



12TH INTERNATIONAL MACHINE TOOLS EXHIBITION

MACHINE-TOOLS

11.1.1

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

11.1.2

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

11.1.3

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

11.1.4

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

11.1.5

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

11.1.6

Gear cutting and finishing 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

11.1.8

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

11.1.9

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

11.1.10

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

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11.1.10.10	Centreless grinding machines	11.1.14.12	Polishing machines – other
11.1.10.11	Copying grinding machines	11.1.14.13	Electromechanical deburring machines
11.1.10.12	High speed grinding machines	11.1.14.14	Thermal deburring machines
11.1.10.13	Abrasive band grinding machines	11.1.14.15	Ultrasonic polishing machines
11.1.10.14	Double-spindle surface-grinding machines		
11.1.10.15	Jig grinding machines	11.1.15	Special production machines and modular units
11.1.10.16	Automatic grinding machines with tool magazine (grinding centres)	11.1.15.1	Special production machines with rotating tools
11.1.11	Special purpose grinding machines	11.1.15.2	Rotary indexing table machines
11.1.11.1	Electrolytic grinding machines	11.1.15.3	Positioning units with rotary table and drum
11.1.11.2	Superfinishing grinding machines	11.1.15.4	Transfer lines
11.1.11.3	Profile grinding machines	11.1.15.5	Special production machines – other
11.1.11.4	Cylindrical grinding machines	11.1.15.6	Turning units
11.1.11.5	Oval grinding machines	11.1.15.7	Drilling units
11.1.11.6	Polygon grinding machines	11.1.15.8	Milling units
11.1.11.7	Spline shaft grinding machines	11.1.15.9	Special modular units – other
11.1.11.8	Calliper gauge grinding machines (surfaces, parallelity)	11.1.15.10	Finishing machines – centring and end facing
11.1.11.9	Centre hole grinding machines	11.1.16	Electroerosion machine tools
11.1.11.10	Slideway grinding machines	11.1.16.1	Electrochemical machine tools
11.1.11.11	Cam grinding machines	11.1.16.2	Electrolytic machine tools
11.1.11.12	Camshaft grinding machines		
11.1.11.13	Crankshaft grinding machines	11.1.16.3	Spark erosion machine tools
11.1.11.14	Valve grinding machines	11.1.16.3.1	Spark erosion sinking machines
11.1.11.15	Piston grinding machines	11.1.16.3.2	Spark erosion cutting machines
11.1.11.16	Axle journal grinding machines	11.1.16.3.3	Spark erosion boring machines
11.1.11.17	Roller bearing race grinding machines	11.1.17	Laser machine tools
11.1.11.18	Grinding machines with flexible shaft	11.1.17.1	Laser tube and profile processing machine tools
11.1.11.99	Grinding machines special – other	11.1.17.2	Laser metal sheet processing machine tools
		11.1.17.3	Laser cutting machines
