (interpenetrating fingered joints B29C 66/139)} | 66/223 | | {being in the form of a triangle wave or of a sawtooth wave, e.g. zigzagged} |
| 66/126 | | {Tenon and mortise joints (tenons and mortises for positioning purposes B29C 65/7814)} | 66/225 | | {being castellated, e.g. in the form of a square wave or of a rectangular wave (B29C 66/2276 takes precedence)} |
| 66/128 | | {Stepped joint cross-sections} | 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)} |
| 66/1282 | | {comprising at least one overlap joint-segment} | 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)} |
| 66/12821 | | {comprising at least two overlap joint-segments} | 66/2274 | | {Dovetailed interlocking undercuts (tongue and groove joints or tenon and mortise joints comprising dovetailed interlocking undercuts B29C 66/12423)} |
| 66/12822 | | {comprising at least three overlap joint-segments} | 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)} |
| 66/1284 | | {comprising at least one butt joint-segment} | 66/229 | | {Other specific patterns not provided for in B29C 66/221 - B29C 66/227 } |
| 66/12841 | | {comprising at least two butt joint-segments} | 66/23 | | {said joint lines being multiple and parallel or being in the form of tessellations} |
| 66/12842 | | {comprising at least three butt joint-segments} | 66/232 | | {said joint lines being multiple and parallel, i.e. the joint being formed by several parallel joint lines} |
| 66/1286 | | {comprising at least one bevelled joint-segment} | 66/234 | | {said joint lines being in the form of tessellations} |
| 66/12861 | | {comprising at least two bevelled joint-segments} | 66/24 | | {said joint lines being closed or non-straight} |
| 66/12862 | | {comprising at least three bevelled joint-segments} | 66/242 | | {said joint lines being closed, i.e. forming closed contours} |
| 66/1288 | | {comprising at least one monotone curved joint-segment} | 66/2422 | | {being circular, oval or elliptical} |
| 66/12881 | | {comprising at least two monotone curved joint-segments} | | | |
| 66/12882 | | {comprising at least three monotone curved joint-segments} | | | |
| 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 } | | | |
| 66/131 | | {Single flanged joints, i.e. one of the parts to be joined being rigid and flanged in the joint area} | | | |
| 66/1312 | | {Single flange to flange joints, the parts to be joined being rigid (the parts to be joined being flexible B29C 66/133)} | | | |
| 66/133 | | {Fin-type joints, the parts to be joined being flexible (the parts to be joined being rigid B29C 66/1312)} | | | |
| 66/135 | | {Single hemmed joints, i.e. one of the parts to be joined being hemmed in the joint area} | | | |
| 66/1352 | | {Single hem to hem joints} | | | |

- 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}
- WARNING**
- Group [B29C 66/40](#) and subgroups are not complete, pending a reorganisation; see also [B29C 65/00](#) and its subgroups
- 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}
- WARNING**
- Not complete, pending a reorganisation; see also [B29C 66/439](#)
- 66/439 {Joining sheets for making inflated articles without using a mould}
- WARNING**
- Not complete, pending a reorganisation; see also [B29C 66/438](#)
- 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](#))}
- WARNING**
- Group [B29C 66/70](#) and subgroups are not complete, pending a reorganisation; see also [B29C 65/00](#) and its subgroups
- 66/71 {characterised by the composition of the plastics material of the parts to be joined ([welding bar compositions B29C 65/125](#))}
- WARNING**
- Group [B29C 66/71](#) and subgroups are not complete, pending a reorganisation
- 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} | 66/73162 | {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} |
| 66/7254 | {honeycomb structures} | 66/7317 | {Hydrophilicity or hydrophobicity} |
| 66/727 | . . . {being porous, e.g. foam} | 66/73171 | {Hydrophilicity} |
| 66/729 | . . . {Textile or other fibrous material made from plastics} | 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} |
| 66/7292 | {coated (B29C 66/72941 takes precedence)} | 66/73175 | {Hydrophobicity} |
| 66/7294 | {Non woven mats, e.g. felt} | 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} |
| 66/72941 | {coated} | 66/7318 | {Permeability to gases or liquids} |
| 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} | 66/73181 | {permeable} |
| 66/731 | . . . {characterised by the intensive physical properties of the material of the parts to be joined} | 66/73182 | {to gases} |
| 66/7311 | {Thermal properties} | 66/73183 | {to liquids} |
| 66/73111 | {Thermal expansion coefficient} | 66/73185 | {non-permeable} |
| 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} | 66/73186 | {to gases} |
| 66/73113 | {Thermal conductivity} | 66/73187 | {to liquids} |
| 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} | 66/733 | . . . {characterised by the optical properties of the material of the parts to be joined, e.g. fluorescence, phosphorescence} |
| 66/73115 | {Melting point} | 66/7332 | {at least one of the parts to be joined being coloured} |
| 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} | 66/73321 | {both parts to be joined being coloured} |
| 66/73117 | {Tg, i.e. glass transition temperature} | 66/73322 | {both parts to be joined having a different colour} |
| 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} | 66/7334 | {at least one of the parts to be joined being glossy or matt, reflective or refractive} |
| 66/7312 | {Rheological properties} | 66/73341 | {at least one of the parts to be joined being glossy or reflective} |
| 66/73121 | {Viscosity} | 66/73343 | {at least one of the parts to be joined being matt or refractive} |
| 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} | 66/7336 | {at least one of the parts to be joined being opaque, transparent or translucent to visible light} |
| 66/7313 | {Density} | 66/73361 | {at least one of the parts to be joined being opaque to visible light} |
| 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} | 66/73362 | {both parts to be joined being opaque to visible light} |
| 66/7314 | {Electrical and dielectric properties} | 66/73365 | {at least one of the parts to be joined being transparent or translucent to visible light} |
| 66/73141 | {Electrical conductivity} | 66/73366 | {both parts to be joined being transparent or translucent to visible light} |
| 66/73143 | {Dielectric properties} | 66/7338 | {at least one of the parts to be joined being polarising} |
| 66/7315 | {Mechanical properties} | 66/735 | . . . {characterised by the extensive physical properties of the parts to be joined} |
| 66/73151 | {Hardness} | 66/7352 | {Thickness, e.g. very thin} |
| 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} | 66/73521 | {of different thickness, i.e. the thickness of one of the parts to be joined being different from the thickness of the other part} |
| 66/7316 | {Surface properties} | 66/737 | . . . {characterised by the state of the material of the parts to be joined} |
| 66/73161 | {Roughness or rugosity} | 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

