

# CPC COOPERATIVE PATENT CLASSIFICATION

## B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

### SHAPING

## B23 MACHINE TOOLS; METAL-WORKING NOT OTHERWISE PROVIDED FOR

(NOTES omitted)

## B23C MILLING (broaching [B23D](#); broach-milling in making gears [B23F](#); arrangement for copying or controlling [B23Q](#))

### 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.

<b>1/00</b>	<b>Milling machines not designed for particular work or special operations</b>	3/053	. . . . {having means for guiding the tool carrying spindle}
1/002	. {Gantry-type milling machines}	3/055	. . . . . {for engines}
1/005	. {with a tool moving in a closed path around the workpiece}	3/056	. . . . . {for taps or valves}
1/007	. {movable milling machines, e.g. on rails}	3/058	. . . {Reconditioning of valves}
1/02	. with one horizontal working-spindle	3/06	. Milling crankshafts
1/025	. . with working-spindle movable in a fixed position	3/08	. Milling cams, camshafts, or the like
1/027	. . with working-spindle movable in a vertical direction	3/10	. Relieving by milling
1/04	. with a plurality of horizontal working-spindles	3/12	. Trimming or finishing edges, e.g. deburring welded corners
1/045	. . {Opposed - spindle machines}	3/122	. . {of pipes or cylinders}
1/06	. with one vertical working-spindle	3/124	. . . {internally}
1/08	. with a plurality of vertical working-spindles	3/126	. . {Portable devices or machines for chamfering edges}
1/10	. with both horizontal and vertical working-spindles	3/128	. . {Trimming or finishing edges of doors and windows}
1/12	. with spindle adjustable to different angles, e.g. either horizontal or vertical	3/13	. Surface milling of plates, sheets or strips
1/14	. with rotary work-carrying table ( <a href="#">work tables for machine tools in general B23Q 1/00</a> )	3/14	. Scrubbing or peeling ingots or similar workpieces
1/16	. specially designed for control by copying devices { <a href="#">not used; see B23Q 35/00</a> }	3/16	. Working surfaces curved in two directions
1/18	. . for milling while revolving the work	3/18	. . for shaping screw-propellers, turbine blades, or impellers
1/20	. Portable devices or machines ( <a href="#">details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00</a> ); Hand-driven devices or machines	3/20	. . for shaping dies
		3/22	. Forming overlapped joints, e.g. of the ends of piston-rings
		3/24	. Making square or polygonal ends on workpieces, e.g. key studs on tools
		3/26	. Making square or polygonal holes in workpieces, e.g. key holes in tools
<b>3/00</b>	<b>Milling particular work; Special milling operations; Machines therefor (<a href="#">milling gear-teeth B23F</a>, {<a href="#">heat assisted machining B23P 25/00</a>})</b>	3/28	. Grooving workpieces ( <a href="#">tread-cutting by milling B23G 1/32</a> )
3/002	. {Milling elongated workpieces}	3/30	. . Milling straight grooves, e.g. keyways
3/005	. . {Rails}	3/305	. . . {in which more than one milling tool is used simultaneously, e.g. for sheet material}
3/007	. {Milling end surfaces of nuts or tubes}	3/32	. . Milling helical grooves, e.g. in making twist-drills
3/02	. Milling surfaces of revolution ( <a href="#">B23C 3/06</a> , <a href="#">B23C 3/08 take precedence</a> )	3/34	. . Milling grooves of other forms, e.g. circumferential
3/023	. . {Milling spherical surfaces}	3/35	. . Milling grooves in keys
3/026	. . . {Milling balls}	3/355	. . . { <a href="#">Holders for the template keys</a> }
3/04	. . while revolving the work	3/36	. Milling milling-cutters ( <a href="#">B23C 3/28 takes precedence</a> )
3/05	. . Finishing valves or valve seats {( <a href="#">machines for grinding seat surfaces, e.g. in valve housings, B24B 15/00</a> )}	<b>5/00</b>	<b>Milling-cutters (for cutting gear-teeth <a href="#">B23F 21/12</a>)</b>
3/051	. . . {Reconditioning of valve seats}	5/003	. {with vibration suppressing means}

- 5/006 . {Details of the milling cutter body}
- 5/02 . characterised by the shape of the cutter
- 5/04 . . Plain cutters, i.e. having essentially a cylindrical or tapered cutting surface of substantial length (B23C 5/10 takes precedence)
- 5/06 . . Face-milling cutters, i.e. having only or primarily a substantially flat cutting surface
- 5/08 . . Disc-type cutters
- 5/10 . . Shank-type cutters, i.e. with an integral shaft
- 5/1009 . . . {Ball nose end mills}
- 5/1018 . . . . {with permanently fixed cutting inserts}
- 5/1027 . . . . {with one or more removable cutting inserts}
- 5/1036 . . . . . {having a single cutting insert, the cutting edges of which subtend 180 degrees}
- 5/1045 . . . . . {having a cutting insert, the cutting edge of which subtends substantially 90 degrees}
- 5/1054 . . . {T slot cutters}
- 5/1063 . . . . {with permanently fixed cutting inserts}
- 5/1072 . . . . {with removable cutting inserts}
- 5/1081 . . . {with permanently fixed cutting inserts (B23C 5/1018 and B23C 5/1063 take precedence)}
- 5/109 . . . {with removable cutting inserts}
- 5/12 . . Cutters specially designed for producing particular profiles (B23C 5/10 takes precedence)
- 5/14 . . . essentially comprising curves (B23C 5/1009 takes precedence)}
- 5/16 . characterised by physical features other than shape
- 5/165 . . {with chipbreaking or chipdividing equipment (for turning machines B23B 25/02; turning tools B23B 27/00; drilling machines B23B 47/34)}
- 5/18 . . with permanently-fixed cutter-bits or teeth
- 5/20 . . with removable cutter bits or teeth {or cutting inserts}
- 5/202 . . . {Plate-like cutting inserts with special form (special form related to securing of the insert B23C 5/22)}

