



Product Index

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Messe München GmbH, Messegelände, 81823 München, Germany

A Cluster Semiconductor

1 Semiconductor production

- 1.1 Wafer front-end processing
- 1.2 Wafer back-end processing
- 1.3 Production of power electronics (IGBT, Power MOSFET, Thyristors, etc.)
- 1.4 Measurement, detection and control systems for semiconductor production
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8 Electronic Manufacturing Services (EMS)

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C Cluster SMT

9 Component mount technology, pick & place

- 9.1 Component preparation
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- 14.4 Logistics management
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- 17.9 Process and quality control/Automation

E Cluster Future Production—Smart Factory

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- 18.3 Machine software
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19 Production technologies for batteries and electrical energy storage

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- 19.2 Equipment for batteries and electrical energy storage
- 19.3 Inspection and test systems for batteries and electrical energy storage
- 19.4 Accumulators

20 Organic and printed electronics

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- 20.3 Inspection and test systems
- 20.4 Applications and devices

21 3D Printing, Additive Manufacturing

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- 21.3 Materials

F Overall Production Support

22 Production materials/equipment and environmental technology

- 22.1 Preliminary products and semi-finished goods, metallic
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- 22.3 Process materials
- 22.4 Plant equipment
- 22.5 Decontamination, cleaning, disposal (environmental management)
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- 23.1 Information provision
- 23.2 Production services except EMS
- 23.3 Used machines, systems, plants
- 23.4 Brainware and Sales
- 23.5 Other services