WARNING

Group [B29C 66/74](#) and subgroups are not complete, pending a reorganisation; see also [B29C 65/00](#) and its 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}

WARNING

Group [B29C 66/80](#) and subgroups are not complete, pending a reorganisation; see also [B29C 65/00](#) and its subgroups

- 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](#))}

WARNING

Group [B29C 66/81](#) and subgroups are not complete, pending a reorganisation; see also [B29C 65/00](#) and its subgroups

- 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}

WARNING

Not complete, pending a reorganisation; see also [B29K 2801/00](#) - [B29K 2911/14](#)

- 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}
- WARNING**
- Group [B29C 66/83](#) and subgroups are not complete, pending a reorganisation; see also this group and its subgroups and [B29C 65/00](#) and its subgroups
- 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}

WARNING

Group B29C 66/90 and subgroups are not complete, pending a reorganisation; see also this group and its subgroups

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} | 66/92311 | {with special measurement means or methods} |
| 66/91431 | {the temperature being kept constant over time} | 66/924 | . . . {by controlling or regulating the pressure, the force, the mechanical power or the displacement of the joining tools} |
| 66/91441 | {the temperature being non-constant over time} | 66/9241 | {by controlling or regulating the pressure, the force or the mechanical power} |
| 66/91443 | {following a temperature-time profile (B29C 65/38 takes precedence)} | 66/92431 | {the pressure, the force or the mechanical power being kept constant over time (B29C 66/92613 takes precedence)} |
| 66/91445 | {by steps} | 66/92441 | {the pressure, the force or the mechanical power being non-constant over time} |
| 66/9161 | {by controlling or regulating the heat or the thermal flux, i.e. the heat flux} | 66/92443 | {following a pressure-time profile} |
| 66/91631 | {the heat or the thermal flux being kept constant over time} | 66/92445 | {by steps} |
| 66/91641 | {the heat or the thermal flux being non-constant over time} | 66/92451 | {using joining tools having different pressure zones or using several joining tools with different pressures} |
| 66/91643 | {following a heat-time profile (B29C 65/38 takes precedence)} | 66/9261 | {by controlling or regulating the displacement of the joining tools} |
| 66/91645 | {by steps} | 66/92611 | {by controlling or regulating the gap between the joining tools} |
| 66/91651 | {by controlling or regulating the heat generated by Joule heating or induction heating} | 66/92613 | {the gap being kept constant over time} |
| 66/91653 | {by controlling or regulating the voltage, i.e. the electric potential difference or electric tension} | 66/92615 | {the gap being non-constant over time} |
| 66/91655 | {by controlling or regulating the current intensity} | 66/92651 | {by using stops} |
| 66/919 | . . . {characterised by specific temperature, heat or thermal flux values or ranges (specific electrical resistance values B29C 66/81262)} | 66/92653 | {said stops being adjustable} |
| 66/9192 | {in explicit relation to another variable, e.g. temperature diagrams} | 66/92655 | {by using several stops} |
| 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} | 66/929 | . . . {characterized by specific pressure, force, mechanical power or displacement values or ranges} |
| 66/91931 | {in explicit relation to the fusion temperature or melting point of the material of one of the parts to be joined} | 66/9292 | {in explicit relation to another variable, e.g. pressure diagrams} |
| 66/91933 | {higher than said fusion temperature} | 66/92921 | {in specific relation to time, e.g. pressure-time diagrams} |
| 66/91935 | {lower than said fusion temperature} | 66/93 | . . . {by measuring or controlling the speed} |
| 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} | 66/932 | . . . {by measuring the speed} |
| 66/91943 | {higher than said glass transition temperature} | 66/9321 | {with special speed measurement means or methods} |
| 66/91945 | {lower than said glass transition temperature} | 66/934 | . . . {by controlling or regulating the speed} |
| 66/91951 | {in explicit relation to time, e.g. temperature-time diagrams} | 66/93411 | {the parts to be joined having different speeds} |
| 66/92 | . . {by measuring or controlling the pressure, the force, the mechanical power or the displacement of the joining tools} | 66/93431 | {the speed being kept constant over time} |
| 66/922 | . . . {by measuring the pressure, the force, the mechanical power or the displacement of the joining tools} | 66/93441 | {the speed being non-constant over time} |
| 66/9221 | {by measuring the pressure, the force or the mechanical power} | 66/93451 | {by controlling or regulating the rotational speed, i.e. the speed of revolution} |
| 66/92211 | {with special measurement means or methods} | 66/939 | . . . {characterised by specific speed values or ranges} |
| 66/9231 | {by measuring the displacement of the joining tools} | 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) | 70/021 | . . {Combinations of fibrous reinforcement and non-fibrous material} |
| | | 70/023 | . . . {with reinforcing inserts} |
| | | 70/025 | . . . {with particular filler} |
| 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)} | 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)} |
| 69/002 | . . {Winding (cutting of individual length B26D)} | 70/028 | . . {and with one or more layers of non-plastics material or non-specified material, e.g. supports} |
| 69/003 | . . . {and cutting longitudinally, e.g. for making O-rings; chain links, insulation tubes} | 70/04 | . comprising reinforcements only, e.g. self-reinforcing plastics |
| 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)} | 70/06 | . . Fibrous reinforcements only |
