

**B 23 K SOLDERING OR UNSOLDERING; WELDING; CLADDING OR PLATING BY SOLDERING OR WELDING; CUTTING BY APPLYING HEAT LOCALLY, e.g. FLAME CUTTING; WORKING BY LASER BEAM** (making metal-coated products by extruding metal B 21 C 23/22; building up linings or coverings by casting B 22 D 19/08; casting by dipping B 22 D 23/04; manufacture of composite layers by sintering metal powder B 22 F 7/00; arrangements on machine tools for copying or controlling B 23 Q; covering metals or covering materials with metals, not otherwise provided for C 23 C; burners F 23 D)

### Notes

- (1) This subclass covers also electric circuits specially adapted for the purposes covered by the title of the subclass.
- (2) In this subclass, the following term is used with the meaning indicated:
  - “soldering” means uniting metals using solder and applying heat without melting either of the parts to be united. [5]
- (3) In groups 1/00 to 31/00, it is desirable to add the indexing codes of groups 101:00 or 103:00. The indexing codes should be unlinked. [5]

### Subclass Index

SOLDERING.....	1/00, 3/00	Characterised by the use of impact or pressure.....	20/00
WELDING		Characterised by other features, processes not restricted to one particular group of this subclass.....	28/00
Characterised by the means used to produce heat			
by flame.....	5/00		
by electricity.....	9/00, 11/00, 13/00		
by means of plasma.....	10/00		
by nuclear particles.....	15/00, 17/00		
by alumino-thermic means.....	23/00		
by laser beam.....	26/00		
otherwise.....	25/00, 28/00		
		CUTTING BY APPLYING HEAT LOCALLY; SEVERING.....	7/00, 9/00, 15/00, 26/00, 28/00; 11/00
		SCARFING, DESURFACING.....	7/00
		MATERIALS; AUXILIARY DEVICES.....	35/00; 37/00
		SPECIAL PROCESSES.....	31/00, 33/00

**Soldering, e.g. brazing, or unsoldering** (essentially requiring the use of welding machines or welding equipment, see the relevant groups for the welding machines or welding equipment)

- 1/00 Soldering, e.g. brazing, or unsoldering** (3/00 takes precedence; characterised only by the use of special materials or media 35/00; dip or wave soldering in the manufacture of printed circuits H 05 K 3/34) [5]
- 1/002 . Soldering by means of induction heating [5]
  - 1/005 . Soldering by means of radiant energy [5]
  - 1/008 . Soldering within a furnace (1/012 takes precedence) [5]
  - 1/012 . Soldering with the use of hot gas [5]
  - 1/015 . . Vapour-condensation soldering [5]
  - 1/018 . Unsoldering; Removal of melted solder or other residues [5]
  - 1/06 . making use of vibrations, e.g. supersonic vibrations
  - 1/08 . Soldering by means of dipping in molten solder
  - 1/14 . specially adapted for soldering seams (making tubes involving operations other than soldering B 21 C) [5]
  - 1/16 . . longitudinal seams, e.g. of shells [5]
  - 1/18 . . circumferential seams, e.g. of shells [5]
  - 1/19 . taking account of the properties of the materials to be soldered [3]
  - 1/20 . Preliminary treatment of work or areas to be soldered, e.g. in respect of a galvanic coating (preparation of surfaces in particular ways, see the relevant classes for the treatments or the materials treated, e.g. C 04 B, C 23 C)
- 3/00 Tools, devices, or special appurtenances for soldering, e.g. brazing, or unsoldering, not specially adapted for particular methods** (materials used for soldering 35/00) [5]
- 3/02 . Soldering irons; Bits
  - 3/03 . . electrically heated [5]

- 3/04 . Heating appliances (soldering lamps or blow-pipes F 23 D; electric heating in general H 05 B)
- 3/047 . . electric [5]
- 3/053 . . . using resistance wires [5]
- 3/06 . Solder feeding devices; Solder melting pans
- 3/08 . Auxiliary devices therefor (cleaning pipes or tubes or systems of pipes or tubes, e.g. before soldering, B 08 B 9/02) [5]