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A Cluster Semiconductor

1 Semiconductor production

1.1 Wafer front-end processing

1.1.1 Wafers and substrates

1.1.1.1 Materials

1.1.1.1.1 Wafers made of semiconductor material

1.1.1.1.2 Ceramic substrates

1.1.1.1.3 Thin-film substrates (glass/ceramic)

1.1.1.1.4 Glass wafers

1.1.1.1.5 Semiconductor semi-finished parts, miscellaneous

1.1.1.1.6 Ceramic foils

1.1.1.1.7 Process gases

1.1.1.2 Production equipment

1.1.1.2.1 Crystal growing systems and substrate treatment

1.1.1.2.1.1 Melt growth

1.1.1.2.1.2 Gas-phase growth

1.1.1.2.1.3 Tempering ovens

1.1.1.2.2 Polishing tools

1.1.1.2.3 Other tools for wafer processing

1.1.2 Mask and artwork generation

1.1.2.1 Mask production equipment

1.1.2.2 Resist-coating systems

1.1.2.3 Beam sources for exposure equipment

1.1.2.3.1 Lasers for exposure equipment

1.1.2.3.2 UV exposure light sources

1.1.3 Lithography

1.1.3.1 Lithography equipment

1.1.3.1.1 Microlithography equipment

1.1.3.1.2 Contact exposure equipment

1.1.3.1.3 Optical steppers

1.1.3.1.4 Laser writing equipment

1.1.3.2 Lithography materials

 1.1.3.2.1 Resists, Developers & Ancillaries
(incl. Adhesion promoter HMDS); Primer

1.1.3.2.2 AR coatings

1.1.3.2.3 Developers

1.1.4 Thin-film generation

1.1.4.1 Materials

1.1.4.1.1 Epitaxial materials

1.1.4.1.2 Process materials, thin-film technology, miscellaneous

 1.1.4.1.3 Quartzware (silicon carbide, fused quartz glass, sapphire),
ceramics

1.1.4.1.4 Vapor deposition materials

1.1.4.1.5 Strippers

1.1.4.1.6 Sputter targets

1.1.4.1.7 Lapping, polishing and grinding agents

1.1.4.1.8 Process chemicals, Cleaning Chemicals, Solvents, miscellaneous

1.1.4.2 Production equipment

1.1.4.2.1 Diffusion ovens

1.1.4.2.2 Dosing devices

 1.1.4.2.3 Heat treatment equipment for microstructuring,
miscellaneous

1.1.4.2.4 Cathode sputter equipment, PVD

1.1.4.2.5 CVD equipment, MOCVD; PECVD; LPCVD; ALD; REALD; MVD

1.1.4.2.6 Electron-beam deposition equipment

1.1.4.2.7 High-vacuum evaporation equipment

1.1.4.2.8 Ion-beam coating equipment

1.1.4.2.9 Oxidation equipment

1.1.4.2.10 Plasma coating systems

1.1.4.2.11 Plasma polymerization units

1.1.4.2.12 Vacuum coating equipment

1.1.4.2.13 Vacuum components

1.1.4.2.14 Evaporator inserts

1.1.4.2.15 Reactors for epitaxy

1.1.5 Etching equipment

1.1.5.1 Ion-etching equipment

1.1.5.2 Wet-etching equipment

1.1.5.3 Etching plasma generators

1.1.5.4 Spray etchers

1.1.5.5 Plasma-, sputter-etching equipment

1.1.6 Drying equipment

1.1.6.1 Continuous dryers

1.1.6.2 UV dryers

1.1.6.3 IR dryers

1.1.6.4 Vacuum dryers

1.1.7 Equipment for mechanical machining

1.1.7.1 Polishing devices/machines for semiconductor technology

1.1.7.2 Scribes and automatic scribes

1.1.7.3 Lapping equipment

1.1.7.4 Separating/trimming/scribing lasers

1.1.7.5 Wafer-cleaning systems

1.1.7.6 Wafer saws

1.1.7.7 Wafer dicing equipment

1.1.8 Manufacturing and machining equipment, miscellaneous

1.1.8.1 Plasma equipment, miscellaneous

1.1.8.2 Spray process machines, miscellaneous

1.1.8.3 Photoresist stripping systems

1.1.8.4 Substrate-cleaning systems

1.1.8.5 Wafer washers

1.1.8.6 Semiconductor technology process equipment, miscellaneous

1.1.8.6.1 Gas; liquid delivery panels as subsystems

1.1.8.6.2 Handling; transfer; loading systems; lifting devices

 1.1.8.6.3 Temperature sensing; control; recirculators; chillers;
heat exchangers

1.1.9 Wafer/substrate handling

1.1.9.1 CTC wafer-handling equipment

1.1.9.2 Wafer-cassette equipment

1.1.9.3 Wafer storage/shipping containers

1.1.9.4 Wafer mounters

1.1.9.5 Wafer/tape laminators/de-laminators

1.1.9.6 Wafer transfer systems

1.1.9.7 Wafer/chip manipulators

1.1.9.8 Marking equipment

1.1.9.9 Wafer/substrate handling systems, miscellaneous

1.2 Wafer back-end processing

1.2.1 Chip handling

1.2.1.1 Component handlers

1.2.1.2 Component-handling machines, specialized

1.2.1.3 Die sorters

1.2.1.4 Sorting equipment for components

1.2.1.5 Lifter modules

1.2.1.6 Coordinate tables

1.2.1.7 Piezo actuators

1.2.1.8 Process carriers

1.2.1.9 Transport carriers

1.2.1.10 Micromanipulators

1.2.1.11 Micropositioning

1.2.1.12 Positioning systems, miscellaneous

1.2.1.13 Chip-handling equipment, miscellaneous

1.2.2 Bonding

1.2.2.1 Pre-contacting processes

1.2.2.2 Plasma cleaning and activation equipment

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- 1.2.2.3 Chip carriers**
 - 1.2.2.3.1 Semi-finished CC goods (metal/plastic)
 - 1.2.2.3.2 Plastic-chip carriers (PCC)
 - 1.2.2.3.3 Ceramic-chip carriers (including LTCC configurations)
- 1.2.2.4 Internal connections**
 - 1.2.2.4.1 Bonding wires/tapes