**WARNING**

Group [B23C 5/202](#) is impacted by reclassification into group [B23C 5/205](#).  
Groups [B23C 5/202](#) and [B23C 5/205](#) should be considered in order to perform a complete search.

- 5/205 . . . . {characterised by chip-breakers of special form}

**WARNING**

Group [B23C 5/205](#) is incomplete pending reclassification of documents from group [B23C 5/202](#).  
Groups [B23C 5/202](#) and [B23C 5/205](#) should be considered in order to perform a complete search.

- 5/22 . . . Securing arrangements for bits or teeth {or cutting inserts}

**WARNING**

Group [B23C 5/22](#) is impacted by reclassification into groups [B23C 5/2298](#), [B23C 5/2301](#), [B23C 5/2304](#), [B23C 5/2306](#) and [B23C 5/2309](#).

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

- 5/2204 . . . . {with cutting inserts clamped against the walls of the recess in the cutter body by a clamping member acting upon the wall of a hole in the insert}

**WARNING**

Group [B23C 5/2204](#) is impacted by reclassification into group [B23C 5/2298](#).  
Groups [B23C 5/2204](#) and [B23C 5/2298](#) should be considered in order to perform a complete search.

- 5/2208 . . . . . {for plate-like cutting inserts (B23C 5/2226, B23C 5/2234 take precedence)}

**WARNING**

Group [B23C 5/2208](#) is impacted by reclassification into group [B23C 5/2301](#).

Groups [B23C 5/2208](#) and [B23C 5/2301](#) should be considered in order to perform a complete search.

- 5/2213 . . . . . {having a special shape}

**WARNING**

Group [B23C 5/2213](#) is impacted by reclassification into group [B23C 5/2304](#).

Groups [B23C 5/2213](#) and [B23C 5/2304](#) should be considered in order to perform a complete search.

- 5/2226 . . . . . {for plate-like cutting inserts fitted on an intermediate carrier, e.g. shank fixed in the cutter body}

**WARNING**

Group [B23C 5/2226](#) is impacted by reclassification into group [B23C 5/2306](#).

Groups [B23C 5/2226](#) and [B23C 5/2306](#) should be considered in order to perform a complete search.

5/2234 . . . . . {for plate-like cutting inserts fitted on a ring or ring segment}

**WARNING**

Group [B23C 5/2234](#) is impacted by reclassification into group [B23C 5/2309](#).  
Groups [B23C 5/2234](#) and [B23C 5/2309](#) should be considered in order to perform a complete search.

5/2239 . . . . . {with cutting inserts clamped by a clamping member acting almost perpendicular on the cutting face}

**WARNING**

Group [B23C 5/2239](#) is impacted by reclassification into group [B23C 5/2298](#).  
Groups [B23C 5/2239](#) and [B23C 5/2298](#) should be considered in order to perform a complete search.

5/2243 . . . . . {for plate-like cutting inserts ([B23C 5/2252](#), [B23C 5/226](#) take precedence)}

**WARNING**

Group [B23C 5/2243](#) is impacted by reclassification into group [B23C 5/2301](#).  
Groups [B23C 5/2243](#) and [B23C 5/2301](#) should be considered in order to perform a complete search.

5/2247 . . . . . {having a special shape}

**WARNING**

Group [B23C 5/2247](#) is impacted by reclassification into group [B23C 5/2304](#).  
Groups [B23C 5/2247](#) and [B23C 5/2304](#) should be considered in order to perform a complete search.

5/2252 . . . . . {for plate-like cutting inserts fitted on an intermediate carrier, e.g. shank fixed in the cutter body}

**WARNING**

Group [B23C 5/2252](#) is impacted by reclassification into group [B23C 5/2306](#).  
Groups [B23C 5/2252](#) and [B23C 5/2306](#) should be considered in order to perform a complete search.

5/226 . . . . . {for plate-like cutting inserts fitted on a ring or ring segment}

**WARNING**

Group [B23C 5/226](#) is impacted by reclassification into group [B23C 5/2309](#).  
Groups [B23C 5/226](#) and [B23C 5/2309](#) should be considered in order to perform a complete search.

5/2265 . . . . . {by means of a wedge}

**WARNING**

Group [B23C 5/2265](#) is impacted by reclassification into group [B23C 5/2298](#).  
Groups [B23C 5/2265](#) and [B23C 5/2298](#) should be considered in order to perform a complete search.