11.1.12	Tool grinding and sharpening machines	11.1.18	Machine tools with parallel kinematic structure
11.1.12.1	Universal tool and cutter grinding machines	11.1.19	Micro-machine tools
11.1.12.2	Single point cutting tool sharpening machines		
11.1.12.3	Carbide tool sharpening machines	11.1.99	Machine tools – other
11.1.12.4	Broaching tool sharpening machines		
11.1.12.5	Twist drill sharpening machines	Forming machines	
11.1.12.6	Cutter and reamer sharpening machines	11.2.1	Mechanical presses
11.1.12.7	Sharpening machines for saw blades	11.2.1.1	Open gap non-inclinable eccentric presses
11.1.12.8	Gear cutting tool sharpening machines	11.2.1.2	Inclinable eccentric presses
11.1.12.9	Tap grinding machines	11.2.1.3	Straight sided presses
11.1.12.10	Tool sharpening and lapping machines	11.2.1.4	Two-point crank presses
11.1.12.11	Threading die and chaser grinding machines	11.2.1.5	Toggle lever presses
11.1.12.12	Milling head sharpening machines	11.2.1.6	Crank presses
11.1.12.13	Shear blade and machine knife sharpening machines	11.2.1.7	Transfer presses
11.1.12.14	Swing-frame grinding machines	11.2.1.8	Mechanical table presses
11.1.12.99	Tool grinding and sharpening machines – other	11.2.1.9	High-duty mechanical presses with automatic feed
11.1.13	Abrasives	11.2.1.10	Friction screw presses
11.1.13.1	Bonded abrasives	11.2.1.11	Fly presses
11.1.13.2	Coated abrasives	11.2.1.12	Mechanical column presses
11.1.13.3	Grinding and polishing pastes	11.2.1.13	Embossing/stamping presses
11.1.13.4	Abrasive products with diamond	11.2.1.14	Gear drawing presses
		11.2.1.15	Hand lever presses
11.1.13.5	Grinding and polishing wheels, discs and belts	11.2.1.16	Wide frame crank drawing presses
11.1.13.5.1	Flexible grinders	11.2.1.17	Four-point drawing presses
		11.2.1.18	Turntable mechanical presses
11.1.13.6	Synthetic diamond powder	11.2.1.19	Calibrating presses
11.1.13.7	Superfinishing materials	11.2.1.20	Fine blanking presses
11.1.13.8	Blast media	11.2.1.99	Special purpose mechanical presses – other
11.1.13.99	Grinding tools and accessories – other	11.2.2	Hydraulic presses
11.1.14	Honing, lapping, polishing and deburring machines	11.2.2.1	Double-action presses
11.1.14.1	Honing machines	11.2.2.2	Double- and four-column hydraulic presses
11.1.14.2	Cylinder honing machines	11.2.2.3	Wide frame drawing presses
11.1.14.3	Surface lapping and cylindrical lapping machines	11.2.2.4	Hydraulic transfer presses
11.1.14.4	Lapping machines – other	11.2.2.5	Hydraulic table presses
11.1.14.5	Polishing machines, abrasive belt	11.2.2.6	Straight double sided presses
11.1.14.6	Polishing machines, abrasive disc	11.2.2.7	Open gap presses
11.1.14.7	Centreless polishing machines	11.2.2.8	Embossing/stamping hydraulic presses
11.1.14.8	Double ended grinding and polishing machines	11.2.2.9	Turntable hydraulic presses
11.1.14.9	Grinding, polishing and tumbling barrels	11.2.2.10	Stretch forming presses
11.1.14.10	Grinding vibrators		
11.1.14.11	Deburring machines		



