B Product categories Urban Steel Expo

1.0

THE ULTIMATE WORLD OF CUTTING AND WELDING
2027
URBAN STEEL EXPO

Düsseldorf
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1 Cutting

1.1	Cutting technologies
1.1.1	Drilling
1.1.2	Oxygen lancing
1.1.3	Flame gouging
1.1.4	Turning, milling, planing
1.1.5	Spark erosion and chemical machining
1.1.6	Joint preparation
1.1.7	Hot Wire cutting
1.1.8	Carbon arc cutting
1.1.9	Laser beam cutting and drilling, electron beam drilling
1.1.10	Air arc gouging
1.1.11	Arc-oxygen cutting
1.1.12	Flame and fusion cutting with metal or mineral powder
1.1.13	Stack cutting
1.1.14	Plasma scarfing
1.1.15	Plasma cutting
1.1.16	Repair welding and cutting
1.1.17	Sawing
1.1.18	Shears
1.1.19	Cutting (e.g. plate shearing), slamping, nibbling
1.1.20	Preparation of cutting edges (Edge rounding, micro cutting, brushing, blasting, drag grinding etc.)
1.1.21	Underwater cutting
1.2	Machinery and plants
1.2.1	Oxy-fuel gas cutting
1.2.2	Erosion machines
1.2.3	Laser cutting machine
1.2.4	Plasma cutting machine
1.2.5	Stamping machines
1.2.6	Water jet cutting, water abrasive jet cutting

2 Welding of Metals – Welding technology

2.1	Flash welding
2.2	Additive manufacturing
2.3	Automation
2.4	Stud welding
2.5	Projection welding
2.6	Diffusion welding
2.7	Electrogas welding
2.8	Electron beam welding
2.9	Electroslag welding
2.10	Narrow gap welding
2.11	Tubular wire welding
2.12	Flux cored arc welding
2.13	Gas pressure welding
2.14	Gas welding
2.15	Thermit welding
2.16	Induction welding
2.17	Cold pressure welding
2.18	Enclosed resistance fusion welding
2.19	Capacitor discharge welding
2.20	Laser hybrid welding
2.21	Laser cold wire welding
2.22	Laser welding
2.23	Manual metal arc welding
2.24	Pulsed arc welding
2.25	Light beam welding
2.26	Linear friction welding, Friction stir welding
2.27	Magnetic pulse welding
2.28	Multiple-wire welding
2.29	MIG/MAG (GMA) welding
2.30	Microwelding
2.31	Orbital welding equipment
2.32	Plasma-TIG welding
2.33	Plasma welding
2.34	Resistance butt welding
2.35	Repair welding
2.36	Seam welding
2.37	Butt seam welding with rotary transformer
2.38	Rotary friction welding
2.39	Friction stir welding
2.40	Butt seam welding with sliding contacts
2.41	Welding torch
2.42	Magnetically impelled arc butt (MIAB) welding
2.43	Explosive welding
2.44	Tandem welding
2.45	Ultrasonic welding
2.46	Submerged arc welding
2.47	Firecracker welding
2.48	Underwater welding
2.49	Submerged arc welding
2.50	Roll butt seam welding
2.51	Resistance spot welding
2.52	TIG (GTA) welding

3 Soldering

3.1	Surfacing by brazing and soldering
3.2	Block brazing
3.3	Hot bar reflow soldering
3.4	Electron beam brazing
3.5	Debrazing, desoldering
3.6	Flame brazing and soldering
3.7	High-temperature brazing
3.8	Induction brazing and soldering
3.9	Bit soldering
3.10	Condensation soldering
3.11	Laser beam brazing
3.12	Arc brazing
3.13	Light beam brazing and soldering
3.14	Bath and drag soldering
3.15	Microbrazing and soldering
3.16	Furnace brazing and soldering
3.17	Roller tinning
3.18	Salt bath brazing
3.19	Wave soldering
3.20	Dip brazing and soldering
3.21	Ultrasonic soldering
3.22	Hot gas soldering
3.23	Wave soldering
3.24	Resistance brazing
3.25	Reflow soldering