5/2269 . . . . . {for plate-like cutting inserts ([B23C 5/2278](#), [B23C 5/2291](#) take precedence)}

**WARNING**

Group [B23C 5/2269](#) is impacted by reclassification into group [B23C 5/2301](#).  
Groups [B23C 5/2269](#) and [B23C 5/2301](#) should be considered in order to perform a complete search.

5/2273 . . . . . {having a special shape}

**WARNING**

Group [B23C 5/2273](#) is impacted by reclassification into group [B23C 5/2304](#).  
Groups [B23C 5/2273](#) and [B23C 5/2304](#) should be considered in order to perform a complete search.

5/2278 . . . . . {for plate-like cutting inserts fitted on an intermediate carrier, e.g. shank fixed in the cutter body}

**WARNING**

Group [B23C 5/2278](#) is impacted by reclassification into group [B23C 5/2306](#).  
Groups [B23C 5/2278](#) and [B23C 5/2306](#) should be considered in order to perform a complete search.

5/2291 . . . . . {for plate-like cutting inserts fitted on a ring or ring segment}

**WARNING**

Group [B23C 5/2291](#) is impacted by reclassification into group [B23C 5/2309](#).  
Groups [B23C 5/2291](#) and [B23C 5/2309](#) should be considered in order to perform a complete search.

5/2295 . . . . . {the cutting elements being clamped simultaneously}

**WARNING**

Group [B23C 5/2295](#) is impacted by reclassification into group [B23C 5/2298](#).  
Groups [B23C 5/2295](#) and [B23C 5/2298](#) should be considered in order to perform a complete search.

5/2298 . . . . {secured by resilient/flexible means}

**WARNING**

Group [B23C 5/2298](#) is incomplete pending reclassification of documents from groups [B23C 5/22](#), [B23C 5/2204](#), [B23C 5/2239](#), [B23C 5/2265](#) and [B23C 5/2295](#).

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

5/2301 . . . . . {for plate-like cutting inserts (B23C 5/2306, B23C 5/2309 take precedence)}

**WARNING**

Group [B23C 5/2301](#) is incomplete pending reclassification of documents from groups [B23C 5/22](#), [B23C 5/2208](#), [B23C 5/2243](#) and [B23C 5/2269](#).

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

5/2304 . . . . . {having a special shape}

**WARNING**

Group [B23C 5/2304](#) is incomplete pending reclassification of documents from groups [B23C 5/22](#), [B23C 5/2213](#), [B23C 5/2247](#) and [B23C 5/2273](#).

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

5/2306 . . . . . {for plate-like cutting inserts fitted on an intermediate carrier, e.g. shank fixed in the cutter body}

**WARNING**

Group [B23C 5/2306](#) is incomplete pending reclassification of documents from groups [B23C 5/22](#), [B23C 5/2226](#), [B23C 5/2252](#) and [B23C 5/2278](#).

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

5/2309 . . . . . {for plate-like cutting inserts fitted on a ring or ring segment}

**WARNING**

Group [B23C 5/2309](#) is incomplete pending reclassification of documents from groups [B23C 5/22](#), [B23C 5/2234](#), [B23C 5/226](#) and [B23C 5/2291](#).

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

5/24 . . . . . adjustable

**WARNING**

Group [B23C 5/24](#) is impacted by reclassification into groups [B23C 5/2462](#), [B23C 5/2465](#), [B23C 5/2468](#), [B23C 5/2472](#), [B23C 5/2475](#), [B23C 5/2479](#), [B23C 5/2482](#), [B23C 5/2486](#), [B23C 5/2489](#), [B23C 5/2493](#) and [B23C 5/2496](#).

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

5/2462 . . . . . {the adjusting means being oblique surfaces}

**WARNING**

Group [B23C 5/2462](#) is incomplete pending reclassification of documents from group [B23C 5/24](#).

Groups [B23C 5/24](#) and [B23C 5/2462](#) should be considered in order to perform a complete search.

5/2465 . . . . . {the adjusting means being notches}

**WARNING**

Group [B23C 5/2465](#) is incomplete pending reclassification of documents from group [B23C 5/24](#).

Groups [B23C 5/24](#) and [B23C 5/2465](#) should be considered in order to perform a complete search.

5/2468 . . . . . {the adjusting means being serrations}

**WARNING**

Group [B23C 5/2468](#) is incomplete pending reclassification of documents from group [B23C 5/24](#).

Groups [B23C 5/24](#) and [B23C 5/2468](#) should be considered in order to perform a complete search.

5/2472 . . . . . {the adjusting means being screws}

**WARNING**

Group [B23C 5/2472](#) is incomplete pending reclassification of documents from group [B23C 5/24](#).

Groups [B23C 5/24](#) and [B23C 5/2472](#) should be considered in order to perform a complete search.

5/2475 . . . . . {the adjusting means being distance elements, e.g. shims or washers}

**WARNING**

Group [B23C 5/2475](#) is incomplete pending reclassification of documents from group [B23C 5/24](#).

Groups [B23C 5/24](#) and [B23C 5/2475](#) should be considered in order to perform a complete search.

5/2479 . . . . . {the adjusting means being eccentrics}  
**WARNING**  
 Group [B23C 5/2479](#) is incomplete pending reclassification of documents from group [B23C 5/24](#).  
 Groups [B23C 5/24](#) and [B23C 5/2479](#) should be considered in order to perform a complete search.