| 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)} | 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 |
| 69/006 | . . {rotating transfer means} | 70/081 | {Combinations of fibres of continuous or substantial length and short fibres} |
| 69/007 | . {Lining or sheathing in combination with forming the article to be lined} | 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)} |
| 69/008 | . . {of tubular articles} | 70/085 | {the structure being deformed in a three dimensional configuration (B29C 53/805 takes precedence)} |
| 69/02 | . of moulding techniques only | 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)} |
| 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)} | 70/088 | {and with one or more layers of non-plastics material or non-specified material, e.g. supports} |
| 70/00 | Shaping composites, i.e. plastics material comprising reinforcements, fillers or preformed parts, e.g. inserts | 70/10 | . . . characterised by the structure of fibrous reinforcements {, e.g. hollow fibres} |
| | NOTE | 70/12 | using fibres of short length, e.g. in the form of a mat {(non-woven fabrics per se D04H 1/00)} |
| | In this group, the following terms or expressions are used with the meanings indicated: | 70/14 | oriented |
| | . "reinforcement" means a structure in the form of fibres, wires, rods, bars, sections, plates or blocks, which improves the strength of an article; | 70/16 | using fibres of substantial or continuous length {(non-woven fabrics per se D04H 3/00)} |
| | . "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; | 70/18 | in the form of a mat, e.g. sheet moulding compound [SMC] |
| | . "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; | 70/20 | oriented in a single direction, e.g. roofing or other parallel fibres {(B29C 70/083, B29C 70/226 take precedence)} |
| | . "insert" means a preformed part incorporated in an article during moulding. | 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)} |
| 70/02 | . 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)} | 70/205 | {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 {(by winding and joining, e.g. filament winding [B29C 53/56](#); for building tyres [B29D 30/08](#))}
- 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 prepreps
- 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. prepreps, 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 (pretreatment, e.g. impregnation, of reinforcements [B29B 15/08](#))}
- 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](#))}
- 70/545 {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}
- 70/56 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}

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|----------------|--|----------|--|
| 70/88 | characterised primarily by possessing specific properties, e.g. electrically conductive or locally reinforced | 73/025 | {fed under pressure} |
| 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)} | 73/04 | using preformed elements |
| 70/885 | {with incorporated metallic wires, nets, films or plates (as lost heating elements B29C 35/0272 , B29C 61/0625)} | 73/06 | using plugs sealing in the hole |
| 70/887 | {locally reinforced, e.g. by fillers (filler concentrated near the surface B29C 70/64)} | 73/063 | {expandable} |
| 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)} | 73/066 | {by mechanical means provided on the plug} |
| 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)} | 73/08 | Apparatus therefor, e.g. for inserting |
| 2071/0018 | {Absorbing ingredients, e.g. drugs, flavourings, UV screeners, embedded in the articles} | 73/10 | using patches sealing on the surface of the article (B29C 73/14 takes precedence) |
| 2071/0027 | {Removing undesirable residual components, e.g. solvents, unreacted monomers (of material to be shaped B29B 9/16 , B29B 13/00)} | 73/105 | {provided with a centering element} |
| 2071/0036 | {Extracting, degassing, removing gases from moulded articles} | 73/12 | Apparatus therefor, e.g. for applying (B29C 73/30 takes precedence) |
| 2071/0045 | {Washing using non-reactive liquids} | 73/14 | using elements composed of two parts joined together after having been placed one on each side of the article |
| 2071/0054 | {Supercritical fluid treatment, i.e. using a liquid in which distinct liquid and gas phases do not exist} | 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)} |
| 71/0063 | {for changing crystallisation} | 73/163 | {Sealing compositions or agents, e.g. combined with propellant agents} |
| 71/0072 | {for changing orientation} | 73/166 | {Devices or methods for introducing sealing compositions into articles} |
| 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)} | 73/18 | the article material itself being self-sealing, e.g. by compression |
| 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)} | 73/20 | the article material only consisting in part of a deformable sealing material |
| 71/02 | Thermal after-treatment {(B29C 71/0063 and B29C 71/0072 take precedence)} | 73/22 | the article containing elements including a sealing composition, e.g. powder being liberated when the article is damaged |
| 2071/022 | {Annealing} | 73/24 | Apparatus or accessories not otherwise provided for |
| 2071/025 | {Quenching, i.e. rapid cooling of an object} | 73/245 | {for removing the element having caused the damage} |
| 2071/027 | {Tempering, i.e. heating an object to a high temperature and quenching it} | 73/26 | for mechanical pretreatment |
| 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)} | 2073/262 | {for polishing, roughening, buffing or sanding the area to be repaired} |
| 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)} | 2073/264 | {for cutting out or grooving the area to be repaired} |
| 73/02 | using liquid or paste-like material (B29C 73/16 takes precedence) | 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 |
| <hr/> | | | |
| 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
2793/0081 . before shaping
2793/009 . after shaping