4 Mechanical Joining

4.1	Bayonet connections
4.2	Flanging

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4.3	Self-piercing rivets (combination of clinching and riveting)
4.4	Crimping
4.5	Wire netting, wire weaving
4.6	Clinching
4.7	Hanging, expanding, clamping, wedging, stretching
4.8	Seaming
4.9	Tongue and groove joints
4.10	Flow-drill screws
4.11	Joining by extrusion or drawing
4.12	Joining by forming
4.13	Joining by overlapping / lockforming (lockseaming)
4.14	Joining by compression or squeezing
4.15	Joining by widening or tightening (tube rolling, necking, beading)
4.16	Joining by winding
4.17	Stapling with wire staples
4.18	Taper press-fit connections
4.19	Spline shaft connections
4.20	Wedge clamp joints
4.21	Clamp joining (clamps and adapter sleeves)
4.22	Riveting processes
4.23	Rivet screws
4.24	Keyed shaft connections
4.25	Press-fit, shrink-fit, expansion-fit, force-fit joining
4.26	Snap-fit and interlocking connections
4.27	Friction-based connection by friction riveting
4.28	Roll seaming / roll flanging
4.29	Friction riveting
4.30	Slotted connections
4.31	Screwing (screws, nuts, bolts)
4.32	Shrink-fit connections
4.33	Self-piercing riveting (SPR)
4.34	Expansion sleeve connections
4.35	Expansion anchor joints
4.36	Upset joining
4.37	Plug-in / modular systems
4.38	Pinning and bolting

5 Plastic welding

5.1	Thermal welding processes
5.1.1	Extrusion welding
5.1.2	Gas flame welding
5.1.3	Hot air contact welding
5.1.4	Heated tool welding / hot plate welding
5.1.5	Hot wedge welding
5.1.6	High frequency welding
5.1.7	Induction welding
5.1.8	Hot gas welding
5.1.9	Resistance welding / heating element welding
5.2	Friction-based welding processes:
5.2.1	Orbital friction welding
5.2.2	Friction welding
5.2.3	Rotational friction welding
5.2.4	Friction stir welding (FSW)
5.2.5	Vibration welding
5.3	Radiation/energy input welding process
5.3.1	Electron beam welding (selten)
5.3.2	Infrared welding
5.3.3	Laser welding
5.3.4	Light beam welding
5.3.5	Microwave welding
5.3.6	Ultrasonic welding
5.4	Cross-sectional technologies & additional processes
5.4.1	Additive manufacturing with in-situ bonding
5.4.2	Automation
5.4.3	Hybrid joining methods
5.4.4	Pre-heating techniques

6 Surface Technology / Heat Treatment

6.1	Heat Treatment & Heating Methods
6.1.1	Flame scarfing
6.1.2	Diffusion annealing
6.1.3	Flame stress relieving
6.1.4	Flame straightening
6.1.5	Flame cleaning
6.1.6	Flame heating
6.1.7	Hardening, tempering, annealing
6.1.8	Induction heating
6.1.9	Normalizing
6.1.10	Furnace heating
6.1.11	Stress relief annealing
6.1.12	Vibratory stress relieving
6.1.13	Soft annealing
6.1.14	Resistance heating
6.2	Thermal Spraying & Systems
6.2.1	Exhaust systems
6.2.2	Automated spraying systems
6.2.3	Detonation spraying
6.2.4	Flame spraying with wire or rod
6.2.5	Flame spraying with powder
6.2.6	High-velocity oxy-fuel spraying
6.2.7	Cold gas spraying
6.2.8	Plastic flame spraying
6.2.9	Laser spraying
6.2.10	Laser cladding
6.2.11	Arc spraying
6.2.12	Plasma spraying
6.2.13	Plasma transfer arc welding
6.2.14	Powder feeder
6.2.15	Soundproof rooms
6.2.16	Virtual spraying
6.2.17	Spray booths
6.2.18	Suspension spraying
6.2.19	Vacuum plasma spraying
6.3	Pre-treatment & classic surface technology
6.3.1	Passivation and pickling
6.3.2	Phosphating
6.3.3	Polishing
6.3.4	PVD (physical vapor deposition)
6.3.5	Grinding
6.3.6	Blasting
6.3.7	Dip coating
6.3.8	Tin, zinc, nickel, copper and chromium plating