 - 1.2.2.4.2 Die bonders
 - 1.2.2.4.3 Flip-chip bonders
 - 1.2.2.4.4 Bonders, miscellaneous
 - 1.2.2.4.5 Bumping systems
 - 1.2.2.4.6 Dispensing systems
- 1.2.2.5 Tools**
 - 1.2.2.5.1 Ultrasonic bonders
 - 1.2.2.5.2 Ultrasonic generators
 - 1.2.2.5.3 Ultrasonic transducers
 - 1.2.2.5.4 Ultrasound metrology
 - 1.2.2.5.5 Contacting equipment, miscellaneous
 - 1.2.2.5.6 Welding equipment for microconnections
 - 1.2.2.5.7 Resistance soldering/welding equipment
 - 1.2.2.5.8 Bonding tools, miscellaneous
- 1.2.3 Chip packaging**
 - 1.2.3.1 Housings
 - 1.2.3.2 Caps and encapsulations, encapsulation equipment**
 - 1.2.3.2.1 Protective component caps
 - 1.2.3.2.2 Glass, passivation/encapsulation
 - 1.2.3.2.3 Ball-grid array packages
 - 1.2.3.2.4 Potting compounds, encapsulations
 - 1.2.3.2.5 Encapsulation materials, miscellaneous
 - 1.2.3.2.6 Encapsulations and encapsulation equipment, miscellaneous
 - 1.2.3.2.7 Epoxy-processing equipment
 - 1.2.3.2.8 Sealants
 - 1.2.3.2.9 Molding presses
 - 1.2.3.2.10 Molding tools
 - 1.2.3.3 Protective coatings for devices**
 - 1.2.3.3.1 Impregnating equipment for devices**
 - 1.2.3.3.1.1 Impregnating machines for metal
 - 1.2.3.3.1.2 Vacuum pressure impregnating machines
 - 1.2.3.3.1.3 Atmospheric pressure impregnating machines
 - 1.2.3.3.1.4 Impregnating machines for laboratory and special applications
 - 1.2.3.4 Potting equipment**
 - 1.2.3.4.1 Potting mixing/dosing equipment
 - 1.2.3.4.2 Vacuum potting systems
 - 1.2.3.4.3 Atmospheric potting systems
 - 1.2.3.4.4 R&D and specialized potting systems
 - 1.2.3.4.5 Automatic pressure gelation (APG)
 - 1.2.3.4.6 Bearings and conveyor equipment for cast resins
 - 1.2.3.4.7 Additional potting equipment, miscellaneous
 - 1.2.3.5 Drying and hardening systems
- 1.3 Production of power electronics (IGBT, Power MOSFET, Thyristors, etc.)**
 - 1.3.1 Materials
 - 1.3.2 Machines and production equipment
 - 1.3.3 Housing and components
- 1.4 Measurement, detection and control systems for semiconductor production**
 - 1.4.1 Monitoring and control units for clean-room technology
 - 1.4.2 Monitoring systems, process-specific
 - 1.4.3 Positioning controllers
 - 1.4.4 Control equipment, miscellaneous, application-specific
 - 1.4.5 Computer; control; communication; data acquisition systems
- 1.5 Packaging and assembly materials**
- 1.6 Electronic components**
- 1.7 Electronic applications**
 - 2 Production of displays, LEDs and discretes**
 - 2.1 Display manufacturing**
 - 2.1.1 Substrate processing for displays**
 - 2.1.1.1 Aligners, exposer systems for displays
 - 2.1.1.2 CVD equipment for displays
 - 2.1.1.3 Laser-annealing systems
 - 2.1.1.4 Substrate processing for displays, miscellaneous
 - 2.1.2 Materials, parts**
 - 2.1.2.1 Substrate materials
 - 2.1.2.2 Spacers for displays
 - 2.1.2.3 Functional organic materials (OLED)
 - 2.1.2.4 Photomasks
 - 2.1.2.5 Functional films, laminates for displays
 - 2.1.2.6 Resins, adhesives for displays
 - 2.1.2.7 Materials, parts, miscellaneous
 - 2.1.3 Panel processing**
 - 2.1.3.1 Printers**
 - 2.1.3.1.1 Screen printers
 - 2.1.3.1.2 Inkjet printers
 - 2.1.3.1.3 Flexo printers
 - 2.1.3.1.4 Display separation equipment
 - 2.2 Manufacturing of Light Emitting Diodes (LED)**
 - 2.2.1 Materials, components**
 - 2.2.1.1 Substrates (Sapphire, SiC, bulk Si, bulk GaN, composites, InP, SiGe, etc.)
 - 2.2.1.2 Material for buffer layers
 - 2.2.1.3 Material for emitter layers, compound semiconductors
 - 2.2.1.4 Optical components
 - 2.2.1.5 Reflectors
 - 2.2.1.6 Components for LED Package
 - 2.2.1.7 Resins, material for sealing
 - 2.2.2 Manufacturing equipment**
 - 2.2.2.1 Sapphire wafer equipment (crystal growth, sawing, grinding)
 - 2.2.2.2 Silicon carbide wafer equipment (crystal growth, sawing, grinding)
 - 2.2.2.3 Wafer equipment for other LED-related semiconductors
 - 2.2.2.4 Lithography
 - 2.2.2.5 Etching
 - 2.2.2.6 Metallization
 - 2.2.2.7 Dicing
 - 2.2.2.8 Pick-and-place
 - 2.2.2.9 Die attach
 - 2.2.2.10 Bonding
 - 2.2.2.11 Phosphor coating
 - 2.2.2.12 Packaging, sealing, housing
 - 2.2.2.13 Equipment for epitaxy**
 - 2.2.2.13.1 Organic/Organo-metallic vapour phase deposition (OMVPE, MOCVD)
 - 2.2.3 Test systems**
 - 2.2.3.1 Life time test systems
 - 2.2.3.2 Photometric test systems
 - 2.2.3.3 LED test systems, miscellaneous
 - 2.3 Manufacturing of discrete components (resistors, capacitors, transistors, diodes)**
 - 2.3.1 Materials for discrete components
 - 2.3.2 Equipment for manufacturing of discrete components**
 - 2.3.2.1 Small parts precision manufacturing equipment
 - 2.3.2.2 Vacuum technology equipment
 - 2.3.2.3 Laser-processing equipment for discrete components