2795/00 Printing on articles made from plastics or substances in a plastic state

- 2795/002 . before shaping
2795/005 . during shaping
2795/007 . after shaping

2945/00 Indexing scheme relating to injection moulding, i.e. forcing the required volume of moulding material through a nozzle into a closed mould

- 2945/76 . Measuring, controlling or regulating
2945/76003 . . Measured parameter
2945/76006 . . . Pressure
2945/7601 derivative, change thereof
2945/76013 . . . Force
2945/76016 derivative, change thereof
2945/7602 . . . Torque
2945/76023 derivative, change thereof
2945/76026 . . . Energy, power
2945/7603 Power
2945/76033 . . . Electric current or voltage
2945/76036 . . . Frequency
2945/7604 . . . Temperature
2945/76043 derivative, change thereof
2945/76046 Heat flux, heat transfer
2945/7605 . . . Viscosity
2945/76053 derivative, change thereof
2945/76056 . . . Flow rate
2945/7606 derivative, change thereof
2945/76063 MFI, MFR
2945/76066 . . . Time
2945/7607 start
2945/76073 termination
2945/76076 duration
2945/7608 pause, wilful interruption
2945/76083 . . . Position
2945/76086 Start position
2945/7609 End position
2945/76093 Angular position
2945/76096 Distance
2945/761 . . . Dimensions, e.g. thickness
2945/76103 shrinkage, dilation, dimensional change, warpage

- 2945/76107 volume
2945/7611 . . . Velocity
2945/76113 linear movement
2945/76117 derivative, change thereof
2945/7612 rotational movement
2945/76123 derivative, change thereof
2945/76127 . . . Density
2945/7613 . . . Weight
2945/76133 . . . Crystallinity
2945/76137 . . . Degree of crosslinking, solidification
2945/7614 . . . Humidity, moisture
2945/76143 . . . Volatiles
2945/76147 . . . Contaminants
2945/7615 . . . Electrical properties
2945/76153 . . . Optical properties
2945/76157 . . . Magnetic properties
2945/7616 . . . Surface properties
2945/76163 . . . Errors, malfunctioning
2945/76167 . . . Presence, absence of objects
2945/7617 . . . Sequence, e.g. the order in which operations are conducted
2945/76173 . . . Others
2945/76177 . . Location of measurement
2945/7618 . . . Injection unit
2945/76183 hopper
2945/76187 screw
2945/7619 barrel
2945/76193 barrel-chamber
2945/76197 screw ante-chamber
2945/762 injection piston
2945/76204 injection piston cylinder
2945/76207 accumulators
2945/7621 nozzle
2945/76214 drive means
2945/76217 nozzle-touch mechanism
2945/7622 others
2945/76224 . . . Closure or clamping unit
2945/76227 mould platen
2945/7623 clamping or closing drive means
2945/76234 tie-bars
2945/76237 others
2945/7624 . . . Ejection unit
2945/76244 ejectors
2945/76247 drive means thereof
2945/7625 others
2945/76254 . . . Mould
2945/76257 cavity
2945/7626 cavity walls
2945/76264 movable
2945/76267 non-cavity forming parts
2945/7627 movable
2945/76274 runners, nozzles
2945/76277 nozzles
2945/7628 manifolds
2945/76284 others
2945/76287 . . . Moulding material
2945/7629 . . . Moulded articles
2945/76294 . . . Inserts
2945/76297 . . . Fluids
2945/76301 auxiliary fluids introduced into the cavity
2945/76304 temperature control fluids

