German Plastics Center Testing · Education · Research · Certification · Networking

K NOW EDGE CREATES

Training courses

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SKZ

SKA



SKZ – KFE gGmbH

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Our general terms and conditions apply. Our terms and conditions can be found here: www.skz.de/agb

CHANGE IS COMING. ONE FACT REMAINS. Quality requires qualification

Nowadays it is getting more difficult to make a difference. Suppliers need to keep a very high level to satisfy customers and fulfill specifications. The demand for high quality standards is on the rise and more and more often it comes down to the human factor. Or let's say one of many human factors.

Starting with the developers and the engineers designing the products to the workers calibrating machinery and people ensuring quality control, the human factor is the key to quality assurance.

To provide you with this advantage SKZ has been offering trainings and educations for professionals in the plastics industry for 60 years now. Customers all over the world, for example in the area of Europe, Dubai, China or even South America, rely on us. We will take care of your needs and train your employees in your preferred area, in Würzburg or in our other locations in Germany. Everything you need to enable your human factor to make the difference you will find in our catalog.

Remember, quality requires qualifications and knowledge opens doors. Even those which may have seemed locked.

We are looking forward to transferring the knowledge and helping to improve good work of your employees.



Matthias Ruff



Alexander Hefner Education Manager

"KNOWING IS NOT ENOUGH – WE MUST **APPLY**.

WANTING IS Not Enough -We must do"

powered by

JOHANN WOLFGANG VON GOETHE

LEARN. KNOW. IMPLEMENT. From basic to expert knowledge.

Are your employees already experts, masters or professionals in their field? Then it will be time for them to become students again. Because in today's fast-paced world of plastics a standstill in knowledge means at the same time a step backwards. And who wants to miss the next big development? You know yourself best where the problem is and where the journey is going. As an experienced educational partner, SKZ will take you by the hand and mediate your employees with creativity and verve both well-founded basic knowledge as well as innovative solutions for specific questions.

"I really liked the practical relevance and the explanation of the implementation using everyday examples. "

Participant 2020

"Smooth operation even with the large number of participants"

Participant 2020

With its six locations and over 400 member companies within the network SKZ is involved in a wide range of research and development activities. Thereby you have an individual education partner with a wide range of offers at your side, who accompanies you enthusiastically in these challenges.



EXPERIENCE FOR OVER 50 YEARS **600 EVENTS** PER YEAR **ANNUAL 10.000 INSPIRED PARTICIPANTS INDUSTRY FOCUS** PLASTICS INDUSTRY ASSURED QUALITY ACCORDING TO ISO 9001

YOU CAN COUNT ON IT. The industry trusts SKZ.

Since the founding of SKZ in 1961, our mission has been the further education of engineers and specialists in the plastics industry.

Every year, we welcome over 10,000 participants at our 6 training locations in Germany - and many more at our in-house training courses worldwide.

For example, more than 3,500 industrial foremen have already signed up for the SKZ and IHK training and form an active alumni community - in the Federation of Master Craftsmen in Plastics.

A genuine practical component in the courses is a central quality feature for effective continuing education. For this reason, SKZ operates its own pilot plants at all its locations.

Because skills emerge from regular practice

Our customers appreciate the practical expertise of our course instructors and speakers. The intensive networking of our education sector with the industry and our own research and development activities guarantee that.



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Basics of plastic materials

₽ PLASTIC TECHNOLOGY

WHY SHOULD YOU ATTEND? DATES **DURATION:** 2 days The seminar imparts basic knowledge about thermoplastic materials. Increased on request attention is paid to the mass-produced polymers and engineering thermoplastics. You will get to know material classes, property profiles and the areas of application of the respective polymer types. **COURSE FACTS** individual price upon request Ă Ē Ô target group level theory/practice CONTENT » Production, composition, structure and behavior of plastics » Characteristic values of plastic materials » Overview of semi-crystalline thermoplastics » Overview of amorphous thermoplastics Subject to changes » Identification of plastics with simple methods **REGISTRATION PRACTICAL TRAINING INFORMATION** » Workshop on material selection using specimens www.skz.de/worldwide **ICONS** basic advanced expert practical training

 ICONS
 Image: Desire
 Image: Desire

Basics of plastics technology

¢ PLASTIC TECHNOLOGY



The quicker the better. For registrations up to 12 weeks before the course we offer an early bird discount of 10 %. Prices plus VAT.

