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TCS

Technology Consulting Solutions GmbH

Internal corporate offers of our training and consulting programme

(ev) high voltage • photovoltaics • battery systems
electrical regulations according VDE & IEC


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1M
2S Working Station
93
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Content

(EV) high voltage E-levels

Course 110

Instructed person (iP) Level 1E

For general work on or in the vicinity of a high-voltage vehicle in development or production, qualification as an instructed person (FuP) in accordance with Level 1E within the meaning of DGUV I 209-093 is required.

Duration:
3-4 hours of 45 minutes each

Participation requirements:
None

Format:
Webinar or in-house possible

Seminar content

- Electrical hazards
- Electrical protection measures for (EV) high-voltage systems
- Non-electrical work without the need for high-voltage isolation and in the isolated state
- Marking of hv-components and hv-cables in and on high-voltage vehicles, e.g. Electric vehicles
- Permitted activities on hv-vehicles in the area of development and production
- Prohibited activities on hv-vehicles in the area of development and production
- Organisation and prerequisites for activities under the direction and supervision of a SHV or EFK
- Abortion of measures in the event of problems with high-voltage systems and high-voltage vehicles
- Duties and rights of the instructed person

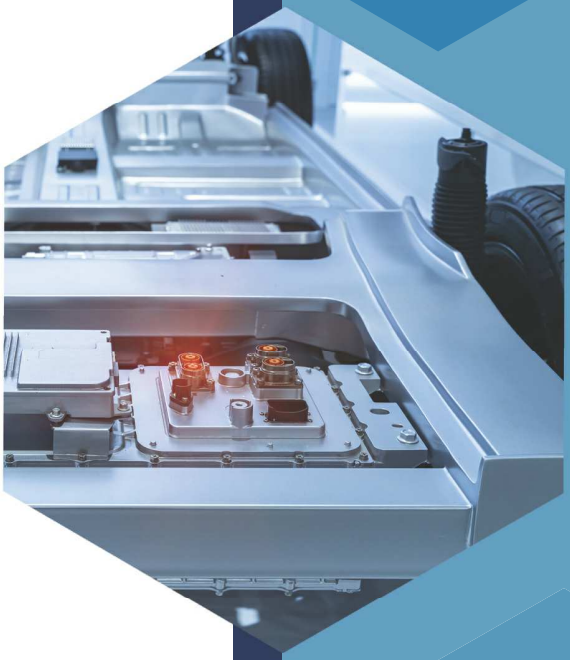
Designation:

Certificate, required as proof of legal obligations

Course 111

Annual instruction
(ev) high voltage level E for iP, SHV / ES

The training required at least once a year for all (ev) high-voltage levels in development or production in accordance with level E as defined in DGUV I 209-093.



Duration:
2 hours of 45 minutes each

Participation requirements:
qualification as iP, SHV, ES and all other roles in the (ev)high-voltage organisation

Format:
Webinar or in-house possible

Seminar content

- Electrical hazards
- Electrical protection measures for (EV) high-voltage systems
- Markings and safety labels (e.g. mandatory and prohibitory signs)
- Marking of high-voltage components and cables in and on high-voltage vehicles, e.g. Electric vehicles
- Permitted and prohibited activities on the HV (ev) system for each HV stage in development and production
- Abort measures in the event of problems with HV (ev) systems
- Duties and rights of the iP and SHV

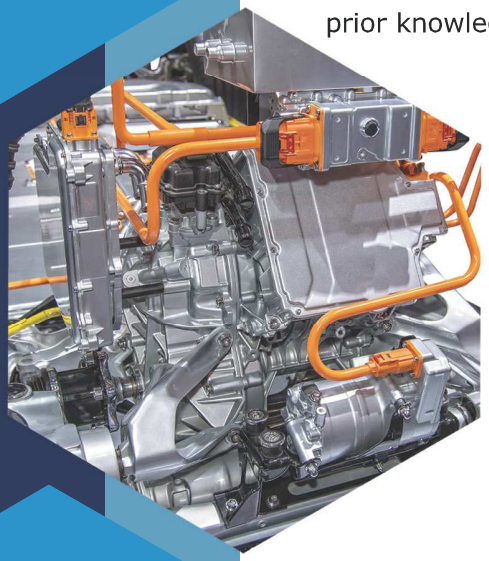
Designation:

Certificate, required as proof of legal obligations

Course 112

Specialist for (EV) high voltage systems (SHV) according to Level 2E - Entry A

Required qualification for working on (EV) high voltage systems, including independent isolation and commissioning in development or production in accordance with Level 2E as defined in DGUV I 209-093 Entry Level A for persons without prior knowledge of electrical engineering.



Duration:
10 days

Participation requirements:
Suitable technical vocational training or experience in the automotive sector; no prior knowledge of electrical engineering required.

Format:
In-house, partly available as a webinar

Seminar content

- Fundamentals of electrical engineering, including Energy storage
- Fundamentals of measurement technology
- Electrical hazards and emergency measures
- Protective measures against electric shock and arc flashes
- EV-specific specialist topics
- Use of HV systems and HV components in vehicles
- Electrical protective measures for high-voltage systems
- Electrical engineering activities including high-voltage insulation and commissioning
- Marking of high-voltage components and cables in and on high-voltage vehicles, e.g. electric vehicles
- Permitted and prohibited activities on the HV (ev) system for each HV (ev) level in development and production
- Organisation and prerequisites for working activities on high-voltage systems
- Technical and managerial responsibility
- Measurement technology and measurement methods on high-voltage systems

Designation:

Certificate, required as proof of legal obligations

Course 113

Specialist for (EV) high voltage systems (SHV) according to Level 2E – Entry B

Qualification required for working on (EV) high voltage systems, including independent isolation and commissioning in development or production in accordance with Level 2E as defined in DGUV I 209-093 Entry Level B for persons with prior electrical engineering knowledge who are not electrical specialists.

