LEADING IN
PRODUCTION
EFFICIENCY

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DÜRR

Dürr Training

Training program

The key to success is well trained personnel

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Paint shop technology

Process technology

Overview of paint shops

100 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel, manufacturing personnel, planning personnel, management, employees interested in technology

COURSE OBJECTIVE

You will develop a basic understanding of the current process and conveyor technology used in paint shops

ADMISSION REQUIREMENTS

A basic understanding of system processes and technical relationships is an advantage

COURSE STRUCTURE

This course uses an abundance of appropriate plant schematics, layouts and 3D models to assist in explaining the design of a paint shop and the painting process

COURSE CONTENT

- Process of automotive production
- Build-up of the paint layers
- Process chain of painting car bodies
- Basic design of a paint shop (process steps, plant levels, subsystems, utility supply)
- Design and function of the pretreatment and electrocoating
- Design and function of the spray booth with paint overspray separation system and associated air supply units
- Application technology in the spray booth and paint supply
- Sealing processes and material supply
- Types of oven in a paint shop
- Conveyor technology in the paint shop (floor conveyor, high-bay storage, rotation dip conveyor)
- Current trends and products at Dürr, e.g. paint shop of the future

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Process technology

Dürr Plant Basics

101 | BASIC | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel, manufacturing personnel, planning personnel

COURSE OBJECTIVE

You will become able to read technical drawings and find your way around the paint shop using these drawings. You will also become familiar with the basic design of a paint shop and all its subsystems.

ADMISSION REQUIREMENTS

A basic understanding of system processes and technical relationships is an advantage

COURSE STRUCTURE

The course serves as an introduction to all maintenance and operating courses. An abundance of technical drawings is used to explain the design and process sequence of your paint shop. You will learn how to read different drawing types by means of practical exercises, and get an insight into the plant numbering system of Dürr.

COURSE CONTENT

- Process of automotive production
- Build-up of the paint layers
- Process chain of painting car bodies
- Basic design of a paint shop (process steps, plant levels, subsystems, utility supply)
- Material flow chart
- Conveyor and safety layouts
- A comparison of P&IDs for wet systems, spray booths, and ovens
- Design and structure of circuit diagrams
- Durr numbering system and labeling of the plant
- Numbering and identification of mechanical and electrical plant components
- Overview of control systems in a paint shop
- Design and layout of control cabinets
- Control concepts for process and conveyor elements
- Introduction to the operating concept for process and conveyor technology
- Practical exercises on the types of drawing and on the numbering system in the classroom and in the paint shop

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Process technology

Pretreatment & Electrocoating | Maintenance

102 | BASIC | 3 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with both the PT and EC plants, as well as their most important components. You will also learn how to use the technical documentation to determine maintenance intervals, and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the plant. Detailed technical documentation is used as a reference for determining the operating concept and the relevant maintenance tasks. Depending on plant availability, selected maintenance tasks are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- Role of pretreatment and electrocoating in the painting process
- Process zones for pretreatment and electrocoating
- P&ID and plant structure
- Components for maintaining the bath condition of the pretreatment
  - Filter systems and filter press
  - Temperature control in the process tanks
  - Dosing of chemicals
- Components of the electrocoating section
  - Recirculation circuits, cooling circuit, and ultrafiltration circuit
  - Anolyte system
  - Ultrafiltration modules
  - Dosing of chemicals
- Structure of the technical documentation
- Maintenance tasks and cleaning/rinsing intervals according to the maintenance list
- Health & safety instructions for maintenance tasks and cleaning operations
- Health & safety instructions for handling chemicals
- Location of the plant's control cabinets
- Introduction to the operating concept (basic functions of the visualization)
- Practical demonstration of the replacement of spare and wear parts, depending on plant availability

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Process technology

Pretreatment & Electrocoating | Maintenance advanced

103 | ADVANCED | 3 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will develop a thorough understanding of the plant and its detailed functions. You will then be able to quickly and safely perform the maintenance tasks, and have a basic understanding of the production-relevant parameters.