| | | | |
|--------------------|---|--------------------|--|
| 2945/76307 | hydraulic fluids | 2945/76511 | Torque |
| 2945/76311 | environment | 2945/76515 | derivative, change thereof |
| 2945/76314 | Auxiliary devices | 2945/76518 | Energy, power |
| 2945/76317 | robots, grippers | 2945/76521 | power |
| 2945/76321 | conveyors | 2945/76525 | Electric current or voltage |
| 2945/76324 | pre-treatment devices | 2945/76528 | Frequency |
| 2945/76327 | post-treatment devices | 2945/76531 | Temperature |
| 2945/76331 | raw material feeding devices | 2945/76535 | derivative, change thereof |
| 2945/76334 | auxiliary fluid supplying devices | 2945/76538 | Viscosity |
| 2945/76337 | other auxiliary devices | 2945/76541 | derivative, change thereof |
| 2945/76341 | Others | 2945/76545 | Flow rate |
| 2945/76344 | Phase or stage of measurement | 2945/76548 | derivative, change thereof |
| 2945/76347 | Pre-treatment | 2945/76551 | Time |
| 2945/76351 | Feeding | 2945/76555 | start |
| 2945/76354 | raw materials | 2945/76558 | termination |
| 2945/76357 | inserts | 2945/76561 | duration |
| 2945/76361 | auxiliary fluids, e.g. gas, liquid | 2945/76565 | pause, wilful interruption |
| 2945/76364 | others | 2945/76568 | Position |
| 2945/76367 | Metering | 2945/76571 | start position |
| 2945/76371 | Intrusion | 2945/76575 | end position |
| 2945/76374 | Pre-compression prior to injection | 2945/76578 | angular position |
| 2945/76377 | De-compression after injection | 2945/76581 | distance |
| 2945/76381 | Injection | 2945/76585 | Dimensions, e.g. thickness |
| 2945/76384 | Holding, dwelling | 2945/76588 | shrinkage, dilation, dimensional change, warpage |
| 2945/76387 | Mould closing | 2945/76591 | volume |
| 2945/76391 | Mould clamping, compression of the cavity | 2945/76595 | Velocity |
| 2945/76394 | Mould opening | 2945/76598 | linear movement |
| 2945/76397 | Switch-over | 2945/76602 | derivative, change thereof |
| 2945/76401 | metering-injection | 2945/76605 | rotational movement |
| 2945/76404 | injection-holding | 2945/76608 | derivative, change thereof |
| 2945/76408 | holding-metering | 2945/76612 | Density |
| 2945/76411 | others | 2945/76615 | Weight |
| 2945/76414 | Solidification, setting phase | 2945/76618 | Crystallinity |
| 2945/76418 | Ejection | 2945/76622 | Degree of crosslinking, solidification |
| 2945/76421 | Removing or handling ejected articles | 2945/76625 | Humidity, moisture |
| 2945/76424 | After-treatment | 2945/76628 | Volatiles |
| 2945/76428 | Purging | 2945/76632 | Contaminants |
| 2945/76431 | Calibration, e.g. zero-point correction | 2945/76635 | Electrical properties |
| 2945/76434 | Parameter setting | 2945/76638 | Optical properties |
| 2945/76438 | Start up | 2945/76642 | Magnetic properties |
| 2945/76441 | Shut down | 2945/76645 | Surface properties |
| 2945/76444 | in case of emergency | 2945/76648 | Sequence, e.g. the order in which operations are conducted |
| 2945/76448 | Others | 2945/76652 | Others |
| 2945/76451 | Measurement means | 2945/76655 | Location of control |
| 2945/76454 | Electrical, e.g. thermocouples | 2945/76658 | Injection unit |
| 2945/76458 | piezo-electric | 2945/76662 | hopper |
| 2945/76461 | Optical, e.g. laser | 2945/76665 | screw |
| 2945/76464 | cameras | 2945/76668 | barrel |
| 2945/76468 | Manual | 2945/76672 | barrel-chamber |
| 2945/76471 | Acoustic | 2945/76675 | screw ante-chamber |
| 2945/76474 | Ultrasonic | 2945/76678 | injection piston |
| 2945/76478 | Mechanical | 2945/76682 | injection piston cylinder |
| 2945/76481 | Strain gauges | 2945/76685 | accumulators |
| 2945/76484 | Fluid type | 2945/76688 | nozzle |
| 2945/76488 | Magnetic, electro-magnetic | 2945/76692 | drive means |
| 2945/76491 | Others | 2945/76695 | nozzle-touch mechanism |
| 2945/76494 | Controlled parameter | 2945/76698 | others |
| 2945/76498 | Pressure | 2945/76702 | Closure or clamping device |
| 2945/76501 | derivative, change thereof | 2945/76705 | mould platen |
| 2945/76505 | Force | | |
| 2945/76508 | derivative, change thereof | | |

