


1
**Machinery for the manufacture of rods,
wires and strips**
1.1
Casting

- 1.1.1 Continuous casting lines
- 1.1.2 Other casting systems
- 1.1.3 Continuous cast rod process lines (CCR process)

1.2
Rolling

- 1.2.1 Hot rolling lines
- 1.2.2 Cold rolling lines

1.3
Extrusion

- 1.3.1 Extrusion lines (for metals)

1.4
Drawing

- 1.4.1 Rod breakdown lines

2
**Machinery for the processing of rods,
wires and strips**
2.1
Handling systems

- 2.1.1 Wire pay-off systems
- 2.1.2 Rewinding systems for wire
- 2.1.3 Coilers and spoolers for wire
- 2.1.4 Machines for the strapping of coils
- 2.1.5 Cutting systems
- 2.1.6 Other handling systems
- 2.1.7 Coiling and decoiling systems for strips
- 2.1.8 Systems for automatic reel swap

2.2
Machinery for the processing of rods

- 2.2.1 Rod straightening machines
- 2.2.2 Rod cutting machines
- 2.2.3 Rod straightening and cutting machines
- 2.2.4 Rod drawing machines
- 2.2.5 Rod separating machines
- 2.2.6 Rod peeling machines
- 2.2.7 Bundling and tying-off lines for rods
- 2.2.8 Pointing machines for rods
- 2.2.9 Welding machines
 - 2.2.9.1 Butt welding machines
 - 2.2.9.2 Cold pressure welding machines

2.3
Machinery for the processing of wires and strips

- 2.3.1 Wire single-block drawing systems
- 2.3.2 Multiple drawing machines for wire
 - 2.3.2.1 Lubricant application equipment
 - 2.3.2.2 Other Multiple drawing machines for wire
- 2.3.3 Wire stretching lines
- 2.3.4 Draw-peeling machines for wire
- 2.3.5 Wire reduction rolling mills
- 2.3.6 Strip rolling mills
- 2.3.7 Pointing and threading up machines for wire
 - 2.3.7.1 Hammering machines
- 2.3.8 Welding machines
 - 2.3.8.1 Butt welding machines
 - 2.3.8.2 Cold pressure welding machines
 - 2.3.8.3 Special purpose welding machines
 - 2.3.8.4 Systems for soldering
 - 2.3.8.5 Wire and rope welding machines
 - 2.3.8.6 Other welding machines
 - 2.3.8.7 Wire connection of coils

2.3.9
**Single-wire drawing machines
(intermediate, fine and superfine wire drawing)**

- 2.3.10 Multiwire drawing machines
- 2.3.11 Tandem wire drawing lines for telephone cables
- 2.3.12 Inline wire drawing lines for data cables
- 2.3.13 Machines for the manufacture of enamelled wires
- 2.3.14 Welding wire manufacturing lines
- 2.3.15 Other wire manufacturing machines

2.4
Machinery for the heat treatment of wires and strips

- 2.4.1 Continuous resistance annealers
- 2.4.2 Bell furnaces
- 2.4.3 Continuous induction annealers
- 2.4.4 Patenting lines
- 2.4.5 Oil tempering lines
- 2.4.6 Other heat treatment lines
- 2.4.7 Drying furnaces and paint baking furnaces
- 2.4.8 Annealing furnaces with inert gas
- 2.4.9 Annealing furnaces without inert gas
- 2.4.10 Vacuum annealing furnaces

2.5
Machinery for the surface treatment of wires and strips

- 2.5.1 Pickling and descaling lines for wires
- 2.5.2 Brushing lines for wire rod
- 2.5.3 Wire cleaning lines
 - 2.5.3.1 Ultrasonic cleaning lines for wires
 - 2.5.3.2 Airwipes
- 2.5.4 Coating lines for wires
 - 2.5.4.1 Galvanic wire plating lines
 - 2.5.4.2 Enamelling lines for wires
 - 2.5.4.3 Galvanizing lines
 - 2.5.4.4 Other surface treatment lines
 - 2.5.4.5 Metal coating (chemical, electroplating etc.)
- 2.5.5 Cleaning lines for coils