ADMISSION REQUIREMENTS

Participation in the maintenance course (#102) Pretreatment and Electrocoating or comparable work experience

COURSE STRUCTURE

First there will be a short revision of the theory of Pretreatment and Electrocoating. Maintenance tasks will then be realistically trained on the plant. The course closes with a Q&A session on daily plant work.

COURSE CONTENT

- Repetition of the basics of pretreatment and electrocoating
- Process zones for pretreatment and electrocoating
- P&ID and plant design
- Components for maintaining the tank condition of the pretreatment section
  - Filter systems and filter press
  - Temperature control in the process tanks
  - Dosing of chemicals
- Components of the electrocoating section
  - Recirculation circuits, cooling circuit, and ultrafiltration circuit
  - Anolyte system
  - Ultrafiltration modules
  - Dosing of chemicals
- Process-relevant parameters for pretreatment and electrocoating
- Setting of the nozzles in the spray zones and impact on the process quality
- Air balance of the pretreatment and electrocoating tunnel with supply and exhaust air concept
- Ventilation for maintenance tasks in the tunnel
- Replacement and calibration of components/measuring instruments using the technical documentation
- Discussion of current and frequently occurring issues relating to the daily plant work

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Process technology

Pretreatment & Electrocoating | Parameters and functions

104 | EXPERT | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Process owners, specialized maintenance and operating personnel

COURSE OBJECTIVE

You will develop a thorough understanding of the process-relevant parameters in the Pretreatment and Electrocoating and know the physical-chemical relationships. You will then be able to quickly identify irregularities during plant operation and apply problem-solving measures.

ADMISSION REQUIREMENTS

Participation in the maintenance course (#102) Pretreatment and Electrocoating or comparable work experience

COURSE STRUCTURE

Following the process steps of pretreatment and electrocoating, this course comprises an analysis and a discussion on all production-relevant parameters and their impact on the coating quality

COURSE CONTENT

- Repetition of the basics of pretreatment and electrocoating
- Process zones for pretreatment and electrocoating
- P&ID and plant design
- Process-relevant parameters of the pretreatment section (e.g. temperature, water quality, time) and their interdependencies
- Analysis and discussion of quality-relevant parameters in the degreasing, phosphating, and rinsing zones
- Process-relevant parameters of the electrocoating section (e.g. dosing quantity, temperature, and rectifier voltage) and their interdependencies
- Analysis and discussion of quality-relevant parameters for electrocoating processes
- Troubleshooting and analysis of paint defects
- Interactive exercises in small groups

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Process technology

Pretreatment & Electrocoating | Operation

105 | BASIC | 2.5 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Operating personnel

COURSE OBJECTIVE

You will become familiar with the PT and EC plant, with a focus on its most important components and functions. You will also learn the operating modes and become able to safely operate the plant using the visualization and other operating controls.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the PT and EC. The course closes with hands-on training using both the visualization and other operating controls.

COURSE CONTENT

- Role of pretreatment and electrocoating in the painting process
- Components and functions
- Process zones for pretreatment and electrocoating
- P&ID and plant design
- Components for maintaining the tank condition of the pretreatment section (e.g. filter systems, temperature control, or dosing)
- Components of the electrocoating section (e.g. anolyte system, ultrafiltration modules, dosing system)
- Health & safety instructions for operating the pretreatment and electrocoating using the technical documentation
  - Operating modes of the pretreatment and electrocoating
- Design and functions of the visualization
- Central start of the plant
- Switching between automatic and manual mode
- Adjusting and modifying parameters
- Analyzing trend values using the visualization
- Monitoring process parameters and identifying irregularities
- Local operating elements