### Flame welding or cutting

- 5/00 Gas flame welding**
- 5/02 . Seam welding (making tubes involving operations other than welding B 21 C)
  - 5/04 . . using additional profiled strips or like of welding metal along seam edges
  - 5/06 . . Welding longitudinal seams
  - 5/08 . . Welding circumferential seams
  - 5/10 . Welding workpieces essentially comprising layers of different metals, e.g. plated workpieces
  - 5/12 . taking account of the properties of the material to be welded
  - 5/14 . . of non-ferrous metals (5/16 takes precedence)
  - 5/16 . . of different metals
  - 5/18 . for purposes other than joining parts, e.g. built-up welding
  - 5/20 . making use of vibrations, e.g. supersonic vibrations
  - 5/213 . Preliminary treatment [3]
  - 5/22 . Auxiliary equipment, e.g. backings, guides
  - 5/24 . . Arrangements for supporting torches (not restricted to flame welding 37/02)
- 7/00 Cutting, scarfing, or desurfacing by applying flames**
- 7/06 . Machines, apparatus, or equipment specially designed for scarfing or desurfacing

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- 7/08 . by applying additional compounds or means favouring the cutting, scarfing, or desurfacing procedure
- 7/10 . Auxiliary devices, e.g. for guiding or supporting the torch (guiding means applicable to other metal-working machines [B 23 Q](#))

### Electric welding or cutting

- 9/00 Arc welding or cutting** (electro-slag welding [25/00](#); welding transformers [H 01 F](#); welding generators [H 02 K](#))
  - 9/007 . Spot arc welding [5]
  - 9/013 . Arc cutting, gouging, scarfing or desurfacing [5]
  - 9/02 . Seam welding; Backing means; Inserts
  - 9/022 . . Welding by making use of electrode vibrations [5]
  - 9/025 . . for rectilinear seams [5]
  - 9/028 . . for curved planar seams [5]
  - 9/032 . . for three-dimensional seams [5]
  - 9/035 . . with backing means disposed under the seam [5]
  - 9/038 . . using moulding means (not restricted to arc welding [37/06](#)) [5]
  - 9/04 . Welding for other purposes than joining, e.g. built-up welding
  - 9/06 . Arrangements or circuits for starting the arc, e.g. by generating ignition voltage, or for stabilising the arc [5]
    - 9/067 . . Starting the arc [5]
    - 9/073 . . Stabilising the arc [5]
  - 9/08 . Arrangements or circuits for magnetic control of the arc
  - 9/09 . Arrangements or circuits for arc welding with pulsed current or voltage [3]
  - 9/095 . Monitoring or automatic control of welding parameters [5]
  - 9/10 . Other electric circuits therefor; Protective circuits; Remote controls
  - 9/12 . Automatic feeding or moving of electrodes or work for spot or seam welding or cutting
    - 9/127 . . Means for tracking lines during arc welding or cutting (copying in general [B 23 Q 35/00](#)) [5]
  - 9/133 . . Means for feeding electrodes, e.g. drums, rolls, motors [5]
    - 9/14 . making use of insulated electrodes
    - 9/16 . making use of shielding gas
    - 9/167 . . and of a non-consumable electrode [5]
    - 9/173 . . and of consumable electrode [5]
    - 9/18 . Submerged-arc welding
    - 9/20 . Stud welding
    - 9/22 . Percussion welding
    - 9/23 . taking account of the properties of the materials to be welded [3]
    - 9/235 . Preliminary treatment [3]
    - 9/24 . Features related to electrodes (form or composition of electrodes [35/00](#))
      - 9/26 . . Accessories for electrodes, e.g. ignition tips
      - 9/28 . . Supporting devices for electrodes (not restricted to arc welding or cutting [37/02](#))
        - 9/29 . . . Supporting devices adapted for making use of shielding means [5]
      - 9/30 . . . Vibrating holders for electrodes ([9/022](#) takes precedence) [5]
    - 9/32 . Accessories (earthing connections [H 01 R](#))