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6.4	**Functional & Decorative Coatings**
6.4.1	Anodizing
6.4.2	CVD
6.4.3	Electrolytic oxidation
6.4.4	Enameling
6.4.5	Painting, varnishing, dipping
6.4.6	Flame priming / flame phosphating
6.4.7	Plastic coating
6.4.8	Metallizing
6.5	**Cladding & Build-Up Welding**
6.5.1	Electroslag cladding
6.5.2	Laser cladding
6.5.3	Plasma cladding
6.5.4	Plasma transfer arc welding
6.5.5	Friction cladding
6.5.6	Gas shielded arc cladding
6.5.7	Explosive and roll cladding
6.5.8	Submerged arc cladding
6.6	**Functional Layer Systems**
6.6.1	Abradable applications
6.6.2	Electrical / electronics
6.6.3	Erosion protection
6.6.4	Slide bearing layers
6.6.5	High temperature corrosion protection
6.6.6	Atmospheric corrosion protection
6.6.7	Renovation, repair
6.6.8	Wear resistance
6.6.9	Thermal insulation
6.7	**Adhesive Surface Treatment**
6.7.1	Solvent containing system
6.7.2	Mechanical processes (grinding, blasting)
6.7.3	Wet chemical processes (etching, phosphatating, anodizing, others)
6.7.4	Primer/Adhesion promoters
6.7.5	Dry chemical processes (silicoater, low pressure plasma, atmospheric pressure plasma, others)
6.7.6	Water based systems (neutral, acid, alkaline)

7 Gas, Supplies, Filler materials

7.1	**Filler Materials by base material type**
7.1.1	Filler materials for duplex and super duplex steels
7.1.2	Filler materials for heat-resistant materials
7.1.3	Filler materials for high alloy steels
7.1.4	Filler materials for high alloy cast steels
7.1.5	Filler materials for plastics
7.1.6	Filler materials for non-ferrous metals and alloys
7.1.7	Filler materials for other materials
7.1.8	Filler materials for unalloyed and low alloy steels
7.1.9	Filler materials for unalloyed and low alloy cast steels
7.1.10	Filler materials for underwater welding
7.1.11	Filler materials for wear and corrosion resisting deposits
7.2	**Wires, Rods and Electrodes by Process**
7.2.1	Wires, strips and plates for submerged arc and electroslag welding
7.2.2	Wires and strips for micro welding
7.2.3	Wire electrodes for gas metal-arc welding
7.2.4	Flux cored wires and strips
7.2.5	Tubular stick electrodes
7.2.6	Gas welding rods
7.2.7	TIG welding rods
7.2.8	Gouging and thermal cutting electrodes
7.2.9	Underwater welding and cutting electrodes
7.2.10	Covered electrodes (manual arc welding)
7.2.11	Filler materials for electron beam welding
7.2.12	Filler materials for friction welding
7.2.13	Filler materials for laser beam welding
7.3	**Powders, Coatings and Specialty Additives**
7.3.1	Other powders (filler materials)
7.3.2	High-entropy alloys (HEA)
7.3.3	Intermetallic powders
7.3.4	Carbide powders
7.3.5	Ceramic rods (filler materials)
7.3.6	Ceramic powders (metal oxides/nitrides)
7.3.7	Metal powders and wires
7.3.8	Nanostructured thermal spray powders
7.3.9	Welding fluxes
7.3.10	Self fluxing powders
7.3.11	Powder mixtures
7.3.12	Suspensions
7.3.13	Thermit welding materials
7.3.14	Thermoplastics
7.3.15	Filler materials for laser beam welding
7.4	**Soft solders**
7.4.1	Lead-free solders
7.4.2	Lead-tin solders
7.4.3	Other soft solders
7.4.4	Solders for aluminium
7.4.5	Soft solders with biodegradable fluxes
7.4.6	Tin-lead solders with or without Cu, Ag, P additions
7.5	**brazing fillers**
7.5.1	Aluminium brazing fillers
7.5.2	Gold-containing brazing fillers
7.5.3	Iron-based brazing fillers
7.5.4	Brazing fillers for high-temperature applications
7.5.5	Copper/brass brazing fillers
7.5.6	Nickel-base brazing fillers
7.5.7	Palladium-containing brazing fillers
7.5.8	Phosphorus-containing brazing fillers
7.5.9	Platinum-containing brazing fillers
7.5.10	Silver brazing fillers
7.5.11	Special brazing fillers (cobalt-, titanium-, zirconium-based)
7.5.12	Other brazing fillers
7.6	**Solders – forms & application types**
7.6.1	Automated solder feeding systems
7.6.2	D-printed solder structures
7.6.3	Flux-cored rods
7.6.4	Flux-coated rods
7.6.5	Solder and brazing wires, rods and strips
7.6.6	Preforms and foils
7.6.7	Brazing and soldering pastes
7.6.8	Filler precoated plates
7.6.9	Brazing and soldering powders
7.6.10	Stranded rods