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Process technology

Ovens | Maintenance

106 | BASIC | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with the oven plants and their most important components. You will also learn how to use the technical documentation to determine the maintenance intervals and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the oven. Detailed technical documentation is used as a reference for determining the operating concept and the relevant maintenance tasks. Depending on plant availability, selected maintenance tasks are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- Oven design, drying process and properties of ovens
- Design and components of the individual oven zones (air seals, heating zones, cooling zones)
- Design and components of heating and cooling units with air pollution control systems Oxi.**X** or single burners
- Design and components of recirculated air and exhaust air fans
- Discussion of P&IDs and layouts
- Structure of the technical documentation
- Maintenance tasks and intervals according to the maintenance list
- Health & safety instructions for maintenance tasks and cleaning operations
- Location of the plant's control cabinets
- Access in the event of a fault and function of the quick cooling system
- Introduction to the operating concept (basic functions of the visualization)
- Practical demonstration of spare and wear parts, depending on plant availability

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Process technology

Ovens | Maintenance advanced

107 | ADVANCED | 1.5 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will develop a thorough understanding of the oven and its detailed functions. You will then be able to quickly identify irregularities during plant operation and apply problem-solving measures.

ADMISSION REQUIREMENTS

Participation in the maintenance course (#106) Oven and thermal air pollution control systems Oxi.**X** or comparable work experience

COURSE STRUCTURE

First there will be a short revision of the theory of oven systems. Maintenance tasks will then be realistically trained on the plant. The course closes with a Q&A session on daily plant work.

COURSE CONTENT

- Repetition of the basics of oven systems
- Oven design, drying process, and properties of ovens
- Design and components of the individual oven zones (air seals, heating zones, cooling zones)
- Design and components of heating and cooling units with thermal air pollution control systems Oxi.**X** or single burners
- Discussion of P&IDs and layouts
- Setting and influencing of the air balance (fresh air and exhaust air concept)
- Temperature control (measuring instruments, control circuits, parameterization)
- System differential pressure monitoring (measuring instruments, warning and alarm limits, parameterization)
- Replacement and calibration of components/measuring instruments using the technical documentation
- Discussion of current and frequently occurring issues relating to the daily plant work

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Process technology

Oven air balance and air flow rate calculation | Expert

108 | EXPERT | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will be able to detect and correct errors in the air balance. You will also develop a thorough understanding of the parameters that impact on the air balance in the oven, and then be able to calculate air flow rates.

ADMISSION REQUIREMENTS

Several years of professional experience dealing with ovens in the paint shop

COURSE STRUCTURE

First there will be a short introduction to the theory of oven systems. Further topics of the oven air balance will then be discussed and measurements performed. The setting of the air balance via dampers and fans will be shown directly on the plant.

COURSE CONTENT

- Repetition of the basics of oven systems
- Oven design, drying process, and properties of ovens
- Design and components of the individual oven zones (air seals, heating zones, cooling zones)
- Design and components of heating and cooling zones with thermal air pollution control systems Oxi.**X** or single burners
- Discussion of P&IDs and layouts
- Identification of errors in the air balance
- Introduction to the air flow rate measurement
- Performance of an air flow rate measurement in the air duct piece
- Performance of an air flow rate measurement at the nozzles
- Measurement of the air supply and exhaust air flow rate
- Discussion of the air balance
- Calculation of the air flow rate
- Influence of the nozzles and suction gaps on the air balance
- Performance of an emission measurement

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Process technology

Ovens | Operation

109 | BASIC | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Operating personnel

COURSE OBJECTIVE

You will become familiar with the oven plants with a focus on the most important components and functions, as well as the oven operating modes. You will then able to safely operate the oven using the visualization and other operating controls.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the ovens. The course closes with hands-on training using both the visualization and other operating controls.

COURSE CONTENT

- Oven design, drying process, and properties of ovens
- Structure and components of the individual oven zones (air seals, heating zones, cooling zones)
- Design and components of the heating and cooling units with air pollution control systems Oxi.**X** or single burners
- Design and components of recirculated air and exhaust air fans
- Discussion of P&IDs and layouts
- Health & safety instructions for operating the ovens using the technical documentation
- Operating modes of the ovens
- Design and functions of the visualization
- Central start of the plant
- Switching between automatic and manual mode
- Adjusting and modifying parameters
- Analyzing trend values using the visualization system
- Monitoring process parameters and detecting irregularities
- Local operating elements

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Process technology

Oven **Eco**InCure | Compact course

110 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel, manufacturing personnel, planning personnel, management, employees interested in technology

COURSE OBJECTIVE

You will develop a basic understanding of the **Eco**InCure oven. You will become familiar with the general design and function, and learn about the differences from classic types of oven.

