



**Machine tools**

**Lathes**

- 11.1.1.1 Bench lathes
- 11.1.1.2 Production lathes (for lot production)
- 11.1.1.3 Universal centre lathes
- 11.1.1.4 Multi-tool production lathes
- 11.1.1.5 Vertical turning lathes
- 11.1.1.6 Copying lathes
- 11.1.1.7 Short-bed lathes (second operation lathes)
- 11.1.1.8 Facing lathes with tailstock
- 11.1.1.9 Facing lathes with bench
- 11.1.1.10 Cutting-off lathes
- 11.1.1.11 Watchmakers' lathes
- 11.1.1.12 Precision bench lathes
- 11.1.1.13 Relieving lathes
- 11.1.1.14 Oval turning lathes
- 11.1.1.15 Wheel set lathes
- 11.1.1.16 Wheelset tyre profiling lathes
- 11.1.1.17 Axle turning lathes
- 11.1.1.18 Axle journal turning and roller burnishing lathes
- 11.1.1.19 Crankshaft turning lathes
- 11.1.1.20 Camshaft turning lathes
- 11.1.1.21 Piston lathes
- 11.1.1.22 Roll turning lathes
- 11.1.1.23 Bar turning and peeling machines
- 11.1.1.99 Lathes - other

**Automatic lathes**

- 11.1.2.1 Single-spindle universal automatic lathes
- 11.1.2.2 Single-spindle chucking automatic lathes
- 11.1.2.3 Single-spindle bar automatic lathes
- 11.1.2.4 Multi-spindle chucking automatic lathes
- 11.1.2.5 Multi-spindle bar automatic lathes
- 11.1.2.6 Lathes with driven tool
- 11.1.2.7 Vertical turning automatic lathes
- 11.1.2.8 High-speed automatic lathes
- 11.1.2.9 Automatic multioperational lathes with tool magazine (turning centres)
- 11.1.2.99 Automatic lathes - other

**Drilling machines**

- 11.1.3.1 Bench type drilling machines
- 11.1.3.2 Pillar type drilling machines
- 11.1.3.3 Column type drilling machines
- 11.1.3.4 Gang drilling machines
- 11.1.3.5 Multi-spindle drilling machines
- 11.1.3.6 Radial drilling machines
- 11.1.3.7 Precision coordinate drilling machines
- 11.1.3.8 Deep hole drilling and boring machines
- 11.1.3.9 Turret head drilling machines
- 11.1.3.10 Horizontal drilling machines
- 11.1.3.11 Automatic multioperational drilling machines with tool magazine (drilling centres)
- 11.1.3.99 Drilling machines - other

**Boring machines**

- 11.1.4.1 Fine boring machines, horizontal
- 11.1.4.2 Fine boring machines, vertical
- 11.1.4.3 Bed type boring and milling machines, fixed column
- 11.1.4.4 Bed type boring and milling machines, moving column
- 11.1.4.5 Boring and milling machines, gantry type
- 11.1.4.6 Jig boring machines (coordinate boring and milling machines)
- 11.1.4.7 Cylinder block re boring machines
- 11.1.4.99 Boring machines - other

**Milling machines**

- 11.1.5.1 Horizontal knee-type milling machines
- 11.1.5.2 Vertical knee-type milling machines
- 11.1.5.3 Universal knee-type milling machines
- 11.1.5.4 Horizontal bed type milling machines

- 11.1.5.5 Vertical bed type milling machines
- 11.1.5.6 Universal bed type milling machines
- 11.1.5.7 Multi-head bed type milling machines
- 11.1.5.8 Copying milling machines
- 11.1.5.9 Circular able milling machines
- 11.1.5.10 Drum type milling machines
- 11.1.5.11 Die-sinking machines
- 11.1.5.12 Universal tool milling machines
- 11.1.5.13 Milling and boring machines
- 11.1.5.14 Universal milling and boring machines
- 11.1.5.15 Machining centres
- 11.1.5.16 Bench hand-controlled knee-type milling machines
- 11.1.5.17 Open-side gantry milling machines
- 11.1.5.18 Slot and keyway milling machines
- 11.1.5.19 Crankshaft and camshaft milling machines
- 11.1.5.20 Chamfering and pointing milling machines
- 11.1.5.21 Engraving machines
- 11.1.5.99 Milling machines - other

**Gear cutting machines**

- 11.1.6.1 Gear hobbing machines
- 11.1.6.2 Rack milling machines
- 11.1.6.3 Gear shaping machines
- 11.1.6.4 Bevel gear hobbing and shaping machines
- 11.1.6.5 Gear rolling machines
- 11.1.6.6 Gear grinding machines
- 11.1.6.7 Gear shaving machines
- 11.1.6.8 Gear polishing and lapping machines
- 11.1.6.9 Gear tooth rounding and deburring machines
- 11.1.6.10 Automatic multioperational gear cutting machines with tool magazine (gear cutting centres)
- 11.1.6.99 Gear cutting machines - other

**11.1.7 Screwing and threading machines**

**Planing, shaping, slotting and broaching machines**

- 11.1.8.1 Planing machines with other operation options
- 11.1.8.2 Horizontal shaping machines
- 11.1.8.3 Vertical shaping machines
- 11.1.8.4 Plate edge planing machines
- 11.1.8.5 Copy shaping machines
- 11.1.8.6 Keyseating, broaching and slotting machines
- 11.1.8.7 Planing and shaping machines - other
- 11.1.8.8 Internal broaching machines
- 11.1.8.9 Surface broaching machines
- 11.1.8.10 Transfer broaching machines
- 11.1.8.11 Broaching machines
- 11.1.8.12 Planing, shaping and broaching machines
- 11.1.8.99 Planing, shaping, slotting and broaching machines - other