2.6
Machinery for the manufacture of cables

- 2.6.1 Pay-off systems for wires and cables
- 2.6.2 Bunching machines
- 2.6.3 Foil pay-off and taping systems
 - 2.6.3.1 Cable filling machines
 - 2.6.3.2 Tape Application machinery, with/without auto-splicing
- 2.6.4 Accumulators
- 2.6.5 Stranding machines
 - 2.6.5.1 Bow stranding machines
 - 2.6.5.2 Rigid stranding machines
 - 2.6.5.3 Tubular stranding machines
 - 2.6.5.4 Planetary stranding machines
 - 2.6.5.5 Drum twisters
 - 2.6.5.6 Single twist stranding machines
 - 2.6.5.7 Double twist stranding machines
- 2.6.6 Braiding machines
- 2.6.7 Spiraling machines
- 2.6.8 Winding machines for braiding bobbins
- 2.6.9 Powder-coating machines
- 2.6.10 Compounding plants
- 2.6.11 Extrusion lines
 - 2.6.11.1 Extrusion machines
 - 2.6.11.2 Other extrusion systems
- 2.6.12 Sheathing lines
- 2.6.13 Crosslinking lines
- 2.6.14 Cutting and crimping machines
 - 2.6.14.1 Insulation strippers for cables



2.6.15	Machines for cable marking
2.6.16	Lead extruders
2.6.17	Take-ups and coilers for cables
2.6.18	Spoolers for cables
2.6.19	Haul-off devices for cables
2.6.19.1	Wheel / disc type haul-offs
2.6.19.2	Belt type haul-offs
2.6.19.3	Caterpillar haul-offs
2.6.20	Cable stripping machines
2.6.21	Machines for the repair of cables
2.6.22	Coil / spool winding lines
2.6.23	Peripheral systems for cable production
2.6.23.1	Cooling troughs
2.6.23.2	Cable cooling systems
2.6.23.3	Length measuring machines
2.6.24	Other cable manufacturing machines
2.7	Machinery for the manufacture of fibre optics
2.7.1	Drawing lines for fibre optics
2.7.2	Ink coating devices for fibre optics
2.7.3	Stranding machines for fibre optics
2.7.4	Spooling systems for fibre optics
2.7.5	Stranding lines for fibre optics
2.7.6	Lines for the assembly of fibre optics
2.7.7	Machines for the marking of fibre optics
2.7.8	Fibre optic manufacturing machinery
2.8	Machinery for the manufacture of wire ropes
2.8.1	Stranding machines for wire ropes
2.8.2	Stranding machines for steel cord
2.8.3	Machines for the assembly of wire ropes
2.8.4	Stranding
2.9	Machinery for the manufacture of wire mesh, wire cloth and wire netting
2.9.1	Wire mesh welding machines
2.9.2	Wire weaving machines
2.9.3	Wire netting machines
2.9.3.1	Chain link fence machines
2.9.3.2	Hexagonal wire netting machines
2.9.3.3	Wire fence machines
2.10	Machinery for the manufacture of springs, chains, and punched and bent parts
2.10.1	Tension spring coiling machines
2.10.2	Torsion / leg spring coiling machines
2.10.3	Compression spring coiling machines
2.10.4	Spring end grinding machines
2.10.5	Spiral spring coiling machines
2.10.6	Other spring coiling machines
2.10.7	Chain bending machines
2.10.8	Chain welding machines
2.10.9	Chain bending and welding machines
2.10.10	Chain calibration machines
2.10.11	Bending machines
2.10.11.1	Single-head wire bending machines
2.10.11.2	Multiple-head wire bending machines
2.10.11.3	Wire and strip bending machines
2.10.11.4	Ring coiling machines
2.10.11.5	Other bending machines
2.10.12	Punching and bending machines
2.10.13	Processing centers for punched and bent parts
2.10.14	Punching and stamping machines
2.10.15	Ring, hook and eye wire machines
2.10.16	Hairclip and paperclip machines (office accessories)

