



USA/Canada

## Machine and industrial safety services

- education
- consulting
- engineering
- integration

**tec.nicum**  
Schmersal Group



Heinz and Philip Schmersal,  
Managing Directors of the Schmersal Group

## Introduction

**Functional machine safety is a complex topic. There are different requirements for the various roles when handling machines and systems.**

The manufacturers of machines need to ensure that they comply with the regulations and laws based on specific machine requirements. On the other hand, the operators of machines are subject to the regulations of occupational safety and health standards. Machine safety is not only an obligation for manufacturers and operators. Machine and plant importers and dealers also operate on sensitive ground, as they are subject to specific regulations. It is not unusual for existing applications to be subject to modernization, either independently or with the help of system integrators, which involves a range of other complexities with clearly defined processes to be complied with.

For these complex legal and technical issues, more and more companies are seeking advice from qualified specialists.

Our experts design and implement projects and safety solutions in all lifecycle phases, such as development, manufacturing, sales, operation, modernization (retrofitting) and decommissioning of machines and systems all over the world.

**tec.nicum** is the service division of the Schmersal Group. Subject Matter Experts, Functional Safety Engineers and Machinery CE Experts certified by TÜV Rheinland form a global advice network, having both in-depth knowledge of the regionally, nationally or internationally applicable directives, laws and regulations as well as the technical know-how and many years of experience in the implementation of projects. Services can also be obtained around the world.

**tec.nicum's** core philosophy is to offer advice that is manufacturer-independent and as objective as possible. The experts at **tec.nicum** aim to offer their customers competent, product and manufacturer-neutral advice and support them in analyzing and designing their machines and workplaces to comply with the standards.

This means that **tec.nicum** makes a significant contribution to making the industrial world safer – based on our commitment “excellence in safety – we care!”

This brochure gives an overview of the comprehensive range of **tec.nicum** services available specifically in the United States and Canada.

Heinz Schmersal

Philip Schmersal

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## Four modules for machine safety and occupational health and safety

**In the Schmersal Group, tec.nicum is the department for services relating to machine and industrial safety. The experts of tec.nicum give advice to both the machine manufacturers and the machine operators.**

Functional safety is a complex matter that has to be taken into account when developing, upgrading and converting existing machinery as well as when integrating machinery into overall plants.

### **Consulting for machine manufacturers**

The experts at **tec.nicum** advise and accompany machine manufacturers throughout the entire process of design to implementation, not only in accordance with North American requirements, but also with other national regulations in the target markets worldwide, such as the European Machinery Directive.

### **Consulting for machine operators**

Regarding machine operators, **tec.nicum** offers machine- and plant-specific risk assessment services, starting with ISO 12100 as a baseline.

Thanks to a worldwide consulting network, the services can be accessed easily and conveniently at your location. The Subject Matter Experts, Functional Safety Engineers and Machinery CE Experts certified by TÜV Rheinland have both in-depth knowledge of the regionally or nationally applicable directives, laws and regulations as well as technical know-how and many years of experience in the implementation of projects.

The experts at **tec.nicum** aim to offer customers competent, product and manufacturer-neutral advice and support them in analyzing and designing their machines and workplaces to comply with the standards.

For all of its consultancy and solution strategies, **tec.nicum** sets great store by objectivity.



The range at tec.nicum covers four modules:

#### academy



- Seminars and training
- In-house training
- Customer-specific workshops
- Demonstration events
- Symposia

#### consulting



- Safety analysis of machines and production lines
- Conformity assessment and verification
- Risk assessments
- Hazard assessments
- Technical documentation

#### engineering



- Technical project planning
- Validation of safety functions
- Measurements and tests
- Modernisation of machines
- Safety controller programming

#### integration



- Conversion / Retrofitting
- Installation of protective devices and fences
- Integration of safety functions
- Maintenance and service

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# Education

## tec.nicum academy



academy

### Training and seminars

**Machine safety can be challenging and complex for both machine builder and end user. As an industry solution provider, Schmersal takes pride in providing the necessary skill sets to our customers in order to make them more fluent in machine safety. For many years our motto has been Turning Workplaces into Safer Places and we welcome the opportunity to help provide the means to achieve this goal. We understand the value of educating our customers with the knowledge and know-how to properly provide a safer working environment.**

**The tec.nicum academy offers a series of safety training courses designed to educate people on machine guarding practices and principles consistent with current national and international machine safety standards.**

### In Person Training Sessions

Our courses will be offered in various locations across the US throughout the calendar year; Our website will have a current listing of upcoming dates and locations. We can also tailor the content and duration of sessions to focus specifically on a customer's needs for in-house presentation.