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7.7	**Gases & shielding atmospheres**
7.7.1	Active gas
7.7.2	Fuel gases (acetylene, butane, natural gas, methane, propane, town gas)
7.7.3	Doping and test gas
7.7.4	Compressed air
7.7.5	Liquid gas
7.7.6	Hydrogen-nitrogen mixture
7.7.7	Inert gases (argon, neon, helium)
7.7.8	Carbon dioxide
7.7.9	Gas mixtures
7.7.10	Recycled or green gases
7.7.11	Oxygen
7.7.12	Oxygen and powder lances
7.7.13	Shielding gas mixtures for additive manufacturing
7.7.14	Nitrogen
7.7.15	Hydrogen
7.8	**Auxiliary materials – chemical/technical**
7.8.1	Asbestos substitutes
7.8.2	Weld backing
7.8.3	Pickling pastes
7.8.4	Coatings for temporary corrosion protection
7.8.5	Calcium carbide
7.8.6	Leak-test materials
7.8.7	Anti-spatter compounds
7.8.8	Electro-burnish chemicals
7.8.9	Paints and varnishes
7.8.10	Brazing and soldering fluxes
7.8.11	Auxiliary materials for thermit welding
7.8.12	Heat protection for welding
7.8.13	Impregnating compounds
7.8.14	Ceramic performs
7.8.15	Ceramic powders
7.8.16	Solvents
7.8.17	Solder masks and resists
7.8.18	Sustainable cleaning agents
7.8.19	Surface cleaners
7.8.20	Deadener
7.8.21	Cleaning agents
7.8.22	Raw materials for electrode coatings
7.8.23	Anti-rust compounds
7.8.24	Lubricants
7.8.25	Chalk
7.8.26	Weld primers
7.8.27	Weld cleaning products
7.8.28	Marking paints
7.8.29	Technical sprays
7.9	**Auxiliary materials – mechanical/functional**
7.9.1	Cutting powders for concrete, cast iron and other materials
7.9.2	Explosives
7.9.3	Abrasives
7.9.4	Cutting and snagging wheels
7.9.5	Joining elements (rivets, screws, bolts etc.)
7.9.6	Clamping systems for welding and soldering
7.10	**Adhesives & bonding systems**
7.10.1	Acrylate adhesives
7.10.2	Anaerobically curing adhesives
7.10.3	Bio-based adhesive systems
7.10.4	Cyanoacrylates
7.10.5	Epoxy resins (C, C)
7.10.6	Pressure-sensitive adhesives
7.10.7	High-temperature adhesives
7.10.8	Conductive adhesives
7.10.9	MS polymers
7.10.10	Phenol-formaldehyde resol adhesives
7.10.11	Polyurethanes (C, C)
7.10.12	Reactive hot melts
7.10.13	Silan-crosslinking polymer adhesives
7.10.14	Silicones
7.10.15	UV-curing adhesives
7.10.16	Structural pressure-sensitive adhesive tapes (PSA)

