SECTION B — PERFORMING OPERATIONS; TRANSPORTING

B22 CASTING; POWDER METALLURGY

B22D CASTING OF METALS; CASTING OF OTHER SUBSTANCES BY THE SAME PROCESSES OR DEVICES (shaping of plastics or substances in a plastic state B29C; metallurgical processing, selection of substances to be added to metal C21, C22)

Note(s)

In this subclass, any material to be cast is referred to as metal.

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1/00 Treatment of fused masses in the ladle or the supply runners before casting (features relating to gas injection, provided on closures of the sliding-gate type B22D 41/42, provided on pouring-nozzles B22D 41/58)

2/00 Arrangement of indicating or measuring devices, e.g. for temperature or viscosity of the fused mass [3]

Casting of pigs, i.e. metal castings suitable for subsequent melting; Similar casting

3/00 Pig or like casting (equipment for conveying molten metal B22D 35/00)

3/02 • Moulding of beds

5/00 Machines or plants for pig or like casting

5/02 • with rotary casting tables

5/04 • with endless casting conveyors

Casting of ingots, i.e. metal castings suitable for subsequent rolling or forging

7/00 Casting ingots (equipment for conveying molten metal B22D 35/00)

7/02 • Casting compound ingots of two or more different metals in the molten state, i.e. integrally cast

7/04 • Casting hollow ingots

7/06 • Ingot moulds or their manufacture

7/08 • • Divided ingot moulds

7/10 • • Hot tops therefor

7/12 • Accessories, e.g. for sintering, for preventing splashing

9/00 Machines or plants for casting ingots

Particular casting processes; Machines or apparatus therefor

11/00 Continuous casting of metals, i.e. casting in indefinite lengths (metal drawing, metal extruding B21C)
11/01 • without moulds, e.g. on molten surfaces **[2]**
11/04 • into open-ended moulds (B22D 11/06, B22D 11/07 take precedence; plants for continuous casting, e.g. for upwardly drawing the strand, B22D 11/14) **[3]**
11/041 • • for vertical casting (B22D 11/043, B22D 11/049-B22D 11/059 take precedence) **[7]**
11/043 • • Curved moulds (B22D 11/049-B22D 11/059 take precedence) **[7]**
11/045 • • for horizontal casting (B22D 11/049-B22D 11/059 take precedence) **[7]**
11/047 • • • Means for joining tundish to mould **[7]**
11/049 • • for direct chill casting, e.g. electromagnetic casting **[7]**
11/05 • • into moulds having adjustable walls **[7]**
11/051 • • into moulds having oscillating walls **[7]**
11/053 • • Means for oscillating the moulds **[7]**
11/055 • • Cooling the moulds **[7]**
11/057 • • Manufacturing or calibrating the moulds **[7]**
11/059 • • Mould materials or platings **[7]**
11/06 • into moulds with travelling walls, e.g. with rolls, plates, belts, caterpillars (B22D 11/07 takes precedence) **[3]**
11/07 • Lubricating the moulds **[3]**
11/08 • Accessories for starting the casting procedure
11/10 • Supplying or treating molten metal (B22D 41/00 takes precedence) **[1, 7]**
11/103 • • Distributing the molten metal, e.g. using runners, floats, distributors **[7]**
11/106 • • Shielding the molten jet **[7]**
11/108 • • Feeding additives, powders, or the like **[7]**
11/11 • • Treating the molten metal **[7]**
11/111 • • • by using protecting powders **[7]**
11/112 • • • by accelerated cooling **[7]**
11/113 • • • by vacuum treating **[7]**
11/114 • • • by using agitating or vibrating means (B22D 11/117 takes precedence) **[7]**
11/115 • • • • by using magnetic fields **[7]**
11/116 • • • Refining the metal **[7]**
11/117 • • • • by treating with gases (B22D 11/118, B22D 11/119 take precedence) **[7]**
11/118 • • • • by circulating the metal under, over or around weirs (B22D 11/119 takes precedence) **[7]**
11/119 • • • • by filtering **[7]**
11/12 • Accessories for subsequent treating or working cast stock in situ (rolling immediately subsequent to continuous casting B21B 1/46, B21B 13/22) **[3]**
11/124 • • for cooling **[2]**
11/126 • • for cutting **[2]**
11/128 • • for removing **[2]**
11/14 • Plants for continuous casting, e.g. for upwardly drawing the strand
11/16 • Controlling or regulating processes or operations **[2]**
11/18 • • for pouring (B22D 11/20 takes precedence) **[4]**
11/20 • • for removing cast stock **[4]**
11/22 • • for cooling cast stock or mould **[4]**