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2.3.2.4	Surface-finishing equipment	3.2.2.11	Equipment for thin-film production, miscellaneous
2.3.2.5	Continuous furnaces	3.2.3	Equipment for new generation solar cells
2.3.2.6	Drying/curing equipment, miscellaneous	3.2.3.1	Equipment for concentrator photovoltaics (CPV)
2.3.2.7	Finishing equipment for discrete components	3.2.3.2	Equipment for other novel solar concepts
2.3.2.8	Manufacturing equipment for capacitors	3.3	Factory planning and -equipment for photovoltaics
2.3.2.9	Manufacturing equipment for resistors	3.3.1	Waste-gas abatement/Waste-water treatment
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3.1	Materials for Photovoltaics	4.1.2	Nanomaterials
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3.2.1.2	Cell production	4.2.3	Production technology for microsystems
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3.2.1.3.1	Tabbers/Stringers/Soldering ovens/Bonder	4.2.4.1	Micro tools
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3.2.2.3	Surface processing equipment/Priming/Conditioning/Resin coating	4.2.5.11	Production machines for micro system technology, miscellaneous
3.2.2.4	Laser processing equipment (sawing, drilling, edge isolation, marking)	4.2.5.12	Micro reaction systems
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- 4.2.7.1 Component mount techniques
- 4.2.7.2 Component mounting in microsystems
- 4.2.7.3 Micro technology mounting & assembly systems
- 4.2.7.4 Joining and interconnection techniques
- 4.2.7.5 Micro filters
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- 4.2.7.7 Nanorobotics
- 4.2.8 Microdrive technology**
- 4.2.8.1 Piezo-electric actuators
- 4.2.8.2 Micro motors
- 4.2.8.3 Micro gears
- 4.2.8.4 Micro positionings
- 4.3 Test, measurement and adaptation equipment for microtechnology**
- 4.4 Assembly and packaging technology for microintegration**
- 4.4.1 On-Chip Integration, System-on-chip (SoC), Wafer-level packaging
- 4.4.2 On-Board Integration, Chip-on-Board (CoB)
- 4.4.3 Flip-chip assembly
- 4.4.4 System-in-Package (SiP), Multi-chip modules, 3D integration
- 4.5 Microtechnology applications**
- 4.5.1 Micro manufacturing, precision technology
- 4.5.2 Lab-on-Chip, micro-process technology
- 4.6 Nanotechnology**
- 4.6.1 Nanochemistry, -materials, -substances
- 4.6.2 Nano tools, Nano analysis
- 4.6.3 Nanomanufacturing
- 4.6.4 Nanoelements/Nanosystems
- 5 Clean room technology**
- 5.1 Clean rooms**
- 5.1.1 Clean rooms, built-in
- 5.1.2 Clean-room boxes, incl. walk-in
- 5.1.3 Clean hoods
- 5.1.4 Flow boxes
- 5.1.5 Laminar flow equipment
- 5.1.6 Dust-free workstations
- 5.2 Clean-room maintenance and control**
- 5.2.1 Clean-room filter elements
- 5.2.2 Particle-monitoring equipment
- 5.2.3 Ionization systems
- 5.2.4 Flow visualization (clean rooms)
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- 15.2.1 Wire-crimping units
- 15.2.2 Cable-harness production equipment
- 15.2.3 Ultrasonic welders for cable harnesses
- 15.2.4 Resistance welders for wire harnesses
- 15.2.5 Cable strippers
- 15.2.6 Cable splicing equipment
- 15.2.7 Wiring machines
- 15.2.8 Wiring aids
- 15.2.9 Coax strippers
- 15.2.10 Cable ties and guides
- 15.2.11 Wiring tools, miscellaneous

15.3 Cable-processing equipment

- 15.3.1 Crimping tools
- 15.3.2 Bench-top crimping presses
- 15.3.3 Crimping units/machines, miscellaneous
- 15.3.4 Post crimp soldering equipment
- 15.3.5 IDC tools
- 15.3.6 Coax stripping tools
- 15.3.7 Optical-fiber stripping tools

