



## Company-specific services

### ■ Welding technology software

- The software development focuses on learning software and on software for the fields of quality assurance, technology and the management of welder and operator qualification tests for all materials

### ■ Process engineering/automation

- Testing of machines, components and materials
- Support for companies with regard to fabrication preparation, equipment testing, the selection of suitable installation engineering and the automation of joining technology processes

### ■ Personnel qualification specific to companies and tasks

### ■ Special welds

- Custom-built installations, repair and overhaul and the manufacture of prototypes/execution of zero series

### ■ Conferences/seminars

- Special conference: "Welding in Installation Engineering and Tank Construction"
- Special conference: "Resistance Welding"
- International conference: "Beam Technology"
- Expert conference: "Joining and Designing in Railway Vehicle Construction"
- Expert conference: "Wear Protection of Components by Deposition Welding"
- Expert conference: "Railway Welding Technology"
- Expert conference: "Welding in Maritime Technology and Civil Engineering"
- International expert conference: "Welding Trainer"
- Seminars about topical subject areas
- Customer-specific inhouse seminars

### ■ Who we are

GSI – Gesellschaft für Schweißtechnik International mbH was founded by the DVS – German Welding Society in 1999. It is an amalgamation of efficient Welding Training and Research Institutes and experienced Welding Training Centres at home and abroad with over 80 years of experience in welding, joining and testing technologies. Together with cooperating facilities, it forms the GSI group. GSI is a non-profit-making limited liability company (GmbH) which works for individuals, skilled trade businesses, industrial firms, authorities, research bodies and public facilities.

### ■ Our services – Your advantages

- Education and training according to national and international recognised guidelines
- IIW and EWF training courses are staged according to international harmonised training guidelines which lead to the mutual recognition of the qualifications in more than 50 countries
- e-Learning ranges on offer, inhouse training courses and firm-specific training courses
- Education and training at home and abroad in German, English and other languages
- Accredited testing laboratories (DIN EN ISO/IEC 17025)
- Recognised testing and certification agency according to the Pressure Equipment Directive
- Stationary and mobile tests on components
- Quick technology transfer from research and development to operational application as well as pilot applications
- Contract research and development
- Comprehensive investment advice



### ■ Contacts

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## Theoretical and practical training

Training assures future



## Training and further education

### Individual welder training oriented to learning progress

- Manual metal arc welding
- Gas-shielded metal arc welding
- Gas-shielded tungsten arc welding
- Gas welding

All according to internationally recognised welder qualification tests (e.g. DIN EN ISO 9606-1, DIN EN ISO 9606-2 and others)

### Certified employment promotion measures according to the Accreditation and Authorisation Regulation for Employment Promotion (AZAV)

- Welder training according to DVS-EWF/IIW guidelines
- Flame cutting and weld preparation
- Prestraightening according to isometric drawing
- Welder training with German lessons related to occupations and subjects
- Retraining: Installation Mechanic – Deployment field: Welding Technology
- Retraining: Structural Mechanic – Deployment field: Welding Technology
- Retraining: Machining Mechanic
- Combined training in all metal technology occupations

### Special training courses

- Welding with flux-cored wires
- Welding with energy-reduced arcs
- Reinforcing steel welding
- Stud welding
- Friction welding

- Friction stir welding
- Underwater welding
- Welding of components on aircraft
- Railway welding
- Robot welding
- Plastics welding
- Laser beam welding/cutting/surface treatment
- Brazing
- Thermal spraying
- Adhesive bonding
- Mechanical joining (amongst others)
- Certification of specialist welding personnel according to the Pressure Equipment Directive
- Operator qualification test according to DIN EN ISO 14732

### Training, qualification testing and certification in non-destructive testing (NDT) according to DIN EN ISO 9712

- Visual testing, VT 1-3
- Magnetic particle testing, MT 1-3
- Penetrant testing, PT 1-3
- Ultrasonic testing, UT 1-3
- Radiographic testing, RT 1-3
- Film evaluation, RT 2.FI

### Training of specialist welding personnel

- In presence and e-Learning courses, amongst others:
- DVS-IIW International Welding Engineer (IWE) (e-Learning)
  - DVS-IIW International Welding Technologist (IWT) (e-Learning)

- DVS-IIW International Welding Specialist (IWS) (e-Learning)
- DVS-PersZert certification of International Welding Coordinators
- DVS-IIW International Welding Practitioner
- DVS-IIW/EWF International Welding Inspector (IWI) (e-Learning)
- DVS Welding Designer (e-Learning)
- DVS Welding Shop Foreman (e-Learning)
- DVS Welding Instructor (certification)
- DVS-EWF European Welding Specialist and Practitioner for Resistance Welding (EWS-RW/EWP-RW)
- Tailor-made company-specific e-Learning solutions for specialist welding personnel