2.11	Machinery for the manufacture of fasteners (bulk metal forming)
2.11.1	One-stage presses
2.11.2	Multi-stage presses
2.11.3	Wire nail presses
2.11.4	Micro-forming machines
2.11.5	Thread rolling machines
2.11.6	Profile rolling machines
2.11.7	Thread cutting machines
2.11.8	Forging presses
2.11.9	Other machines for bulk metal forming
2.11.9.1	Cold upsetting, forging
2.11.10	Nail machines
2.12	Machinery for the manufacture of other wire products
2.12.1	Barbed wire machines
2.12.2	Wire knitting machines
2.12.3	Manufacturing machines for cut wire shot
2.12.4	Manufacturing machines for other wire products
2.12.5	Machines for transformer wire winding
2.12.6	Electrode manufacturing machines
2.12.7	Lead wire and solder wire production plant
2.12.8	Special-purpose machines (bag ties, belt fasteners, drawing pins, clothes hangers, can openers, buckles, lead shot etc.)
2.13	Machinery for the heat treatment of bulk goods made from wire or strip
2.13.1	Salt-bath furnaces
2.13.2	Conveyor furnaces
2.13.3	Chamber furnaces
2.13.4	Hardening and tempering lines
2.13.5	Preheater
2.14	Machinery for the surface treatment of wire products
2.14.1	Cleaning lines for wire products
2.14.2	Coating lines for wire products
2.14.3	Shot blasting machines for springs
2.14.4	Vibratory finishing machines for wire products
2.15	Sorting machinery for wire products
2.15.1	Sorting machines for springs
2.15.2	Sorting machines for punched and bent parts
2.15.3	Sorting machines for fasteners
2.15.4	Sorting machines for other wire products
2.15.5	Machines for size reduction
2.16	Machinery for additive manufacturing (3D printing)
2.17	Second-hand machines for the wire and cable industry
2.18	Spare and wear parts for the wire and cable industry
2.18.1	Haul-off-belts for Caterpillar-machines
2.18.2	Timing-belts
2.18.3	Other spare and wear parts for the wire and cable industry
2.19	Machinery for cable recycling
2.20	Machines for other types of material processing
2.20.1	Turning, milling, grinding, spinning
2.20.2	Deburring, peeling, upsetting
2.20.3	Grinding, pointing, lapping



2.21	Machines for tool manufacturing
2.21.1	Spark erosion
2.22	Plant engineering and construction
3	Tools and auxiliary materials and agents for the manufacture of drawn wire and the further processing of wire products
3.1	Tools for wire production
3.1.1	Rolling tools
3.1.1.1	Steel
3.1.1.2	Hard metal, hard-faced
3.1.1.3	Ceramics, ceramic-coated
3.1.1.4	Turks head rolls
3.1.1.5	Plain rolls
3.1.1.6	Shape rolls
3.1.2	Drawing tools
3.1.2.1	Drawing capstans
3.1.2.2	Wire pullers
3.1.2.3	Drawing dies with natural diamond (ND)
3.1.2.4	Drawing dies with polycrystalline diamond (PCD)
3.1.2.5	Hard metal dies
3.1.2.6	Drawing tools made of ceramics
3.1.2.7	Enamelled drawing dies
3.1.2.8	Adjustable drawing dies
3.1.2.9	Tube and rod drawing dies
3.1.3	Machines for drawing die processing
3.1.4	Tools for the manufacture of cables, fibre optics and wire ropes
3.1.4.1	Wire guidings, fiber guidings and cable guidings
3.1.4.2	Compacting tools
3.1.4.3	Stranding dies
3.1.4.4	Bows for rotating machines
3.1.4.5	Extrusion dies
3.1.4.5.1	Extrusion heads
3.1.4.5.2	Other extrusion dies
3.1.4.6	Cutting and crimping tools for cables
3.1.4.7	Flat cores
3.1.4.8	Round cores
3.1.4.9	Tools for power transmission purposes (cones, rings, guide and bearing pulleys)
3.1.4.9.1	Steel/cast, chrome-plated
3.1.4.9.2	Stainless steel
3.1.4.9.3	Plastics
3.1.4.9.4	Other materials
3.1.5	Tools for the manufacture of springs
3.1.5.1	Grinding wheels for spring end grinding machines
3.1.5.2	Ceramic tools for the manufacture of springs
3.1.5.3	Other tools for the manufacture of springs
3.1.6	Tools for the manufacture of fasteners
3.1.6.1	Tools for thread rolling
3.1.6.2	Other rolling tools
3.1.6.3	Pressing tools
3.1.6.4	Tools for forming technology
3.1.7	Other forming tools
3.1.7.1	Cold upsetting and stamping tools
3.1.7.2	Other materials
3.1.8	Tools and devices for processing of rods, wires and wire products
3.1.8.1	Cutting devices
3.1.8.2	Straightening devices
3.1.8.3	Bending devices
3.1.9	Tools for casting