15.4 Others

- 15.4.1 Cable ring binder equipment
- 15.4.2 Contacting units, miscellaneous
- 15.4.3 Control systems for cable-assembly systems

15.5 Cable-protection devices

- 15.5.1 Corrugated sheath processing machines
- 15.5.2 Heat shrinkable sleeves
- 15.5.3 Protective devices for cable harnesses, miscellaneous

15.6 Processing equipment for cable-protection devices

- 15.6.1 Corrugated sheaths
- 15.6.2 Corrugated sheaths, slotted

15.7 Technology for detachable connections, connectors

- 15.7.1 Connector strips
- 15.7.2 Single-conductor connectors
- 15.7.3 Ribbon cable connectors
- 15.7.4 Cables with connectors
- 15.7.5 Cable terminals
- 15.7.6 Wire end ferrules
- 15.7.7 Crimp connectors and accessories
- 15.7.8 Terminals
- 15.7.9 Enameled-wire connectors
- 15.7.10 Plugs and sockets
- 15.7.11 Plug sockets, all types
- 15.7.12 Plug connectors for household appliances
- 15.7.13 Plug connectors for industrial electronics
- 15.7.14 Plug connectors for automotive electronics
- 15.7.15 Plug connectors for laboratory/test equipment
- 15.7.16 Plug connectors for aerospace
- 15.7.17 Plug connector parts, miscellaneous
- 15.7.18 Plug connectors, miscellaneous complete

16 Coilware production

16.1 Materials for coilware

- 16.1.1 Coil cores
- 16.1.2 Cut and toroidal coil cores
- 16.1.3 Enameled wire, copper-, silver-
- 16.1.4 Superconducting wires
- 16.1.5 Transformer production aids, miscellaneous
- 16.1.6 Coil-winding technology materials, miscellaneous

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16.2 Production equipment for coilware

- 16.2.1 Stator coil winders
- 16.2.2 Fine-wire coil winders, automatic
- 16.2.3 Coiled-product assembly lines
- 16.2.4 Manual coil winders
- 16.2.5 Layer winders
- 16.2.6 Linear winders, automatic
- 16.2.7 Modular winding systems
- 16.2.8 Toroidal coil winders
- 16.2.9 Welding/soldering equipment for coiled-product connections
- 16.2.10 Transfer winding robots
- 16.2.11 Bench-type coil winders
- 16.2.12 Bobbin winders
- 16.2.13 Coil winders, miscellaneous
- 16.2.14 Coil-manufacturing aids, miscellaneous
- 16.2.15 Coil-winding technology tools, miscellaneous

16.3 Applications for coilware

- 16.3.1 Electric motor
- 16.3.2 Generators
- 16.3.3 Transformers
- 16.3.4 Relays
- 16.3.5 Electric magnets
- 16.3.6 Coilware for actuators, miscellaneous
- 16.3.7 Coilware for sensors, miscellaneous

17 Hybrid-component manufacturing

17.1 Tooling and mouldmaking

- 17.1.1 Die making, tool making
- 17.1.2 Rapid prototyping
- 17.1.3 Tooling and mouldmaking, miscellaneous

17.2 Tools, tool equipment

- 17.2.1 Follow-on assembly tools
- 17.2.2 Press tools
- 17.2.3 Cutting tools
- 17.2.4 Injection moulding tools
- 17.2.5 Stamping tools
- 17.2.6 Deep-drawing tools
- 17.2.7 Separating tools
- 17.2.8 Bending tools
- 17.2.9 Tools, miscellaneous

17.3 Assembly and handling technology, periphery

- 17.3.1 Reeling/unreeeling machines
- 17.3.2 Destacking systems
- 17.3.3 Feeders, feed technology
- 17.3.4 Conveyor systems
- 17.3.5 Reels
- 17.3.6 Cooling equipment and systems
- 17.3.7 Assembly equipment and systems
- 17.3.8 Robots

- 17.3.9 Cleaning equipment

17.4 Stamping

- 17.4.1 Presses
- 17.4.2 Stamping presses
- 17.4.3 Stamping machines and systems
- 17.4.4 Service-providers—stamping

17.5 Shaping

- 17.5.1 Bending machines and systems
- 17.5.2 Lathes
- 17.5.3 Roll bending machines
- 17.5.4 Special-purpose machines
- 17.5.5 Service-providers—shaping
- 17.5.6 Equipment, spare parts and accessories for shaping, miscellaneous