Duration:
5 days

Participation requirements:
Suitable technical training, e.g. automotive mechatronics, automotive electrician, mechanical engineer, physicist

Format:
Inhouse

Seminar content

- Brief review of electrical engineering basics
- Electrical hazards and emergency measures
- Protective measures against electric shock and arc flash
- High-voltage-specific expert topics
- Use of HV (ev) systems and HV components in vehicles
- Electrical protective measures for high-voltage systems
- Electrical engineering working activities including high-voltage insulation and commissioning
- Marking of high-voltage components and high-voltage lines in and on high-voltage vehicles, e.g. electric vehicles
- Permitted and prohibited activities on the HV (ev) system for each HV (ev) level in development and production
- Organisation and prerequisites for activities on high-voltage systems
- Technical and managerial responsibility
- Measurement technology and measurement methods on (ev) high-voltage systems

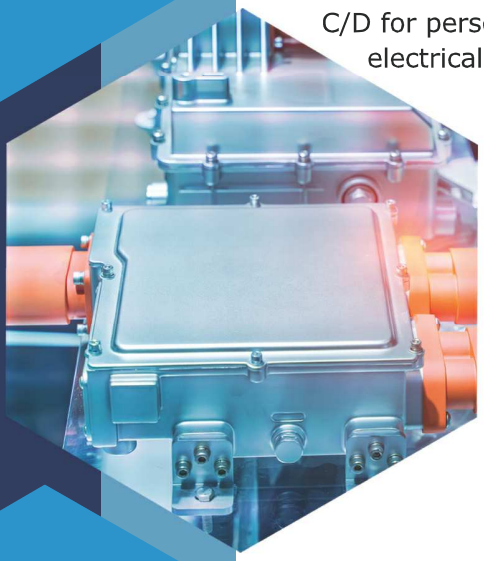
Designation:

Certificate, required as proof of legal obligations

Course 114

Fachkundige Person für Hochvoltsysteme (FHV) nach Stufe 2E - Einstieg C/D

Qualification required for work on (EV) high voltage systems, including independent isolation and commissioning as well as free troubleshooting in development or production in accordance with Level 2E as defined by DGUV I 209-093 Entry C/D for persons with electrical engineering training/studies or electrical specialists from other fields.



Duration:
3 days

Participation requirements:
Suitable electrical engineering training, e.g. electronics technician, electrician, electrical engineer

Format:
In-house

Seminar content

- Electrical hazards and emergency measures
- Protective measures against electric shock and arc flash
- High-voltage-specific expert topics
- Use of HV (ev) systems and HV (ev) components in vehicles
- Electrical protective measures for high-voltage systems
- Electrical engineering activities including high-voltage insulation and commissioning
- Marking of high-voltage components and cables in and on high-voltage vehicles e.g. electric vehicles
- Permitted and prohibited activities on the HV (ev) system for each HV (ev) level in development and production
- Organisation and prerequisites for activities on (ev) high-voltage systems
- Technical and managerial responsibility
- Fault finding/troubleshooting on the high-voltage system
- Measurement technology and measurement methods on the high-voltage system

Designation:

Certificate, required as proof of legal obligations

Course 115

Live line work on (ev) high voltage systems according to Level 3E

Qualification required for necessary live line work on (EV) high voltage systems in development or production in accordance with Level 3E as defined in DGUV I 209-093 for specialists in high voltage systems.

Duration:
3 days

Participation requirements:
qualification according to Level 2E

Format:
In-house

Seminar content

- Electrical hazards and emergency measures
- Protective measures against electric shock and arc flash
- Electrical protective measures for (ev) high voltage systems
- Permitted and prohibited cases of live line work on (ev) high voltage vehicles
- Organisation and prerequisites for live line work on (ev) high voltage systems
- Technical and managerial responsibility in the (ev) high voltage system in development and production
- Live line work on the (ev) high voltage system using PPE

Designation:

Certificate, required as proof of legal obligations

(EV) high voltage S-levels

Course 120

Instructed person (iP) Level 1S

For general work on or in the vicinity of a high-voltage vehicle in development or production, qualification as an instructed person (FuP) in accordance with Level 1S within the meaning of DGUV I 209-093 is required.

Duration:
2-3 hours of 45 minutes each

Participation requirements:
None

Format:
Webinar or in-house possible

Seminar content

- Electrical hazards
- Electrical protective measures for (EV) high voltage systems
- Non-electrical work without the need for high voltage insulation and in the insulated state
- Marking of high voltage components and high voltage cables in and on high voltage vehicles, e.g. Electric vehicles
- Permitted activities on high-voltage vehicles
- Prohibited activities on high-voltage vehicles of series production vehicles
- Organisation and prerequisites for activities under the direction and supervision of an SHV or EFK
- Abortion of measures in the event of problems with high-voltage systems and high-voltage vehicles
- Duties and rights of the instructed person

Designation:

Certificate, required as proof of legal obligations

Course 121

Annual instruction
(EV) high voltage level S for iP, SHV / ES

The training required at least once a year for all high-voltage levels in series-production vehicles in accordance with level S as defined in DGUV I 209-093.

Duration:
2 hours of 45 minutes each

Participation requirements:
Qualifications in iP, SHV, ES and all other roles in the high-voltage organisation

Format:
Webinar or in-house possible

Seminar content

- Electrical hazards
- Electrical protective measures for (EV) high-voltage systems
- Markings and safety labels (e.g. mandatory & prohibitory signs)
- Marking of high-voltage components and cables in and on high-voltage vehicles, e.g. Electric vehicles
- Permitted and prohibited activities on the HV (ev) system according to HV (ev) level (S levels)
- Measures to be taken in the event of problems with hv systems
- Obligations and rights of the iP and SHV

Designation:

Certificate, required as proof of legal obligations

Course 122

Specialist for high voltage systems (SHV) according to level 2S - Entry A

Qualification required for working on (EV) high voltage systems, including independent isolation and commissioning of series vehicles in accordance with level 2S as defined in DGUV I 209-093 Entry Level A for persons without prior knowledge of electrical engineering.

Duration:
10 days

Participation requirements:
Suitable technical vocational training or experience in the automotive sector; no prior knowledge of electrical engineering required.