S INJECTION MOLDING

Injection molding operator

WHY SHOULD YOU ATTEND? DATES **DURATION:** 5 days The qualification as an injection molding operator enables you to operate and monitor On request injection molding machines. You will get to know all safety-relevant criteria for molds and machines, the injection molding process and thermoplastic materials in practice. **COURSE FACTS** individual price upon request L target group level theory/practice CONTENT Material science of polymers » Manufacturing, structure and properties of polymers

- » Preparation, drying
- Injection molding technology
- » Machine and process parameters and their influence on the quality of the injection molded product
- » Influence on shrinkage
- » Inner pressure measurement

PRACTICAL TRAINING

- » Preparation for mold setting and mold changing Injection mold installation and closing unit adjustment, calculation of the required clamping force, mold protection adjustment
- » Setting up the injection unit

Determination of the filling point (volumetric mold filling without holding pressure), injection speed variation, determination of the required injection pressure, holding pressure, protection of the injection phase, optimization of the holding pressure time, determination of sealing time, effect of the decompression and the determination of the correct decompression, optimization of the process, cycle time, changing of the mold and materials, influence of the holding pressure on weight and shrinkage, mold temperature, cooling time and demolding temperature

ICONS	basic	advanced	expert	amount of practical training
	safety equipment necessary	📝 exam	SKZ certificate	inhouse offer possible
ono prior know- ledge necessary	specialists technicians craftsmer	n 📑 engineer bachelor	management · sales · assistant	senior management

Subject to changes

REGISTRATION INFORMATION

www.skz.de/worldwide



Injection molding defects

Causes and troubleshooting

G INJECTION MOLDING



The quicker the better. For registrations up to 12 weeks before the course we offer an early bird discount of 10 %. Prices plus VAT.

specialists · technicians · craftsmen

ono prior know-ledge necessary

SKZ certificate

€ management sales assistant

senior management

Systematic sampling (DOE) Process optimization using sensor technology

Strate S

WHY SHOULD YOU ATTEND?

Injection molding process is becoming increasingly complex. The course teaches you in a simple way the basic processes and statistical experiments for determination of the optimal machine settings. To sample a mold does not mean to produce parts; it means to look for molding defects.



CONTENT

- » Starting of the injection mold
- » Preparation of the material, mold and machine
- » Determination of the injection and holding phase / process window
- » Calculation of clamping force and cycle time
- » Process indexes: normal distribution, standard deviation, controlled process, test methods, Quality assurance, reliability of measuring methods, capable process, Cp- and Cpk –values

Subject to changes

DATES

On request

PRACTICAL TRAINING

- » Control of the fitting dimensions of the mold
- » Determination of injection and holding phase
- » Determination of the clamping force and control of the parting line
- » Determination of the process window, production of tests series
- » Writing of a sampling report, description of the errors of the mold
- » Evaluation of test series, process reliability determination
- » Design of Experiments (DoE)

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- » Plan preparation and parts manufacturing according to the plan
- » Parts measuring and analyze of the process

ICONS	basic	advanced	expert	T amount of practical training
	safety equipment necessary	exam	SKZ certificate	inhouse offer possible
ono prior know- ledge necessary	specialists · technicians · craftsmen	engineer · bachelor	■ management sales assistant	senior management

The quicker the better. For registrations up to 12 weeks before the course we offer an early bird discount of 10 %. Prices plus VAT.

REGISTRATION INFORMATION

DURATION: 3 days

www.skz.de/worldwide



Plastic injection molding seminar

WHY SHOULD YOU ATTEND?	DATES
	On request
COURSE FACTS individual price upon request	
target group level theory/practice 🔂 🗅	
CONTENT	

- » Material science and technology: thermoplastics, thermosets, TPE's, biopolymers, purging compounds, masterbatches; drying, properties and processing instructions of the most important thermoplastics
- » Injection molding machine: clamping units, injection units, molds, return valves, drive concepts: electrical, hydraulic machines
- » Euromap 60 (energy consumption)
- » Injection molding process: Injection molding cycle, shrinkage warpage, pvT-diagram, causes of warpage
- » Special processes: multi-component injection molding, gas- water injection technology (GIT, WIT), foaming process, variotherm tempering, decoration (IMD, IML and IM), processing of thermosets.
- » Welding and adhesive bonding of the injection molded parts.

ICONS	basic	advanced	expert	amount of practical training
	safety equipment necessary	exam	SKZ certificate	inhouse offer possible
ono prior know- ledge necessary	specialists technicians craftsmen	engineer · bachelor	t management - sales - assistant	senior management

Subject to changes



DURATION: 2 days



The quicker the better. For registrations up to 12 weeks before the course we offer an early bird discount of 10 %. Prices plus VAT.



Basics of extrusion technology

COMPOUNDING AND EXTRUSION

DATES **DURATION:** 2 days WHY SHOULD YOU ATTEND? This course will provide you with a broad knowledge of extrusion technology. You will on request learn important process correlations as well as machine and tool technology basics for the main types of extrusion. The basics imparted in connection with numerous tips in the practical part enable you to work more efficiently and to complete the all-round view of extrusion. **COURSE FACTS** individual price upon request ſĽĺ L target group level theory/practice 17 CONTENT » Material science » Common plastic materials for extrusion » Mechanical engineering basics » Screw and die technology Subject to changes » Peripheral equipment **REGISTRATION PRACTICAL TRAINING INFORMATION** » Demonstration experiments on the extrusion line www.skz.de/worldwide

 ICONS
 Image: safety equipment necessary
 Image: safety equipment necessary<

The quicker the better. For registrations up to 12 weeks before the course we offer an early bird discount of 10 %. Prices plus VAT.