**Sawing, filing and abrasive cutting-off machines**

- 11.1.9.1 Band sawing machines
- 11.1.9.2 Hack sawing machines
- 11.1.9.3 Circular sawing machines
- 11.1.9.4 Cutting-off machines, with abrasive discs
- 11.1.9.5 Friction sawing machines
- 11.1.9.6 Filing machines
- 11.1.9.7 Automatic cutting lines
- 11.1.9.99 Sawing, filing and abrasive cutting-off machines - other

**Grinding machines**

- 11.1.10.1 Horizontal spindle surface-grinding machines
- 11.1.10.2 Vertical spindle surface-grinding machines
- 11.1.10.3 Universal spindle surface-grinding machines (with adjustable wheelhead)
- 11.1.10.4 Horizontal surface-grinding machines with rotary table
- 11.1.10.5 Vertical surface-grinding machines with rotary table
- 11.1.10.6 Plain cylindrical grinding machines
- 11.1.10.7 Production plain cylindrical grinding machines with possible recess grinding (for lot production)
- 11.1.10.8 Internal grinding machines
- 11.1.10.9 Universal grinding machines

- 11.1.10.10 Centreless grinding machines
- 11.1.10.11 Copying grinding machines
- 11.1.10.12 High speed grinding machines
- 11.1.10.13 Abrasive band grinding machines
- 11.1.10.14 Double-spindle surface-grinding machines
- 11.1.10.15 Jig grinding machines
- 11.1.10.16 Automatic grinding machines with tool magazine (grinding centres)

**Special purpose grinding machines**

- 11.1.11.1 Electrolytic grinding machines
- 11.1.11.2 Superfinishing grinding machines
- 11.1.11.3 Profile grinding machines
- 11.1.11.4 Cylindrical grinding machines
- 11.1.11.5 Oval grinding machines
- 11.1.11.6 Polygon grinding machines
- 11.1.11.7 Spline shaft grinding machines
- 11.1.11.8 Calliper gauge grinding machines (surfaces, parallelity)
- 11.1.11.9 Centre hole grinding machines
- 11.1.11.10 Slideway grinding machines
- 11.1.11.11 Cam grinding machines
- 11.1.11.12 Camshaft grinding machines
- 11.1.11.13 Crankshaft grinding machines
- 11.1.11.14 Valve grinding machines
- 11.1.11.15 Piston grinding machines
- 11.1.11.16 Axle journal grinding machines
- 11.1.11.17 Roller bearing race grinding machines
- 11.1.11.18 Grinding machines with flexible shaft
- 11.1.11.99 Special purpose grinding machines - other

**Tool grinding and sharpening machines**

- 11.1.12.1 Universal tool and cutter grinding machines
- 11.1.12.2 Single point cutting tool sharpening machines
- 11.1.12.3 Carbide tool sharpening machines
- 11.1.12.4 Broaching tool sharpening machines
- 11.1.12.5 Twist drill sharpening machines
- 11.1.12.6 Cutter and reamer sharpening machines
- 11.1.12.7 Sharpening machines for saw blades
- 11.1.12.8 Gear cutting tool sharpening machines
- 11.1.12.9 Tap grinding machines
- 11.1.12.10 Tool sharpening and lapping machines
- 11.1.12.11 Threading die and chaser grinding machines
- 11.1.12.12 Milling head sharpening machines
- 11.1.12.13 Shear blade and machine knife sharpening machines
- 11.1.12.14 Swing-frame grinding machines
- 11.1.12.99 Tool grinding and sharpening machines - other

**Grinding tools and accessories**

- 11.1.13.1 Bonded abrasives
- 11.1.13.2 Coated abrasives
- 11.1.13.3 Grinding and polishing pastes
- 11.1.13.4 Abrasive products with diamond
- 11.1.13.5 Grinding and polishing wheels, discs and belts
- 11.1.13.5.1 Flexible grinders
- 11.1.13.6 Synthetic diamond powder
- 11.1.13.7 Superfinishing materials
- 11.1.13.8 Blast media
- 11.1.13.99 Grinding tools and accessories - other

**Honing, lapping, polishing and deburring machines**

- 11.1.14.1 Honing machines
- 11.1.14.2 Cylinder honing machines
- 11.1.14.3 Surface lapping and cylindrical lapping machines
- 11.1.14.4 Lapping machines - other
- 11.1.14.5 Polishing machines, abrasive belt
- 11.1.14.6 Polishing machines, abrasive disc
- 11.1.14.7 Centreless polishing machines
- 11.1.14.8 Double ended grinding and polishing machines
- 11.1.14.9 Grinding, polishing and tumbling barrels
- 11.1.14.10 Grinding vibrators

- 11.1.14.11 Deburring machines
- 11.1.14.12 Polishing machines - other
- 11.1.14.13 Electromechanical deburring machines
- 11.1.14.14 Thermal deburring machines
- 11.1.14.15 Ultrasonic polishing machines

**Special production machines and modular units**

- 11.1.15.1 Special production machines with rotating tools
- 11.1.15.2 Rotary indexing table machines
- 11.1.15.3 Positioning units with rotary table and drum
- 11.1.15.4 Transfer lines
- 11.1.15.5 Special production machines - other
- 11.1.15.6 Turning units
- 11.1.15.7 Drilling units
- 11.1.15.8 Milling units
- 11.1.15.9 Special modular units - other
- 11.1.15.10 Finishing machines - centring and end facing