3.2	Agents for wire processing
3.2.1	Pickling agents
3.2.2	Cleaning agents
3.2.3	Drawing agents
3.2.4	Lubricants
3.2.5	Other chemicals
3.2.6	Coating agents
3.2.7	Agents for chemical and galvanic coating
3.2.8	Grinding and lapping materials
3.2.9	Adhesives
3.3	Materials and agents for cable production
3.3.1	Insulating and sheathing materials for cables
3.3.1.1	Polymers
3.3.1.2	Flame-retardant, halogen-free polymers
3.3.1.3	Elastomers
3.3.1.4	Silicones
3.3.1.5	Natural rubber
3.3.1.6	Tapes made of paper, textile and non-woven materials
3.3.1.7	Resins and varnishes for wire insulation
3.3.1.8	Crosslinked polymers
3.3.1.9	Insulating, separating and special tapes
3.3.2	Additives for insulating and sheathing materials
3.3.2.1	Colorants
3.3.2.2	Fillers
3.3.2.3	Flame-retardant substances
3.3.2.4	Other additives
3.3.2.5	Masterbatches
3.3.3	Yarns and foils for cables and ropes
3.3.3.1	Reinforcing yarns and filler yarns for cables
3.3.3.2	Water swellable yarns for cables
3.3.3.3	Yarns for steel wire ropes
3.3.3.4	Foils for cables
3.3.3.5	Non-woven tapes for cables
3.3.3.6	Other reinforcing elements for cables
3.3.3.7	Other anti-moisture systems
3.3.3.8	Other wrapping materials
3.4	Handling systems for the wire and cable industry
3.4.1	Headstocks
3.4.2	Spools
3.4.2.1	Steel spools
3.4.2.2	Wooden spools
3.4.2.3	Plastic spools
3.4.2.4	One-way spools
3.4.2.5	Bobbins for braiding machines
3.4.2.6	Cable reels / drums
3.4.2.7	Other special coils, spools and reels
3.4.3	Barrels
3.4.4	Cardboard containers and disposable containers
3.4.5	Other containers
3.5	Robot technology for the wire and cable industry
3.5.1	Material Handling
3.6	Logistics for the wire and cable industry
3.6.1	Machines for the counting, weighing and sorting of wire products
3.6.1.1	Separating systems
3.6.2	Dosing machines
3.6.3	Packing / packaging machines
3.6.3.1	Counting and packaging machines
3.6.3.2	Collating machines