Basics of compounding technology

WHY SHOULD YOU ATTEND? DATES **DURATION:** 2 days This course is ideal for gaining initial experience in compounding. You will learn On request the essentials of compounding technology and understand the correlations during practical experiments. You will get an overview of the various machine concepts for compounding and the various possibilities to modify plastic materials through additives and fillers. **COURSE FACTS** individual price upon request Ĥ ĔÍ L target group level theory/practice CONTENT » Material science » Construction and differences in compounding lines » Setting parameters on the compounding line » Additives and fillers Subject to changes » Dosing and pelletizing **REGISTRATION PRACTICAL TRAINING INFORMATION** » Demonstration experiments on the compounding line www.skz.de/worldwide **ICONS basic** advanced expert amount of practical training safety equipment necessary inhouse offer possible exam SKZ certificate

senior management

€ management sales assistant

specialists· technicians·craftsmen

ono prior knowledge necessary

Basics of thermoforming

COMPOUNDING AND EXTRUSION

WHY SHOULD YOU ATTEND? DATES **DURATION:** 1.5 days This course is ideal for gaining and expanding experience in the field of thermoforon request ming. You will learn the essentials of thermoforming and understand the correlations during practical experiments. **COURSE FACTS** individual price **H** upon request Ĕ L target group level theory/practice CONTENT » Common materials for thermoforming » Construction and differences in thermoforming lines » Process sequence and process flow » Setting parameters and their influence Subject to changes **REGISTRATION PRACTICAL TRAINING INFORMATION** » Demonstration experiments on the thermoforming machine www.skz.de/worldwide **ICONS** amount of practical training **basic** advanced expert 📝 exam SKZ certificate

inhouse offer possible safety equipment necessary no prior know-ledge necessary specialists· technicians·craftsmen senior management € management sales assistant ĕ

The quicker the better. For registrations up to 12 weeks before the course we offer an early bird discount of 10 %. Prices plus VAT.

Basics of blow molding

C COMPOUNDING AND EXTRUSION

WHY SHOULD YOU ATTEND? DATES **DURATION:** 1.5 days Extrusion blow molding is an important process for the production of plastic parts On request (e.g. cosmetic packaging, hollow parts etc.). In this course, you will learn the essentials of the blow molding of plastics products. You will get to know the machine technology in theory and practice and understand the correlations of materials and different process steps. **COURSE FACTS** individual price **H** upon request ĔÍ L target group level theory/practice CONTENT » Materials for the extrusion blow molding and their properties » Machine technology for blow molding » Tools for blow molding » Process flow and setting parameters Subject to changes **REGISTRATION PRACTICAL TRAINING INFORMATION** » Demonstration experiments on the extrusion blow molding line www.skz.de/worldwide

ICONS	basic	advanced	expert	amount of practical training
	safety equipment necessary	exam	SKZ certificate	inhouse offer possible
ono prior know- ledge necessary	specialists · technicians · craftsmen	engineer · bachelor	sales assistant	senior managemen

The quicker the better. For registrations up to 12 weeks before the course we offer an early bird discount of 10 %. Prices plus VAT.



Introduction into composite technology

ABOUT THIS COURSE This course is designed for decision-makers, purchasers, production planners, who want to get an overview of relevant market data as well as all necessary consumable materials and the common processing techniques in a short time. WHO SHOULD ATTEND? Executives, decision makers, purchasers, newcomers and anyone interested in getting an overview on this subject.	DATES On request	DURATION: 3 days
THEORY		
 » Application and characteristics of fiber composite materials: areas of application » Overview of matrix systems: resin types and application, standard and special resins 		This course is exempt from sales tax.
	individ	dual price
» Overview of reinforcing fibers and textile semi-finished products: fiber types and application, glass, carbon and aramid fibers	upon	
» Overview of processing methods » From hand laminate to prepreg processing		
» Construction and technology: sandwich construction	R I IN	EGISTRATION
PRACTICAL TRAINING	WWW	v.skz.de/worldwide
 » Components manufacturing by various processes: hand lay up, vacuum infusion, prepreg technology, pressing technology » Error analysis » Processing instructions for all procedures » User-specific fiber composite applications 		
🕒 Safety shoes 🕌 Work clothes 📄 Certificate course 🏠 Inhouse possible 💽 Scheduled monito-		12 Mar