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|------------|-----------|---|----------------|-----------|--|
| 2945/76709 | | clamping or closing drive means | 2945/76913 | . . . | Parameter setting |
| 2945/76712 | | tie-bars | 2945/76916 | . . . | Start up |
| 2945/76715 | | others | 2945/76919 | . . . | Shut down |
| 2945/76719 | . . . | Ejection unit | 2945/76923 | | in case of emergency |
| 2945/76722 | | ejectors | 2945/76926 | . . . | Others |
| 2945/76725 | | drive means thereof | 2945/76929 | . . | Controlling method |
| 2945/76729 | | others | 2945/76933 | . . . | Open loop, i.e. the operating conditions are corrected immediately, during the same phase or cycle |
| 2945/76732 | . . . | Mould | 2945/76936 | . . . | Closed loop, i.e. the operating conditions are corrected in the next phase or cycle |
| 2945/76735 | | cavity | 2945/76939 | . . . | Using stored or historical data sets |
| 2945/76739 | | cavity walls | 2945/76943 | | compare with thresholds |
| 2945/76742 | | movable | 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 |
| 2945/76745 | | non-cavity forming parts | 2945/76949 | | using a learning system, i.e. the system accumulates experience from previous occurrences, e.g. adaptive control |
| 2945/76749 | | movable | 2945/76953 | . . . | Distributed, i.e. several control units perform different tasks |
| 2945/76752 | | runners, nozzles | 2945/76956 | . . . | Proportional |
| 2945/76755 | | nozzles | 2945/76959 | | and derivative, i.e. PD regulation |
| 2945/76759 | | manifolds | 2945/76963 | | using a second derivative, e.g. determination of inflexion points |
| 2945/76762 | | others | 2945/76966 | | and integral, i.e. PI regulation |
| 2945/76765 | . . . | Moulding material | 2945/76969 | | derivative and integral, i.e. PID regulation |
| 2945/76769 | . . . | Moulded articles | 2945/76973 | . . . | By counting |
| 2945/76772 | . . . | Inserts | 2945/76976 | . . . | By trial and error, trial tests |
| 2945/76775 | . . . | Fluids | 2945/76979 | . . . | Using a neural network |
| 2945/76779 | | auxiliary fluids introduced into the cavity | 2945/76983 | . . . | Using fuzzy logic |
| 2945/76782 | | temperature control fluids | 2945/76986 | . . . | Interpolating |
| 2945/76785 | | hydraulic fluids | 2945/76989 | . . . | Extrapolating |
| 2945/76789 | | environment | 2945/76993 | . . . | Remote, e.g. LAN, wireless LAN |
| 2945/76792 | . . . | Auxiliary devices | 2945/76996 | . . . | Others |
| 2945/76795 | | robots, grippers | 2948/00 | | Indexing scheme relating to extrusion moulding |
| 2945/76799 | | conveyors | 2948/92 | . . . | Measuring, controlling or regulating |
| 2945/76802 | | pre-treatment devices | 2948/92009 | . . | Measured parameter |
| 2945/76806 | | post-treatment devices | 2948/92019 | . . . | Pressure |
| 2945/76809 | | raw material feeding devices | 2948/92028 | . . . | Force; Tension |
| 2945/76812 | | Auxiliary fluid supplying devices | 2948/92038 | . . . | Torque |
| 2945/76816 | | others auxiliary devices | 2948/92047 | . . . | Energy, power, electric current or voltage |
| 2945/76819 | . . . | Others | 2948/92057 | . . . | Frequency |
| 2945/76822 | . . | Phase or stage of control | 2948/92066 | . . . | Time, e.g. start, termination, duration or interruption |
| 2945/76826 | . . . | Pre-treatment | 2948/92076 | . . . | Position, e.g. linear or angular |
| 2945/76829 | . . . | Feeding | 2948/92085 | . . . | Velocity |
| 2945/76832 | | raw materials | 2948/92095 | | Angular velocity |
| 2945/76836 | | inserts | 2948/92104 | | Flow or feed rate |
| 2945/76839 | | auxiliary fluids, e.g. gas, liquid | 2948/92114 | . . . | Dimensions |
| 2945/76842 | | others | 2948/92123 | | Diameter or circumference |
| 2945/76846 | . . . | Metering | 2948/92133 | | Width or height |
| 2945/76849 | . . . | Intrusion | 2948/92142 | | Length |
| 2945/76852 | . . . | Pre-compression prior to injection | 2948/92152 | | Thickness |
| 2945/76856 | . . . | De-compression after injection | 2948/92161 | | Volume or quantity |
| 2945/76859 | . . . | Injection | 2948/92171 | | Distortion, shrinkage, dilatation, swell or warpage |
| 2945/76862 | . . . | Holding, dwelling | 2948/9218 | . . . | Weight |
| 2945/76866 | . . . | Mould closing | 2948/9219 | . . . | Density, e.g. per unit length or area |
| 2945/76869 | . . . | Mould clamping, compression of the cavity | 2948/922 | . . . | Viscosity; Melt flow index [MFI]; Molecular weight |
| 2945/76872 | . . . | Mould opening | | | |
| 2945/76876 | . . . | Switch-over | | | |
| 2945/76879 | | metering-injection | | | |
| 2945/76882 | | injection-holding | | | |
| 2945/76886 | | holding-metering | | | |
| 2945/76889 | | others | | | |
| 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 | | | |