13/00 Centrifugal casting; Casting by using centrifugal force
13/02 • of elongated solid or hollow bodies, e.g. pipes, in moulds rotating around their longitudinal axis
13/04 • of shallow solid or hollow bodies, e.g. wheels or rings, in moulds rotating around their axis of symmetry
13/06 • of solid or hollow bodies in moulds rotating around an axis arranged outside of the mould
13/08 • in which a stationary mould is fed from a rotating mass of liquid metal
13/10 • Accessories for centrifugal casting apparatus, e.g. moulds, linings therefor, means for feeding molten metal, cleansing moulds, removing castings (making or lining moulds B22C)
13/12 • Controlling, supervising, specially adapted to centrifugal casting, e.g. for safety reasons **[3]**

15/00 Casting using a mould or core of which a part significant to the process of high thermal conductivity, e.g. chill casting; Moulds or accessories specially adapted therefor (continuous casting of metals into open-ended moulds for direct chill casting B22D 11/049) **[1, 7]**
15/02 • of cylinders, pistons, bearing shells or like thin-walled objects
15/04 • Machines or apparatus for chill casting (B22D 15/02 takes precedence)

17/00 Pressure die casting or injection die casting, i.e. casting in which the metal is forced into a mould under high pressure [3]
17/02 • Hot chamber machines, i.e. with heated press chamber in which metal is melted
17/04 • • Plunger machines
17/06 • • Air injection machines
17/08 • Cold chamber machines, i.e. with unheated press chamber into which molten metal is ladled
17/10 • • with horizontal press motion
17/12 • • with vertical press motion
17/14 • Machines with evacuated die cavity
17/16 • specially adapted for casting slide fasteners or elements therefor
17/18 • Machines built up from units providing for different combinations
17/20 • Accessories; Details
17/22 • • Dies (manufacture, see the appropriate class, e.g. B23P 15/24); Die plates; Die supports; Cooling equipment for dies; Accessories for loosening and ejecting castings from dies
17/24 • • • Accessories for locating and holding cores or inserts
17/26 • • Mechanisms or devices for locking or opening dies
17/28 • • Melting pots
17/30 • • Accessories for supplying molten metal, e.g. in rations
17/32 • • Controlling equipment

18/00 Pressure casting; Vacuum casting (B22D 17/00 takes precedence; treating the metal in the mould by using pressure or vacuum B22D 27/00) **[3]**
18/02 • Pressure casting making use of mechanical pressing devices, e.g. cast-forging (B22D 18/04 takes precedence) **[3]**
18/04 • Low pressure casting, i.e. making use of pressures up to a few bars to fill the mould **[3]**
18/06 • Vacuum casting, i.e. making use of vacuum to fill the mould **[3]**
18/08 • Controlling, supervising, e.g. for safety reasons **[3]**

19/00 **Casting in, on, or around, objects which form part of the product** (B22D 23/04 takes precedence; alumino-thermic welding B23K 23/00; coating by casting molten material on the substrate C23C 6/00)

19/02 • for making reinforced articles (B22D 19/14 takes precedence) **[3]**

19/04 • for joining parts

19/06 • for manufacturing or repairing tools

19/08 • for building up linings or coverings, e.g. of anti-frictional metal

19/10 • Repairing defective or damaged objects by metal casting techniques (by other techniques B23P 6/04)