17.6 Surface-finishing equipment, refinement

- 17.6.1 Etching machines and systems
- 17.6.2 Coating machines and systems
- 17.6.3 Electroplating machines and systems
- 17.6.4 Marking systems and equipment
- 17.6.5 Polishing machines and systems
- 17.6.6 Cleaning machines and systems
- 17.6.7 Grinding machines and systems
- 17.6.8 Service-providers—surface technology
- 17.6.9 Equipment, spare parts and accessories for surface treatment and refinement, miscellaneous

17.7 Injection molding for plastics

- 17.7.1 Processing machines and systems
- 17.7.2 Extruders
- 17.7.3 Cooling equipment
- 17.7.4 Injection molding machines and systems
- 17.7.5 Service-providers—injection molding
- 17.7.6 Equipment, spare parts and accessories for injection molding for plastics, miscellaneous

17.8 Metal/plastic composite technologies

- 17.8.1 Assemblies (mounted in plastic)
- 17.8.2 Inserts (plastic injection around inserted part)
- 17.8.3 Metal/plastic composite technologies, miscellaneous

17.9 Process and quality control/Automation

- 17.9.1 Production data-acquisition (PDA) systems
- 17.9.2 Measuring, testing and inspection equipment
- 17.9.3 Process measuring technology
- 17.9.4 Process control and automation
- 17.9.5 Process monitoring
- 17.9.6 Traceability equipment
- 17.9.7 Sensors
- 17.9.8 Regulation and control equipment
- 17.9.9 Equipment, spare parts and accessories for process and quality control, miscellaneous

E Cluster Future Production—Smart Factory

18 Industry 4.0

18.1 Autonomous inter-connected micro systems, sensor and actuator networks, cyber physical systems

- 18.1.1 Autonomous inter-connected micro systems, sensor and actuator networks, wireless sensor networks
- 18.1.2 5G-Technology
- 18.1.3 Machine Learning/Big Data Analytics
- 18.1.4 Cyber Physical Systems (CPS)

- 18.1.5 Energy harvesting
- 18.1.6 Human machine interfaces active/passive (touch panel displays, barcode reader, RFID systems, augmented reality devices, aso.)
- 18.1.7 Information security/IP protection (embedded)
- 18.1.8 Product Security
- 18.1.9 Digital twin
- 18.1.10 **Equipment with integrated sensor and actuator networks, CPS**
 - 18.1.10.1 Condition Monitoring
 - 18.1.10.2 Predictive Maintenance