You can find the courses currently available on the following pages or on our website:

[schmersalusa.com/service/tecnicum-engineering-services](https://schmersalusa.com/service/tecnicum-engineering-services)

### Continuing Education Credits

**tec.nicum** is accredited by IACET to the ANSI/IACET 2018-1 Standard for Continuing Education and Training (CE/T) and offers Continuing Education Units (CEUs) for some courses. In order to receive CEUs, learner must meet the course specific requirements, be present for the entirety of the course (with a functioning camera for virtual event) and successfully pass the course exam with a minimum score of 80%.





# Training courses tec.nicum online academy



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The **tec.nicum** online academy is a self-paced learning platform, which features versions of flagship trainings, such as the one-day General Machine Safety course. Additionally, there are self-paced courses on topics of general Industrial Safety, such as lockout/tagout, confined space, Electrical Safety & fall protection. More courses will be added regularly.

Every course allows for group discussions to dive deeper into any of the topics which have been presented. Once enrolled, you will have unlimited access to all current content & all additional content released thereafter, as well as discounts on selected live trainings.

Also offered with the enrollment is access to the online forum where you will have the opportunity to communicate with peers & subject matter experts throughout the industry.

Enroll here: [tecnicumacademy.thinkific.com/](https://tecnicumacademy.thinkific.com/)





# Training courses general occupational safety

## OSHA Outreach Training Program: General Industry

The OSHA Outreach Training Program for General Industry provides basic training for workers and employers on the recognition, avoidance, abatement, and prevention of common job-related safety and health hazards while giving a general overview of OSHA Standards. The program also provides information regarding workers' rights, employer responsibilities, and how to file a complaint. Through this training, OSHA helps to ensure that workers are more knowledgeable about workplace hazards and their rights, and contribute to our nation's productivity.

While course lesson plans are provided by the OSHA Office of Training and Education, it is important to note that this is a voluntary program and does not fulfill an employer's requirement to provide training per any specific OSHA standards. Although some states, municipalities or others may require outreach training as a condition of employment, it is not an OSHA requirement.

An OSHA authorized trainer will be presenting this training. Students receive an OSHA course completion card.



### 10-hour course

Covers common job-related safety and health hazards.

**CEUs:** 1.0  
**Duration:** 10 hours (2 Days)  
**Max Attendees:** 40  
**Sessions:** In-Person

### 30-hour course

More appropriate for supervisors or workers with some safety responsibility.

**CEUs:** 3.0  
**Duration:** 30 hours (4 days)  
**Max Attendees:** 40  
**Sessions:** In-Person





# Training courses machine safety education

## General Machine Safety



### A review of the concepts of machine safeguarding

Anyone responsible for the design, operation, or maintenance of machines needs an understanding of legal requirements, risk assessment, types of hazards, the several levels of circuit design, and available types of safety equipment and how they all come together for a complete safety solution.

**CEUs:** 0.6  
**Duration:** 7 hours (1 day)  
**Max Attendees:** 35  
**Sessions:** In Person or Virtual (Live)

## Lock Out Tag Out



### A review of Lockout Tagout requirements.

LOTO is an OSHA legal obligation, and this course helps you understand what is required to comply. Attendees will review OSHA and ANSI regulations pertaining to the LOTO process, the required training programs and practical use.

**CEUs:** 0.6  
**Duration:** 7 hours (1 day)  
**Max Attendees:** 35  
**Sessions:** In Person or Virtual (Live)



# Training courses machine safety education

## ISO 13849 – Understanding and Implementation



### A review of the aspects within the ISO 13849 Standard

ISO 13849 is a global harmonized standard relating to the risk assessment, design, and performance of safety control systems on machinery. This standard is accepted worldwide as the principle safety control design guideline and it represents a major change in the philosophy of hazard analysis and design of safety related parts of machine control systems.

**CEUs:** 0.6  
**Duration:** 7 hours (1 day)  
**Max Attendees:** 35  
**Sessions:** In Person or Virtual (Live)

## Understanding and Conducting Risk Assessments



### A review of Risk Assessment and performing safety audits on machines

Understanding machine hazards and having the ability to qualify and quantify them, helps you establish a tool to identify machine hazards. This class works with your team to develop a version of a tool that you can use to perform machine safety assessments. Identify the hazards, while presenting ideas on how to remedy those hazards with proper guarding measures is key to having a successful machine safety program.

**CEUs:** 1.3  
**Duration:** 16 hours (2 days)  
**Max Attendees:** 30  
**Sessions:** In Person



academy

## Safety Circuits and Wiring



### A review of Control Categories and wiring safety circuits

Learn the practical use along with the theory of safety related control systems. This is a hands-on course where participants will be challenged to wire a mix of components of differing technologies to meet specific safety control requirements.