Format:
In-house, partly available as a webinar

Seminar content

- Fundamentals of electrical engineering, including Energy storage
- Fundamentals of measurement technology
- Electrical hazards and emergency measures
- Protective measures against electric shock and arc flashes
- EV-specific expert topics
- Use of HV systems and HV components in vehicles
- Electrical protective measures for high-voltage systems
- Electrical engineering activities including high-voltage insulation and commissioning
- Marking of high-voltage components and cables in and on high-voltage vehicles, e.g. electric vehicles
- Permitted and prohibited activities on the HV (ev) system per HV (ev) level (S levels)
- Organisation and prerequisites for activities on high-voltage systems
- Technical and managerial responsibility
- Measurement technology and measurement methods on the high-voltage system

Designation:

Certificate, required as proof of legal obligations

Course 123

Specialist for high voltage systems (SHV) according to level 2S – entry level B

Qualification required for working on (EV) high voltage systems, including independent isolation and commissioning of series vehicles in accordance with level 2S as defined in DGUV I 209-093 Entry Level B for persons with prior knowledge of electrical engineering who are not electrical specialists.

Duration:
2 days

Participation requirements:
Suitable technical training, e.g. automotive mechatronics, automotive electrician, mechanical engineer, physicist

Format:
In-house

Seminar content

- Brief review of electrical engineering basics
- Electrical hazards and emergency measures
- Protective measures against electric shock and arc flash
- High-voltage-specific specialist topics
- Use of HV (ev) systems and HV components in vehicles
- Electrical protective measures for high-voltage systems
- Electrical engineering activities including high-voltage insulation and commissioning
- Marking of high-voltage components and high-voltage lines in and on high-voltage vehicles, e.g. electric vehicles
- Permitted and prohibited activities on the HV (ev) system according to HV (ev) level (S levels)
- Organisation and prerequisites for activities on high-voltage systems
- Technical and managerial responsibility
- Measurement technology and measurement methods on the high-voltage system

Designation:

Certificate, required as proof of legal obligations

Course 124

Specialist for high voltage systems (SHV) according to level 2S - entry C/D

Qualification required for working on (EV) high voltage systems, including independent disconnection and commissioning as well as free troubleshooting on series vehicles in accordance with level 2S as defined by DGUV I 209-093 Entry C/D for persons with electrical engineering training/studies or electrical specialists from other fields.

Duration:
2 days

Participation requirements:
Suitable electrical engineering training, e.g. electronics technician, electrician, electrical engineer

Format:
In-house

Seminar content

- Electrical hazards and emergency measures
- Protective measures against electric shock and arc flashes
- High-voltage-specific specialist topics
- Use of HV (ev) systems and HV (ev) components in vehicles
- Electrical protective measures for high-voltage systems
- Electrical engineering activities including high-voltage insulation and commissioning
- Marking of high-voltage components and cables in and on high-voltage vehicles e.g. electric vehicles
- Permitted and prohibited activities on the HV (ev) system according to HV (ev) level (S levels)
- Organisation and prerequisites for activities on high-voltage systems
- Technical and managerial responsibility
- Fault finding/troubleshooting on the high-voltage system
- Measurement technology and measurement methods on the high-voltage system

Designation:

Certificate, required as proof of legal obligations

Course 125

Live line work on (ev) high voltage systems (LLW) according to level 3S

Qualification required for necessary live line work on (EV) high voltage systems of series production vehicles in accordance with Level 3E as defined in DGUV I 209-093 for specialists in high voltage systems.

Duration:
3 days

Participation requirements:
Qualification according to Level 2S

Format:
In-house

Seminar content

- Electrical hazards and emergency measures
- Protective measures against electric shock and arc flash
- Electrical protective measures for (ev) high voltage systems
- Permitted and prohibited cases of live line work on (ev) high voltage vehicles
- Organisation and prerequisites for live line work on (ev) high voltage systems
- Technical and managerial responsibility in the (ev) high voltage system
- Live line work on (ev) high voltage systems using PPE

Designation:

Certificate, required as proof of legal obligations

(EV) high voltage Pro Select

Course 130

Chief responsible electrical specialist for (ev) hv-systems (CRES HV)

Recommended qualification for assuming the duties of chief responsible electrical specialist for (EV) high voltage systems in accordance with VDE 1000-10, § 13 ArbSchG.

Duration:
2 days

Participation requirements:
planned, pending or existing acceptance of a corresponding role as CRES or deputy CRES

Format:
Webinar or in-house possible

Seminar content

- Causes of accidents and hazards
- Laws, regulations and standards
- Organisation of safety and health in electrical engineering work
- Technical and managerial responsibility and legal consequences
- Demarcation of high-voltage areas in electrical installations HV roles, levels of responsibility and employee qualifications
- Risk assessment, work instructions and operating instructions
- Requirements for structures and safety measures

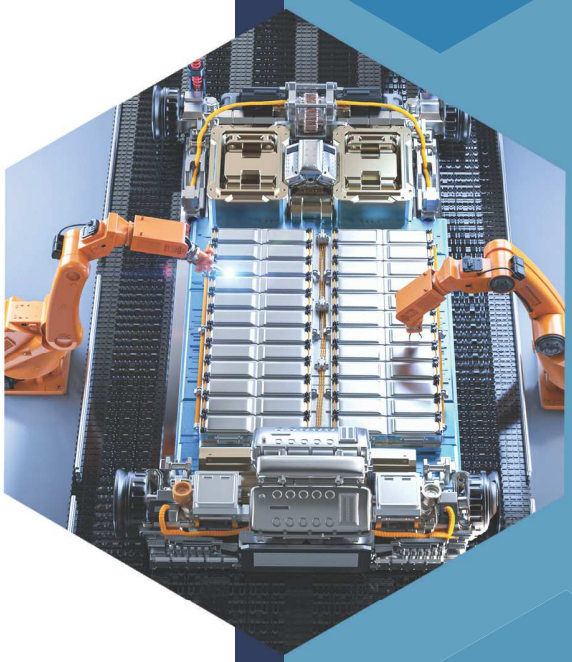
Designation:

Certificate recommended as proof of suitability for legal or contractual obligations

Course 131

Expertise in battery diagnosis

Recommended qualification for performing technical assessments of high-voltage batteries in accordance with DGUV Regulation 1, Sections 7, 9 and 13 of the German Occupational Safety and Health Act (ArbSchG).