ADMISSION REQUIREMENTS

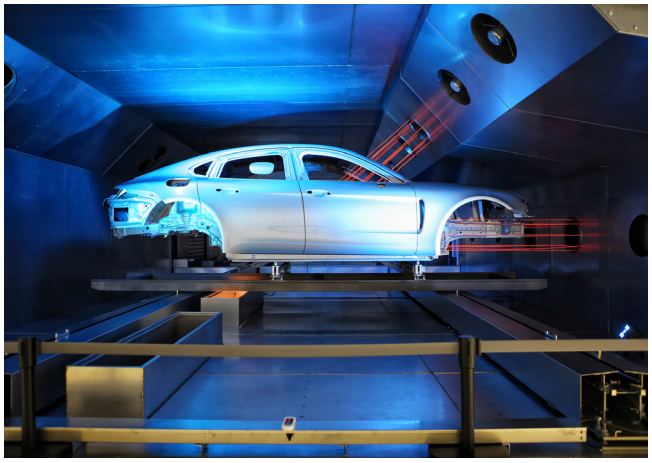
A basic understanding of system processes and technical relationships is an advantage

COURSE STRUCTURE

This course uses models and drawings to explain the design and function of the oven. At the end of the course a test system of the oven will be shown.

COURSE CONTENT

- Basics of oven systems
- Oven design, drying process, and properties of ovens
- An overview of oven types (straight-through oven, A-type oven)
- Introduction to the **Eco**InCure oven and differences from classic ovens
- Design and function of the **Eco**InCure
- Design and components of the individual oven zones (air seals, heating zones, cooling zones)
- Operating modes of the **Eco**InCure
- Setting and influencing the air balance (fresh air and exhaust air concept)
- Current trends in oven systems
- Plant tour in the research center



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Process technology

Spray booths and air supply units | Maintenance

111 | BASIC | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with both the spray booth and air supply units, as well as their most important components. You will also learn how to use the technical documentation to determine maintenance intervals, and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

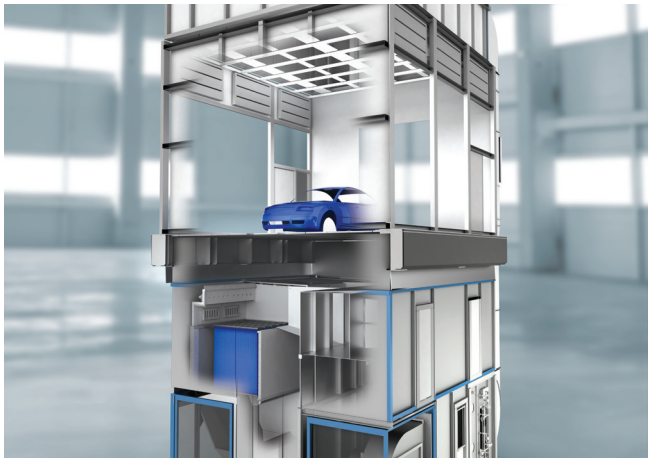
Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the spray booths. Detailed technical documentation is used as a reference for determining the operating concept and the relevant maintenance tasks. Depending on plant availability, selected maintenance tasks are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- Overview of the spray booth system
- Design of the spray booth and the various levels
- Relationship between spray booth and paint overspray separation system
- Design and components of air supply units (filter stages, temperature and humidity control, fans)
- Setting and influencing the air balance in the spray booth
- Structure of the technical documentation
- Maintenance tasks and cleaning intervals according to the maintenance list
- Location of the plant's control cabinets
- Health & safety instructions for maintenance tasks and cleaning operations (personal protection, ATEX areas)
- Introduction to the operating concept (basic functions of the visualization)
- Practical demonstration of the replacement of spare and wear parts, depending on plant availability



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Process technology

Spray booths and air supply units | Operation

112 | BASIC | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Operating personnel

COURSE OBJECTIVE

You will become familiar with both the spray booth and air supply units, as well as their most important components and functions. You will be able to safely operate the plant via the visualization and other operating elements.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the spray booths. The course closes with hands-on training using both the visualization and other operating controls.