3.6.3.3	Packaging (coil forming, storing)
3.6.4	Conveyor systems
3.6.4.1	Small capacity lifting devices
3.6.5	Warehouse systems, storage systems
3.6.6	Packaging materials
3.6.7	Coiling and decoiling systems
3.7	Marking and labelling systems
3.8	Others
3.9	Stock automation
3.10	Auxiliaries (guides, feed devices, brakes etc.)
4	Wire and wire products
4.1	Wire and bar material
4.1.1	Wire, related to its shape and dimension
4.1.1.1	Wire rod
4.1.1.2	Drawn or cold-rolled wire
4.1.1.3	Round / rounded wire
4.1.1.4	Fine wire
4.1.1.5	Superfine wire
4.1.1.6	Ultra-fine wire
4.1.1.7	Flat / flattened wire
4.1.1.8	Profile / profiled wire
4.1.2	Wire, related to its material: Iron and steel
4.1.2.1	Iron wire, bare
4.1.2.2	Iron wire with metallic coating
4.1.2.3	Iron wire with non-metallic coating
4.1.2.4	Steel wire, bare
4.1.2.5	Steel wire with metallic coating
4.1.2.6	Steel wire with non-metallic coating
4.1.2.7	Low alloy steel wire
4.1.2.8	High alloy steel wire
4.1.2.9	Stainless steel wire
4.1.2.10	Wire made of other steels
4.1.2.11	Low-carbon steel wire
4.1.2.12	High-carbon steel wire
4.1.2.13	Annealed steel wire
4.1.2.14	Tempered steel wire
4.1.2.15	Strain hardened steel wire
4.1.2.16	Wire of special alloys
4.1.2.17	Bare wire, rod and wire ropes
4.1.3	Wire, related to its material: Non-ferrous materials
4.1.3.1	Aluminium wire / aluminium alloy wire
4.1.3.2	Copper wire / copper alloy wire (such as brass wire or bronze wire)
4.1.3.3	Magnesium wire
4.1.3.4	Nickel wire
4.1.3.5	German silver wire
4.1.3.6	Chromium-nickel wire
4.1.3.7	Gold wire
4.1.3.8	Platinum wire
4.1.3.9	Silver wire
4.1.3.10	Lead wire
4.1.3.11	Zinc wire
4.1.3.12	Tin wire
4.1.3.13	Titanium wire
4.1.3.14	Tungsten (wolfram) wire
4.1.3.15	Beryllium wire
4.1.3.16	Molybdenum wire

4.1.3.17	Niobium wire
4.1.3.18	Tantalum wire
4.1.3.19	Zirconium wire
4.1.3.20	Wire made of other metals and alloys
4.1.4	Wire, related to its application
4.1.4.1	Reinforcing wire / armouring wire
4.1.4.2	Cold-upsetting wire / cold heading wire
4.1.4.3	Screw wire
4.1.4.4	Spring steel wire
4.1.4.5	Spring wire made of non-ferrous metals
4.1.4.6	Rope wire
4.1.4.7	Netting wire
4.1.4.8	Wire for architectural wire mesh
4.1.4.9	Brazing wire / soldering wire
4.1.4.10	Eroding wire
4.1.4.11	Metallizing wire
4.1.4.12	Carrying wire for fiber-optic cables
4.1.4.13	Enamelled wire / magnet wire / winding wire
4.1.4.14	Electronic wire
4.1.4.15	Heating / heat conducting wire / resistance wire
4.1.4.16	Stitching wire
4.1.4.17	Teabag wire
4.1.4.18	Staple wire
4.1.4.19	Lightning protection wire
4.1.4.20	Tyre wire
4.1.4.21	Welding wire / cored wire / filler rod
4.1.4.22	Wire for brushes
4.1.4.23	Binding wire
4.1.4.24	Florist's wire
4.1.4.25	Barbed wire
4.1.4.26	Wire for other purposes
4.1.4.27	Braiding wire
4.1.4.28	Grid wire
4.1.4.29	Wire for sieves and filters
4.1.4.30	Bending wire
4.1.4.31	Chain wire
4.1.4.32	Wire for use in the automotive and aircraft industries
4.1.4.33	Auxiliary welding materials
4.1.5	Bar material
4.1.5.1	Iron, steel and special steel bars
4.1.5.1.1	Low alloy steel
4.1.5.1.2	Structural steel
4.1.5.1.3	Bright steel
4.1.5.1.4	Hardening and tempering steel
4.1.5.1.5	Tool steel
4.1.5.1.6	Machining steel
4.1.5.1.7	Ball bearing steel
4.1.5.1.8	Case-hardening steel
4.1.5.1.9	Stainless steel
4.1.5.1.10	Other Steels
4.1.5.2	Aluminium and aluminium alloy bars
4.1.5.3	Copper and copper alloy bars
4.1.5.4	Other non-ferrous metals bars
4.2	Wire ropes
4.2.1	Wire ropes made from stainless steel
4.2.2	Wire ropes made from galvanized steel
4.2.3	Customized wire ropes
4.2.4	Wire rope accessories
4.2.5	Rope cores
4.3	Cables
4.3.1	Conductor ropes