Duration:
1 day

Participation requirements:
Specialist high voltage (SHV)
or electrical specialist (ES)

Format:
Webinar or in-house possible

Seminar content

- Brief review of electrical and battery technology
- Battery chemistry and battery technology at the cell level
- Battery structures, modules and systems
- Protective measures and hazards of lithium-ion batteries
- Expert assessment of high-voltage batteries

Designation:

Certificate, required as proof of legal obligations

Course 132

(EV) high voltage & battery expertise for Automotive Appraiser

Combined training comprising the necessary qualification for working on (EV) high voltage systems, including independent insulation and commissioning as well as free troubleshooting on series vehicles in accordance with level 2S as defined in DGUV I 209-093 Entry B/C, as well as battery expertise and high voltage expertise for motor vehicle experts.

Duration:
4 days

Participation requirements:
Upcoming or existing work as Automotive Appraiser

Format:
Webinar or in-house possible

Seminar content

- High-voltage-specific expert topics
- Use of HV (ev) systems and components in vehicles
- Electrical protective measures for high-voltage systems
- Electrical engineering activities including high-voltage insulation and commissioning
- Marking of high-voltage components and cables in and on high-voltage vehicles, e.g. Electric vehicles
- Permitted and prohibited activities on the HV (ev) system
- Organisation and prerequisites for HV activities
- Technical and managerial responsibility
- Brief refresher on electrical and battery technology
- Battery chemistry and battery technology at cell level
- Battery structures, modules and systems Electrical hazards and emergency measures
- Protective measures and hazards of lithium-ion batteries
- Protective measures against electric shock and arc flash
- Expert assessment of high-voltage batteries
- Troubleshooting on the high-voltage system
- Measurement technology and measurement methods on the high-voltage system

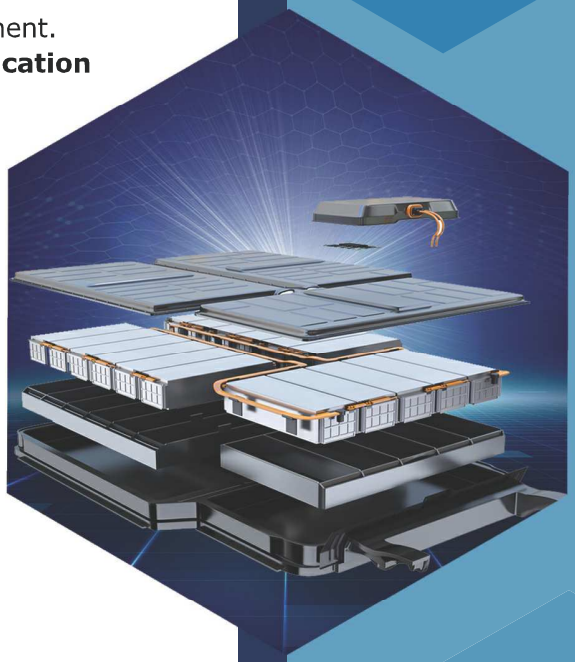
Designation:

Certificate, required as proof of legal obligations

The HV World

Further (EV) high voltage topics and combined training courses

The qualifications for working on (EV) high voltage systems in accordance with DGUV I 209-093 often have common areas of activity with other subject areas in their practical implementation – for example, on the battery component.
We would be happy to help you adapt the qualification strategy to suit your specific needs.



Offer

Request a 30-minute consultation to discuss your situation. Free of charge and with no obligation.

Qualification, training and certification.
TCS doesn't just provide support: we do it for you!

Photovoltaics

Course 210

Elektrotechnisch unterwiesene Person für Photovoltaik (EuP-PV)

Required for general work on or in the vicinity of a photovoltaic system for electrotechnically instructed persons (EiP) in accordance with VDE 0105-100 / EN 50110.

Duration:
2 days

Participation requirements:
None

Format:
Webinar or in-house possible

Seminar content

- Electrical hazards
- Electrical protection measures for PV systems
- Non-electrical work without the need to disconnect the system
- Marking of PV components and PV cables and low-voltage cables
- Permitted work on PV systems and their components
- Prohibited work on PV systems and their components
- Organisation and requirements for work under the direction and supervision of an ES/EFK
- Interruption of measures in case of problems with PV systems
- Obligations and rights of the electrotechnically instructed person

Designation:
Certificate, required as proof of legal obligations

Course 211

Basic training for electrical specialists in photovoltaics (ES-PV)

This seminar teaches the basics of the necessary knowledge of the relevant regulations and systems in accordance with VDE 0105-100, IEC 60364-1, VDE 1000-10 and DGUV V 3, as well as special features in the field of photovoltaics. This is the right course for young professionals starting their careers after graduating or those returning to the field after a long period of working in a different industry.

Duration:
2 days

Participation requirements:
Vocational qualification or degree in electrical engineering

Format:
Webinar or in-house possible

Seminar content

- Requirements for the installation and operation of low-voltage systems in accordance with VDE 0100
- Network system in accordance with VDE 0100-100
- Requirements for photovoltaic systems in accordance with VDE 0100-712, IEC 60364-7-712
- Testing of electrical systems in accordance with VDE 0100-600, IEC 60364-6
- Protective measures in accordance with VDE 0100-410
- Electrical hazards and safety Requirements
- Requirements for the grid feed-in of photovoltaic systems in accordance with VDE 0126-23 / IEC 62446
- Safe operation of electrical installations in accordance with VDE 0105-100 and hazards of electric current
- Carrying out electrical work in accordance with VDE 0100
- Requirements for persons working in electrical engineering in accordance with VDE 1000-10
- Updates to regulations, standards and laws

Designation:

Certificate recommended as proof of suitability for legal or contractual obligations

Course 212

Electrical specialist for defined tasks in photovoltaics (ESfdt PV)

Required qualification for work on photovoltaic systems, including independent disconnection and commissioning of PV systems for installation and maintenance purposes in accordance with work instructions in accordance with DGUV Regulation 3 in conjunction with DGUV G 303-001, VDE 0105-100, IEC 60364-1, DGUV I 203-080.