19/12 • for making objects, e.g. hinges, with parts which are movable relatively to one another

19/14 • the objects being filamentary or particulate in form (making alloys containing fibres or filaments by contacting the fibres or filaments with molten metal C22C 47/08) **[3]**

19/16 • for making compound objects cast of two or more different metals, e.g. for making rolls for rolling mills (casting compound ingots B22D 7/02) **[3]**

21/00 **Casting non-ferrous metals or metallic compounds so far as their metallurgical properties are of importance for the casting procedure** (apparatus for vacuum casting B22D 18/00)**; Selection of compositions therefor**

21/02 • Casting exceedingly oxidisable non-ferrous metals, e.g. in inert atmosphere (use of inert atmosphere in casting metals in general B22D 23/00)

21/04 • • Casting aluminium or magnesium

21/06 • Casting non-ferrous metals with a high melting-point, e.g. metallic carbides (B22D 21/02 takes precedence)

23/00 **Casting processes not provided for in groups B22D 1/00-B22D 21/00** (making metallic powder by casting B22F 9/08; alumino-thermic welding B23K 23/00; remelting metals C22B 9/16)

23/02 • Top casting

23/04 • Casting by dipping (hot-dipping or immersion processes for applying coating material in the molten state without affecting the shape C23C 2/00)

23/06 • Melting-down metal, e.g. metal particles, in the mould

23/10 • • Electroslag casting **[5]**

25/00 **Special casting characterised by the nature of the product** (B22D 15/02, B22D 17/16, B22D 19/00 take precedence; casting stereotype plates B41D 3/00) **[2]**

25/02 • by its peculiarity of shape; of works of art

25/04 • • Casting metal electric battery plates or the like (manufacture thereof by multi-step processes H01M 4/82) **[2]**

25/06 • by its physical properties (B22D 27/00 takes precedence)

25/08 • • by uniform hardness (B22D 15/00 takes precedence)

27/00 **Treating the metal in the mould while it is molten or ductile** (B22D 7/12, B22D 11/10, B22D 18/00, B22D 43/00 take precedence) **[3]**

27/02 • Use of electric or magnetic effects

27/04 • Influencing the temperature of the metal, e.g. by heating or cooling the mould (cooling of open-ended moulds in continuous casting B22D 11/055) **[1, 7]**

27/06 • • Heating the top discard of ingots (hot tops for ingot moulds B22D 7/10)

27/08 • Shaking, vibrating, or turning of moulds (B22D 11/051, B22D 11/053 take precedence) **[1, 7]**

27/09 • by using pressure **[3]**

27/11 • • making use of mechanical pressing devices **[3]**

27/13 • • making use of gas pressure **[3]**

27/15 • by using vacuum **[3]**

27/18 • Measures for using chemical processes for influencing the surface composition of castings, e.g. for increasing resistance to acid attack

27/20 • Measures not previously mentioned for influencing the grain structure or texture; Selection of compositions therefor

Final measures after casting

29/00 **Removing castings from moulds, not restricted to casting processes covered by a single main group; Removing cores; Handling ingots [2]**

29/02 • Vibratory apparatus specially designed for shaking out flasks

29/04 • Handling or stripping castings or ingots (grippers in general, see the relevant subclasses, e.g. B66C)

29/06 • • Strippers actuated by fluid pressure

29/08 • • Strippers actuated mechanically **[2]**

30/00 **Cooling castings, not restricted to casting processes covered by a single main group** (accessories for cooling cast stock in continuous casting of metals B22D 11/124; controlling or regulating processes or operations for cooling cast stock or mould in continuous casting of metals B22D 11/22; chill casting B22D 15/00) **[5]**

31/00 **Cutting-off surplus material after casting, e.g. gates** (cleaning of castings by sand-blasting B24C)

Other equipment for casting [3]