### SCC (safety certificate contractors) training for managers and operative employees

### Training of specialist joining personnel

- DVS-EWF European Adhesive Engineer (EAE)
- DVS-EWF European Adhesive Bonder (EAB)
- DVS-EWF European Adhesive Specialist (EAS)
- DVS-EWF European Thermal Sprayer (ETS)
- DVS-EWF European Thermal Spraying Specialist (ETSS)

### Training of specialist corrosion protection personnel

- Coating Inspector according to FROSIO
- Master of Engineering in Surface Technology and Corrosion Protection



## Materials and procedures

Research, development and technology for optimum fabrication



## Research and development

### Processes and procedures

- Arc welding: gas-shielded arc welding, welding with an energy-reduced arc, plasma welding, orbital welding, drawn arc and initial contact capacitor discharge stud welding, magnetically impelled arc butt welding and submerged arc welding
- Resistance welding: spot, projection and roller seam welding
- Pressure and flash butt welding
- Laser beam materials processing: laser beam welding, inscription, hardening and brazing/soldering as well as laser-arc hybrid welding
- Electron beam welding
- Magnetic pulse welding
- Friction welding: friction spin welding, multiorbital friction welding, friction spot welding, linear friction welding, friction stud welding and friction stir welding
- Ultrasonic welding
- Thermal cutting: flame, plasma and laser beam cutting
- Brazing/soldering: flame brazing/soldering, induction brazing/soldering, furnace brazing/soldering, GMA brazing/soldering and resistance brazing/soldering
- Coating and corrosion protection: tandem GMA surface welding, single-wire GMA welding, roller seam surface welding and hot wire TIG welding
- Thermal spraying: arc spraying, flame spraying, plasma spraying, HVOF spraying and cold gas spraying

### Application-oriented research and development

- Development, optimisation and testing of new process and procedure variants
- Exploration of the material behaviour during welding/customer-specific applications
- Elaboration of fundamentals of the configuration of welded structures/structural configuration of welded components
- Simulation of temperature distribution, distortion, residual stress and structural condition

## Materials engineering

### Advice, expert reports and damage analytics

### Non-destructive and destructive tests on base materials and welded joints/assessment of the results/proposals for measures

### Manufacture of training and test pieces for targeted terms of reference of the companies

### Fatigue strength tests, also on large components

### Metallography, analytics and corrosion tests, weldability tests and fractography

### Investigation of coating systems

### Material acceptances as well as welder and operator qualification tests

### Simulation of materials, procedures and properties

### Accredited testing laboratories according to DIN EN ISO/IEC 17025

## Quality assurance

Quality assurance creates trust



## Quality assurance

### Certification according to

- DIN EN 1090-2, previously: DIN 18 800-7 (welding on steel structures/metal construction)
- DIN EN 1090-3, previously: DIN V 4113-3 (welding on aluminium structures/metal construction)
- DIN EN ISO 17660-1 and -2 (reinforcing steel)
- DIN 6701-2 (adhesive bonding in railway vehicle construction)
- DIN 2303 (welding in the military technology field)

### Auditing within the framework of certification measures via DVS ZERT GmbH

- DIN EN ISO 9001 (QM systems)
- DIN EN 3834 (quality requirements in welding technology)
- DIN EN 1090-1 (certification of the factory production control systems for manufacturers of steel and aluminium structures)
- DIN EN 15085 and DIN 27201-6 (welding of railway vehicle)
- SCC (safety certificate contractors)

### Testing, monitoring and certification agency for construction products in metal construction and according to the Pressure Equipment Directive

### Advice for applications of the ASME Boiler and Pressure Vessel Code (USA)

### Services according to the set of rules of the National Association of NDT and Welding (NAKS) in Russia (attestation measures for products and services)

### Testing laboratory for railway welding consumables

### Qualification of welding procedures

- e.g. DIN EN ISO 15613, DIN EN ISO 15614, DIN EN 14555 etc.

### Construction and fabrication monitoring

- Construction-accompanying monitoring of welding and corrosion protection work
- Inspection of steel structures and miscellaneous construction products in the construction supervision field

### Expert reports in cases of damage and support with regard to welding technology questions

## Process optimisation measures

Process optimisation for cost reduction



## Process optimisation

### Potential analyses

- Improvement potentials in business and fabrication sequences for cost reduction

### SixSigma and lean management methods

- Improvement in communication and transparency for team control (teamboard)
- Development and consolidation of skills and capabilities within teams
- Establishing of process-related standard approaches
- Risk analysis and assessment of business processes
- Process analysis and optimisation (value stream analysis)

### SixSigma projects

- Execution of complete SixSigma projects
- Support during the project execution by experienced project managers or project members
- Elaboration of business cases as the basis for future SixSigma projects