- 10/00 Welding or cutting by means of a plasma** [5]
    - 10/02 . Plasma welding [5]
  - 11/00 Resistance welding; Severing by resistance heating**
    - 11/02 . Pressure butt welding
    - 11/04 . Flash butt welding
    - 11/06 . using roller electrodes
    - 11/08 . Seam welding not restricted to one of the preceding subgroups
      - 11/087 . . for rectilinear seams [5]
      - 11/093 . . for curved planar seams [5]
    - 11/10 . Spot welding; Stitch welding
      - 11/11 . . Spot welding [5]
      - 11/12 . . making use of vibrations
    - 11/14 . Projection welding
    - 11/16 . taking account of the properties of the material to be welded
      - 11/18 . . of non-ferrous metals ([11/20](#) takes precedence)
      - 11/20 . . of different metals
    - 11/22 . Severing by resistance heating
    - 11/24 . Electric supply or control circuits therefor
      - 11/25 . . Monitoring devices [5]
      - 11/26 . . Storage discharge welding
    - 11/28 . Portable welding equipment
    - 11/30 . Features relating to electrodes (form or composition of electrodes [35/00](#))
      - 11/31 . . Electrode holders (not restricted to resistance welding or severing by resistance heating [37/02](#)) [5]
      - 11/34 . Preliminary treatment [3]
      - 11/36 . Auxiliary equipment ([11/31](#) takes precedence) [3,5]
  - 13/00 Welding by high-frequency current heating** [5]
    - 13/01 . by induction heating [5]
    - 13/02 . . Seam welding
    - 13/04 . by conduction heating [5]
    - 13/06 . characterised by the shielding of the welding zone against influence of the surrounding atmosphere (selection of media [35/38](#)) [5]
    - 13/08 . Electric supply or control circuits therefor [5]
- ### Other welding or cutting: Working by laser beam [3]
- 15/00 Electron-beam welding or cutting** (electron- or ion-beam tubes [H 01 J 37/00](#))
    - 15/02 . Control circuits therefor [5]
    - 15/04 . for welding annular seams [5]
    - 15/06 . within a vacuum chamber ([15/04](#) takes precedence) [5]
    - 15/08 . Removing material, e.g. by cutting, by hole drilling [5]
    - 15/10 . Non-vacuum electron beam-welding or cutting [5]
  - 17/00 Use of the energy of nuclear particles in welding or related techniques**
  - 20/00 Non-electric welding by applying impact or other pressure, with or without the application of heat, e.g. cladding or plating** [3]
    - 20/02 . by means of a press [3]
    - 20/04 . by means of a rolling mill [3]
    - 20/06 . by means of high energy impulses, e.g. magnetic energy [3]
      - 20/08 . . Explosive welding [3]
      - 20/10 . making use of vibrations, e.g. ultrasonic welding [3]