**11.1.16 Electroerosion machine tools**

- 11.1.16.1 Electrochemical machine tools
- 11.1.16.2 Electrolytic machine tools
- 11.1.16.3 Spark erosion machine tools
- 11.1.16.3.1 Spark erosion sinking machines
- 11.1.16.3.2 Spark erosion cutting machines
- 11.1.16.3.3 Spark erosion boring machines

**11.1.17 Laser machine tools**

- 11.1.17.1 Laser tube and profile processing machine tools
- 11.1.17.2 Laser metal sheet processing machine tools
- 11.1.17.3 Laser cutting machines

**11.1.18 Machine tools with parallel kinematic structure**

- 11.1.19 Micro-machine tools**
- 11.1.99 Machine tools - other**

**Forming machines**

**Mechanical presses**

- 11.2.1.1 Open gap non-inclinable eccentric presses
- 11.2.1.2 Inclinable eccentric presses
- 11.2.1.3 Straight sided presses
- 11.2.1.4 Two-point crank presses
- 11.2.1.5 Toggle lever presses
- 11.2.1.6 Crank presses
- 11.2.1.7 Transfer presses
- 11.2.1.8 Mechanical table presses
- 11.2.1.9 High-duty mechanical presses with automatic feed
- 11.2.1.10 Friction screw presses
- 11.2.1.11 Fly presses
- 11.2.1.12 Mechanical column presses
- 11.2.1.13 Embossing/stamping presses
- 11.2.1.14 Geared drawing presses
- 11.2.1.15 Hand lever presses
- 11.2.1.16 Wide frame crank drawing presses
- 11.2.1.17 Four-point drawing presses
- 11.2.1.18 Turntable mechanical presses
- 11.2.1.19 Calibrating presses
- 11.2.1.20 Fine blanking presses
- 11.2.1.99 Mechanical presses - other

**Hydraulic presses**

- 11.2.2.1 Double-action presses
- 11.2.2.2 Double- and four-column hydraulic presses
- 11.2.2.3 Wide frame drawing presses
- 11.2.2.4 Hydraulic transfer presses
- 11.2.2.5 Hydraulic table presses
- 11.2.2.6 Straight double sided presses
- 11.2.2.7 Open gap presses
- 11.2.2.8 Embossing/stamping hydraulic presses
- 11.2.2.9 Turntable hydraulic presses
- 11.2.2.10 Stretch forming presses



11.2.2.11	Die spotting presses	11.2.8.9	Swing-arm bending machines
11.2.2.12	Fine blanking presses	11.2.8.10	Mechanical press brakes
11.2.2.13	Special purpose hydraulic presses	11.2.8.11	Hydraulic press brakes
11.2.2.14	Deep-drawing presses	11.2.8.12	Sheet bending rolls
11.2.2.15	Pneumatic and hydropneumatic presses	11.2.8.13	Knurling, flanging, ribbing and curling machines
	<b>Presses for special applications</b>	11.2.8.14	Seaming machines
11.2.3.1	Trimming presses	11.2.8.15	Marking machines
11.2.3.2	Coining presses	11.2.8.16	Can making machines
11.2.3.3	Powder compacting presses	11.2.8.17	Riveting machines
11.2.3.4	Calibrating presses for special applications	11.2.8.18	Winding devices
11.2.3.5	Scrap baling and briquetting presses	11.2.8.19	Pressure compression and joining machines and tools
11.2.3.6	Flanging presses	11.2.8.99	Sheet working machines, laser based equipment - other
11.2.3.7	Stamping presses		<b>Shears, press dies, blanking machines</b>
11.2.3.8	Bending and straightening presses	11.2.9.1	Metal forming centres for punching and pressing
	<b>Forging machines and hammers</b>	11.2.9.2	Mechanically driven table shears
11.2.4.1	Hammers	11.2.9.3	Hydraulically driven table shears
11.2.4.2	Forging machines and presses	11.2.9.4	Circular shears
11.2.4.3	Automatic transfer forging machines	11.2.9.5	Gang slitting and circular tool shears
11.2.4.99	Forging machines and hammers - other	11.2.9.6	Combined curve-cutting and nibbling machines
	<b>Bar, section and tube working machines</b>	11.2.9.7	Universal shearing and punching ( and/or notching) machines
11.2.5.1	Straightening machines	11.2.9.8	Concrete reinforcing bar cutters
11.2.5.2	Bar and section bending machines	11.2.9.9	Notching machines
11.2.5.3	Bending machines for reinforcing bars	11.2.9.10	Nibbling machines
11.2.5.4	Roller finishing and deep rolling machines	11.2.9.11	Punching presses
11.2.5.5	Section roll bending machines	11.2.9.99	Shears, press dies, blanking machines - other
11.2.5.6	Ring rolling machines		<b>11.2.10 Micro-forming machines</b>
11.2.5.7	Tube forming, welding and cutting-off machines		<b>11.2.99 Forming machines - other</b>
11.2.5.8	Tube bending machines		<b>Machines for unconventional and special machining and forming technologies</b>
11.2.5.9	Tube reducing and flaring machines	11.3.1	Rapid prototyping devices
11.2.5.10	Tube finishing machines	11.3.2	Ultrasonic machine tools
11.2.5.11	Automatic transfer bar, profile and tube forming lines	11.3.3	Water jet cutting machines
11.2.5.99	Bar, section and tube working machines - other	11.3.4	Electron beam working machines
	<b>Wire forming machines</b>	11.3.5	Plasma beam working machines
11.2.6.1	Wire drawing machines	11.3.6	Machines for unconventional machining - other
11.2.6.2	Wire straightening and cutting-off machines	11.3.7	Laminating (sandwiching) machines and equipment for composites
11.2.6.3	Wire bending machines	11.3.8	Die casting machines
11.2.6.4	Spring coiling machines and devices	11.3.9	Longitudinal and circular dividing machines
11.2.6.5	Chain making machines	11.3.10	Finishing (make-up) machines
11.2.6.6	Wire netting and weaving machines	11.3.11	Embossing, stamping and marking equipment
11.2.6.7	Threading, screwing and bolt rolling machines	11.3.12	Laser lettering machines
11.2.6.8	Rope and cable making machines	11.3.13	Coating machines
11.2.6.9	Nail making machines		<b>11.3.99 Machines for unconventional and special machining and forming technologies - other</b>
11.2.6.99	Wire forming machines - other		<b>Quality control for machining and forming sector</b>
	<b>Bolt, screw, nut and rivet making machines</b>		<b>Measuring and checking instruments for machining and forming</b>
11.2.7.1	Hot and cold pressing machines for bolts and screws	11.4.1.1	Length measuring instruments for machining and forming
11.2.7.2	Bolt shears	11.4.1.2	Angle and inclination measuring instruments for machining and forming
11.2.7.3	Bolt and screw chamfering machines	11.4.1.3	Vibration measuring instruments for machining and forming
11.2.7.4	Nut presses	11.4.1.4	Speed measuring instruments for machining and forming
11.2.7.5	Nut tapping machines	11.4.1.5	Surface quality measuring instruments for machining and forming
11.2.7.6	Screw and bolt threading machines	11.4.1.6	Layer thickness measuring instruments for machining and forming
11.2.7.7	Thread, screw and bolt rolling machines	11.4.1.7	Noise level measuring instruments for machining and forming
11.2.7.8	Screw head turning and slotting machines	11.4.1.8	Temperature measuring instruments for machining and forming
11.2.7.9	Bolt, nut and rivet deburring (trimming) machines	11.4.1.9	Force and torque measuring instruments for machining and forming
11.2.7.10	Wood screw making machines	11.4.1.10	Clamping force measuring instruments for machining and forming
11.2.7.11	Multistation-Partformer	11.4.1.11	Pressure measuring instruments for machining and forming
11.2.7.99	Bolt, screw, nut and rivet making machines - others		
	<b>Sheet working machines, laser based equipment</b>		
11.2.8.1	Sheet metal machining centers, incl. laser based machines or plasma units		
11.2.8.2	Nibbling machines		
11.2.8.3	Strip levelling and cutting-off machines		
11.2.8.4	Cutting-to-length and slitting lines		
11.2.8.5	Sheet-straightening machines		
11.2.8.6	Sheet forming machines		
11.2.8.7	Sheet metal forming machines		
11.2.8.8	Spinning machines		