5/2482 . . . . . {the adjusting means being hydraulic cylinders}  
**WARNING**  
 Group [B23C 5/2482](#) is incomplete pending reclassification of documents from group [B23C 5/24](#).  
 Groups [B23C 5/24](#) and [B23C 5/2482](#) should be considered in order to perform a complete search.

5/2486 . . . . . {where the adjustment is made by elastically deforming the toolholders}  
**WARNING**  
 Group [B23C 5/2486](#) is incomplete pending reclassification of documents from group [B23C 5/24](#).  
 Groups [B23C 5/24](#) and [B23C 5/2486](#) should be considered in order to perform a complete search.

5/2489 . . . . . {where the adjustment is made by changing the inclination of the inserts}  
**WARNING**  
 Group [B23C 5/2489](#) is incomplete pending reclassification of documents from group [B23C 5/24](#).  
 Groups [B23C 5/24](#) and [B23C 5/2489](#) should be considered in order to perform a complete search.

5/2493 . . . . . {where the adjustment is made by deforming the seating surfaces}  
**WARNING**  
 Group [B23C 5/2493](#) is incomplete pending reclassification of documents from group [B23C 5/24](#).  
 Groups [B23C 5/24](#) and [B23C 5/2493](#) should be considered in order to perform a complete search.

5/2496 . . . . . {where the adjusting means are gears and racks}  
**WARNING**  
 Group [B23C 5/2496](#) is incomplete pending reclassification of documents from group [B23C 5/24](#).  
 Groups [B23C 5/24](#) and [B23C 5/2496](#) should be considered in order to perform a complete search.

5/26 . . . . . Securing milling cutters to the driving spindle  
 5/265 . . . . . {by fluid pressure means}

5/28 . . . . . Features relating to lubricating or cooling  
**WARNING**  
 Group [B23C 5/28](#) is impacted by reclassification into groups [B23C 5/281](#), [B23C 5/282](#), [B23C 5/283](#), [B23C 5/285](#), [B23C 5/286](#) and [B23C 5/287](#).  
 All groups listed in this Warning should be considered in order to perform a complete search.

5/281 . . . . . {Coolant moving along the outside tool periphery towards the cutting edges}  
**WARNING**  
 Group [B23C 5/281](#) is incomplete pending reclassification of documents from group [B23C 5/28](#).  
 Groups [B23C 5/28](#) and [B23C 5/281](#) should be considered in order to perform a complete search.

5/282 . . . . . {Coolant channel characterised by its cross-sectional shape}  
**WARNING**  
 Group [B23C 5/282](#) is incomplete pending reclassification of documents from group [B23C 5/28](#).  
 Groups [B23C 5/28](#) and [B23C 5/282](#) should be considered in order to perform a complete search.

5/283 . . . . . {Cutting inserts with internal coolant channels}  
**WARNING**  
 Group [B23C 5/283](#) is incomplete pending reclassification of documents from group [B23C 5/28](#).  
 Groups [B23C 5/28](#) and [B23C 5/283](#) should be considered in order to perform a complete search.

5/285 . . . . . {Nozzles}  
**WARNING**  
 Group [B23C 5/285](#) is incomplete pending reclassification of documents from group [B23C 5/28](#).  
 Groups [B23C 5/28](#) and [B23C 5/285](#) should be considered in order to perform a complete search.

5/286 . . . . . {Deflectors}  
**WARNING**  
 Groups [B23C 5/286](#) and [B23C 5/287](#) are incomplete pending reclassification of documents from group [B23C 5/28](#).  
 Groups [B23C 5/28](#), [B23C 5/286](#) and [B23C 5/287](#) should be considered in order to perform a complete search.

5/287 . . . . . {intersecting the rotational axis}

7/00 **Milling devices able to be attached to a machine tool, whether or not replacing an operative portion of the machine tool**

## B23C

- 7/02 . to lathes
- 7/04 . to planing or slotting machines

### 9/00 Details or accessories so far as specially adapted to milling machines or cutter (drives, control devices, or accessories, in general B23Q)

- 9/005 . {milling heads}

### 2200/00 Details of milling cutting inserts

- 2200/04 . Overall shape
- 2200/0405 . . Hexagonal
- 2200/0411 . . . irregular
- 2200/0416 . . Irregular
- 2200/0422 . . Octagonal
- 2200/0427 . . . rounded
- 2200/0433 . . Parallelogram
- 2200/0438 . . . rounded
- 2200/0444 . . Pentagonal
- 2200/045 . . Round
- 2200/0455 . . Square
- 2200/0461 . . . rounded
- 2200/0466 . . Star form
- 2200/0472 . . Trapezium
- 2200/0477 . . Triangular
- 2200/0483 . . . rounded
- 2200/0488 . . Heptagonal
- 2200/0494 . . Rectangular
- 2200/08 . Rake or top surfaces
- 2200/081 . . with projections (chip breaking projections in general B23C 2200/323)
- 2200/082 . . with an elevated clamping surface
- 2200/083 . . curved
- 2200/085 . . discontinuous
- 2200/086 . . with one or more grooves
- 2200/088 . . spherical
- 2200/12 . Side or flank surfaces
- 2200/121 . . with projections
- 2200/123 . . curved
- 2200/125 . . discontinuous
- 2200/126 . . . stepped
- 2200/128 . . with one or more grooves
- 2200/16 . Supporting or bottom surfaces
- 2200/161 . . with projections
- 2200/162 . . curved
- 2200/164 . . discontinuous
- 2200/165 . . with one or more grooves
- 2200/167 . . star form
- 2200/168 . . with features related to indexing (with lines to permit indexing of round inserts B23C 2200/363)
- 2200/20 . Top or side views of the cutting edge
- 2200/201 . . Details of the nose radius and immediately surrounding areas
- 2200/203 . . Curved cutting edges
- 2200/205 . . Discontinuous cutting edges
- 2200/206 . . Cutting edges having a wave-form
- 2200/208 . . Wiper, i.e. an auxiliary cutting edge to improve surface finish
- 2200/24 . Cross section of the cutting edge
- 2200/243 . . bevelled or chamfered
- 2200/246 . . rounded