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- 18.1.10.3 Process controlling
- 18.2 Software: basic systems and development tools**
- 18.2.1 Embedded systems
- 18.2.2 Development tools
- 18.2.3 Simulation systems
- 18.2.4 Programming systems
- 18.2.5 Networks and communication
- 18.2.6 Expert systems (AI-technologies)
- 18.3 Machine software**
- 18.3.1 Machine control software
- 18.3.2 Measurement technology (embedded into machines)
- 18.3.3 NC/CNC-path software
- 18.3.4 Bus systems
- 18.3.5 Machine vision software
- 18.4 Manufacturing software**
- 18.4.1 Production control center, production data acquisition (PDA), operating and machine data logging
- 18.4.2 Manufacturing Execution Systems (MES)
- 18.4.3 Advanced Planning & Scheduling (APS)
- 18.4.4 Process optimisation and simulation
- 18.4.5 Material flow control
- 18.4.6 Automated Process Control (APC)
- 18.4.7 Factory automation; cell controller software
- 18.4.8 Maintenance and service
- 18.5 Business software**
- 18.5.1 Engineering (CAD, CAM, CAE, EDM, PDM, VR, DMU, etc.)
- 18.5.2 Variant configuration
- 18.5.3 Supplies/stock/ordering
- 18.5.4 Supply Chain Management (SCM)
- 18.5.5 ERP, PPS, order processing
- 18.5.6 Business process management
- 18.5.7 Project management
- 18.5.8 Business Intelligence
- 18.5.9 Quality management
- 18.5.10 Technical product documentation
- 18.5.11 Product Lifecycle Management
- 18.5.12 E-Business/E-Commerce/E-Market
- 18.5.13 Service management
- 18.6 Software services**
- 18.6.1 System development/-integration
- 18.6.2 Order specific software development
- 18.6.3 Quality and project management
- 18.7 Application specific software**
- 18.7.1 Process control software for semiconductor and display production
- 18.7.2 Process control software for photovoltaics production
- 18.7.3 Process control software for PCB production**
- 18.7.3.1 Gerber data processing programs
- 18.7.3.2 Drill data processing programs
- 18.7.3.3 PCB data generation systems
- 18.7.3.4 Check data processing programs
- 18.7.3.5 Software for printing tools, miscellaneous
- 18.7.4 Process control software for pick-and-place technology**
- 18.7.4.1 Automation software
- 18.7.4.2 Visualizing software
- 18.7.4.3 Process software, miscellaneous
- 18.7.5 Measurement and test software**
- 18.7.5.1 Measurement technology software
- 18.7.5.2 ATE software/postprocessors
- 18.7.5.3 Fault-detection software
- 18.7.5.4 Fault-detection software with user prompting
- 18.7.6 Control software for material processing
- 18.7.7 Software for Material-flow control**
- 18.7.7.1 Warehouse management and control systems
- 18.7.7.2 Commissioning systems
- 18.7.7.3 Production logistics systems
- 18.7.7.4 Visualization systems for material flow and warehouse logistics
- 19 Production technologies for batteries and electrical energy storage**
- 19.1 Materials and components for batteries and electrical energy storage**
- 19.1.1 Cathode material, cathodes
- 19.1.2 Current Collector
- 19.1.3 Electrode Foil
- 19.1.4 Activated Carbon
- 19.1.5 Materials and components for battery modules
- 19.1.6 Materials/Components, miscellaneous
- 19.2 Equipment for batteries and electrical energy storage**
- 19.2.1 Electrode and separator manufacturing equipment**
- 19.2.1.1 Coating equipment
- 19.2.1.2 Film casting equipment
- 19.2.1.3 Drying equipment
- 19.2.1.4 Rolling Press Machine
- 19.2.2 Cell manufacturing equipment**
- 19.2.2.1 Cutter
- 19.2.2.2 Stamping equipment
- 19.2.2.3 Stacking machines
- 19.2.2.4 Current collector welding machines
- 19.2.2.5 Cell packaging machines
- 19.2.2.6 Degassing equipment
- 19.2.3 Automation equipment
- 19.2.4 Assembly and handling equipment
- 19.2.5 Battery module equipment, battery pack assembly**
- 19.2.5.1 Cell current collector contacting equipment (Soldering, welding, screwing)
- 19.2.5.2 Battery Management Systems and sensors mounting equipment
- 19.2.5.3 Assembly and handling equipment battery pack
- 19.2.5.4 Screwing equipment battery pack
- 19.2.6 Manufacturing equipment for batteries and energy storage, miscellaneous
- 19.2.7 Clean room technology
- 19.3 Inspection and test systems for batteries and electrical energy storage**
- 19.3.1 Charge/Discharge Test Equipment
- 19.3.2 Insulation Tester
- 19.3.3 Life cycle tester, ageing
- 19.3.4 Impedance measuring equipment
- 19.3.5 Leak tightness test equipment
- 19.3.6 Battery simulators for system test (grid buffers for renewable energy, e-mobility, etc.)
- 19.3.7 Inspection/Testing/Evaluation equipment, miscellaneous
- 19.4 Accumulators**
- 19.4.1 Fuel cells
- 19.4.2 Supercaps/Ultracaps
- 19.4.3 Usage**
- 19.4.3.1 Mobile use, high power (automotive, e-mobility)
- 19.4.3.2 Mobile use, low power/consumer (smart phone, laptop, etc.)
- 19.4.3.3 Stationary use (photovoltaics, renewable energy, buffer systems)
- 20 Organic and printed electronics**
- 20.1 Materials and components**
- 20.1.1 Substrates



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- 20.1.2 Conductors
- 20.1.3 Semiconductors
- 20.1.4 Dielectrics
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- 20.1.6 Components for hybrid systems
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- 20.2.1.1 Screen printing equipment
- 20.2.1.2 Ink-jet printers
- 20.2.2 Vacuum processes
- 20.2.3 Laser deposition equipment
- 20.2.4 Solution coating (spin coating, dip coating, etc.)
- 20.2.5 Roll-to-roll process

20.2.6 Assembly and packaging technology, system integration

- 20.2.6.1 Electrical contacting (flip chip, bonding, etc.)
- 20.2.6.2 Lamination equipment
- 20.2.6.3 System integration
- 20.2.6.4 Hybrid systems (polytronics)
- 20.2.7 Manufacturing equipment, miscellaneous

20.3 Inspection and test systems

- 20.3.1 Optical characterisation
- 20.3.2 Chemical characterisation
- 20.3.3 Quality/Process control
- 20.3.4 Inspection and test systems, miscellaneous

F Overall Production Support

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22.1 Preliminary products and semi-finished goods, metallic