33/00 **Equipment for handling moulds**

33/02 • Turning or transposing moulds

33/04 • Bringing together or separating moulds

33/06 • Burdening or relieving moulds

35/00 **Equipment for conveying molten metal into beds or moulds** (B22D 37/00-B22D 41/00 take precedence; specially adapted to particular processes or machines, see the relevant groups)

35/02 • into beds

35/04 • into moulds, e.g. base plates, runners

35/06 • Heating or cooling equipment

37/00 **Controlling or regulating the pouring of molten metal from a casting melt-holding vessel** (B22D 39/00, B22D 41/00 take precedence; specially adapted to particular processes or machines, see the relevant groups of this subclass) **[3, 5]**

39/00 **Equipment for supplying molten metal in rations** (specially adapted to particular processes or machines, see the relevant groups of this subclass)

39/02 • having means for controlling the amount of molten metal by volume **[3]**

39/04 • having means for controlling the amount of molten metal by weight **[3]**

39/06 • having means for controlling the amount of molten metal by controlling the pressure above the molten metal **[3]**

41/00 **Casting melt-holding vessels, e.g. ladles, tundishes, cups or the like** (B22D 39/00, B22D 43/00 take precedence) **[5]**
41/005 • with heating or cooling means **[5]**
41/01 • • Heating means **[5]**
41/015 • • • with external heating, i.e. the heat source not being a part of the ladle **[5]**
41/02 • Linings
41/04 • tiltable
41/05 • • Tea-pot spout ladles **[5]**
41/06 • Equipment for tilting
41/08 • for bottom pouring (B22D 41/14, B22D 41/50 take precedence)
41/12 • Travelling ladles or similar containers; Cars for ladles (casting cranes B66C)
41/13 • • Ladle turrets **[7]**
41/14 • Closures **[5]**
41/16 • • stopper-rod type, i.e. a stopper-rod being positioned downwardly through the vessel and the metal therein, for selective registry with the pouring opening **[5]**
41/18 • • • Stopper-rods therefor **[5]**
41/20 • • • Stopper-rod operating equipment **[5]**
41/22 • • sliding-gate type, i.e. having a fixed plate and a movable plate in sliding contact with each other for selective registry of their openings **[5]**
41/24 • • • characterised by a rectilinearly movable plate (B22D 41/38-B22D 41/42 take precedence) **[5]**
41/26 • • • characterised by a rotatively movable plate (B22D 41/38-B22D 41/42 take precedence) **[5]**
41/28 • • • Plates therefor (B22D 41/38-B22D 41/42 take precedence) **[5]**
41/30 • • • • Manufacturing or repairing thereof **[5]**
41/32 • • • • • characterised by the materials used therefor **[5]**
41/34 • • • • Supporting, fixing or centering means therefor **[5]**
41/36 • • • • Treating the plates, e.g. lubricating, heating (ladles, cups or the like with heating means B22D 41/01) **[5]**
41/38 • • • Means for operating the sliding gate **[5]**
41/40 • • • Means for pressing the plates together **[5]**
41/42 • • • Features relating to gas injection **[5]**
41/44 • • Consumable closure means, i.e. closure means being used only once **[5]**
41/46 • • • Refractory plugging masses **[5]**
41/48 • • • Meltable closures **[5]**
41/50 • Pouring-nozzles **[5]**
41/52 • • Manufacturing or repairing thereof **[5]**
41/54 • • • characterised by the materials used therefor **[5]**
41/56 • • Means for supporting, manipulating or changing a pouring-nozzle **[5]**
41/58 • • with gas injecting means **[5]**
41/60 • • with heating or cooling means **[5]**
41/62 • • with stirring or vibrating means **[5]**

43/00 **Mechanical cleaning, e.g. skimming of molten metals**

45/00 **Equipment for casting, not otherwise provided for**

46/00 **Controlling, supervising, not restricted to casting covered by a single main group, e.g. for safety reasons [3]**

47/00 **Casting plants**
47/02 • for both moulding and casting