<b>CEUs:</b>	0.6
<b>Duration:</b>	7 hours (1 day)
<b>Max Attendees:</b>	20
<b>Sessions:</b>	In Person

## mce.expert® (Machinery CE Certified Expert)



### Certification course on the CE process

The mce.expert® course breakdowns each of the essential health and safety requirements (SSRS) referred to in the Machinery Directive with the goal of understanding and complying with the CE Marking according to the Machinery Directive 2006-42. Upon successful completion of this course, the international Machinery CE Certified Expert® qualification will be issued by TÜV Rheinland®.

<b>CEUs:</b>	3.5
<b>Duration:</b>	35 hours (5 days)
<b>Max Attendees:</b>	35
<b>Sessions:</b>	In Person or Virtual (Live)



# Technical services tec.nicum consulting

## Analysis and Documentation

**Our experts carry out risk assessments to identify hazards relating to machines. We can provide technical safety inspections on existing machines, systems and product lines, and produce documentation on the machines inspected. We provide information on the applicable regulations and norms on machine and industrial safety, and can provide recommendations the implementation of compliant protective equipment.**

## Technical support

The experts at **tec.nicum** can provide expertise and experience for every life-cycle phase of machine and plant construction. We provide information on the applicable regulations and norms on machine and industrial safety and, make recommendations on the relevant norm-compliant protective equipment.

**tec.nicum** employees are available to their customers on an hourly basis and provide support on your premises, by telephone, or online.

## Schematic Review

Designing new safety systems or modifying existing safety functions can be challenging. The Engineers in **tec.nicum** can review your schematics to help ensure your designs fulfil the requirements for a specific performance level or safety regulation. Recommendations are given for designs which may fall short of their requirements.



consulting

### Risk analysis (customer specific)

**tec.nicum** carries out technical safety inspections on existing machines, systems and product lines. Where adjustments are required to ensure the machines meet the working directives for health, safety and the environment and specific national legislation, **tec.nicum** can provide recommendations.

For old or modified machines and systems, the **tec.nicum** engineers evaluate whether the current system or the modifications made will satisfy the applicable technical safety requirements.

When evaluating machines from the operator's perspective, **tec.nicum** proceeds as follows:

- Analysis of existing documentation
- Description of the machines and the processes
- Checklist of mandatory criteria to be fulfilled

### Risk analysis to ISO 12100

Based on ISO 12100, the **tec.nicum** specialists carry out risk analysis and a comprehensive assessment of all hazards relating to the machines and systems. They also analyze machines for conformity with the applicable standards and norms.

Based on the results of these investigations, we develop recommendations and corrective action, in order to ensure that the machines comply with the various applicable guidelines.

All the results of the investigations are compiled into a comprehensive final report. Priority is given to an optimum balance between appropriate safety and maintaining maximum productivity.

- Risk analysis in accordance with ISO 12100, which serves as the basis for the relevant national standards
- Identification and assessment of risks and hazards
- Reference to functional safety
- Reference to applicable legal regulations, e.g. by means of (standardized) norms
- Working out a plan of action to minimize risk



## Technical services tec.nicum consulting

### **Collaborative Robot Risk Analysis (based on requirements from ISO/TS 15066 & ISO 10218)**

Risk assessments are the starting point to any machine safeguarding initiative, even when the application involves inherently safe by design equipment such as a collaborative robot. It is important to note that the use of an inherently safe collaborative robot does not automatically equate to a safe application. This is because the application as a whole must be evaluated which includes the environment, scope of work defined for the robot and human operator, material being handled, etc.

### **Technical documentation**

The production and maintenance of technical documents is a major principle of machine and industrial safety. Modern quality processes are based on a seamless chain of documentation, which represents a key element of product and process safety, accident prevention and for clarifying liability issues in the event of an accident.

In order to make this process as efficient as possible, **tec.nicum** develops the necessary technical documentation based on the information provided by the customer. This can contain the following:

- Checklists based on product standards
- Risk analysis
- Evaluation of proposed solutions
- Electrical wiring diagrams including pneumatic and hydraulic processes where applicable
- Electrical measurements
- Design and validation of safety functions and systems
- Technical data, tables, manuals and maintenance schedules
- Drafting of a conformity recommendation. e.g. CE in accordance with the European Machinery Directive



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### Lockout Tagout Service

OSHA requires employers to establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, start-up or release of stored energy in order to prevent injury to employees.

Part of this requirement involves providing specific procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy.

**tec.nicum** provides the services to identify all energy sources of a machine and the creation a placard detailing the procedures of how to properly implement lockout tagout for a specific machine.

### Corporate standard

Following a thorough analysis carried out in collaboration with the customer, **tec.nicum** can create a safety manual which summarizes general safety principles and safety-related solution approaches.

These summarized excerpts are based on applicable safety standards specific to the customers processes and equipment.