- 2200/28 . Angles

#### **WARNING**

Group [B23C 2200/28](#) is impacted by reclassification into groups [B23C 2200/291](#) and [B23C 2200/293](#).

Groups [B23C 2200/28](#), [B23C 2200/291](#) and [B23C 2200/293](#) should be considered in order to perform a complete search.

- 2200/281 . . Negative rake angles

#### **WARNING**

Group [B23C 2200/281](#) is incomplete pending reclassification of documents from group [B23C 2200/283](#).

Groups [B23C 2200/283](#) and [B23C 2200/281](#) should be considered in order to perform a complete search.

- 2200/283 . . Negative cutting angles  
(Frozen)

#### **WARNING**

Group [B23C 2200/283](#) is no longer used for the classification of documents as of February 1, 2022.

The content of this group is being reclassified into groups [B23C 2200/281](#) and [B23C 2200/284](#).

Groups [B23C 2200/283](#), [B23C 2200/281](#) and [B23C 2200/284](#) should be considered in order to perform a complete search.

- 2200/284 . . Negative clearance angles

#### **WARNING**

Group [B23C 2200/284](#) is incomplete pending reclassification of documents from group [B23C 2200/283](#).

Groups [B23C 2200/283](#) and [B23C 2200/284](#) should be considered in order to perform a complete search.

- 2200/286 . . Positive cutting angles  
(Frozen)

#### **WARNING**

Group [B23C 2200/286](#) is no longer used for the classification of documents as of February 1, 2022.

The content of this group is being reclassified into groups [B23C 2200/287](#) and [B23C 2200/289](#).

Groups [B23C 2200/286](#), [B23C 2200/287](#) and [B23C 2200/289](#) should be considered in order to perform a complete search.

- 2200/287 . . Positive rake angles

#### **WARNING**

Group [B23C 2200/287](#) is incomplete pending reclassification of documents from group [B23C 2200/286](#).

Groups [B23C 2200/286](#) and [B23C 2200/287](#) should be considered in order to perform a complete search.

- 2200/289 . . Positive clearance angles

**WARNING**

Group [B23C 2200/289](#) is incomplete pending reclassification of documents from group [B23C 2200/286](#).

Groups [B23C 2200/286](#) and [B23C 2200/289](#) should be considered in order to perform a complete search.

- 2200/291 . . Variable rake angles

**WARNING**

Group [B23C 2200/291](#) is incomplete pending reclassification of documents from group [B23C 2200/28](#).

Groups [B23C 2200/28](#) and [B23C 2200/291](#) should be considered in order to perform a complete search.

- 2200/293 . . Variable clearance angles

**WARNING**

Group [B23C 2200/293](#) is incomplete pending reclassification of documents from group [B23C 2200/28](#).

Groups [B23C 2200/28](#) and [B23C 2200/293](#) should be considered in order to perform a complete search.

- 2200/32 . Chip breaking or chip evacuation

- 2200/323 . . by chip-breaking projections ([with projection on top surface B23C 2200/081](#))

- 2200/326 . . by chip-breaking grooves

- 2200/36 . Other features of the milling insert not covered by [B23C 2200/04](#) - [B23C 2200/32](#)

**WARNING**

Group [B23C 2200/36](#) is impacted by reclassification into groups [B23C 2200/364](#), [B23C 2200/369](#) and [B23C 2200/3691](#).

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

- 2200/361 . . Fixation holes

- 2200/362 . . . Having two fixation holes

- 2200/363 . . Lines for indexing round inserts

- 2200/364 . . Porous inserts, e.g. lattice-shaped constructions

**WARNING**

Group [B23C 2200/364](#) is incomplete pending reclassification of documents from group [B23C 2200/36](#).

Groups [B23C 2200/36](#) and [B23C 2200/364](#) should be considered in order to perform a complete search.

- 2200/365 . . Lands, i.e. the outer peripheral section of rake faces

- 2200/366 . . . Variable

- 2200/367 . . Mounted tangentially, i.e. where the rake face is not the face with largest area

- 2200/368 . . Roughened surfaces

- 2200/369 . . Double-sided inserts

**WARNING**

Groups [B23C 2200/369](#) and [B23C 2200/3691](#) are incomplete pending reclassification of documents from group [B23C 2200/36](#).