Processing of composites

Basic knowledge

i COMPOSITES

DATES **DURATION:** 5 days **ABOUT THIS COURSE** The intensive course offers the possibility to gain the extensive knowledge on On request fiber composites in a compact form and thus to provide an overview of the current state of the art. WHO SHOULD ATTEND? Specialists from the apparatus, plant and pipeline construction as well as automotive and railway industry, manufacturers of sports equipment and boats, wind energy and aerospace industry. Members of all technical professions working with fiber composites. THEORY This course is exempt from sales tax. » Fiber composites essentials: construction, characteristics, applications » Matrix systems: reaction resins and reactants, reaction processes and influences » Reinforcing fibers and textile semi- finished products: individual price upon request Glass fiber, carbon fiber and aramid fiber • Roving, mats, fabrics and non-crimped fabrics L Additives » Security measures and job requirements: health and environmental protection, workplace safety REGISTRATION » Processing of thin layers: applications and processing of gelcoat and topcoat, **INFORMATION** errors and their prevention » Additives www.skz.de/worldwide • Filler, colorant, release agents, thixotropic Solvent and detergent » Core materials and sandwich construction PRACTICAL TRAINING » Manufacturing of thermosetting resin » Determination of pot and work life » Manufacturing of flat parts Simple lamination · Lamination with gelcoat Lamination, symmetric construction with gelcoat, mats and fabrics Sandwich construction » Manufacturing of parts in molds Simple negative mold subject to changes Scheduled monito-ring possible nhouse possible □ Safety shoes Mork clothes Certificate course

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Plastics laminators and adhesive bonders according to DVS 2290

ECOMPOSITES

DURATION: 10 days **ABOUT THIS COURSE** DATES The preparatory course follows the DVS rules and offers the opportunity to get com-On request prehensive knowledge on fiber composites. The aim is to provide a comprehensive overview of the current state of the art in a compact form. The course includes a theoretical and a practical examination according to DVS 2220. After successful examination, participants receive a DVS certificate. WHO SHOULD ATTEND? Specialists from the apparatus, plant and pipeline construction as well as automotive and railway industry, manufacturers of sports equipment and boats, wind energy and aerospace industry. Members of all technical professions working with fiber composites. THEORY Written and practical exam This course is exempt from sales tax. » Material science, general principals » Reaction resins UP, EP, VE and post curing » Reinforcing materials and additives individual price upon request » Environmental protection and workplace safety » Processing of fiber-reinforced plastics (FRP) L » Hand lamination process » Gelcoat, topcoat » Fillers and auxiliary agents REGISTRATION » Properties of reinforced plastic materials and design regulations **INFORMATION** » Sandwich components » Repair techniques, adhesive bonding www.skz.de/worldwide » Further manufacturing processes of composites » Machining of FRP-parts » GRP-pipes and joints of pipes » Overview of testing methods PRACTICAL TRAINING » Manufacturing of resin formulations Determination of pot and work life » Laminating exercises: manufacturing of flat parts, manufacturing of spherical parts, manufacturing of sandwich constructions » Joining and repair techniques for reinforced plastic parts: manufacturing of laminate joints, manufacturing of laminate pipe joints, manufacturing of adhesive joints pipe/fitting, repair of spherical parts subject to changes Scheduled monito-ring possible □ Safety shoes Work clothes Certificate course nhouse possible

Repair of fiber-reinforced plastics

i COMPOSITES

DATES **DURATION:** 5 days **ABOUT THIS COURSE** Besides high quality manufacturing processes, methods for repair and maintenance On request of composite structures play a significant role along the composite value chain. During this course, participants will obtain special knowledge reinforced with skilled manual work. Various repair methods for carbon and glass fiber-reinforced plastics are enhanced by numerous practical exercises. WHO SHOULD ATTEND? Skilled workers from the composite industry, interested parties, as well as everyone intending to deal with repair principles in a practical way. THEORY This course is exempt from sales tax. » Basics of repair technology: applications and limitations » Inspection technology and fault detection » Damages: causes, forms of damage individual price upon request » Repair parameters: choice of material, pre-treatment, finish » Technology: reconstruction of laminates L » Error prevention » Quality assurance REGISTRATION **INFORMATION** PRACTICAL TRAINING www.skz.de/worldwide » Material removal: chipping technology » Surface preparation: grinding, cleaning, activating » Repair of simulated damages usually occurring in practice: reconstruction of laminates » Repair using vacuum technology: cacuum build-up, repair procedure » Error prevention and typical approaches subject to changes Scheduled monito-ring possible ☐ Safety shoes Inhouse possible Mork clothes Certificate course

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Infusion technology for composites Specialized knowledge

COMPOSITES

30

ABOUT THIS COURSE Manufacturing of composite components by vacuum infusion process is an ideal way to reduce component weight and, at the same time, to develop this processing technology at low cost. This course offers the opportunity to gain the necessary knowledge on this closed process in a compact way.	DATES DURATION: 5 days On request
WHO SHOULD ATTEND? Skilled workers from the composite industry, interested parties, as well as everyone intending to deal with vacuum infusion in a practical way.	
THEORY » Principles of vacuum infusion	This course is exempt from sales tax.
 » Tools: typical infusion lines » Periphery » Infusion and vacuum assemblies » Construction methods and technology: VAP technology » Controlling production parameters » Error prevention » Quality assurance PRACTICAL TRAINING » Manufacturing of flat and curved parts from GRP and CFRP » Manufacturing of monolithic and sandwich structures » Mold preparation: release agent » Vacuum build-up and control: tightness test, leak detection » Working according to the laying plan » Error prevention 	individual price upon request
	REGISTRATION INFORMATION www.skz.de/worldwide
subject to changes	
🗋 Safety shoes 🛱 Work clothes 📄 Certificate course 🔂 Inhouse possible Scheduled monito- ring possible	