- 20/12 . the heat being generated by friction; Friction welding [3]
- 20/14 . Preventing or minimising gas access, or using protective gases or vacuum during welding (formed by material interposed between workpieces 20/18) [3]
- 20/16 . with interposition of special material to facilitate connection of the parts, e.g. material for absorbing or producing gas [3]
- 20/18 . Zonal welding by interposing weld-preventing substances between zones not to be welded [3]
- 20/20 . Special methods allowing subsequent separation, e.g. of metals of high quality from scrap material [3]
- 20/22 . taking account of the properties of the materials to be welded [3]
- 20/227 . . with ferrous layer [5]
- 20/233 . . without ferrous layer [5]
- 20/24 . Preliminary treatment [3]
- 20/26 . Auxiliary equipment [3]
- 23/00 Alumino-thermic welding**
- 25/00 Slag welding, i.e. using a heated layer or mass of powder, slag, or the like in contact with the material to be joined (23/00 takes precedence; submerged-arc welding 9/18)**
- 26/00 Working by laser beam, e.g. welding, cutting, boring (lasers H 01 S 3/00) [2,3]**
- 26/02 . Positioning or observing the workpiece, e.g. with respect to the point of impact; Aligning, aiming or focusing the laser beam [3]
- 26/03 . . *Observing the workpiece* [7]
- 26/04 . . Automatically aligning, aiming or focusing the laser beam, e.g. using the back-scattered light [3]
- 26/06 . . Shaping the laser beam, e.g. by masks or multi-focusing (optical elements, systems, or apparatus, in general G 02 B) [3]
- 26/067 . . . *Dividing the beam into multiple beams, e.g. multi-focusing* [7]
- 26/073 . . . *Shaping the laser spot* [7]
- 26/08 . Devices involving relative movement between laser beam and workpiece [3]
- 26/10 . . using a fixed support [3]
- 26/12 . in a special atmosphere, e.g. in an enclosure [3]
- 26/14 . using a flow, e.g. a jet of gas, in conjunction with the laser beam (26/12 takes precedence) [3]
- 26/16 . Removing of by-products, e.g. particles or vapours produced during treatment of a workpiece (by a flow of gas 26/14) [3]
- 26/18 . using absorbing layers on the material being worked, e.g. for marking or protecting purposes [3]
- 26/20 . *Bonding, e.g. welding (soldering by means of radiant energy 1/005; joining of preformed plastics parts by heating using laser beam B 29 C 65/16) [7]*
- 26/22 . . *Spot welding* [7]
- 26/24 . . *Seam welding* [7]
- 26/26 . . . *of rectilinear seams* [7]
- 26/28 . . . *of curved planar seams* [7]
- 26/30 . . . *of three-dimensional seams* [7]
- 26/32 . . *taking account of the properties of the material involved* [7]
- 26/34 . *Welding for purposes other than joining, e.g. build-up welding* [7]
- 26/36 . *Removing material* [7]
- 26/38 . . *by boring or cutting* [7]
- 26/40 . . *taking account of the properties of the material involved* [7]
- 26/42 . *Preliminary treatment; Auxiliary operations or equipment (26/16 takes precedence) [7]*
- 28/00 Welding or cutting not covered by any of the preceding groups (joining workpieces by electrolysis C 25 D 2/00; electrolytic removal of materials C 25 F) [2]**
- 28/02 . Combined welding or cutting procedures or apparatus [2]
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- 31/00 Processes relevant to this subclass, specially adapted for particular articles or purposes, but not covered by only one of the preceding main groups (making tubes or profiled bars involving operations other than soldering or welding B 21 C 37/04, 37/08)**
- 31/02 . relating to soldering or welding (dip or wave soldering in the manufacture of printed circuits H 05 K 3/34)
- 31/10 . relating to cutting or desurfacing
- 31/12 . relating to investigating the properties, e.g. the weldability, of materials [5]
- 33/00 Specially-profiled edge portions of workpieces for making soldering or welding connections; Filling the seams formed thereby**
- 35/00 Rods, electrodes, materials, or media, for use in soldering, welding, or cutting**
- 35/02 . characterised by mechanical features, e.g. shape
- 35/04 . . specially designed for use as electrodes (ignition tips for arc welding or cutting 9/26)
- 35/06 . . . of non-circular cross-section; with special arrangement, e.g. internal
- 35/08 . . . . multi-cored; multiple
- 35/10 . . . . with more than one layer of coating or sheathing material
- 35/12 . . not specially designed for use as electrodes
- 35/14 . . . for soldering
- 35/16 . . . of non-circular cross-section; with special arrangement, e.g. internal (35/14 takes precedence)
- 35/18 . . . . multi-cored; multiple
- 35/20 . . . . with more than one layer of coating or sheathing material
- 35/22 . characterised by the composition or nature of the material
- 35/24 . . Selection of soldering or welding materials proper (35/34 takes precedence)
- 35/26 . . . with the principal constituent melting at less than 400°C
- 35/28 . . . with the principal constituent melting at less than 950°C
- 35/30 . . . with the principal constituent melting at less than 1550°C
- 35/32 . . . with the principal constituent melting at more than 1550°C
- 35/34 . . comprising compounds which yield metals when heated
- 35/36 . . Selection of non-metallic compositions, e.g. coatings, fluxes (35/34 takes precedence); Selection of soldering or welding materials, conjoint with selection of non-metallic compositions, both selections being of interest (selection of soldering or welding materials proper 35/24) [2]