8 Quality Assurance

8.1	**Measurement & Sensor Technology**
8.1.1	Chemical analysis
8.1.2	Elongation, path and angle measurement
8.1.3	Throughput and flow-rate measurement
8.1.4	Capture, checking and processing of process and production parameters
8.1.5	Ferrite-content measuring devices
8.1.6	Photography and cinematography
8.1.7	Speed and rotational-speed measurement
8.1.8	Manual and miscellaneous measuring devices for arc welding
8.1.9	Holography
8.1.10	Calibration
8.1.11	Camera systems for monitoring design and production processes
8.1.12	Capacitance and inductance measurement
8.1.13	Force measuring systems
8.1.14	Gauges and weld gauges
8.1.15	Power measurement
8.1.16	Mass, density, force, torque and pressure measurement
8.1.17	Measuring and monitoring devices for electrode-penetration depth
8.1.18	Measuring devices for resistance welding
8.1.19	Measuring devices for gases, fumes and dusts
8.1.20	Measuring devices for sound/noise
8.1.21	Measuring devices for radiation
8.1.22	Microscopy
8.1.23	Surface quality (cut-surface quality)
8.1.24	Specimen-preparation installations
8.1.25	Scanning electron microscopes
8.1.26	Roughness measurement
8.1.27	Coat-thickness, wall-thickness and crack-depth measurement
8.1.28	Sensor technology
8.1.29	Miscellaneous measurement technology and measuring devices
8.1.30	Photoelasticity
8.1.31	Current and voltage measurement
8.1.32	Temperature measurement
8.1.33	Thermography
8.1.34	Monitoring devices for arc welding
8.1.35	Monitoring devices for resistance welding
8.1.36	Hydrogen determination
8.1.37	Resistance and insulation measurement
8.1.38	Time, event-number and frequency measurement

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8.2	**Non-Destructive Testing (NDT)**
8.2.1	Acoustic measuring devices
8.2.2	Acoustic microscopy
8.2.3	Analysis devices
8.2.4	Atomic absorption spectrometers
8.2.5	Auger probes
8.2.6	Automatic testing systems
8.2.7	Automation in measurement and testing technology
8.2.8	Automation and computer assistance for non-destructive testing
8.2.9	Betatron and linear accelerators
8.2.10	Image-processing installations
8.2.11	Image intensifiers
8.2.12	CAQ (Computer-Aided Quality)
8.2.13	CCD cameras
8.2.14	CIM (Computer Integrated Manufacturing)
8.2.15	Computerised tomography
8.2.16	Elongation and stress determination methods
8.2.17	Elongation gauges
8.2.18	Densitometers, leak-testing installations and devices
8.2.19	Leak testing
8.2.20	Thickness measuring devices
8.2.21	Dose and dose-rate measuring devices
8.2.22	Darkroom facilities
8.2.23	Radiographic testing
8.2.24	Real-time radiographic systems
8.2.25	Residual-stress measuring devices
8.2.26	Penetration testing installations
8.2.27	Electrical testing
8.2.28	Electrodynamic testing
8.2.29	Electronic measuring devices
8.2.30	Borescopes
8.2.31	Demagnetization installations
8.2.32	Dye penetrants
8.2.33	Dye-penetration testing
8.2.34	Color measuring devices
8.2.35	Field-strength measuring devices
8.2.36	Production measuring devices
8.2.37	Production monitoring
8.2.38	Configuration measuring devices
8.2.39	Photographic devices
8.2.40	Filling-level measuring devices
8.2.41	Gammagraphic devices
8.2.42	Structural testing
8.2.43	Hardness testing
8.2.44	ICP spectrometers
8.2.45	Information systems
8.2.46	Infrared measurement technology
8.2.47	Infrared thermography
8.2.48	Calibration
8.2.49	Parameter determination
8.2.50	Nuclear magnetic resonance
8.2.51	Corrosion testing
8.2.52	Laboratory quality assurance
8.2.53	Laminography
8.2.54	Length measuring and testing devices
8.2.55	Laser-beam testing
8.2.56	Laser technology
8.2.57	Leak detection
8.2.58	Light measuring devices
8.2.59	Light microscopy
8.2.60	Magnetic testing
8.2.61	Magnetic powders
8.2.62	Magnetic-powder testing devices and installations
8.2.63	Manipulators
8.2.64	Marking systems
8.2.65	Mathematics, statistics and computers
8.2.66	Measured-data collection
8.2.67	Measuring systems
8.2.68	Metallography
8.2.69	Metallographic tests
8.2.70	Microfocus X-ray installations
8.2.71	Mobile spectrometers
8.2.72	Neutron-beam testing
8.2.73	Surface testing devices
8.2.74	Optical testing
8.2.75	Penetration installations and penetrants
8.2.76	Physical tests
8.2.77	Testing documentation
8.2.78	Testing machines
8.2.79	Testing agents for magnetic-powder testing
8.2.80	Testing-agent monitoring
8.2.81	Testing of welded joints
8.2.82	Quality control
8.2.83	Quality planning
8.2.84	Quality assurance in process monitoring
8.2.85	Quality assurance in repair/maintenance
8.2.86	Quality assurance in series production
8.2.87	Radioactive materials
8.2.88	Radiography
8.2.89	Scanning electron microscopy
8.2.90	X-ray apparatus
8.2.91	X-ray diffractometers
8.2.92	X-ray film
8.2.93	X-ray film viewers
8.2.94	X-ray fluorescence analysis
8.2.95	X-ray tubes
8.2.96	X-ray carriages
8.2.97	X-ray accessories
8.2.98	Scanners
8.2.99	Damage analysis
8.2.100	Acoustic emission analysis
8.2.101	Acoustic emission devices
8.2.102	Coat-thickness measuring devices
8.2.103	Weld testing
8.2.104	Vibration measurement
8.2.105	Safety technology
8.2.106	Visual inspection
8.2.107	Signal and image processing
8.2.108	Computational modeling / simulation
8.2.109	Software packages
8.2.110	Miscellaneous non-destructive testing procedures
8.2.111	Spectral-analysis devices
8.2.112	Spectral analysis
8.2.113	Spectral photometers
8.2.114	Spectrometers
8.2.115	Control systems
8.2.116	Radiation measuring devices
8.2.117	Radiation-protection measuring devices, components and materials
8.2.118	Stray-flux testing devices
8.2.119	Temperature measuring devices
8.2.120	Thermal analysis
8.2.121	Thermal testing