Duration:
10 days

Participation requirements:
Suitable technical vocational training or experience in the PV sector; no prior electrical knowledge required.

Format:
In-house, partly available as webinar

Seminar content

- Fundamentals of electrical engineering, including Energy storage
- Electrical hazards and emergency measures
- Protective measures against electric shock and arc faults
- Requirements for PV systems (VDE 0100-712, IEC 60364-7-712)
- Use of energy storage devices and other PV components in PV systems
- Electrical protective measures for photovoltaic systems
- Electrical engineering activities including insulation and commissioning
- Marking, connection and installation of PV components and PV cables
- Permitted and prohibited activities on the PV system
- Organisation and prerequisites for activities on PV systems
- Technical and managerial responsibility
- Measurement technology and measurement methods in photovoltaics

Designation:

Certificate recommended as proof of suitability for legal or contractual obligations

Course 213

Live line work on photovoltaic systems (LLW-PV)

Qualification required for necessary live line work on photovoltaic systems in accordance with DGUV R 103-011, IEC 63247.

Duration:
2 days

Participation requirements:
Existing qualification as an electrical specialist (ES / EFK) or ESfdt

Format:
In-house

Seminar content

- Electrical hazards and emergency measures
- Protective measures against electric shock and arc flash
- Electrical protective measures for PV systems
- Permitted and prohibited cases of live line work on PV systems
- Organisation and prerequisites for live line work on PV systems in accordance with DGUV R 103-011
- Technical and managerial responsibility and demarcation from the grid operator
- Live line work IEC 63247 for PV systems using PPE

Designation:

Certificate, required as proof of legal obligations

Course 214

Maintenance of competence for electrical specialists working on PV systems (ES maintain PV)

The seminar 'Maintenance of professional competence for electrical specialists for photovoltaic systems' meets the requirements for further training in accordance with VDE 1000-10. It also includes the mandatory annual instruction. In addition to the required refresher of basic technical knowledge, the seminar focuses on current topics and new standards relating to photovoltaic systems.

Duration:
1 day

Participation requirements:
Qualification as an electrical specialist (ES) or ESfdt

Format:
Webinar or in-house possible

Seminar content

- Requirements for the installation and operation of low-voltage systems
- Requirements for PV systems (VDE 0100-712, IEC 60364-7-712)
- Testing of electrical systems in accordance with VDE 0100-600, IEC 60364-6
- Requirements for the grid feed-in of photovoltaic systems in accordance with VDE 0126-23 / IEC 62446
- Safe operation of electrical installations in accordance with VDE 0105-100 and hazards of electric current
- Carrying out electrical work in accordance with VDE 0100
- Requirements for persons working in electrical engineering in accordance with VDE 1000-10
- Updates to regulations, standards and laws

Designation:
Certificate, required as proof of legal obligations

Course 215

Recurring instruction PV / Annual instruction for electrical specialists PV

Mandatory, at least annual, recurring training in accordance with DGUV V 1 in conjunction with electrical engineering in photovoltaics.

Duration:
3-4 hours of 45 minutes each

Participation requirements:
EiP, ES or ESfdT

Format:
Webinar or in-house possible

Seminar content

- Electrical hazards
- Electrical protection measures for PV systems
- Labelling of PV components and PV and low-voltage cables
- Permitted activities on photovoltaic systems and their components
- Prohibited activities on photovoltaic systems and their components
- Organisation and requirements for activities under the direction and supervision of an ES / EFK
- Abortion of measures in the event of problems with PV systems and PV components
- Duties and rights of the EiP and ES

Designation:
Certificate, required as proof of legal obligations

Battery technology

Course 310

Electrotechnically instructed person in battery technology (EiP)

Required for general work on or in the vicinity of a battery system for electrotechnically instructed persons (EiP) in accordance with VDE 0105-100, IEC 60364-1.

Duration:
2 days

Participation requirements:
None

Format:
Webinar or in-house possible

Seminar content

- Electrical hazards
- Electrical protection measures for battery systems
- Non-electrical work without the need to disconnect the system
- Markings and components of battery systems
- Permitted work on battery systems and their components
- Prohibited work on battery systems and their components
- Organisation and requirements for work under the direction and supervision of an EFK / ES
- Interruption of measures in the event of problems with battery systems
- Duties and rights of the EiP

Designation:
Certificate, required as proof of legal obligations

Course 311

Basic training for electrical specialists for battery systems (ES)

This seminar teaches the basics of the necessary knowledge of the relevant regulations and systems in accordance with VDE 0105-100, IEC 60364-1 VDE 1000-10 and DGUV V 3, as well as special features of battery systems. This is the right course for young professionals starting their careers after graduating or those returning to the field after a long period of working in a different industry.

Duration:
2 days

Participation requirements:
Vocational qualification or degree in electrical engineering

Format:
Webinar or in-house possible

Seminar content

- Requirements for the installation and operation of low-voltage systems in accordance with VDE 0100
- Network system in accordance with VDE 0100-100
- Requirements for work with battery systems
- Testing of electrical systems in accordance with VDE 0100-600, IEC 60364-6
- Protective measures in accordance with VDE 0100-410
- Electrical hazards and safety
- Safety requirements for batteries and battery systems in accordance with VDE 0510-485
- Safe operation of electrical installations in accordance with VDE 0105-100 and hazards of electric current
- Carrying out electrical work in accordance with VDE 0100
- Requirements for persons working in electrical engineering in accordance with VDE 1000-10
- Updates to regulations, standards and laws

Designation:

Certificate recommended as proof of suitability for legal or contractual obligations

Course 312

Electrical specialist for defined tasks Battery systems (ESfdt)

Qualifications required for working on battery systems, including independent work on battery systems for installation and maintenance purposes in accordance with work instructions in accordance with DGUV Regulation 3 in conjunction with DGUV G 303-001, VDE 0105-100, IEC 60364-1.