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- 35/362 . . . Selection of compositions of fluxes (35/365, 35/368 take precedence) [2]
- 35/363 . . . . for soldering or brazing [4]
- 35/365 . . . Selection of non-metallic compositions of coating materials either alone or conjoint with selection of soldering or welding materials [2]
- 35/368 . . . Selection of non-metallic compositions of core materials either alone or conjoint with selection of soldering or welding materials [2]
- 35/38 . . Selection of media, e.g. special atmospheres for surrounding the working area
- 35/40 . Making wire or rods for soldering or welding (processes involving a single technical art, see the relevant subclasses, e.g. B 05 D, B 21 C)
- 37/00 Auxiliary devices or processes, not specially adapted to a procedure covered by only one of the preceding main groups** (eye-shields for welders worn on the operator's body or carried in the hand A 61 F 9/00; applicable to metal-working machines other than soldering, welding, or flame-cutting machines B 23 Q; other protective shields F 16 P 1/06)
- 37/02 . Carriages for supporting the welding or cutting element
- 37/04 . for holding or positioning work
- 37/047 . . moving work to adjust its position between soldering, welding or cutting steps (37/053 takes precedence) [5]
- 37/053 . . aligning cylindrical work; Clamping devices therefor [5]
- 37/06 . for positioning the molten material, e.g. confining it to a desired area
- 37/08 . for flash removal [5]

**Indexing scheme associated with groups 1/00 to 31/00, relating to articles made by soldering, welding or cutting or to materials to be soldered, welded or cut. The indexing codes should be unlinked.** [5]

### Note

Attention is drawn to Chapter IV of the Guide which sets forth the rules concerning the application and presentation of the different types of indexing code. [6]

- 101:00 Articles made by soldering, welding or cutting** [5]
- 101:02 . Honeycomb structures [5]

- 101:04 . Tubular or hollow articles [5]
- 101:06 . . Tubes [5]
- 101:08 . . . finned or ribbed [5]
- 101:10 . . Pipe-lines [5]
- 101:12 . . Vessels [5]
- 101:14 . . Heat exchangers [5]
- 101:16 . Bands or sheets of indefinite length [5]
- 101:18 . Sheet panels [5]
- 101:20 . Tools [5]
- 101:22 . Nets, wire fabrics or the like [5]
- 101:24 . Frameworks [5]
- 101:26 . Railway- or like rails [5]
- 101:28 . Beams [5]
- 101:30 . Chains, hoops or rings [5]
- 101:32 . Wires [5]
- 101:34 . Coated articles [5]
- 101:36 . Electric or electronic devices [5]
- 101:38 . . Conductors [5]
- 101:40 . . Semiconductor devices [5]
- 101:42 . . Printed circuits [5]
- 103:00 Materials to be soldered, welded or cut** [5]
- 103:02 . Iron or ferrous alloys [5]
- 103:04 . . Steel alloys [5]
- 103:06 . . Cast-iron alloys [5]
- 103:08 . Non-ferrous metals or alloys [5]
- 103:10 . . Aluminium or alloys thereof [5]
- 103:12 . . Copper or alloys thereof [5]
- 103:14 . . Titanium or alloys thereof [5]
- 103:16 . Composite materials [5]
- 103:18 . Dissimilar materials [5]
- 103:20 . . Ferrous alloys and aluminium or alloys thereof [5]
- 103:22 . . Ferrous alloys and copper or alloys thereof [5]
- 103:24 . . Ferrous alloys and titanium or alloys thereof [5]