Mold making using glass fiber-reinforced plastics

ECOMPOSITES

ABOUT THIS COURSE DATES **DURATION:** 3 days The quality of fiber-reinforced components mostly depends on the quality of the On request forming tools. To meet this requirements detailed knowledge on mold making is conveyed during this course. The production of high quality manufacturing equipment is addressed in theory practice, while the entire process is clearly explained. WHO SHOULD ATTEND? Instructors, master craftsmen and skilled workers from the sectors of boat building, rotor blade construction, automotive, railway and molded parts construction, as well as members of all technical professions working with fiber composites and the corresponding forming tools. THEORY This course is exempt from sales tax. » Material science, general principles Thermoplastics, thermosets, elastomers Structure, properties, applications individual price upon request » Resin systems for mold making: polyester resins (UP), epoxy resins (EP), vinyl ester resins (VE) L » Reinforcing fibers Glass fiber, carbon fiber, aramid fiber Property profiles of fiber reinforcements REGISTRATION » Typical processing methods for mold making **INFORMATION** • Hand laminating processes Tools, equipment, laminating technology www.skz.de/worldwide » Model and mold making: gelcoat layers and their processing Tasks and processing of gelcoat; errors and how to avoid them » Additives and design guidelines PRACTICAL TRAINING » Preparation of resin formulations » Lamination exercises: simple laminate, laminate with gelcoat » Preparation of a master form provided beforehand: structure, release agent, finish » Laminating a forming mold » Post-processing a forming mold » Repair techniques in GRP molds » Evaluating the mold » Theoretical exam as a performance review subject to changes

Certificate course 🔐 Inhouse possible

Scheduled monitoring possible

Prepreg: Components and tools made of CFRP

iiiii COMPOSITES

ABOUT THIS COURSE

Carbon fiber-reinforced composites have a large potential for lightweight construction due to their very high specific strength and stiffness. To use this aspect, the course gives a complete overview of the entire process chain. With its highly modern equipment, our technical center offers optimal conditions to understand all work steps from preparing of high quality prepreg materials to mold pretreatment and to curing in the autoclave – always combined with the corresponding theoretical knowledge.

WHO SHOULD ATTEND?

Skilled workers from the composite industry, interested parties and everyone intending to deal with prepreg in a practical way.

THEORY

- » Basics of prepreg: design and applications
- » Autoclave technology: control, parameters, temperature cycles
- » Periphery
- » Processing: lay up
- » Cutting: vacuum build-up
- » Construction methods and technology
- » Error prevention
- » Quality assurance
- » Tooling

PRACTICAL TRAINING

- » Manufacturing of flat and curved parts from GRP and CFRP
- » Manufacturing of monolithic and sandwich structures
- » Mold preparation
- » Vacuum build-up and control
- » Autoclave control
- » Working according to the laying plan

Mork clothes

Certificate course

» Chipping of CFRP



subject to changes

Scheduled monitoring possible

nhouse possible

□ Safety shoes

MAKE USE OFTHE NETWORKS IN THE PLASTICS INDUSTRY

The association for the promotion of the SKZ with more than 400 members currently constitutes the most important and dynamic network – when it comes to plastics. Our network reflects the wide range of the industry and thus offers excellent cooperation opportunities. Benefit from the numerous cooperation possibilities through networking with experts from all areas of the plastics industry.

Have influence on relevant R&D topics, derive intellectual poperty rights

- a nd commercialize them for your company.
- Get involved in a dynamic network that provides you easy access to experts
- a s well as to keycontacts in industry associations and politics.
- **Present** your company and your products to attract maximum attention within
- t he communications mediaof one of the most impotant industry networks.
- With your contribution, you support our commitment inteaching at universities and universities of applied scienœs; you promote the enthusiasm of students for technology
- a nd plastics, and enable SKZ to maintain its unique chnical equipment
- **Through your commitment in theSKZ bodies you make sure that you can continue**
- t o access all the services and equipmentyou need at SKZ in the futue.
- D You receive information, research results and impulses at fist hand. Additionally
- S KZ network members profit from discounts for training courses and conferences.

UN

Introduction into adhesive bonding technology

ADHESIVE BONDING

ABOUT THIS COURSE

This course offers a good start into adhesive technology. The various surface treatment methods and adhesives for different materials as well as their application possibilities are presented here.

WHO SHOULD ATTEND?