11.4.1.12	Profile and shape measuring instruments for machining and forming
11.4.1.13	Thread measuring instruments for machining and forming
11.4.1.14	Circularity measuring instruments for machining and forming
11.4.1.15	Gauges and meters for machining and forming
11.4.1.16	Measuring and testing devices, machining and forming standards
11.4.1.17	Mechanical precision measuring instruments for machining and forming
11.4.1.18	Optical precision measuring instruments for machining and forming
11.4.1.19	Electric precision measuring instruments for machining and forming
11.4.1.20	Electronic precision measuring instruments for machining and forming
11.4.1.21	Pneumatic precision measuring instruments for machining and forming
11.4.1.22	Laser measuring instruments for machining and forming
11.4.1.23	Measured value transducers for machining and forming
11.4.1.24	Measured value amplifiers for machining and forming
11.4.1.25	Measuring tables for machining and forming
11.4.1.26	Digital read out systems
11.4.1.27	Breakage and wear detection systems
11.4.1.28	Measuring microscopes for machining and forming
11.4.1.29	Surface plates and flatness testing equipment

**Measuring machines**

11.4.2.1	Measuring and marking machines
11.4.2.2	Computerized measuring machines for machining and forming sector
11.4.2.3	Tool setting devices
11.4.2.4	Hob testing instruments
11.4.2.5	Gear testing equipment
11.4.2.6	Sorting machines and equipment
11.4.2.7	Measuring robots
11.4.2.8	Measuring machines for lot production in machining and forming sector
11.4.2.9	Measuring projectors
11.4.2.10	Coordinate and multicoordinate measuring machines
11.4.2.11	Systems for 3D scanning
11.4.2.12	Measuring machine accessories

**Testing machines for machining and forming sector**

11.4.3.1	Testing machines for tension, compression, bending and other features
11.4.3.2	Tension testing machines
11.4.3.3	Pendulum impact testing machines
11.4.3.4	Drop hammers for material testing
11.4.3.5	Hardness testing machines and devices
11.4.3.6	Spring testing machines
11.4.3.7	Material fatigue testing machines (tension, compression, bending)
11.4.3.8	Torsion testing machines
11.4.3.9	Deep-drawing testers
11.4.3.10	Machines and devices for non-destructive material testing
11.4.3.11	Gear testing machines
11.4.3.12	Balancing machines for machining and forming
11.4.3.13	Electronic balancing equipment for machining and forming
11.4.3.14	Ultrasonic testing machines for machining and forming
11.4.3.15	Power test benches for machining and forming
11.4.3.16	Surface testing machines for machining and forming
11.4.3.17	Stereomicroscopes
11.4.3.18	Eddy current testers
11.4.3.99	Testing machines for machining and forming sector - other

**Image data processing in machining and forming sector**

11.4.4.1	Image processing systems in machining and forming sector
11.4.4.2	Video systems and endoscopes
11.4.4.3	Sensor systems for image and signal pattern recognition for machining and forming sector
11.4.4.4	Visual geometry measuring devices
11.4.4.5	Measuring microscopes with digital image processing