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| 2948/92209 | . . . | Temperature | 2948/92666 | | Distortion, shrinkage, dilatation, swell or warpage |
| 2948/92219 | . . . | Degree of crosslinking, solidification, crystallinity or homogeneity | 2948/92676 | . . . | Weight |
| 2948/92228 | . . . | Content, e.g. percentage of humidity, volatiles, contaminants or degassing | 2948/92685 | . . . | Density, e.g. per unit length or area |
| 2948/92238 | . . . | Electrical properties | 2948/92695 | . . . | Viscosity; Melt flow index [MFI]; Molecular weight |
| 2948/92247 | . . . | Optical properties | 2948/92704 | . . . | Temperature |
| 2948/92257 | | Colour | 2948/92714 | . . . | Degree of crosslinking, solidification, crystallinity or homogeneity |
| 2948/92266 | . . . | Mechanical properties | 2948/92723 | . . . | Content, e.g. percentage of humidity, volatiles, contaminants or degassing |
| 2948/92276 | . . . | Magnetic properties | 2948/92733 | . . . | Electrical properties |
| 2948/92285 | . . . | Surface properties | 2948/92742 | . . . | Optical properties |
| 2948/92295 | . . . | Errors or malfunctioning, e.g. for quality control | 2948/92752 | | Colour |
| 2948/92304 | . . . | Presence or absence; Sequence; Counting | 2948/92761 | . . . | Mechanical properties |
| 2948/92314 | . . . | Particular value claimed | 2948/92771 | . . . | Magnetic properties |
| 2948/92323 | . . | Location or phase of measurement | 2948/9278 | . . . | Surface properties |
| 2948/92333 | . . . | Raw material handling or dosing, e.g. active hopper or feeding device | 2948/9279 | . . . | Errors or malfunctioning, e.g. for quality control |
| 2948/92342 | . . . | Raw material pre-treatment, e.g. drying or cleaning | 2948/928 | . . . | Presence or absence; Sequence; Counting |
| 2948/92352 | . . . | Inserts | 2948/92809 | . . . | Particular value claimed |
| 2948/92361 | . . . | Extrusion unit | 2948/92819 | . . | Location or phase of control |
| 2948/92371 | | Inlet shaft or slot, e.g. passive hopper; Injector, e.g. injector nozzle on barrel | 2948/92828 | . . . | Raw material handling or dosing, e.g. active hopper or feeding device |
| 2948/9238 | | Feeding, melting, plasticising or pumping zones, e.g. the melt itself | 2948/92838 | . . . | Raw material pre-treatment, e.g. drying or cleaning |
| 2948/9239 | | Screw or gear | 2948/92847 | . . . | Inserts |
| 2948/924 | | Barrel or housing | 2948/92857 | . . . | Extrusion unit |
| 2948/92409 | | Die; Nozzle zone | 2948/92866 | | Inlet shaft or slot, e.g. passive hopper; Injector, e.g. injector nozzle on barrel |
| 2948/92419 | | Degassing unit | 2948/92876 | | Feeding, melting, plasticising or pumping zones, e.g. the melt itself |
| 2948/92428 | . . . | Calibration, after-treatment, or cooling zone | 2948/92885 | | Screw or gear |
| 2948/92438 | . . . | Conveying, transporting or storage of articles | 2948/92895 | | Barrel or housing |
| 2948/92447 | . . . | Moulded article | 2948/92904 | | Die; Nozzle zone |
| 2948/92457 | . . . | Drive section, e.g. gearbox, motor or drive fluids | 2948/92914 | | Degassing unit |
| 2948/92466 | . . . | Auxiliary unit, e.g. for external melt filtering, re-combining or transfer between units | 2948/92923 | . . . | Calibration, after-treatment or cooling zone |
| 2948/92476 | . . . | Fluids, e.g. for temperature control or of environment | 2948/92933 | . . . | Conveying, transporting or storage of articles |
| 2948/92485 | . . . | Start-up, shut-down or parameter setting phase; Emergency shut-down; Material change; Test or laboratory equipment or studies | 2948/92942 | . . . | Moulded article |
| 2948/92495 | . . . | Treatment of equipment, e.g. purging, cleaning, lubricating or filter exchange | 2948/92952 | . . . | Drive section, e.g. gearbox, motor or drive fluids |
| 2948/92504 | . . | Controlled parameter | 2948/92961 | . . . | Auxiliary unit, e.g. for external melt filtering, re-combining or transfer between units |
| 2948/92514 | . . . | Pressure | 2948/92971 | . . . | Fluids, e.g. for temperature control or of environment |
| 2948/92523 | . . . | Force; Tension | 2948/9298 | . . . | Start-up, shut-down or parameter setting phase; Emergency shut-down; Material change; Test or laboratory equipment or studies |
| 2948/92533 | . . . | Torque | 2948/9299 | . . . | Treatment of equipment, e.g. purging, cleaning, lubricating or filter exchange |
| 2948/92542 | . . . | Energy, power, electric current or voltage | | | |
| 2948/92552 | . . . | Frequency | | | |
| 2948/92561 | . . . | Time, e.g. start, termination, duration or interruption | 2949/00 | Blow moulding, i.e. blowing a preform or parison to a desired shape within a mould | |
| 2948/92571 | . . . | Position, e.g. linear or angular | 2949/78 | . . | Measuring, controlling or regulating |
| 2948/9258 | . . . | Velocity | 2949/78008 | . . | Measuring |
| 2948/9259 | | Angular velocity | 2949/78016 | . . . | Measured parameter |
| 2948/926 | | Flow or feed rate | 2949/78025 | | Pressure |
| 2948/92609 | . . . | Dimensions | 2949/78033 | | Energy, power, electric current or voltage |
| 2948/92619 | | Diameter or circumference | 2949/78042 | | Time, e.g. start, termination, duration or interruption |
| 2948/92628 | | Width or height | 2949/7805 | | Position, e.g. start, end or actual position |
| 2948/92638 | | Length | 2949/78058 | | Velocity |
| 2948/92647 | | Thickness | 2949/78067 | | Dimension |
| 2948/92657 | | Volume or quantity | | | |