Engineers, technicians, designers, product developers, decision makers, manufacturing planners, quality assurance, application engineers, sales assistants, process managers.

DURATION: 3 days

On request

THEORY

- » Basic principles of adhesive technology
 - · Importance of adhesion, cohesion and wetting for adhesive bonding
 - Advantages and limits of application of adhesive technology
- » Surface treatment
 - Cleaning agents and methods
 - Methods of surface pretreatment
 - · Application of low-pressure plasma,
 - Atmospheric pressure plasma, corona, flaming, laser adhesives
 - Physical setting adhesives
 - Pressure sensitive adhesives (adhesive tapes, transfer adhesive tape)
 - Chemical curing adhesives (1K, 2K adhesives)
 - Selection criteria

PRACTICAL TRAINING

- » Quality control and testing
 - Destructive and non-destructive testing methods
 - Standards and quidelines
 - Importance of DIN 2304 for bonding processes
- » Occupational health and workplace safety
 - Requirements for adhesive workstation
 - Hazards and assessment of risks
- » Surface treatment of the joining parts
- » Application of various adhesives and processing methods

subject to changes

This course is exempt from sales tax.

REGISTRATION INFORMATION

www.skz.de/worldwide

Adhesive bonding of CFRP

ADHESIVE BONDING

ABOUT THIS COURSE

This course offers the opportunity to get comprehensive knowledge of the future technology adhesive bonding, especially dedicated to the joining of carbon fiber reinforced plastics with other materials in a compact form. The aim is to provide an overview of the current state of the art.

WHO SHOULD ATTEND?

Specialists from the apparatus, plant and pipeline construction as well as automotive and railway industry, manufacturers of sports equipment and boats, wind energy and aerospace industry. The course is designed for employees and managers in the area of production and development as well as for members of all technical professions, bonding CFRP.

THEORY

- » Essentials of adhesive bonding, technology, technical terms, advantages and limitations of use
- » Material science
- » Plastics, CFRP, metals (e.g. aluminum)
- » Surface treatment
- » Methods, surface treatment of CFRP and other materials (e.g. aluminum, glass etc.)
- » Adhesives
- » Classification, selection, processing, structural bonding, thick film bonding, bonding of CFRP
- » Testing and quality assurance
- » Methods, standards and regulations
- » Health and environmental protection
- » Special risks, workplace safety, hazardous substances and symbols, disposal and storage

PRACTICAL TRAINING

- » Bonding of CFRP
- » Bonding of CFRP with other materials
- » Application of different adhesives
- » Application of primer
- » Testing of adhesive CFRP bonding
- » Final discussion

☐ Safety shoes

37

DURATION: 2 days

This course is exempt from sales tax.

REGISTRATION

INFORMATION

www.skz.de/worldwide

individual price upon request

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On request

European Adhesive Bonder (EAB) according to DVS/EWF 3305 and EWF 515-01

ADHESIVE BONDING

ABOUT THIS COURSE

Being universally applicable and effective assembling technique, adhesive bonding has been gaining more and more importance. With adhesive bonding technology one can assemble e.g. lightweight materials or even miniature parts precisely and reliably. Nowadays adhesive bonding techniques are used in a wide range of work fields, especially automotive engineering, railway vehicle manufacturing as well as the aircraft and boat building industry.

WHO SHOULD ATTEND?

Specialists and professionals/skilled personnel from industry and small trade in the area of metal, wood, glass and plastic manufacturing.

THEORY

- » Introduction to adhesive bonding technology
 - Basics, terms and definitions
 - · Adhesion, cohesion, wetting of the assembly parts
 - · Application of adhesive bonding technology, advantages and limits
- » Health, workplace and environmental protection
 - Hazards, workplace layout
 - Hazardous substances, warning symbols
 - Disposal, storage and transport
- » Types of adhesives and their use
 - Physically hardening adhesives (e.g. solvent-containing adhesives, dispersion adhesives, hot melts, pressure sensitive adhesives)
 - Chemically curing adhesives
 - Application, bonding and fixing
 - Curing of adhesives

PRACTICAL TRAINING

- » Surface treatment of parts for bonded joints
- » Methods of surface preparation, treatment and post-treatment
- » Use of different adhesives
 - Bonding of metal and plastic
 - Bonding of material combination/ material hybrids
- » Practical, written and oral exam
- » The exam takes place on the last day of the course. Examination is carried out by TC Kleben GmbH, Übach-Palenberg

subject to changes

This course is exempt from sales tax.

DURATION: 5 days

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On request

REGISTRATION INFORMATION

www.skz.de/worldwide

Successful adhesive bonding of plastics

ADHESIVE BONDING

ABOUT THIS COURSE

This course teaches basic knowledge about the successful bonding of plastics within various industrial sectors. For this purpose, the range of different methods, processing technologies and various surface preparation methods are presented.

WHO SHOULD ATTEND?