**Quality assurance software in machining and forming sector**

11.4.5.1	Software for acquisition of measured electrical data in machining and forming sector
11.4.5.2	Software for acquisition of measured non-electrical data in machining and forming sector
11.4.5.3	Software for processing and evaluation of measured data in machining and forming sector
11.4.5.4	Diagnostic systems for machining and forming sector
11.4.5.5	Quality assurance software in machining and forming sector
11.4.5.6	Software for failure mode and effects analysis (FMEA) applications
11.4.5.7	Software for technological data acquisition in machining and forming sector
11.4.5.8	Software for operating data acquisition in machining and forming sector
11.4.5.9	Quality information and control systems in machining and forming sector
11.4.5.10	Software for testing equipment supervision and management in machining and forming sector
11.4.5.11	Software for test scheduling and test data evaluation in machining and forming sector

**11.4.99 Quality control for machining and forming sector - other****Flexible manufacturing systems (FMS)****Computer systems and peripherals for flexible manufacturing systems**

11.5.1.1	FMS data processing systems
11.5.1.2	Turnkey computer systems for flexible manufacturing systems
11.5.1.3	CAD workstations
11.5.1.4	Servers for flexible manufacturing systems
11.5.1.5	Data network elements for flexible manufacturing systems
11.5.1.6	Communication adapters
11.5.1.7	Operator workplaces for flexible manufacturing systems
11.5.1.8	Input devices for flexible manufacturing systems
11.5.1.9	Interactive terminals for flexible manufacturing systems
11.5.1.10	Digitizers, tablets for flexible manufacturing systems
11.5.1.11	Scanners for flexible manufacturing systems
11.5.1.12	Plotters for flexible manufacturing systems
11.5.1.13	Printers for flexible manufacturing systems
11.5.1.14	NC-programming systems
11.5.1.99	Computer systems and peripheral units for flexible manufacturing systems - other

**Software for flexible manufacturing systems**

11.5.2.1	CAD/CAM systems for machine tools and metal forming machines
11.5.2.1.1	CAD/CAM systems for machine tools
11.5.2.1.2	CAD/CAM systems for metal forming machines
11.5.2.2	Software for TPV and PDM (Product Data Management)
11.5.2.3	Software for CNC control
11.5.2.4	Software for PLC control
11.5.2.5	Software for calculation of stress analysis, dynamic design and heat balance by the finite-element method
11.5.2.6	Software for electrical design
11.5.2.7	Software for production planning and management in flexible manufacturing systems
11.5.2.8	Software for flexible assembling systems
11.5.2.9	Software for operating data processing in flexible manufacturing systems
11.5.2.10	Software for capacity and production date scheduling in flexible manufacturing systems
11.5.2.11	Software for stock management
11.5.2.12	Software for warehousing and material management
11.5.2.13	Software for material database
11.5.2.14	Software for industrial robots in flexible manufacturing systems



- 11.5.2.15 Software for simulation calculations in flexible manufacturing systems
- 11.5.2.16 Software for warehousing and conveyor systems in flexible manufacturing systems
- 11.5.2.99 Software for flexible manufacturing systems - other
  
- Control and drives**
- 11.5.3.1 CNC control systems
- 11.5.3.2 Programmable logic controllers (PLC)
- 11.5.3.3 Programming systems for CNC training
- 11.5.3.4 Axis position measuring systems
- 11.5.3.5 Robot controllers in flexible manufacturing systems
- 11.5.3.6 Feed drives in flexible manufacturing systems
  
- 11.5.3.7 Main drives in flexible manufacturing systems
- 11.5.3.7.1 Servo drives for machine tools and metal forming+C2034 machines
  
- 11.5.3.8 Actuators
- 11.5.3.9 Heavy-duty electronics for machine tool and metal working machine control and drives
- 11.5.3.99 Control and drives - other

**Electrical and electronic equipment for machine tools and metal forming machines**

- 11.5.4.1 Electric motors for machine tools and forming machines
- 11.5.4.2 Generators
- 11.5.4.3 Converters
- 11.5.4.4 Rectifiers for electrical and electronic equipment of machine tools and metal forming machines
- 11.5.4.5 Electric, electronic and magnetic switching and control gear
- 11.5.4.6 Electric and electronic measuring and counting devices
- 11.5.4.7 Electric and electronic detecting, measuring, testing and protecting devices
- 11.5.4.8 Electric and electronic C1797 components and assemblies in flexible manufacturing systems
- 11.5.4.9 Piezoelectric motors, controllers, systems in flexible manufacturing systems
- 11.5.4.10 Optoelectronic parts for laser machine tools
- 11.5.4.11 Power electronics, closed-loop electronic systems in flexible manufacturing systems
- 11.5.4.12 Flexible energy supplies
- 11.5.4.13 Flexible control and power-supply cables for flexible manufacturing systems
- 11.5.4.14 Electric control panels and cubicles in flexible manufacturing systems
- 11.5.4.15 Electrical equipment for induction heating plants
- 11.5.4.99 Electric and electronic equipment for machine tools and metal forming machines - other

**Assembling and industrial robots in flexible manufacturing systems**

- 11.5.5.1 Flexible assembling systems
- 11.5.5.2 Individual assembling workplaces
- 11.5.5.3 Assembling equipment and automatic machines
- 11.5.5.4 Assembling lines in flexible manufacturing systems
- 11.5.5.5 Modular units for assembling systems
- 11.5.5.6 Handling equipment for warehousing, input and delivery of workpieces, semi-products in flexible manufacturing systems
- 11.5.5.7 Handling equipment for aligning and positioning of workpieces
- 11.5.5.8 Feeding equipment for machine tools
- 11.5.5.9 Gripping tools and automatic fixtures
- 11.5.5.10 Exchangeable devices for robot grippers
- 11.5.5.11 Manipulators in flexible manufacturing systems
- 11.5.5.12 Industrial robots in flexible manufacturing systems
- 11.5.5.13 Working tools for industrial robots
- 11.5.5.99 Assembling and industrial robots in flexible manufacturing systems - other