Groups [B23C 2200/36](#), [B23C 2200/369](#) and [B23C 2200/3691](#) should be considered in order to perform a complete search.

- 2200/3691 . . . Split inserts

**2210/00 Details of milling cutters**

- 2210/02 . Connections between the shanks and detachable cutting heads

- 2210/03 . Cutting heads comprised of different material than the shank irrespective of whether the head is detachable from the shank

- 2210/04 . Angles

- 2210/0407 . . Cutting angles

- 2210/0414 . . . different

- 2210/0421 . . . negative

- 2210/0428 . . . . axial rake angle

- 2210/0435 . . . . radial rake angle

- 2210/0442 . . . positive

- 2210/045 . . . . axial rake angle

- 2210/0457 . . . . radial rake angle

- 2210/0464 . . . neutral

- 2210/0471 . . . . axial rake angle

- 2210/0478 . . . . radial rake angle

- 2210/0485 . . Helix angles

- 2210/0492 . . . different

- 2210/08 . Side or top views of the cutting edge

- 2210/082 . Details of the corner region between axial and radial cutting edges

- 2210/084 . . Curved cutting edges

- 2210/086 . . Discontinuous or interrupted cutting edges

- 2210/088 . . Cutting edges with a wave form

- 2210/12 . Cross section of the cutting edge

- 2210/123 . . Bevelled cutting edges

- 2210/126 . . Rounded cutting edges

- 2210/16 . Fixation of inserts or cutting bits in the tool ([details of connections B23C 2240/00](#))

- 2210/161 . . Elastically deformable clamping members

- 2210/163 . . Indexing

- 2210/165 . . Fixation bolts

- 2210/166 . . Shims

- 2210/168 . . Seats for cutting inserts, supports for replaceable cutting bits

- 2210/20 . Number of cutting edges

- 2210/201 . . one

- 2210/202 . . three

- 2210/203 . . four

- 2210/204 . . five

- 2210/205 . . six

- 2210/206 . . seven

- 2210/207 . . eight

- 2210/208 . . ten

- 2210/209 . . twelve

- 2210/24 . Overall form of the milling cutter ([angles B23C 2210/04](#); [top or side views of cutting edges B23C 2210/08](#); [cross sections of cutting edges B23C 2210/12](#))

- 2210/241 . . Cross sections of the whole milling cutter
- 2210/242 . . Form tools, i.e. cutting edges profiles to generate a particular form
- 2210/243 . . Cutting parts at both ends
- 2210/244 . . Milling cutters comprised of disc-shaped modules or multiple disc-like cutters
- 2210/245 . . Milling cutters comprising a disc having a wave form
- 2210/246 . . Milling cutters comprising a hole or hollow in the end face or between the cutting edges
- 2210/247 . . Stepped milling cutters
- 2210/248 . . . with enlarged cutting heads
- 2210/28 . . Arrangement of teeth
- 2210/282 . . Unequal angles between the cutting edges, i.e. cutting edges unequally spaced in the circumferential direction
- 2210/285 . . Cutting edges arranged at different diameters
- 2210/287 . . Cutting edges arranged at different axial positions or having different lengths in the axial direction
- 2210/32 . . Details of teeth
- 2210/321 . . Lands, i.e. the area on the rake face in the immediate vicinity of the cutting edge
- 2210/323 . . Separate teeth, i.e. discrete profiled teeth similar to those of a hob
- 2210/325 . . Different teeth, i.e. one tooth having a different configuration to a tooth on the opposite side of the flute
- 2210/326 . . File like cutting teeth, e.g. the teeth of cutting burrs
- 2210/328 . . Treated cutting edges
- 2210/40 . . Flutes, i.e. chip conveying grooves
- 2210/402 . . of variable depth
- 2210/405 . . . having decreasing depth in the direction of the shank from the tip of the tool
- 2210/407 . . . having increasing depth in the direction of the shank from the tip of the tool
- 2210/44 . . Margins, i.e. the part of the peripheral surface immediately adjacent the cutting edge
- 2210/445 . . variable
- 2210/48 . . Chip breakers
- 2210/483 . . Chip breaking projections
- 2210/486 . . Chip breaking grooves or depressions
- 2210/50 . . Cutting inserts

**WARNING**

Group [B23C 2210/50](#) is impacted by reclassification into groups [B23C 2210/501](#), [B23C 2210/502](#) and [B23C 2210/504](#).

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

- 2210/501 . . with cutting edges following one or more helices

**WARNING**

Group [B23C 2210/501](#) is incomplete pending reclassification of documents from group [B23C 2210/50](#).

Groups [B23C 2210/50](#) and [B23C 2210/501](#) should be considered in order to perform a complete search.

- 2210/502 . . with cutting edges following straight flutes or rows of more than one insert

**WARNING**

Group [B23C 2210/502](#) is incomplete pending reclassification of documents from group [B23C 2210/50](#).

Groups [B23C 2210/50](#) and [B23C 2210/502](#) should be considered in order to perform a complete search.

- 2210/503 . . mounted internally on the cutter
- 2210/504 . . arranged in a manner that only extends longitudinally by one insert

**WARNING**

Group [B23C 2210/504](#) is incomplete pending reclassification of documents from group [B23C 2210/50](#).