Duration:
10 days

Participation requirements:
Suitable technical vocational training or experience in the battery sector; no prior knowledge of electrical engineering required.

Format:
In-house, partly available as webinar

Seminar content

- Fundamentals of electrical engineering, including energy storage
- Electrical hazards and emergency measures
- Protective measures against electric shock and arc flash
- Safety requirements for batteries and battery systems in accordance with VDE 0510-485
- Use of battery systems as energy storage devices in systems
- Electrical protective measures for battery systems
- Marking, connection and installation of components and cables
- Permitted and prohibited activities on battery systems
- Organisation and prerequisites for activities on battery systems
- Technical and managerial responsibility
- Measurement technology and measurement methods on battery systems

Designation:
Certificate, required as proof of legal obligations

Course 313

Recurring instruction / annual instruction for electrical specialists in battery systems

Mandatory, at least annual, recurring training in accordance with DGUV V 1 in conjunction with VDE 0105-100, IEC 60364-1 for electrical engineering for battery systems.

Duration:
3-4 hours of 45 minutes each

Participation requirements:
EiP, ES or ESfdt

Format:
Webinar or in-house possible

Seminar content

- Electrical hazards
- Electrical protection measures for battery systems
- Labelling, connection and installation of components and cables
- Permitted activities on battery systems and their components
- Prohibited activities on battery systems and their components
- Organisation and requirements for activities under the direction and supervision of an ES
- Measures to be taken in the event of problems with battery systems
- Duties and rights of the EiP and ES

Designation:

Certificate, required as proof of legal obligations

Course 314

Maintenance of competence for electrical specialists working on battery systems (ES maintain)

The seminar 'Maintenance of professional competence for electrical specialists for battery systems' meets the requirements for the required further training according to VDE 1000-10. It also includes the mandatory annual instruction. In addition to the required refresher of basic technical knowledge, the focus is on current topics and new standards for battery systems.

Duration:
1 day

Participation requirements:
Qualification as an electrical specialist(ES)or ESfdt

Format:
Webinar or in-house possible

Seminar content

- Requirements for the installation and operation of low-voltage systems in accordance with VDE 0100
- Safety requirements for batteries and battery systems in accordance with VDE 0510-485
- Testing of electrical systems in accordance with VDE 0100-600
- General standard updates of the VDE
- Safe operation of electrical systems in accordance with VDE 0105-100 and hazards of electrical current
- Carrying out electrical work in accordance with VDE 0100
- Requirements for persons working in electrical engineering in accordance with VDE 1000-10
- Updates to regulations, standards and laws

Designation:

Certificate, required as proof of legal obligations

Course 315

Chief responsible electrical specialist for battery systems (CRES)

Recommended qualification for assuming the duties of chief responsible electrical specialist for battery systems within the meaning of VDE 1000-10, § 13 ArbSchG.

Duration:
2 days

Participation requirements:
planned, pending or existing acceptance of a corresponding role as CRES or deputy CRES

Format:
Webinar or in-house possible

Seminar content

- Causes of accidents and hazards
- Laws, regulations and standards
- Organisation of safety and health in electrical engineering
- Technical and managerial responsibility and legal consequences
- Demarcation and special features of battery systems in electrical installations
- Roles, levels of responsibility and employee qualifications
- Risk assessment, work instructions and operating instructions
- Requirements for structures and safety measures

Designation:

Certificate recommended as proof of suitability for legal or contractual obligations

General VDE / IEC

Course 410

Electrotechnically instructed person (EiP)

Required for general work in the field of electrical engineering for electrotechnically instructed persons (EiP) in accordance with VDE 0105-100, IEC 60364-1.

Duration:
2 days

Participation requirements:
None

Format:
Webinar or in-house possible

Seminar content

- Electrical hazards
- Electrical protective measures for electrical installations
- Non-electrical work without the need to disconnect the installation
- Markings and regulations
- Permitted work on electrical installations and their components
- Prohibited work on electrical installations and their components
- Organisation and prerequisites for work under the direction and supervision of an ES / EFK
- Interruption of measures in the event of problems with electrical installations
- Duties and rights of the electrotechnically instructed person

Designation:

Certificate, required as proof of legal obligations

Course 411

Basic training for electrical specialists (ES)

This seminar teaches the basics of the necessary knowledge of the relevant provisions for electrical installations and equipment in accordance with VDE 0105-100, IEC 60364-1, VDE 1000-10 and DGUV V 3. This is the right course for young professionals starting their careers after graduating or those returning to the field after a long period of working in a different industry.

Duration:
2 days

Participation requirements:
Vocational qualification or degree in electrical engineering

Format:
Webinar or in-house possible

Seminar content

- Requirements for the installation and operation of low-voltage systems in accordance with VDE 0100
- Network system in accordance with VDE 0100-100
- Requirements for work with electrical systems
- Testing of electrical systems in accordance with VDE 0100-600, IEC 60364-6
- Protective measures in accordance with VDE 0100-410
- Electrical hazards and safety
- Safe operation of electrical systems in accordance with VDE 010 5-100 and hazards of electric current
- Carrying out electrical work in accordance with VDE 0100
- Requirements for persons working in electrical engineering in accordance with VDE 1000-10
- Updates to regulations, standards and laws

Designation:

Certificate recommended as proof of suitability for legal or contractual obligations

Course 412

Electrical specialist for defined tasks (ESfdt)

Required qualifications for working on and with electrical systems and equipment, including independent disconnection and commissioning for installation and maintenance purposes in accordance with work instructions in accordance with DGUV Regulation 3 in conjunction with DGUV G 303-001, VDE 0105-100VDE 0105-100, IEC 60364-1.

Duration:
10 days

Participation requirements:
Suitable technical vocational training or experience in the electrical field; no prior knowledge of electrical engineering required.