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8.2.122	Thermographic installations
8.2.123	Ultrasonic applications
8.2.124	Ultrasonic testing devices and installations
8.2.125	Ultrasonic cleaning installations
8.2.126	Ultrasonic transducers
8.2.127	Ultrasonic testing
8.2.128	Wear tests / erosion tests
8.2.129	Confusion testing
8.2.130	Vibration analysis
8.2.131	Video installations and cameras
8.2.132	Thermal conductivity measuring devices
8.2.133	Materials testing
8.2.134	Eddy-current testing devices and installations
8.2.135	Eddy-current testing
8.2.136	Non-destructive testing
8.2.137	Accessories for testing facilities
8.3	**Destructive Testing**
8.3.1	Dynamic fracture testing (Battelle, drop-weight, double-torsion, explosion-bulge, Esso notched-bar bend impact, notched-bar tensile impact, Niblink and Robertson tests)
8.3.2	Hardness testing
8.3.3	Resources, automation and computer assistance for destructive testing
8.3.4	Kic test and crack-opening displacement (COD) test
8.3.5	Weldability testing (cold-cracking and hot-cracking testing and others)
8.3.6	Miscellaneous and mechanical-technological tests
8.3.7	Static fracture testing (longitudinal-weld bend, bursting, deep-notch, bend, notched-bar bend, notched-bar tensile and wide-plate tests)
8.3.8	Universal testing facilities
8.3.9	Creep rupture and fatigue-endurance strength testing and vibration-fatigue testing installations
8.3.10	Tensile, pressure, torsion and bend testing
8.4	**Materials Testing**
8.4.1	Plant monitoring and production monitoring
8.4.2	Parameter determination
8.4.3	Quality and defect testing
8.4.4	Environmental-protection tests
8.4.5	Components to be tested (areas of application)
8.4.6	Properties to be tested
8.4.7	Materials to be tested
8.5	**Testing Procedures & Facilities**
8.5.1	Component testing / design testing
8.5.2	Fracture-mechanical parameters
8.5.3	Chemical tests
8.5.4	Strength and toughness
8.5.5	Structural investigations
8.5.6	Resources for metallography (etching agents, polishing agents and embedding compounds)
8.5.7	Mechanical testing procedures
8.5.8	Physical tests
8.5.9	Weldability tests
8.5.10	Technological testing procedures
8.6	**General Quality Assurance**
8.6.1	A+F in QM
8.6.2	Bilatrometry
8.6.3	Ergonomics of workplaces
8.6.4	Instructions for use
8.6.5	Mathematics, statistics and computer
8.6.6	Measurement technology
8.6.7	Organization for QA and insurance policies
8.6.8	Quality planning and assessment
8.6.9	Quality assurance in packing, storage and transport
8.6.10	Quality assurance in small and medium-sized businesses and in skilled trades
8.6.11	Quality assurance of software