Groups [B23C 2210/50](#) and [B23C 2210/504](#) should be considered in order to perform a complete search.

- 2210/506 . . mounted so as to be able to rotate freely
- 2210/52 . . Bushings
- 2210/54 . . Configuration of the cutting part
- 2210/56 . . Supporting or guiding sections located on the periphery of the tool
- 2210/58 . . Brushes
- 2210/60 . . Axis of the cutter inclined with respect to the axis of rotation
- 2210/62 . . Selectable cutting diameters
- 2210/64 . . End milling cutters having a groove in the end cutting face, the groove not being present so as to provide a cutting edge

**WARNING**

Group [B23C 2210/64](#) is impacted by reclassification into group [B23C 2210/641](#).

Groups [B23C 2210/64](#) and [B23C 2210/641](#) should be considered in order to perform a complete search.

- 2210/641 . . at least one groove or gash being different than another

**WARNING**

Group [B23C 2210/641](#) is incomplete pending reclassification of documents from group [B23C 2210/64](#).

Groups [B23C 2210/64](#) and [B23C 2210/641](#) should be considered in order to perform a complete search.

- 2210/66 . . Markings, i.e. symbols or indicating marks
- 2210/68 . . Reground to nominal diameter by removal of material from both the front of the insert and the back of insert carrier
- 2210/70 . . Pilots
- 2210/72 . . Rotatable in both directions
- 2210/74 . . Slits

**2215/00 Details of workpieces**

- 2215/04 . . Aircraft components
- 2215/045 . . Propellers



- 2215/08 . Automotive parts ([B23C 2215/16](#), [B23C 2215/20](#) and [B23C 2215/24](#) take precedence)
- 2215/085 . . Wheels
- 2215/12 . Propellers for boats
- 2215/16 . Camshafts
- 2215/20 . Crankshafts
- 2215/24 . Components of internal combustion engines
- 2215/242 . . Combustion chambers
- 2215/245 . . Connecting rods
- 2215/247 . . Components of diesel engines
- 2215/28 . Nipples
- 2215/32 . Railway tracks
- 2215/36 . Railway wheels
- 2215/40 . Spectacles
- 2215/44 . Turbine blades
- 2215/48 . Kaplan turbines
- 2215/52 . Axial turbine wheels
- 2215/56 . Radial turbine wheels
- 2215/60 . Valve guides in combination with the neighbouring valve seat
- 2215/64 . Well pipe windows, i.e. windows in tubings or casings for wells
- 2220/00 Details of milling processes**
- 2220/04 . Milling with the axis of the cutter inclined to the surface being machined
- 2220/08 . Milling with the axis of the tool perpendicular to the workpiece axis
- 2220/12 . Cutting off, i.e. producing multiple discrete components from a single piece of material
- 2220/16 . Chamferring
- 2220/20 . Deburring
- 2220/24 . Production of elliptical holes
- 2220/28 . Finishing ([roughing and finishing B23C 2220/605](#))
- 2220/32 . Five-axis
- 2220/36 . Production of grooves
- 2220/363 . . Spiral grooves
- 2220/366 . . Turbine blade grooves
- 2220/40 . Using guiding means
- 2220/44 . High speed milling
- 2220/48 . Methods of milling not otherwise provided for
- 2220/52 . Orbital drilling, i.e. use of a milling cutter moved in a spiral path to produce a hole
- 2220/56 . Plunge milling
- 2220/60 . Roughing
- 2220/605 . . Roughing and finishing
- 2220/64 . Using an endmill, i.e. a shaft milling cutter, to generate profile of a crankshaft or camshaft
- 2220/68 . Whirling
- 2222/00 Materials of tools or workpieces composed of metals, alloys or metal matrices**
- 2222/04 . Aluminium
- 2222/06 . Babbitt metal
- 2222/12 . Brass
- 2222/14 . Cast iron
- 2222/16 . Cermet
- 2222/28 . Details of hard metal, i.e. cemented carbide
- 2222/32 . Details of high speed steel ([steel B23C 2222/84](#))
- 2222/52 . Magnesium
- 2222/61 . Metal matrices with metallic or non-metallic particles or fibres
- 2222/64 . Nickel
- 2222/76 . Silver
- 2222/78 . Sodium
- 2222/84 . Steel ([details of high speed steel B23C 2222/32](#))
- 2222/88 . Titanium
- 2222/98 . Zinc
- 2224/00 Materials of tools or workpieces composed of a compound including a metal**
- 2224/04 . Aluminium oxide
- 2224/13 . Chromium nitride
- 2224/14 . Chromium aluminium nitride (CrAlN)
- 2224/20 . Tantalum carbide
- 2224/22 . Titanium aluminium carbide nitride (TiAlCN)
- 2224/24 . Titanium aluminium nitride (TiAlN)
- 2224/28 . Titanium carbide
- 2224/32 . Titanium carbide nitride (TiCN)
- 2224/36 . Titanium nitride
- 2224/56 . Vanadium aluminium nitride (VAlN)
- 2226/00 Materials of tools or workpieces not comprising a metal**
- 2226/12 . Boron nitride
- 2226/125 . . cubic [CBN]
- 2226/18 . Ceramic
- 2226/27 . Composites, e.g. fibre reinforced composites
- 2226/31 . Diamond
- 2226/315 . . polycrystalline [PCD]
- 2226/33 . Elastomers, e.g. rubber
- 2226/37 . Fibreglass
- 2226/41 . Gypsum
- 2226/42 . Gem, i.e. precious stone
- 2226/45 . Glass ([milling glass B28D 1/18](#))
- 2226/54 . Paper
- 2226/61 . Plastics not otherwise provided for, e.g. nylon
- 2226/62 . Polystyrene foam
- 2226/72 . Silicon carbide
- 2226/73 . Silicon nitride
- 2226/75 . Stone, rock or concrete ([milling stone or like materials B28D 1/18](#))
- 2228/00 Properties of materials of tools or workpieces, materials of tools or workpieces applied in a specific manner**
- 2228/04 . applied by chemical vapour deposition [CVD]
- 2228/08 . applied by physical vapour deposition [PVD]
- 2228/10 . Coating
- 2228/12 . Cast, i.e. in the form of a casting
- 2228/14 . Flexible
- 2228/24 . Hard, i.e. after being hardened
- 2228/25 . Honeycomb
- 2228/26 . Hot
- 2228/49 . Sintered
- 2228/50 . Soft metal
- 2230/00 Details of chip evacuation ([chip evacuation in cutting inserts B23C 2200/32](#))**
- 2230/04 . Transport of chips
- 2230/045 . . to the middle of the cutter or in the middle of a hollow cutter
- 2230/08 . Using suction
- 2235/00 Details of milling keys**
- 2235/04 . Keys with blind holes
- 2235/08 . Brushes