**Automation of warehousing and transportation for machining and forming**

- 11.5.6.1 Conveying systems for machining and forming
- 11.5.6.2 Conveyers for workpieces for machining and forming
- 11.5.6.3 Driverless ground conveyors for machining and forming
- 11.5.6.4 Driverless warehouse conveyors for machining and forming
- 11.5.6.5 Components to interlink separate production stages
- 11.5.6.6 Magazines for workpieces, pressed pieces and semi-products
- 11.5.6.7 Warehousing systems for machining and forming
- 11.5.6.8 Palletizing systems of workpieces and tools
- 11.5.6.9 Warehousing systems of workpieces and tools
- 11.5.6.10 Palletizing systems for machining and forming
- 11.5.6.11 Warehousing equipment for manufacturing plants for machining and forming
- 11.5.6.12 Metal chip crushers in flexible manufacturing systems
- 11.5.6.13 Chip conveyers for flexible manufacturing systems
- 11.5.6.14 Chip deoiling equipment

**11.5.99 Flexible manufacturing systems - other**

**Precision tools**

**Machining tools**

- 11.6.1.1 Reamers
- 11.6.1.2 Boring bars
- 11.6.1.3 Tool bits
- 11.6.1.4 Broaching tools
- 11.6.1.5 Gear tools
- 11.6.1.6 Threading dies
- 11.6.1.7 Threading tools, cutting
- 11.6.1.8 Milling cutters and gear shaping cutters, disc-type
- 11.6.1.9 Countersinks and core drills
- 11.6.1.10 Circular saw blades, incl. metal carbide discs and tips
- 11.6.1.11 Metal hacksaw blades
- 11.6.1.12 Metal band saw blades
- 11.6.1.13 Inserted tooth saw blades
- 11.6.1.14 Cylindrical saws, slitting saws
- 11.6.1.15 Cutting ceramics inserts
- 11.6.1.16 Carbide tipped tools and cutting tips
- 11.6.1.17 Twist drills and center drills
- 11.6.1.18 Spade drills
- 11.6.1.19 Step drills
- 11.6.1.20 Gun drills
- 11.6.1.21 Boring tools
- 11.6.1.22 Fine boring tools
- 11.6.1.23 Turning tools and tool holders
- 11.6.1.24 Diamond tools, diamond paste, industrial diamonds
- 11.6.1.25 Dressing tools
- 11.6.1.26 Shaving cutters, deburring tools
- 11.6.1.27 Planing and shaping tools
- 11.6.1.28 Honing, lapping and polishing tools
- 11.6.1.29 Cutting tools, coated
- 11.6.1.30 Cutting tools with integrated code
- 11.6.1.31 Power tools
- 11.6.1.32 Graphite materials for EDM - Electro discharge machining
- 11.6.1.33 Electrodes, cutting wires, consumables for electro discharge machine tools
- 11.6.1.34 Special tools for machining
- 11.6.1.35 Tool care products for machining
- 11.6.1.99 Machining tools - other

**Forming tools**

- 11.6.2.1 Cutting tools
- 11.6.2.2 Shear knives, machine knives
- 11.6.2.3 Blanking and punching dies
- 11.6.2.4 Forming dies
- 11.6.2.5 Stamping dies, embossing dies
- 11.6.2.6 Markers
- 11.6.2.7 Punches
- 11.6.2.8 Knurling tools
- 11.6.2.9 Thread rolling dies

- 11.6.2.10 Thread cutting tools (forming)
- 11.6.2.10.1 Heads for thread cold rolling
  
- 11.6.2.11 Roller burnishing tools, smoothing and straining tools
- 11.6.2.12 Drawing dies
- 11.6.2.13 Die blocks
- 11.6.2.14 Deep drawing dies
- 11.6.2.15 Forming tools coated
- 11.6.2.16 Quick-action fixtures for press tools
- 11.6.2.17 Press tool changing systems
- 11.6.2.18 Special tools for forming
- 11.6.2.19 Die-casting dies
- 11.6.2.20 Guide racks
- 11.6.2.21 Standardized parts for forming tools and moulds (punching, stamping tools, posts, sleeves)
- 11.6.2.22 Wedge units
- 11.6.2.99 Forming tools - other

**Chucking tools**

- 11.6.3.1 Standard fixture parts and clamping elements
- 11.6.3.2 Control elements for jigs and machines
- 11.6.3.3 Collet chucks
- 11.6.3.4 Machine vices
- 11.6.3.5 Drill chucks
- 11.6.3.6 Manual chucks for grinding machines
- 11.6.3.7 Power chucks for grinding machines
- 11.6.3.8 Lathe chucks, hand operated
- 11.6.3.9 Lathe chucks, power operated
- 11.6.3.10 Centers, carriers for lathes
- 11.6.3.11 Expanding mandrels
- 11.6.3.12 Magnetic chucks
- 11.6.3.13 Milling arbors
- 11.6.3.14 Sleeves
- 11.6.3.15 Dividing fixing heads
- 11.6.3.16 Magnetic fixing plates
- 11.6.3.17 Vacuum fixing plates
- 11.6.3.18 Fixture plates
- 11.6.3.19 Rotary holders
- 11.6.3.20 Tool holders
- 11.6.3.21 Rotary tables, also NC-controlled
- 11.6.3.22 Cross slide tables, also NC-controlled
- 11.6.3.23 Chucking tools with code
- 11.6.3.24 Chucking systems, incl. modular
- 11.6.3.99 Chucking tools - other