Format:
In-house, partly available as webinar

Seminar content

- Fundamentals of electrical engineering, including energy storage
- Electrical hazards and emergency measures
- Protective measures against electric shock and arc flash
- Use of electrical systems and equipment
- Electrical protective measures for electrical systems and equipment
- Marking, connection and installation of components and cables
- Permitted and prohibited activities on electrical systems and equipment
- Organisation and prerequisites for activities on electrical systems and equipment
- Technical and managerial responsibility
- Measurement technology and measurement methods on electrical systems and equipment

Designation:
Certificate, required as proof of legal obligations

Course 413

Recurring instruction / annual instruction for electrical specialists

Mandatory, at least annual, recurring training in accordance with DGUV V 1 in conjunction with VDE 0105-100, IEC 60364-1 for electrical engineering for battery systems.

Duration:
3-4 hours of 45 minutes each

Participation requirements:
EiP, ES or ESfdt

Format:
Webinar or in-house possible

Seminar content

- Electrical hazards
- Electrical protection measures for electrical systems and equipment
- Marking, connection and routing of components and cables
- Permitted activities on electrical systems and equipment
- Prohibited activities on electrical systems and equipment
- Organisation and prerequisites for activities under the direction and supervision of an ES
- Measures to be taken in the event of problems with electrical systems and equipment
- Duties and rights of the EiP and ES

Designation:

Certificate, required as proof of legal obligations

Course 414

Maintenance of competence for electrical specialists (ES maintain)

The seminar 'Maintenance of professional competence for electrical specialists' meets the requirements for further training in accordance with VDE 1000-10. It also includes the mandatory annual instruction. In addition to the required refresher of basic technical knowledge, the seminar focuses on current topics and new standards in electrical engineering.

Duration:
1 day

Participation requirements:
Qualification as an electrical specialist (ES) or ESfdt

Format:
Webinar or in-house possible

Seminar content

- Requirements for the installation and operation of low-voltage systems in accordance with VDE 0100
- Testing of electrical equipment – New features in VDE 0701, EN 50678 and VDE 0702, EN 50699
- Testing of electrical systems – New features in VDE 0100-600, IEC 60364-6
- Safe operation of electrical systems – New features in VDE 0105-100 and hazards of electrical current
- Safe operation of electrical installations in accordance with VDE 0113, IEC 61496
- Carrying out electrical work in accordance with VDE 0100
- Requirements for persons working in electrical engineering in accordance with VDE 1000-10
- Updates to regulations, standards and laws

Designation:

Certificate, required as proof of legal obligations

Course 415

Chief responsible electrical specialist (CRES)

Recommended qualification for assuming the duties of chief responsible electrical specialist in accordance with VDE 1000-10, § 13 ArbSchG.

Duration:
2 days

Participation requirements:
planned, pending or existing acceptance of a corresponding role as CRES or deputy CRES

Format:
Webinar or in-house possible

Seminar content

- Electrical hazards
- Electrical protection measures for electrical systems and equipment
- Marking, connection and laying of components and cables
- Permitted activities on electrical systems and equipment
- Prohibited activities on electrical systems and equipment
- Organisation and prerequisites for activities under the direction and supervision of an ES
- Interruption of measures in the event of problems with electrical systems and equipment
- Duties and rights of the EiP and ES

Designation:

Certificate recommended as proof of suitability for legal or contractual obligations

CRES/VEFK-Consulting

Course 501

Chief responsible electrical specialist (CRES)

If you have not yet completed CRES training, we recommend that you participate in this qualification course in order to assume the duties of a chief responsible electrical specialist in accordance with VDE 1000-10, § 13 ArbSchG.

Duration:
2 days

Participation requirements:
planned, pending or existing acceptance of a corresponding role as CRES or deputy CRES

Format:
Webinar or in-house possible

Seminar content

- Electrical hazards
- Electrical protection measures for electrical systems and equipment
- Marking, connection and laying of components and cables
- Permitted activities on electrical systems and equipment
- Prohibited activities on electrical systems and equipment
- Organisation and prerequisites for activities under the direction and supervision of an ES
- Interruption of measures in the event of problems with electrical systems and equipment
- Duties and rights of the EiP and ES

Designation:

Certificate recommended as proof of suitability for legal or contractual obligations

Number 502

Consultation for chief responsible electrical specialists (CRES) face to face

Skope:
At least three consecutive days (can be combined with online consulting [503])

Requirements:
planned, pending or existing acceptance of a corresponding role as CRES or deputy CRES

Format:
In-house - Booking by days

Service

We will provide you with an CRES-expert who will accompany you on site through each step and work with you to set up your electrical safety structure. You remain in control of the overall scope. All appointments are made by arrangement. Bookings can only be made for full days (8 hours).

Number 503

Consultation for chief responsible electrical specialists (CRES) online

Skope:
At least three consecutive days (can be combined with face to face consulting [502])

Requirements:
planned, pending or existing acceptance of a corresponding role as CRES or deputy CRES

Format:
Online - Booking by days

Service

We will provide you with an CRES-expert who will accompany you online through each step and work with you to set up your electrical safety structure. You remain in control of the overall scope. All appointments are made by arrangement. Bookings can only be made for full days (8 hours).

Number 504

Consulting for CRES package development phase

Skope:
12 to 14 sessions 60 to 90 minutes each.

Requirements:
Booked CRES consulting services (numbers 502 or 503)

Format:
Online

Service

Supplementary package to the consulting services (502 and 503) with support and handling of all CRES issues. Three months of support through weekly team meetings (60–90 minutes each).

Number 505

Consulting for CRES package establishment phase

Skope:
3 sessions 60 to 90 minutes each

Requirements:
Booked CRES consulting services (numbers 502 or 503)

Format:
Online

Service

Supplementary package to the consulting services (502 and 503) with support and handling of all CRES issues. Three months of support through monthly team meetings (60–90 minutes each)

Number 506

Consulting on the CRES package requirement phase

Skope:
Individual sessions 60 to 90 minutes each

Requirements:
Booked CRES consulting services (502 or 503)

Format:
Online

Service

Supplementary package to the consulting services (502 and 503) or packages (504 and 505) with support and handling of all CRES issues. Individual team meetings (60–90 minutes each).

Further consulting services

All our customers are unique, including their requirements..
That is why we are happy to provide you with a customised quote based on your specific needs.