9 Equipment, Safety, Health

9.1	**Workshop and workplace equipment**
9.1.1	Separations for industrial robots (for welding and cutting)
9.1.2	Separations against high-energy radiation (e.g. X-ray and laser radiation)
9.1.3	Gas cylinder storage, bottle trolley, anti-tip device, trolley for hoses, service reel, etc.
9.1.4	Heat protection blankets, curtains and pillows
9.1.5	Welding protection separations, transparent (foils and lamellas)
9.1.6	Welding protection booths, screens
9.1.7	Welding table
9.1.8	Safety devices for robot partitions (door locks, safety edges, etc.)
9.1.9	Other protection and safety devices (fire extinguishers, fire blankets, information signs, etc.)
9.1.10	Other workshop equipment, gas supply, stationary vacuum cleaning systems or similar
9.1.11	Workbenches, cabinets, chairs, standing aids, etc.
9.1.12	Tools, tool trolley
9.2	**Extraction and Ventilation Systems**
9.2.1	Extraction units, single user, low vacuum
9.2.2	Extraction units, single user, high vacuum
9.2.3	Capture units, fixed
9.2.4	Capture units, portable, high vacuum
9.2.5	Capture units, portable, low vacuum
9.2.6	Stationary systems (e.g. ducting for displacement or layer ventilation)
9.2.7	Portable room ventilation systems (e.g. filter towers)
9.2.8	Safety devices against fire and explosion
9.2.9	Systems for monitoring room air quality with and without control function
9.2.10	Central extraction systems, high vacuum
9.2.11	Central extraction systems, low vacuum
9.2.12	Accessories and spare parts for filter systems and devices
9.2.13	Supply air and heat recovery systems
9.3	**Personal Protective Equipment**
9.3.1	Active respiratory protection (ventilated helmets)
9.3.2	Eye protection, active, helmets with self-darkening UV protection
9.3.3	Eye protection, passive, welding screens, shields, glasses
9.3.4	Disposable and Reusable ear plugs, ear muffs
9.3.5	First aid equipment such as bandages, eye drops, ointments, etc., as well as defibrillators