- 4.3.2 Underwater cables
- 4.3.3 Underground cables
- 4.3.4 Extra-high voltage cables (EHV)
- 4.3.5 High voltage cables (HV)
- 4.3.6 Medium voltage cables (MV)
- 4.3.7 Low voltage cables (LV)
- 4.3.8 Telecommunication cables
- 4.3.9 LAN cables
- 4.3.10 Control cables
- 4.3.11 Computer cables
- 4.3.12 Flat cables
- 4.3.13 Automotive cables
- 4.3.14 Battery cables
- 4.3.15 Marine cables
- 4.3.16 Railway cables
- 4.3.17 Photovoltaic cables
- 4.3.18 Installation cables
- 4.3.19 Fibre optic cables
- 4.3.20 Hybrid cables
- 4.3.21 Other special cables
- 4.3.22 Plastic and paper-insulated cables
- 4.3.23 Continuously Transposed Cables (CTC)

4.4

Springs

- 4.4.1 Metallic springs and spring elements
 - 4.4.1.1 Tension springs / helical extension springs
 - 4.4.1.2 Compression springs / helical compression springs
 - 4.4.1.3 Torsion springs / leg springs
 - 4.4.1.4 Bending springs / strip springs / leaf springs
 - 4.4.1.5 Special shaped springs
 - 4.4.1.6 Conical springs
 - 4.4.1.7 Roller- and mainsprings
 - 4.4.1.8 Annular springs
 - 4.4.1.9 Spiral springs
 - 4.4.1.10 Torsion bar springs
 - 4.4.1.11 Disc springs
 - 4.4.1.12 Spring rings (Belleville springs)
 - 4.4.1.13 Spring washers
 - 4.4.1.14 Clamping washers
 - 4.4.1.15 Securing elements
 - 4.4.1.16 Snap rings
 - 4.4.1.17 Shaft rings
 - 4.4.1.18 Splints
 - 4.4.1.19 Micro springs
 - 4.4.1.20 Other spring components
 - 4.4.1.21 Assemblies with other elements
- 4.4.2 Non-metallic springs and spring elements
 - 4.4.2.1 Elastomer springs (rubber springs)
 - 4.4.2.2 Springs made of plastics
 - 4.4.2.3 Springs made of fiber composite materials
 - 4.4.2.4 Springs made of ceramics
 - 4.4.2.5 Fluid springs
 - 4.4.2.6 Air springs (gas spring)
 - 4.4.2.7 Spring and securing elements
 - 4.4.2.8 Other non-metallic spring elements
- 4.4.3 Starting materials for springs
 - 4.4.3.1 Rod material for springs
 - 4.4.3.2 Round wire for springs
 - 4.4.3.3 Flat wire for springs
 - 4.4.3.4 Profile wire for springs
 - 4.4.3.5 Strip for springs
 - 4.4.3.6 Spring steel
 - 4.4.3.7 Other steel types for springs
 - 4.4.3.8 Copper and copper alloys for springs

- 4.4.3.9 Aluminium and aluminium alloys for springs
- 4.4.3.10 Other metals and alloys for springs
- 4.4.3.11 Non-metallic materials for springs
- 4.4.4 Springs, related to forming process and condition
 - 4.4.4.1 Hot-formed springs
 - 4.4.4.2 Cold-formed springs
 - 4.4.4.3 Heat-treated springs
 - 4.4.4.4 Surface-treated springs
 - 4.4.4.5 Coated springs
 - 4.4.4.6 Greased springs
 - 4.4.4.7 Cleaned springs
 - 4.4.4.8 Other treated springs
- 4.4.5 Packages for springs
 - 4.4.5.1 Blister packages for springs
 - 4.4.5.2 Cartons for springs
 - 4.4.5.3 PE bags for springs
 - 4.4.5.4 Plastic hoses for springs
 - 4.4.5.5 Other packages for springs

4.5

Punched and bent parts

- 4.5.1 Punched / stamped parts
- 4.5.2 Bent parts (such as staples, paper clips, brackets)
- 4.5.3 Hose clamps
- 4.5.4 Complete assemblies
- 4.5.5 Other punched and bent parts