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| 2949/78075 | | Diameter | 2949/78529 | | Controlled parameter |
| 2949/78084 | | Length | 2949/78537 | | Pressure |
| 2949/78092 | | Thickness | 2949/78546 | | Energy, power, electric current or voltage |
| 2949/781 | | of individual layers of multilayered objects | 2949/78554 | | Time, e.g. start, termination, duration or interruption |
| 2949/78109 | | Volume or quantity | 2949/78563 | | Position, e.g. start, end or actual position |
| 2949/78117 | | Dimensional change, e.g. distortion or shrinkage | 2949/78571 | | Velocity |
| 2949/78126 | | Weight | 2949/78579 | | Dimension |
| 2949/78134 | | Density, e.g. per unit length or area | 2949/78588 | | Diameter |
| 2949/78142 | | Viscosity | 2949/78596 | | Length |
| 2949/78151 | | Temperature | 2949/78605 | | Thickness |
| 2949/78159 | | Electrical properties | 2949/78613 | | of individual layers of multilayered objects |
| 2949/78168 | | Optical properties | 2949/78621 | | Volume or quantity |
| 2949/78176 | | Colour, e.g. transparency | 2949/7863 | | Dimensional change, e.g. distortion or shrinkage |
| 2949/78184 | | Mechanical properties | 2949/78638 | | Weight |
| 2949/78193 | | Magnetic properties | 2949/78647 | | Density, e.g. per unit length or area |
| 2949/78201 | | Surface properties | 2949/78655 | | Viscosity |
| 2949/7821 | | Errors or malfunctioning | 2949/78663 | | Temperature |
| 2949/78218 | | Presence or absence, e.g. of preforms or parisons | 2949/78672 | | Electrical properties |
| 2949/78226 | | Location or phase of measurement | 2949/7868 | | Optical properties |
| 2949/78235 | | Injection phase or unit | 2949/78689 | | Colour, e.g. transparency |
| 2949/78243 | | Extrusion phase or unit | 2949/78697 | | Mechanical properties |
| 2949/78252 | | Die; Nozzle zone | 2949/78705 | | Magnetic properties |
| 2949/7826 | | Handling phase or unit, e.g. feeding device | 2949/78714 | | Surface properties |
| 2949/78268 | | of blow moulded articles | 2949/78722 | | Errors or malfunctioning |
| 2949/78277 | | of inserts | 2949/78731 | | Presence or absence, e.g. of preforms or parisons |
| 2949/78285 | | of labels | 2949/78739 | | Location or phase of control |
| 2949/78294 | | Blow moulding phase | 2949/78747 | | Injection phase or unit |
| 2949/78302 | | Closure, opening or clamping phase or unit | 2949/78756 | | Extrusion phase or unit |
| 2949/7831 | | during opening phase | 2949/78764 | | Die; Nozzle zone |
| 2949/78319 | | during clamping phase | 2949/78773 | | Handling phase or unit, e.g. feeding device |
| 2949/78327 | | Ejection phase or unit | 2949/78781 | | of blow moulded articles |
| 2949/78336 | | Mould | 2949/78789 | | of inserts |
| 2949/78344 | | cavity | 2949/78798 | | of labels |
| 2949/78352 | | non cavity forming parts | 2949/78806 | | Blow moulding phase |
| 2949/78361 | | core of the injection blow moulding machine, e.g. core transporting preform to blow moulding machine | 2949/78815 | | Closure, opening or clamping phase or unit |
| 2949/78369 | | Stretching phase or unit | 2949/78823 | | during opening phase |
| 2949/78378 | | Blowing means, pressurized phase | 2949/78831 | | during clamping phase |
| 2949/78386 | | Preform or parison | 2949/7884 | | Ejection phase or unit |
| 2949/78394 | | Moulded articles | 2949/78848 | | Mould |
| 2949/78403 | | Inserts | 2949/78857 | | cavity |
| 2949/78411 | | Fluids | 2949/78865 | | non cavity forming parts |
| 2949/7842 | | introduced into the preform, parison or blown article | 2949/78873 | | core of the injection blow moulding machine, e.g. core transporting preform to blow moulding machine |
| 2949/78428 | | for temperature control | 2949/78882 | | Stretching phase or unit |
| 2949/78436 | | Temperature control fluids, i.e. to regulate the temperature in the blow mould | 2949/7889 | | Blowing means, pressurized phase |
| 2949/78445 | | Driving means, e.g. motor or drive fluids | 2949/78899 | | Preform or parison |
| 2949/78453 | | Auxiliary phases or units | 2949/78907 | | Moulded articles |
| 2949/78462 | | Pre-treatment phase or devices | 2949/78915 | | Inserts |
| 2949/7847 | | Post-treatment phases or devices | 2949/78924 | | Fluids |
| 2949/78478 | | Start-up, shut-down phase; Emergency shut down | 2949/78932 | | introduced into the preform, parison or blown article |
| 2949/78487 | | Measurement means | 2949/78941 | | for temperature control |
| 2949/78495 | | Electrical, e.g. thermocouples | 2949/78949 | | Temperature control fluids, i.e. to regulate the temperature in the blow mould |
| 2949/78504 | | Optical, e.g. laser | 2949/78957 | | Driving means, e.g. motor or drive fluids |
| 2949/78512 | | Cameras | 2949/78966 | | Auxiliary phases or units |
| 2949/78521 | | Controlling or regulating | 2949/78974 | | Pre-treatment phases or devices |

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| 2949/78983 | | Post-treatment phases or devices |
| 2949/78991 | | Start-up, shut-down phase; Emergency shut down |