22.1.1 Sheet metal, strips

- 22.1.1.1 Strips, metal
- 22.1.1.2 Laminations and metal foils

22.1.2 Wires

- 22.1.2.1 Wires, bare
- 22.1.2.2 Wires for component connections
- 22.1.2.3 Copper wires, insulated
- 22.1.2.4 Silver wires, insulated
- 22.1.2.5 Wires, specialized cross-section

22.1.3 Springs

22.1.4 Plastics

22.1.5 Cables

- 22.1.5.1 Ribbon cables
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- 22.1.5.3 Coaxial cables
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- 22.1.5.5 Stranded wires for mains/low frequency
- 22.1.5.6 Cables, miscellaneous

22.1.6 Semi-finished goods

- 22.1.6.1 Etched parts
- 22.1.6.2 Lathed parts
- 22.1.6.3 Punch-pressed flexible parts
- 22.1.6.4 Drawn parts/semi-finished goods
- 22.1.6.5 Contact parts/semi-finished goods
- 22.1.6.6 Molded parts, miscellaneous
- 22.1.6.7 Mechanical components, miscellaneous
- 22.1.6.8 Semi-finished goods in electrical engineering, miscellaneous

22.2 Preliminary products and semi-finished goods, non-metallic

20.4 Applications and devices

- 20.4.1 Integrated Circuits (IC)
- 20.4.2 Passive components
- 20.4.3 Antennas
- 20.4.4 RFID labels
- 20.4.5 Displays and lighting
- 20.4.6 Speakers
- 20.4.7 Smart objects/smart textiles
- 20.4.8 Polymer electronics, other applications

21 3D Printing, Additive Manufacturing

21.1 Production equipment and process technology

- 21.1.1 Laser Sintering
- 21.1.2 Selective Laser Melting
- 21.1.3 3D Printing/Binder Jetting
- 21.1.4 Digital Light Processing
- 21.1.5 other additive manufacturing processes

21.2 Sub systems and machine components

- 21.2.1 Tools, nozzles, print heads
- 21.2.2 Support structures, object platforms, retractable tables
- 21.2.3 Software, CAD platforms
- 21.2.4 other sub systems and machine components

21.3 Materials

- 21.3.1 Plastic filaments
- 21.3.2 Metal granulates

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- 22.2.1.2 Resin-bonded molded parts/semi-finished goods
- 22.2.1.3 Molded glass parts/semi-finished goods
- 22.2.1.4 Resin-bonded fabric
- 22.2.1.5 Plastic semi-finished goods
- 22.2.1.6 Industrial laminates (sheets, rods, tubes)
- 22.2.1.7 Thermoplastic molded parts/semi-finished goods
- 22.2.1.8 Silicones and silicone parts
- 22.2.1.9 Molded ceramic parts/semi-finished goods, miscellaneous
- 22.2.1.10 Plastic parts, miscellaneous
- 22.2.1.11 Insulated molded parts/semi-finished goods, miscellaneous

22.2.2 Materials, miscellaneous

- 22.2.2.1 Masks (including UV-curable)
- 22.2.2.2 Sealants
- 22.2.2.3 Seals
- 22.2.2.4 Foils, insulating

22.3 Process materials

22.3.1 Lacquers

- 22.3.1.1 Photographic laminates (resists)
- 22.3.1.2 Protective lacquers
- 22.3.1.3 Solder mask lacquers
- 22.3.1.4 Insulating paints/lacquers

22.3.2 Metals

- 22.3.2.1 Precious metals
- 22.3.2.2 Metals/alloys, pure/ultra-pure
- 22.3.2.3 Metallic powders

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- 22.3.3.1 Electronics chemicals
- 22.3.3.2 Process chemicals, miscellaneous
- 22.3.3.3 Solvents
- 22.3.3.4 Chemicals, miscellaneous

22.3.4 Insulating materials

- 22.3.4.1 Insulating resins

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- 22.3.4.3 Insulating materials, miscellaneous
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- 22.5.2.3 Stencil cleaners
- 22.5.2.4 Ultrasonic cleaning equipment
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- 22.5.4.7 Plasma-cleaning systems
- 22.5.4.8 Screen-washing equipment
- 22.5.4.9 Underwipe cleaning
- 22.5.4.10 Rinsing equipment, specialized
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- 22.5.6.1 Waste gas abatement/exhaust extraction equipment
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- 22.5.6.3 Environmental protection equipment, miscellaneous
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- 22.6.2.3 Filtration equipment, miscellaneous
- 22.6.2.4 Resist filter systems in recirculation
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- 22.6.6.1 Process-water purification equipment (recirculation)
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- 23.2 Production services except EMS**
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