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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
		11.2.8.14	Seaming machines
11.2.3	Presses for special applications	11.2.8.15	Marking machines
11.2.3.1	Trimming presses	11.2.8.16	Can making machines
11.2.3.2	Coining presses	11.2.8.17	Riveting machines
11.2.3.3	Powder compacting presses	11.2.8.18	Winding devices
11.2.3.4	Calibrating presses for special applications	11.2.8.19	Pressure compression and joining machines and tools
11.2.3.5	Scrap baling and briquetting presses	11.2.8.99	Sheet and strip working machines – other
11.2.3.6	Flanging presses		
11.2.3.7	Stamping presses	11.2.9	Shears, press dies, blanking machines
11.2.3.8	Bending and straightening presses	11.2.9.1	Metal forming centres for punching and pressing
		11.2.9.2	Mechanically driven table shears
11.2.4	Forging machines and hammers	11.2.9.3	Hydraulically driven table shears
11.2.4.1	Hammers	11.2.9.4	Circular shears
11.2.4.2	Forging machines and presses	11.2.9.5	Gang slitting and circular tool shears
11.2.4.3	Automatic transfer forging machines	11.2.9.6	Combined curve-cutting and nibbling machines
11.2.4.99	Forging machines – other	11.2.9.7	Universal shearing and punching (and/or notching) machines
		11.2.9.8	Concrete reinforcing bar cutters
11.2.5	Bar, section and tube working machines	11.2.9.9	Notching machines
11.2.5.1	Straightening machines	11.2.9.10	Nibbling machines
11.2.5.2	Bar and section bending machines	11.2.9.11	Punching presses
11.2.5.3	Bending machines for reinforcing bars	11.2.9.99	Shearing, nibbling, notching and punching machines – other
11.2.5.4	Roller finishing and deep rolling machines		
11.2.5.5	Section roll bending machines	11.2.10	Micro-forming machines
11.2.5.6	Ring rolling machines		
11.2.5.7	Tube forming, welding and cutting-off machines	11.2.99	Forming machines – other
11.2.5.8	Tube bending machines		
11.2.5.9	Tube reducing and flaring machines		
11.2.5.10	Tube finishing machines		
11.2.5.11	Automatic transfer bar, profile and tube forming lines		
11.2.5.99	Bar, section and tube working machines – other		
		Machines for unconventional and special machining and forming technologies	
11.2.6	Wire forming machines	11.3.1	Rapid prototyping devices
11.2.6.1	Wire drawing machines	11.3.2	Ultrasonic machine tools
11.2.6.2	Wire straightening and cutting-off machines	11.3.3	Water jet cutting machines
11.2.6.3	Wire bending machines	11.3.4	Electron beam working machines
11.2.6.4	Spring coiling machines and devices	11.3.5	Plasma beam working machines
11.2.6.5	Chain making machines	11.3.6	Machines for unconventional machining – other
11.2.6.6	Wire netting and weaving machines	11.3.7	Laminating (sandwiching) machines and equipment for composites
11.2.6.7	Threading, screwing and bolt rolling machines	11.3.8	Die casting machines
11.2.6.8	Rope and cable making machines	11.3.9	Longitudinal and circular dividing machines
11.2.6.9	Nail making machines	11.3.10	Finishing (make-up) machines
11.2.6.99	Wire forming machines – other	11.3.11	Embossing, stamping and marking equipment
		11.3.12	Laser lettering machines
11.2.7	Bolt, screw, nut and rivet making machines	11.3.13	Coating machines
11.2.7.1	Hot and cold pressing machines for bolts and screws	11.3.99	Machines for unconventional and special machining and forming technologies – other
11.2.7.2	Bolt shears		
11.2.7.3	Bolt and screw chamfering machines		
11.2.7.4	Nut presses		
11.2.7.5	Nut tapping machines		
11.2.7.6	Screw and bolt threading machines		
11.2.7.7	Thread, screw and bolt rolling machines		
11.2.7.8	Screw head turning and slotting machines		
11.2.7.9	Bolt, nut and rivet deburring (trimming) machines		
11.2.7.10	Wood screw making machines		
11.2.7.11	Multistation-Partformer		
11.2.7.99	Bolt, screw, nut and rivet making machines – others		
11.2.8	Sheet working machines, laser based equipment		
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		