**Tool systems**

- 11.6.4.1 Tool systems, modular
- 11.6.4.2 Tool turrets
- 11.6.4.3 Tool changers and magazines
- 11.6.4.4 Tool management software
- 11.6.4.5 Multi-spindle heads
- 11.6.4.6 Boring and facing heads
- 11.6.4.7 Turret heads
- 11.6.4.8 Slotting heads
- 11.6.4.9 Inserted blade milling cutters
- 11.6.4.10 Toolholder with coupleable drive
- 11.6.4.11 Copying devices
- 11.6.4.12 Relieving devices
- 11.6.4.13 Grinding wheel trueing, dressing and forming devices
- 11.6.4.14 Threading devices
- 11.6.4.15 Milling devices
- 11.6.4.16 Boring devices
- 11.6.4.17 Grinding devices
- 11.6.4.18 Tool identification systems
- 11.6.4.19 Tool breakage identification devices
- 11.6.4.20 Tool measuring and setting units
- 11.6.4.21 Tool maintenance systems
- 11.6.4.22 Spherical turning attachments
- 11.6.4.99 Tool systems - other

**11.6.99 Precision tools - other**

**Accessories for metal working and forming**

**Lubrication and cooling of metal working and forming machines**

- 11.7.1.1 Lubricating oils and consumables for metal working and forming machines
- 11.7.1.2 Coolants and lubricants
- 11.7.1.3 Central lubricating systems
- 11.7.1.4 Oiling and greasing systems
- 11.7.1.5 Cooling systems
- 11.7.1.6 Separators for coolants and lubricants, filters, centrifuges
- 11.7.1.7 Metal cleaning and deoiling devices
- 11.7.1.8 Spraying attachment for forging machines
- 11.7.1.9 Cask cleaning equipment
- 11.7.1.10 Coolant hoses

**Waste disposal in machining and forming sector**

- 11.7.2.1 Air purity protection systems and components
- 11.7.2.2 Exhaust systems in machining and forming sector
- 11.7.2.3 Dust collection equipment, filtering systems, filters
- 11.7.2.4 Wastewater treatment equipment and components in machining and forming sector
- 11.7.2.5 Water treatment equipment and components in machining and forming sector
- 11.7.2.6 Emulsion recovery equipment
- 11.7.2.7 Processing of coolants and lubricants
- 11.7.2.8 Oil separation, oil mist separation
- 11.7.2.9 Waste oil collecting tanks
- 11.7.2.10 Filtration, ultrafiltration
- 11.7.2.11 Chip breakers
- 11.7.2.12 Chip conveyors
- 11.7.2.13 Chip briquetting presses
- 11.7.2.14 Oil recovery equipment (chip separators)
- 11.7.2.15 Tipping containers for chip removal
- 11.7.2.16 Industrial dust collectors for cleaning of machines
- 11.7.2.17 Process water treatment for superfinishing systems

**Mechanical components and accessories for construction of machine-tools and forming machines**

- 11.7.3.1 Fittings for machine tools and metal forming machines
- 11.7.3.2 Seals / gaskets for machine tools and metal forming machines
- 11.7.3.3 Flexible washers, levelling components
- 11.7.3.4 Springs for machine tools and metal forming machines
- 11.7.3.5 Drive components for machine tools and metal forming machines
- 11.7.3.6 Gear units for machine tools and metal forming machines
- 11.7.3.7 Infinitely variable speed gears for machine tools and metal forming machines
- 11.7.3.8 Reducing gears for machine tools and metal forming machines
- 11.7.3.9 Couplings for machine tools and metal forming machines
- 11.7.3.10 Friction couplings for machine tools and metal forming machines
- 11.7.3.11 Brakes for machine tools and metal forming machines
- 11.7.3.12 Plain and antifriction bearings for machine tools and metal forming machines
- 11.7.3.13 Linear lines for machine tools and metal forming machines
- 11.7.3.14 Ball and roller slides, pneumatic slides
- 11.7.3.15 Ball screws and nuts
- 11.7.3.16 Machine elements for machine tools and metal forming machines
- 11.7.3.17 Hydraulic power units, pumps, motors, cylinders, drives, assemblies
- 11.7.3.18 Hydraulic control engineering for machine tools and metal forming machines
- 11.7.3.19 High pressure lines and hoses, flexible tubing
- 11.7.3.20 Fittings, connections for machine tools and metal forming machines
- 11.7.3.21 High-pressure pumps and their accessories for water-jet cutting machines