The course is ideal for technical employees, engineers, designers, developers and production managers.

THEORY

» Material science of polymers

- Thermoplastics, thermosets, elastomers
- Structure, characteristics
- » Surface tension and testing methods
- » Wetting, adhesion, cohesion
- » Surface pretreatment
 - · Atmospheric plasma, low-pressure plasma, corona
 - Flaming, fluorination, primers
 - Pickling, laser, grinding
- » Adhesives for plastics
- » Epoxies, 2K-acrylates, special acrylates, cyanoacrylates, UV curing agents, adhesives, polyurethanes, adhesive tapes, solvent adhesives
- » Adhesive processing, specifics
- » Information from the technical data
- » Testing methods for the plastic adhesives joints
- » Health and workplace safety
- » Workplace requirements, information from the safety data sheet

PRACTICAL TRAINING

- » Implementation of special surface pretreatment methods such as low-pressure plasma, corona and flaming
- » Adhesive bonding of different plastics, taking into account their specifics
- » Testing of plastic adhesive joints and evaluation of the results

subject to changes

This course is exempt from sales tax.

DURATION: 2 days

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On request

REGISTRATION INFORMATION

www.skz.de/worldwide

Adhesive bonder according to DVS 2291

ADHESIVE BONDING

ABOUT THIS COURSE

The quality of an adhesive-bonded joint in manufacturing and maintenance in piping construction, apparatus engineering and domestic installation depends on skills and knowledge of the plastic adhesive bonder. Therefore, the proof of qualification of plastic adhesive bonders by practical and theoretical tests is essential. Successful participation may conclude with the adhesive bonder qualification test according to the DVS 2221 guideline.

WHO SHOULD ATTEND?

Professionals from companies dealing with chemical apparatus construction, plant engineering and pipeline construction, repairing and processing semi-finished products.

THEORY

- » Material science of polymers
 - Manufacturing, structures, properties
 - Particularly PVC-U, PVC-C and ABS
 - Marking of pipes and piping parts
- » Essentials of adhesive bonding
 - · Bonding with solvent-based adhesives
 - Adhesive bonding of pipes/sleeves joints
- » Environmental protection and workplace safety

PRACTICAL TRAINING

- » Adhesive bonding
 - Adhesive bonding of pipes with solvent-containing adhesives
 - Practical exercises on pipes with different diameters
- » Manufacturing of specimen
- » Multiple-choice test

subject to changes

Inhouse possible

Scheduled monito-ring possible

Innovative adhesive bonding technologies

ADHESIVE BONDING

ABOUT THIS COURSE

The course offers the opportunity to get comprehensive knowledge of the innovative adhesive bonding technologies and gives an overview on the state of the art technology.

WHO SHOULD ATTEND?

Companies, using adhesive bonding or intending to use this technology in the future. The course is suitable for engineers, designers, developers and managers in the areas of production, product and process development.

THEORY

- » Introduction to future adhesive bonding technology
- » Advantages of adhesive bonding
- » Adhesive layer and forces of bonding joints
- » Different surface treatment of metals, plastics and glass
- » Adhesives overview
- » Mixing and dispensing technology
- » Adhesives application technique
- » Processing of adhesive bonding
- » Information of technical data sheet and safety data sheet
- » Requirements of structural adhesive bonding, additional functions
- » Mechanical stress
- » Engineering design information
- » Selection of adhesives according to the application
- » Quality assurance, lifetime and aging behavior of adhesive joints
- » Current applications of the bonding technology

PRACTICAL TRAINING

- » Methods of surface treatment
- » Selection of adhesives
- » Adhesive bonding of plastics and metal
- » New equipment for mixing and dispensing
- » Various processing equipment
- » Testing of bonded joints

This course is exempt from sales tax.

DURATION: 2 days

L

On request

www.skz.de/worldwide

□ Safety shoes Work clothes

Inhouse possible Certificate course

Scheduled monito ring possible

DVS course for plastics welders test group 1 according to DVS 2281

WELDING

ABOUT THIS COURSE

Professionals from companies dealing with industrial apparatus construction, plant engineering and pipeline construction, metal processing as well as processing of semi-finished products.

WHO WILL BENEFIT?

Professionals from companies dealing with industrial apparatus construction, plant engineering and pipeline construction, metal processing as well as processing of semi-finished products.

THEORY

- » Material science of polymers, especially HDPE, PP, PVC-U and PVDF
- » Different welding techniques
 - Hot gas fan welding (WF), Hot gas string bead welding (WZ)
- » Heated tool butt welding (HS)
 - Heated tool sleeve welding (HD), electro fusion welding (HM)
- » Design and symbols of welding joints
- » Work safety aspects
- » Testing of welded joints

PRACTICAL TRAINING

- » Hot gas fan welding (WF) and hot gas string bead welding (WZ)
 - Welding exercises on plastic sheets and pipes made of HDPE, PP and PVC-U
- » Heated tool butt welding (HS), heated tool sleeve welding (HD) and electro fusion welding (HM)
 - Welding exercises on plastic pipes made of HDPE and PP with welding machine variation
 - Determination and monitoring of welding parameters
 - Testing of welded joints due to technological bending test and torsion shear test
- » Determination and monitoring of welding parameters
- » Testing of welded joints due to technological bending

On request

This course is exempt from sales tax.