QUALITY CONTROL IN METAL-WORKING AND FORMING SECTOR**11.4.1 Measuring and checking instruments for machining and forming**

- 11.4.1.1 Length measuring instruments
- 11.4.1.2 Angle and inclination measuring instruments
- 11.4.1.3 Vibration measuring instruments
- 11.4.1.4 Speed measuring instruments
- 11.4.1.5 Surface quality measuring instruments
- 11.4.1.6 Layer thickness measuring instruments
- 11.4.1.7 Noise level measuring instruments
- 11.4.1.8 Temperature measuring instruments for machining and forming
- 11.4.1.9 Force and torque measuring instruments
- 11.4.1.10 Clamping force measuring instruments
- 11.4.1.11 Pressure measuring instruments for machining and forming
- 11.4.1.12 Profile and shape measuring instruments
- 11.4.1.13 Thread measuring instruments
- 11.4.1.14 Circularity measuring instruments
- 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

11.4.2 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

11.4.3 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

11.4.4 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

11.4.5 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



IMT 2020

12TH INTERNATIONAL MACHINE TOOLS EXHIBITION**FLEXIBLE MANUFACTURING SYSTEMS (FMS)****11.5.1 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

11.5.2 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

11.5.3 Control and drive systems

- 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

11.5.4 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

11.5.5 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 Manipulators, feeding and sorting equipment – other

11.5.6 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 conveyors for flexible manufacturing systems
- 11.5.6.14 Chip deoiling equipment

11.5.99 Flexible manufacturing systems – other

PRECISION TOOLS**11.6.1 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 Tools for machining – other

11.6.2 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

11.6.3

- 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 Clamping tools – other

Chucking tools**11.6.4**

- 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

Tool systems**11.6.99****Precision tools – other**



IMT 2020

12TH INTERNATIONAL MACHINE TOOLS EXHIBITION

ACCESSORIES FOR METAL-WORKING AND FORMING

11.7.1	<i>Lubrication and cooling of metal-working and forming machines</i>	11.7.3.22	Pneumatic drives, control engineering, components for machine tools and metal forming machines
11.7.1.1	Lubricating oils and consumables for metal-working and forming machines	11.7.3.23	Compressors for machine tools and metal forming machines
11.7.1.2	Coolants and lubricants	11.7.3.24	Compressed air conditioning unit
11.7.1.3	Central lubricating systems	11.7.3.25	Small electric hoists, conveyance rollers
11.7.1.4	Oiling and greasing systems	11.7.3.26	Pneumatic and oil pneumatic jacks
11.7.1.5	Cooling systems	11.7.3.27	Winding and unwinding devices
11.7.1.6	Separators for coolants and lubricants, filters, centrifuges	11.7.3.28	Bar magazines and feeders
11.7.1.7	Metal cleaning and deoiling devices	11.7.3.29	Sheet metal containers and loaders
11.7.1.8	Spraying attachment for forging machines	11.7.3.30	Grinding spindles
11.7.1.9	Cask cleaning equipment	11.7.3.31	High frequency spindles for machine-tools
11.7.1.10	Coolant hoses	11.7.3.32	Main spindles for turning, milling, drilling and boring machines
11.7.2	<i>Waste disposal in machining and forming sector</i>	11.7.3.33	Guide way wipers for machine tools
11.7.2.1	Air purity protection systems and components	11.7.3.34	Columns, beds and parts of machines by polymerized concrete
11.7.2.2	Exhaust systems in machining and forming sector	11.7.3.35	Machine lighting
11.7.2.3	Dust collection equipment, filtering systems, filters	11.7.3.36	Personal protective equipment
11.7.2.4	Wastewater treatment equipment and components in machining and forming sector	11.7.3.37	Protective devices
11.7.2.5	Water treatment equipment and components in machining and forming sector	11.7.3.38	Guards for machine-tools, slideways and lead screws
11.7.2.6	Emulsion recovery equipment	11.7.3.39	Safety and protective equipment for machine tools and metal forming machines
11.7.2.7	Processing of coolants and lubricants	11.7.3.40	Antiskid mats for machines
11.7.2.8	Oil separation, oil mist separation	11.7.3.41	Tool cabinets for machine tools
11.7.2.9	Waste oil collecting tanks	11.7.3.42	Equipment of workshops for metal-working and forming sector
11.7.2.10	Filtration, ultrafiltration	11.7.99	<i>Accessories for metal working and forming – other</i>
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		
11.7.3	<i>Mechanical components and accessories for construction of machine-tools and forming machines</i>		
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		

SERVICE AND REPAIRS OF MACHINE-TOOLS AND FORMING MACHINES, REWORKED MACHINES

- 11.8.1 Spare parts for machine tools
- 11.8.2 Spare parts for forming machines
- 11.8.3 General overhauls of machine tools and forming machines**
- 11.8.3.1 General overhauls of machine tools
- 11.8.3.2 General overhauls of metal forming machines
- 11.8.4 Redesign and upgrading of machine tools and metal forming machines**
- 11.8.4.1 Upgrading of el. equipment of machine tools and metal forming machines
- 11.8.4.2 Upgrading of peripheral units for NC and CNC machines
- 11.8.4.3 Redesign and upgrading of machine tools
- 11.8.4.4 Redesign and upgrading of metal forming machines
- 11.8.5 Reworked machine tools
- 11.8.6 Reworked metal forming machines
- 11.8.99 Service and repairs of metal working and forming machines, reworked machines – other**