4.6

Fasteners

- 4.6.1 Metallic screws
 - 4.6.1.1 Sheet metal screws
 - 4.6.1.2 Wood screws
 - 4.6.1.3 Chipboard screws
 - 4.6.1.4 Lock screws
 - 4.6.1.5 Anchor bolts
 - 4.6.1.6 Suspension screws
 - 4.6.1.7 Self drilling screws
 - 4.6.1.8 Screws with conical shank
 - 4.6.1.9 Screws with cylindrical shank
 - 4.6.1.10 Fine-thread screws
 - 4.6.1.11 Flat-thread screws
 - 4.6.1.12 Round-thread screws
 - 4.6.1.13 Screws with buttress thread
 - 4.6.1.14 Self drilling screws / thread cutting screws
 - 4.6.1.15 Screws with sharp thread
 - 4.6.1.16 Screws with trapezoidal thread
 - 4.6.1.17 Screws with other thread forms
 - 4.6.1.18 Mushroom head screws
 - 4.6.1.19 Half-round head screws
 - 4.6.1.20 Truncated cone head screws
 - 4.6.1.21 Round-head screws
 - 4.6.1.22 Raised countersunk-head screws
 - 4.6.1.23 Tapered head screws
 - 4.6.1.24 Screws with decorative head
 - 4.6.1.25 Cylinder head screws
 - 4.6.1.26 Screws with external hexagon drive / hex head screws
 - 4.6.1.27 Screws with external square drive / square-head screws
 - 4.6.1.28 Screws with internal square drive
 - 4.6.1.29 Screws with hexagon socket drive / hex socket head cap screws
 - 4.6.1.30 Screws with hexalobular drive
 - 4.6.1.31 Screws with internal serrated drive
 - 4.6.1.32 Screws with I-star drive
 - 4.6.1.33 Screws with cruciform-style drive / cross recessed screws



- 4.6.1.34 Screws with longitudinal slot drive / slotted screws
- 4.6.1.35 Screws with other drive types
- 4.6.2 Further fasteners
 - 4.6.2.1 Threaded rods / thread rods
 - 4.6.2.2 Bolts
 - 4.6.2.3 Pins
 - 4.6.2.4 Nails
 - 4.6.2.5 Rivets
 - 4.6.2.6 Hooks
 - 4.6.2.7 Nuts
 - 4.6.2.8 Threaded inserts / thread inserts
 - 4.6.2.9 Washers (see also 4.4.1)
 - 4.6.2.10 Other elements
 - 4.6.2.11 Assemblies with other elements
- 4.6.3 Non-metallic fasteners
 - 4.6.3.1 Screws made from polymers
 - 4.6.3.2 Nuts made from polymers
 - 4.6.3.3 Safety elements made from polymers
 - 4.6.3.4 Other elements
- 4.6.4 Starting materials for fasteners
 - 4.6.4.1 Round wire for fasteners
 - 4.6.4.2 Rod material for fasteners
 - 4.6.4.3 Cold heading steel / cold upsetting steel
 - 4.6.4.4 Other steels for fasteners
 - 4.6.4.5 Copper and copper alloys for fasteners
 - 4.6.4.6 Aluminium and aluminium alloys for fasteners
 - 4.6.4.7 Other metals and alloys for fasteners
 - 4.6.4.8 Non-metallic materials for fasteners
- 4.6.5 Finished products in relation to the manufacturing (forming) process and the final condition
 - 4.6.5.1 Cold-formed screws
 - 4.6.5.2 Hot-formed screws
 - 4.6.5.3 Machined screws
 - 4.6.5.4 Coated screws
 - 4.6.5.5 Cleaned screws
 - 4.6.5.6 Surface-treated screws
 - 4.6.5.7 Heat-treated screws
- 4.6.6 Packages for fasteners
 - 4.6.6.1 Blister packages for fasteners
 - 4.6.6.2 Cartons for fasteners
 - 4.6.6.3 PE bags for fasteners
 - 4.6.6.4 Plastic hoses for fasteners
 - 4.6.6.5 Other packages for fasteners
- 4.6.7 Tightening / screwdriving and stapling tools
 - 4.6.7.1 Manually operated tightening tools
 - 4.6.7.2 Electrically driven tightening tools
 - 4.6.7.3 Automatically operating tightening tools
 - 4.6.7.4 Stapling and nailing and tools
 - 4.6.7.5 Riveting machines
 - 4.6.7.6 Clinching systems
- 4.7** Other wire products
 - 4.7.1 Round steel chains
 - 4.7.2 Elements for link chains
 - 4.7.3 Ball bearings