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9.3.6	Individually adapted hearing protection (earmolds)
9.3.7	Laser goggles
9.3.8	Passive respiratory protection (filters, masks)
9.3.9	Shoes, boots, gloves, aprons, other leather articles
9.3.10	Protective helmets with / without hearing protection, but without UV protection
9.3.11	Protective clothing (jackets, trousers)
9.4	Accessories and Auxiliary Equipment
9.4.1	Balancer systems (e.g. for spot welding guns)
9.4.2	Weld backings and adhesive tapes (for one sided welding)
9.4.3	Bending, pipe bending
9.4.4	Torch and welding head manipulation systems
9.4.5	Torch-neck changing systems
9.4.6	Torch cleaning, automatic torch cleaning systems
9.4.7	Controlled feeding devices (e.g. for adhesives, solders and powders)
9.4.8	Wire-guide spiral
9.4.9	Wire feeders
9.4.10	Turntables and tilt-turn positioners, lift tables
9.4.11	Pressure cylinders for pressure and resistance welding
9.4.12	Systems for feeding, positioning, tipping or conveying
9.4.13	Workpiece storage equipment (belts, pallets, stores)
9.4.14	Resistance welding electrodes
9.4.15	TIG (GTA) welding electrodes
9.4.16	Electrode holders
9.4.17	Electrode grinding devices
9.4.18	Materials for resistance welding electrodes
9.4.19	Gas lighters
9.4.20	Globoidal drive
9.4.21	Casting
9.4.22	Clamps (terminals, earthing, workpiece) and polarity testers
9.4.23	Cooling systems
9.4.24	Magnets for welding, magnetic handling equipment
9.4.25	Magnetic valves
9.4.26	Assembly systems, assembling and positioning devices
9.4.27	Seam tracking and welding head guidance systems
9.4.28	Optics for laser beam welding and/or cutting
9.4.29	Plasma valves
9.4.30	Pumps
9.4.31	Spot welding guns
9.4.32	Cold dressing
9.4.33	Robot holding bracket
9.4.34	Chipping hammers and wire brushes
9.4.35	Hoses, hose couplings, hose connections, hose packages
9.4.36	Hose press
9.4.37	Welding-sets, diesel or gasoline driven
9.4.38	Filler, wire spools
9.4.39	Welding flux feeding and recovery devices
9.4.40	Welding mirrors
9.4.41	Welding leads and connectors
9.4.42	Secondary cables for resistance welding
9.4.43	Sintering and hot isostatic pressing
9.4.44	Other accessories, pumps and other auxiliary equipment
9.4.45	Clamping systems, clamping elements
9.4.46	Steel-wire brushes and hand brushes for welds
9.4.47	Drying cabinets (electrodes and fluxes), heated quivers, baking ovens
9.4.48	Milling, compressing, drawing
9.4.49	Water-, oil-, air-cooler
9.4.50	Workpiece handling systems (lift and shift systems, dial tables)
9.4.51	Tools for joint preparation: Deburring and edge milling machines
9.4.52	Tool changing systems
9.5	Gas Supply Systems and Equipment
9.5.1	Individual cylinders (pressure reducers and anti-flashback and backflow devices)
9.5.2	Equipment for gas take-off stations (stop valves, pressure regulators, gas mixers, safety devices, take-off boards)
9.5.3	Gas sources/tanks with pipework and valves (storage tanks, tankers, containers, cylinder racks and batteries, individual cylinders)
9.5.4	Special equipment and general accessories (automatic switching and pressure control systems, gas analyzers, pipe identification stickers, clamps etc.)
9.5.5	Central switching, pressure regulating and safety units, gas mixing units and valves for supply pipework
9.6	Adhesive Application and Dispensing Technology
9.6.1	Application systems
9.6.2	Automation
9.6.3	Metering appliances
9.6.4	Supply/Metering pumps
9.6.5	Cartridges
9.6.6	Mixers (dynamic, static)
9.6.7	Control system adhesive application
9.7	Production Equipment
9.7.1	Acetylene generators and filling stations
9.7.2	Conveying systems
9.7.3	Gas manufacturing and liquefying plants
9.7.4	Brazing filler and solder production plants
9.7.5	Welding wire production plants
9.7.6	Welding flux production plants
9.7.7	Welding electrode and flux cored wire production plants

10 Sub-contracting (services) / Digitisation

10.1	Sub-contracting – Processing of specific materials
10.1.1	General accessories
10.1.2	Other manufacturing processes
10.1.3	Health and safety – Welding fume extraction system
10.1.4	Coating by e.g. Thermal spraying, build-up welding
10.1.5	Gas supply
10.1.6	Adhesives
10.1.7	Welding of plastics
10.1.8	Brazing and Soldering
10.1.9	Mechanical joining
10.1.10	Personal protective equipment
10.1.11	Plant for the production
10.1.12	Coating systems
10.1.13	Metal and non-ferrous welding
10.1.14	Cutting
10.1.15	Consumables other than filler materials
10.1.16	Heat treating
10.1.17	Filler materials classified by types
10.1.18	Filler materials by material groups
10.1.19	Filler materials for thermal spraying

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10.2	**Services**
10.2.1	Training and education
10.2.2	Consultancy companies
10.2.3	Research and Development
10.2.4	Research institutes
10.2.5	Tests
10.2.6	Testing Technology – Testing Procedures/Testing Facilities
10.2.7	Quality Assurance
10.2.8	Societies and organizations
10.2.9	Certification
10.3	**Digitisation – Software**
10.3.1	CAD, CAM, CAQ, CIM and CAP systems
10.3.2	Data processing
10.3.3	Information systems
10.3.4	Calculation systems
10.3.5	Measurement and sensor technology
10.3.6	Computers and other hardware
10.3.7	Software
10.3.8	Control engineering
10.4	**Media**
10.4.1	Digital media
10.4.2	E-Learning
10.4.3	Trade journals / specialist books
10.4.4	Teaching media
10.4.5	Regulations