Hand-operated tools

- 11.9.1 Pneumatic hand-operated tools**
- 11.9.1.1 Hand-operated pneumatic drills
- 11.9.1.2 Hand-operated pneumatic thread-cutting machines
- 11.9.1.3 Hand-operated pneumatic nut runners and screwdrivers
- 11.9.1.4 Hand-operated pneumatic grinding machines, angle grinders and polishing machines
- 11.9.1.5 Hand-operated pneumatic shears
- 11.9.1.6 Manual pneumatic rivet guns
- 11.9.1.99 Hand-operated pneumatic tools and accessories – other
- 11.9.2 Electric hand-operated tools, incl. cordless programme**
- 11.9.2.1 Hand-operated electric drills and hammers
- 11.9.2.2 Hand-operated electric grinders, angle grinders and polishing machines
- 11.9.2.3 Hand-operated electric saws, shears and milling machines
- 11.9.2.4 Hand-operated electric nut runners, screwdrivers and threading machines
- 11.9.2.5 Hand-operated electric staplers
- 11.9.2.6 Manual electric rivet guns
- 11.9.2.7 Microtools
- 11.9.2.99 Hand-operated electric tools and sets – other
- 11.9.3 Hand-operated hydraulic tools**
- 11.9.4 Hand-operated tools driven by internal combustion engine**
- 11.9.5 Mobile and suspension hand-operated tools**
- 11.9.99 Hand-operated tools and parts – others**

Manual non-mechanized tools

- 11.10.1 Hand hammers
- 11.10.2 Pliers, alligator wrenches
- 11.10.3 Manual deburring tools, files
- 11.10.4 Chisels, axes
- 11.10.5 Screwdrivers
- 11.10.6 Wrenches, torque wrenches
- 11.10.7 Hand cutting tools
- 11.10.8 Vices
- 11.10.9 Clamps (cramps)
- 11.10.10 Pullers/removers
- 11.10.11 Hand-operated jacks
- 11.10.12 Cases and bags for tools
- 11.10.99 Manual non-mechanized tools – other**

INSTITUTIONS, LITERATURE AND SERVICES IN METAL-WORKING AND FORMING SECTOR

- 11.11.1 Associations, organizations in metal-working and forming sector
- 11.11.2 Technical publishing houses, literature, specialized periodicals
- 11.11.3 Consultancy in the field of machine tools and metal-forming machines**
- 11.11.4 Engineering and design services in the field of machine tools and metal-forming machines**
- 11.11.4.1 Engineering and design services in the field of machine tools
- 11.11.4.2 Engineering and design services in the field of metal-forming machines
- 11.11.5 Technologies for metal working and forming**
- 11.11.6 Custom manufacture of single-purpose machine tools and metal forming machines**
- 11.11.6.1 Custom manufacture of single-purpose machine tools
- 11.11.6.2 Custom manufacture of single-purpose metal forming machines
- 11.11.7 Execution of investments in the field of metal working and forming**
- 11.11.8 Business services in the field of machine tools and metal forming machines**
- 11.11.9 Leasing of metal working and forming machines**
- 11.11.10 Custom coating of metal cutting and forming tools**
- 11.11.11 Custom tool renovation and reconditioning**
- 11.11.11.1 Compression mould refurbishment
- 11.11.12 Reverse engineering services**
- 11.11.13 Custom rapid prototyping**
- 11.11.14 Offer of production capacities in the metal-working and forming sector**
- 11.11.14.1 Custom material cutting
- 11.11.14.2 Custom sheet-metal processing
- 11.11.14.3 Custom metal-working manufacturing
- 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 Services in the sector of metal working and forming – other**
- 11.99 Metal working and forming machines, manual tools, others**