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- 2235/12 . Using a database to store details of the key, the information in the database being used for the generation of the profile of the key
- 2235/16 . Dial indicators
- 2235/21 . Calibration by electronic detection of position of probes and cutting wheels
- 2235/24 . Electronic sensors
- 2235/28 . Key blanks
- 2235/32 . Measurement systems
- 2235/36 . Ring keys
- 2235/41 . Scanning systems
- 2235/44 . Templates for the simulation of keys
- 2235/48 . Tracers, probes or styli
- 2240/00** **Details of connections of tools or workpieces (fixation of the cutting insert or bit in the tool B23C 2210/16)**
- 2240/04 . Bayonet connections
- 2240/08 . Brazed connections
- 2240/12 . Connections using captive nuts
- 2240/16 . Welded connections
- 2240/21 . Glued connections
- 2240/24 . Connections using screws
- 2240/245 . . hollow screws, e.g. for the transmission of coolant
- 2240/32 . Connections using screw threads
- 2245/00** **Details of adjusting inserts or bits in the milling cutter**
- 2245/04 . Adjustable wedge surfaces
- 2245/08 . Setting gauges
- 2245/12 . Spiral discs
- 2250/00** **Compensating adverse effects during milling**
- 2250/04 . Balancing the cutter ([vibration damping B23C 2250/16](#))
- 2250/08 . compensating centrifugal force
- 2250/12 . Cooling and lubrication
- 2250/16 . Damping vibrations ([balancing B23C 2250/04](#))
- 2250/21 . compensating wear of parts not designed to be exchanged as wear parts
- 2255/00** **Regulation of depth of cut**
- 2255/04 . Depth indicators
- 2255/08 . Limitation of depth of cut
- 2255/12 . Depth stops
- 2260/00** **Details of constructional elements**
- 2260/04 . Adjustable elements
- 2260/08 . Bearings
- 2260/12 . Cams
- 2260/28 . Differential screw threads
- 2260/40 . Harmonic gearboxes, i.e. reduction gearing including a wave generator, a flex spline or a circular spline
- 2260/48 . Indication scales
- 2260/52 . Keys, e.g. spanners or Allen keys, especially for assembling or disassembling tooling
- 2260/56 . Lasers ([improving machinability with laser whilst milling B23P 25/003](#))
- 2260/68 . Rings
- 2260/72 . Seals
- 2260/76 . Sensors
- 2260/80 . Serrations
- 2260/84 . Springs
- 2260/88 . Steadies
- 2265/00** **Details of general geometric configurations**
- 2265/08 . Conical
- 2265/12 . Eccentric
- 2265/16 . Elliptical
- 2265/32 . Polygonal
- 2265/36 . Spherical
- 2265/40 . Spiral
- 2270/00** **Details of milling machines, milling processes or milling tools not otherwise provided for**
- 2270/02 . Use of a particular power source
- 2270/022 . . Electricity
- 2270/025 . . Hydraulics
- 2270/027 . . Pneumatics
- 2270/04 . Use of centrifugal force ([compensation of effect of centrifugal force B23C 2250/08](#))
- 2270/06 . Use of elastic or plastic deformation ([B23C 2210/161 takes precedence](#))
- 2270/08 . Clamping mechanisms or provision for clamping ([B23C 2210/16 takes precedence](#))
- 2270/10 . Use of ultrasound
- 2270/12 . Centering of two elements relative to one another
- 2270/14 . Constructions comprising exactly two similar components
- 2270/16 . Constructions comprising three or more similar components
- 2270/18 . Milling internal areas of components
- 2270/20 . Milling external areas of components