5

Testing technology, sensor technology and quality assurance for the wire and cable industry

- 5.1** Materials testing
 - 5.1.1 Equipment for destructive materials testing

- 5.1.2 Equipment for non-destructive materials testing
- 5.1.3 Hardness testers
- 5.1.4 Vibration test equipment

5.2

- 5.2 Product testing
 - 5.2.1 Tension measuring equipment
 - 5.2.2 Optical test systems for wire
 - 5.2.3 Diameter measuring devices
 - 5.2.4 Profile testers
 - 5.2.5 Concentricity testers
 - 5.2.6 Ovality testers
 - 5.2.7 Geometry testers
 - 5.2.8 Eddy current test instruments
 - 5.2.9 Ultrasonic test equipment
 - 5.2.10 X-ray inspection equipment
 - 5.2.11 Temperature measuring equipment
 - 5.2.12 Rope testing equipment
 - 5.2.13 Capacitance meters
 - 5.2.14 Spark testers
 - 5.2.15 Analytical equipment
 - 5.2.16 Spring force measuring instruments
 - 5.2.17 Optical testing systems for wire products
 - 5.2.18 Testing machines for springs
 - 5.2.19 Testing machines for punched and bent parts
 - 5.2.20 Testing machines for fasteners
 - 5.2.21 Testing machines for other wire products
 - 5.2.22 Empty bobbin detection systems
 - 5.2.23 Test benches
 - 5.2.24 Laser measuring equipment
 - 5.2.25 Test equipment for optical fiber cables
 - 5.2.26 Other test equipment
 - 5.2.27 Test equipment for auxiliary materials
 - 5.2.28 Laboratory test equipment
 - 5.2.29 Other testing systems for wire products

5.3

- 5.3 Sensor technology
 - 5.3.1 Sensors for wire and cable machinery
 - 5.3.2 Sensor evaluation systems (see also 7.1)
 - 5.3.3 Drive and control technology
 - 5.3.4 Torsion control equipment

5.4

- 5.4 Process monitoring systems

5.5

- 5.5 Quality assurance systems (incl. factory data acquisition)

6

Environmental technologies and resource efficiency for the wire and cable industry

- 6.1** Cooling and cleaning systems for drawing agents
- 6.2** Filtration systems and filters for drawing machines
- 6.3** Water treatment plants
- 6.4** Air exhaust systems
- 6.5** Storage systems for chemicals
- 6.6** Processing systems for chemicals
- 6.7** Recycling systems for chemicals
- 6.8** Disposal systems for chemicals



7

**Software and various services for the
wire and cable industry**

7.1

Software

- 7.1.1 Software for the design of springs
- 7.1.2 Software for the design of fasteners
- 7.1.3 Software for the design of cables
- 7.1.4 Software for the design of other wire products
- 7.1.5 Simulation systems
- 7.1.6 Production Data Acquisition (PDA) systems
- 7.1.7 Enterprise Resource Planning (ERP) systems
- 7.1.8 Manufacturing Execution Systems (MES)

7.2

Services

- 7.2.1 Reconditioning services for drawing dies
- 7.2.2 Technical consulting
- 7.2.3 Industry 4.0: Consulting and solutions
- 7.2.4 Market, technology and competition monitoring
- 7.2.5 Patent information
- 7.2.6 Testing laboratories
- 7.2.7 Certifications
- 7.2.8 Others
- 7.2.9 Galvanotechnical consulting

7.3

Education and training

7.4

Research and teaching

7.5

Wholesale

7.6

Specialist literature / publishing houses

7.7

Associations