Examples of wiring schematics and safety devices used to meet certain safety circuit requirements also provided. Additional requirements, such as the customers' corporate safety standards may be added to the custom safety manual as well.



# Conception of safety solutions

## tec.nicum engineering

### Design, planning and programming

**We can provide expertise for every life-cycle phase of machine and plant construction, involved in the design of new machinery and process, and the retrofitting of safety functions during the modernization of older machines. We also perform stop time measurements to calculate safety distances for various guarding systems and carry out the validation of safety functions and provide necessary documentation.**

### Technical project planning

One of the most important phases in the modification of a machine or production line is engineering prior to the conversion work. This lays the foundations for the quality of subsequent implementation. The aim is to develop technical safety solutions for machines and systems. **tec.nicum** defines the necessary safety elements and investigates the PL, SIL and PFH<sub>D</sub> values required. At the same time, the **tec.nicum** engineer can show you the best way to implement the modification.

### Validation of safety functions to ISO 13849-2

Based on ISO 13849-2, **tec.nicum** produces all the documents (validation plan, error lists, calculations, etc.) and carries out the validation of safety functions by means of analysis and testing. **tec.nicum** checks circuit diagrams for electrical, pneumatic and hydraulic systems and calculates the performance level (PL) and PFH<sub>D</sub> for each safety function.





engineering

### **Pressure and Force Limit Analysis – Measurement tests according to ISO/TS 15066**

Within collaborative robot applications where there exists direct interaction between a human operator and a robot, collisions between the two cannot be overlooked, but rather expected as a reasonable foreseeable event. ISO/TS 15066 specifies the safety requirements for collaborative robot systems and the work environment, and also provides further guidance on collaborative industrial robot requirements given in ISO 10218. Among these specifications are the permissible limits for force and pressure deriving from the collaborate robot and are described as transient and quasi-static forces. Our Engineering Services group can perform the necessary pressure and force limit measurements on collaborative robots, and provide analysis of the results.

### **Stop Time Analysis**

Machines and applications which have non-separating primary safety devices (e.g., light curtains, laser scanners, safety mats, two-hand controls, etc.) must be evaluated to ensure the safety device is placed at the correct minimum safe distance according to ISO 13855. This is a crucial step in selecting and installing the safety device as it must be confirmed that the hazardous condition is abated by the time an operator triggers the safety function and reaches the guarded hazard. One parameter needed for this evaluation is the stopping time of the equipment which can be obtained by conducting a Stop Time Analysis.



# Implementation tec.nicum integration



integration

## Execution and assembly

**Our specialists are involved with the planning of fixed or moving protective equipment or complete machine housings tailored to the individual requirements of the respective industry and the relevant company. Through our nationwide network of integrators, we oversee the installation of individual safety components, including wiring, configuration of programming, and integration of safety controllers and safety PLC.**

## Installation of protective equipment and safety fences

**tec.nicum** has extensive experience in the planning and implementation of complex protective equipment for various industries. These include the food and packaging industry, the automotive industry, paper manufacturing, metal processing and chemicals and pharmaceuticals.

**tec.nicum**'s technical safety solutions are tailored to the individual requirements of the respective industry and the client's application. This involves the planning and installation of fixed or moving protective equipment and complete machine housing in a wide range of materials.

## Project Management

If you already have a partnership with an existing integrator, allow **tec.nicum** to manage the safety modifications by coordinating with your integrator to ensure safety designs and installations meet the proper safety requirements and expectations from the risk analysis.

# Stay in touch Visit our website



[www.schmersalusa.com/service/tecnicum-engineering-services](http://www.schmersalusa.com/service/tecnicum-engineering-services)



# excellence in safety

Functional machine safety is a complex business which involves complying with a range of standards and directives. **tec.nicum** offers all machine manufacturers, operators and distributors a completely product and manufacturer-neutral consultancy on all currently relevant statutory regulations and supports them in ensuring their machines and workplaces are designed to comply with the relevant standards.

**tec.nicum** services cover four areas, which can be obtained as individual modules or as complete packages:

- **tec.nicum academy – Learning**
- **tec.nicum consulting – Consultancy services**
- **tec.nicum engineering – Technical planning**
- **tec.nicum integration – Practical implementation**



academy



consulting



engineering



integration

- Education seminars
- In-house or online training
- Customer-specific workshops
- Demonstration events
- Symposia
- Safety analysis of machines and production lines
- Conformity assessment and verification
- Risk assessments
- Technical documentation
- Technical project planning
- Validation of safety functions
- Measurements and tests
- Modernization of machines
- Safety controller programming
- Conversion / Retrofitting
- Installation of
  - safety guards
  - safety fences
- Integration of safety functions
- Maintenance and service

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