DURATION: 5 days

REGISTRATION INFORMATION

sible Scheduled monitoring possible

subject to changes

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□ Safety shoes

DVS course for plastics welders, test group 2 according to DVS 2282

WELDING

ABOUT THIS COURSE

The participant will gain knowledge and proficiency in welding of polymeric sheets and plastic pipes for tank building and industrial applications. The plastic welding examination part II will be according to DVS 2212-1 guidelines.

WHO WILL BENEFIT?

Professionals from companies dealing with industrial apparatus construction, plant engineering and pipeline construction, metal processing as well as processing of semi-finished products.

THEORY

- » Material science of polymers, especially HDPE, PP, PVC-U and PVDF
- » Fundamentals of hot gas extrusion welding (WE), continous and discontinious welding process
- » Design and symbols of welding joints
- » Designs of welding shoes
- » Work safety aspects
- » Testing of welded joints

PRACTICAL TRAINING

Hands on training and exercises with welding machines for hot gas welding as well as heat element welding machines:

- » Hot gas welding
- \cdot Welding exercises on plastic sheets and pipes made of HDPE and PP $^{\scriptscriptstyle >}$ Hot gas extrusion welding (WE)
 - Welding exercises (butt- and T-joints)
 - · Determination and monitoring of welding parameters

Certificate course

- » Determination and monitoring of welding parameters
- » Testing of welded joints due to technological bending

On request

DURATION: 5 days

Inhouse possible

subject to change

Scheduled monito

DVS course for plastics welders, test group 1+2 according to DVS 2281/2282

WELDING

ABOUT THIS COURSE

The participant will gain knowledge and proficiency in welding of polymeric sheets and plastic pipes for tank building and industrial applications. The plastic welding examination part II will be according to DVS 2212-1 guidelines.

WHO WILL BENEFIT?

Professionals from companies dealing with industrial apparatus construction, plant engineering and pipeline construction, metal processing as well as processing of semi-finished products.

THEORY

- » Material science of polymers, especially HDPE, PP, PVC-U and PVDF
- » Different welding techniques
 - Hot gas fan welding (WF)
 - Hot gas string bead welding (WZ)
 - Heated tool butt welding (HS)
 - Heated tool sleeve welding (HD)
 - Electro fusion welding (HM)
- » Principles of hot gas extrusion welding (WE)
- » Joints, design of welded shoes
- » Work safety aspects and testing of welded joints

PRACTICAL TRAINING

» Hands on training and exercises of welding machines:

- Hot gas fan welding (WF) and hot gas string bead welding (WZ)
- Heated tool butt welding (HS), heated tool sleeve welding (HD) and electro fusion welding (HM)

Certificate course

• Hot gas welding

Mork clothes

• Hot gas extrusion welding (WE)

This course is exempt from sales tax.

DURATION: 5 days

On request

subject to changes

Scheduled monitoring possible

nhouse possible

□ Safety shoes

GERMAN PLASTICS CENTER MIDDLE EAST Training Center UAE

Training offered by SKZ – Middle East is a convenient way for Companies to train their staff, welding technicians, supervisors or project managers. The client can request a just-in-time training session for their technicians on site or in their own facilities.

Through this service, experienced trainers from SKZ - Middle East will provide professional instruction that will boost your welding skills.

Certified Training Courses

- CERTIFIED HDPE PIPE WELDER GW330
- DVGW CERTIFIED HDPE PIPE WELDER GW330
- DVGW CERTIFIED HDPE PIPE WELDING SUPERVISOR GW331

For inquires and further information please contact our Team

SKZ – MIDDLE EAST

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COMPETENCE IN PLASTICS BENEFIT FROM OUR KNOW-HOW!

TESTING

We support your product policy through quality testing and quality assurance and thus provide valuable arguments for your sales markets.

TRAINING

We are the market leader for training and knowledge transfer in the plastics sector with more than 10,000 participants per year.

RESEARCH

We stand for market-driven development and improvement of products and production technologies.

CERTIFICATION

With certification of management systems, we offer the best prerequisites for efficiency and economic success.

ASO ANALYTIC SERVICE OBERNBURG

In our ISO 17025 accredited analytical laboratory, we offer added value by consulting the automotive industry as well as in our key areas medical technology and chemistry.

INDUSTRY CONSULTING

As a contact person without interface problems, we resolve issues through interdisciplinary cooperation between our divisions.

EZD EUROPAEN CENTRE FOR DISPERSION TECHNOLOGIES

We are an interdisciplinary research and technology transfer center focused on the preparation and characterization of dispersions.