11.7.3.22	Pneumatic drives, control engineering, components for machine tools and metal forming machines	11.9.2.6	Manual electric rivet guns
11.7.3.23	Compressors for machine tools and metal forming machines	11.9.2.7	Microtools
11.7.3.24	Compressed air conditioning unit	11.9.2.99	Electric hand-operated tools, incl. cordless programme - other
11.7.3.25	Small electric hoists, conveyance rollers	<b>11.9.3</b>	<b>Hand-operated hydraulic tools</b>
11.7.3.26	Pneumatic and oil pneumatic jacks	<b>11.9.4</b>	<b>Hand-operated tools driven by internal combustion engine</b>
11.7.3.27	Winding and unwinding devices	<b>11.9.5</b>	<b>Mobile and suspension hand-operated tools</b>
11.7.3.28	Bar magazines and feeders	<b>11.9.99</b>	<b>Hand-operated tools – others</b>
11.7.3.29	Sheet metal containers and loaders		
11.7.3.30	Grinding spindles	<b>Manual non-mechanized tools</b>	
11.7.3.31	High frequency spindles for machine-tools	11.10.1	Hand hammers
11.7.3.32	Main spindles for turning, milling, drilling and boring machines	11.10.2	Pliers, alligator wrenches
11.7.3.33	Guide way wipers for machine tools	11.10.3	Manual deburring tools, files
11.7.3.34	Columns, beds and parts of machines by polymerized concrete	11.10.4	Chisels, axes
11.7.3.35	Machine lighting	11.10.5	Screwdrivers
11.7.3.36	Personal protective equipment	11.10.6	Wrenches, torque wrenches
11.7.3.37	Protective devices	11.10.7	Hand cutting tools
11.7.3.38	Guards for machine-tools, slideways and lead screws	11.10.8	Vices
11.7.3.39	Safety and protective equipment for machine tools and metal forming machines	11.10.9	Clamps (cramps)
11.7.3.40	Antiskid mats for machines	11.10.10	Pullers/removers
11.7.3.41	Tool cabinets for machine tools	11.10.11	Cases and bags for tools
11.7.3.42	Equipment of workshops for metal-working and forming sector	<b>11.10.99</b>	<b>Manual non-mechanized tools – other</b>
<b>11.7.99</b>	<b>Accessories for metal working and forming - other</b>		
<b>Service and repairs of metal working and forming machines, reworked machines</b>		<b>Institutions, literature and services in metal working and forming sector</b>	
11.8.1	Spare parts for machine tools	11.11.1	Associations, organizations in metal-working and forming sector
11.8.2	Spare parts for forming machines	11.11.2	Technical publishing houses, literature, specialized periodicals
<b>11.8.3</b>	<b>General overhauls of machine tools and forming machines</b>	<b>11.11.3</b>	<b>Consultancy in the field of machine tools and metal-forming machines</b>
11.8.3.1	General overhauls of machine tools	11.11.3.1	Consultancy in the field of machine tools
11.8.3.2	General overhauls of metal forming machines	11.11.3.2	Consultancy in the field of metal-forming machines
<b>11.8.4</b>	<b>Redesign and upgrading of machine tools and metal forming machines</b>	<b>11.11.4</b>	<b>Engineering and design services in the field of machine tools and metal-forming machines</b>
11.8.4.1	Upgrading of el. equipment of machine tools and metal forming machines	11.11.4.1	Engineering and design services in the field of machine tools
<b>11.8.4.2</b>	<b>Upgrading of peripheral units for NC and CNC machines</b>	11.11.4.2	Engineering and design services in the field of metal-forming machines
11.8.4.3	Redesign and upgrading of machine tools	<b>11.11.5</b>	<b>Technologies for metal working and forming</b>
11.8.4.4	Redesign and upgrading of metal forming machines	11.11.5.1	Technological projects for metal working and forming
11.8.5	Reworked machine tools	11.11.5.2	Technological deliveries for metal working and forming
11.8.6	Reworked metal forming machines	<b>11.11.6</b>	<b>Custom manufacture of single-purpose machine tools and metal forming machines</b>
<b>11.8.99</b>	<b>Service and repairs of metal working and forming machines, reworked machines - other</b>	11.11.6.1	Custom manufacture of single-purpose machine tools
		11.11.6.2	Custom manufacture of single-purpose metal forming machines
<b>Hand tools</b>		<b>11.11.7</b>	<b>Execution of investments in the field of metal working and forming</b>
<b>Hand-operated tools</b>		<b>11.11.8</b>	<b>Business services in the field of machine tools and metal forming machines</b>
<b>11.9.1</b>	<b>Pneumatic hand-operated tools</b>	<b>11.11.9</b>	<b>Leasing of metal working and forming machines</b>
11.9.1.1	Hand-operated pneumatic drills	<b>11.11.10</b>	<b>Custom coating of metal cutting and forming tools</b>
11.9.1.2	Hand-operated pneumatic thread-cutting machines		
11.9.1.3	Hand-operated pneumatic nut runners and screwdrivers	<b>11.11.11</b>	<b>Custom tool renovation and reconditioning</b>
11.9.1.4	Hand-operated pneumatic grinding machines, angle grinders and polishing machines	11.11.11.1	Compression mould refurbishment
11.9.1.5	Hand-operated pneumatic shears	<b>11.11.12</b>	<b>Reverse engineering services</b>
11.9.1.6	Manual pneumatic rivet guns	<b>11.11.13</b>	<b>Custom rapid prototyping</b>
11.9.1.99	Pneumatic hand-operated tools - other		
<b>11.9.2</b>	<b>Electric hand-operated tools, incl. cordless programme</b>	<b>11.11.14</b>	<b>Offer of production capacities in the metal-working and forming sector</b>
11.9.2.1	Hand-operated electric drills and hammers	11.11.14.1	Custom material cutting
11.9.2.2	Hand-operated electric grinders, angle grinders and polishing machines	11.11.14.2	Custom sheet-metal processing
11.9.2.3	Hand-operated electric saws, shears and milling machines	11.11.14.3	Custom metal-working manufacturing
11.9.2.4	Hand-operated electric nut runners, screwdrivers and threading machines		
11.9.2.5	Hand-operated electric staplers	11.11.14.4	Offer of production capacities in the metal working sector

- 11.11.14.4.1 Custom CNC machining
- 11.11.14.4.2 Custom high-speed (HSC) machining
- 11.11.14.4.3 Custom machining of hard-to-work materials
- 11.11.14.4.4 Custom laser marking, lettering, engraving
- 11.11.14.4.5 Custom piece polishing
  
- 11.11.14.5 Offer of production capacities in the metal forming sector
  
- 11.11.99 Institutions, literature and services in metal working and forming sector - other**
  
- 11.99 Metal working and forming machines, manual tools – other**