Qualification, training and certification.
TCS doesn't just provide support: we do it for you!

Zubuchbare Optionen

AddOn A01

Training during the night shift

Booking:
per course day (or: course night)

Service:
Add-on option for training courses to be held during night shifts so that your employees can maintain their rhythm.

Feature:
Course start after 8 p.m.
or course end after 10 p.m.

AddOn A02

Training during the late shift

Booking:
per course day (or: course night)

Leistung:
Add-on option for training courses to be held during late shifts so that your employees can maintain their rhythm.

Feature:
Course ends between 7 p.m. and 10 p.m.

AddOn A03

Training during the early shift

Booking:
per course day (or: course night)

Service:
Add-on option for training courses to be held during the early shift so that your employees can maintain their rhythm.

Feature:
Course start between 5:00 a.m. and 6:59 a.m.

Qualification, training and certification.
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Price list

The current price list for our closed company offers for the programme listed in this catalogue can be found online on our homepage at https://preise.tcs-engineering.de.
It is available for download as a PDF file.

Prices depend on number of participants

Our prices depend on the number of participants and start at four participants in the price list. Of course, we also offer small groups or even individual training courses, in which case the price applies to up to four participants.
All prices are for online training courses or training courses in Germany, net plus VAT.
For orders in other countries – EU and worldwide – we look forward to receiving your enquiry.

Further services

Please contact us if you have individual requirements that cannot be met by the offers listed here. We would be pleased to work with you to develop a tailor-made event.

Training languages

We offer our training courses in German and English. We have had good experience with interpreters during training courses for participants who speak other languages. This requires further consultation with regard to the training materials and labels.

International & Intercontinental

Technology Consulting Solutions GmbH serves customers on four continents. We work with you to meet the challenges of a globalised world. Please contact us in good time if you require services outside the EU, as necessary processes such as visa arrangements require preparation time. Just give us a call!

Open seminars

Current dates for our open training courses can be found online at https://open.tcs-engineering.de
The training dates for selected courses from the open programme can be booked by individual participants.

Register individual employees online

Our open offer is aimed at individual participants from industry and trade (B2B).
Simply register your colleagues online.

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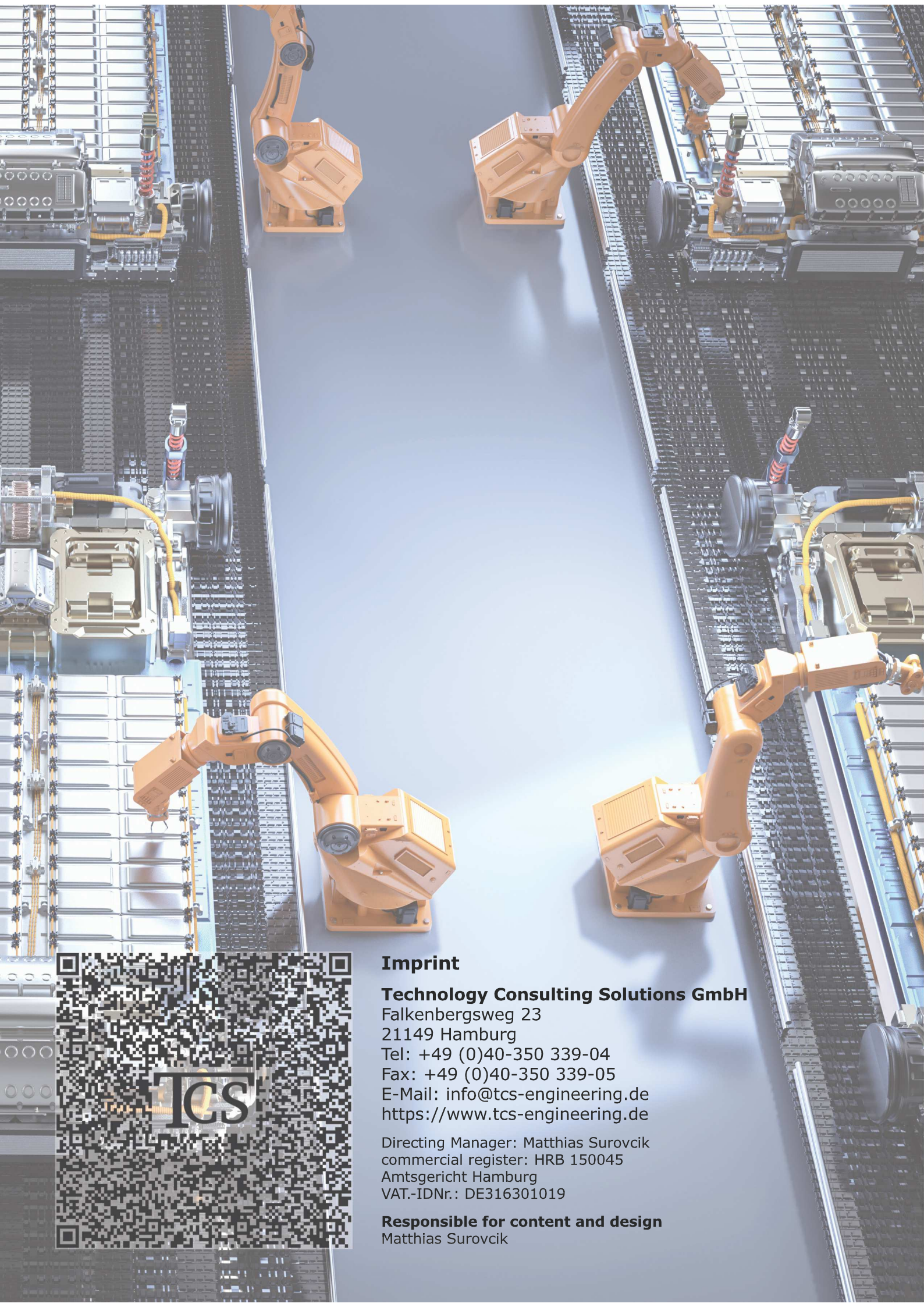

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