COURSE CONTENT

- Overview of the spray booth system
- Design of the spray booth and the various levels
- Relationship between spray booth and paint overspray separation system
- Design and components of air supply units (filter stages, temperature and humidity control, fans)
- Health & safety instructions for operating the plant
- Operating modes of the spray booth
- Design and functions of the visualization
- Central start of the plant
- Switching between automatic and manual mode
- Adjusting and modifying parameters
- Analyzing trend values using the visualization system system
- Monitoring process parameters and detecting irregularities
- Local operating elements

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Process technology

EcoDryScrubber | Maintenance

113 | BASIC | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with the paint overspray separation system **Eco**DryScrubber and its most important components and functions. You will also learn how to use the technical documentation to determine maintenance intervals, and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience. Basic knowledge of spray booths is an advantage.

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the **Eco**DryScrubber. Detailed technical documentation is used as a reference for determining the operating concept and the relevant maintenance tasks. Depending on plant availability, selected maintenance tasks are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- System overview and relationship between spray booth and paint overspray separation system
- Design of the paint overspray separation system **Eco**DryScrubber
- Paint overspray separation process with filter modules
- Components of filter modules
- Operating modes and pneumatic control of the filter modules
- Limestone material supply and residual material disposal from the silos to the filter modules and vice versa
- Structure of the technical documentation
- Maintenance tasks and cleaning intervals according to the maintenance list
- Cleaning operations and cleaning tools
- Location of the plant's control and pneumatic cabinets
- Health & safety instructions for maintenance tasks and cleaning operations
- Introduction to the operating concept (basic functions of the visualization)
- Plant tour (silos and filter modules) and practical exercises
- Practical demonstration of the replacement of spare and wear parts, depending on plant availability

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Process technology

EcoDryScrubber | Maintenance advanced

114 | ADVANCED | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will develop a thorough understanding of the plant and learn about the pneumatic relationships. You will then be able to quickly identify irregularities during operation of the plant and apply problem-solving measures.

ADMISSION REQUIREMENTS

Participation in the maintenance course and several months of professional experience dealing with the plant

COURSE STRUCTURE

First there will be a short revision of the theory of paint overspray separation systems in your plant. Further maintenance tasks of the **Eco**DryScrubber will then be practically trained on the plant. The course closes with a Q&A session on daily plant work.

COURSE CONTENT

- Repetition of the basics of the **Eco**DryScrubber
- Relationship between spray booth and paint overspray separation system
- Design of the paint overspray separation system **Eco**DryScrubber
- Components and function
- Paint overspray separation system with filter modules
- Components of filter modules
- Pneumatic control
- Operating modes of the filter modules
- Limestone material supply and residual material disposal to/from filter modules and silos
- Detection of wear on pipework
- Removal of blockages from pipework
- Silo equipment and fluidization of materials
- Early detection of deviations in the filter modules and initiation of countermeasures
- Replacement and calibration of components and measuring instruments using the technical documentation
- Discussion of current and frequently occurring issues relating to the daily plant work

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Process technology

EcoDryScrubber | Operation

115 | BASIC | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Operating personnel

COURSE OBJECTIVE

You will become familiar with the paint overspray separation system **Eco**DryScrubber and its most important components and functions. You will then be able to safely operate the plant via the visualization and other operating elements.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience. A basic knowledge of spray booths is an advantage.

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the paint overspray separation system **Eco**DryScrubber. The course closes with hands-on training using both the visualization and other operating controls.

COURSE CONTENT

- System overview and relationship between spray booth and paint overspray separation system
- Basic design of the paint overspray separation system **Eco**DryScrubber
- Paint overspray separation system with filter modules
- Components of filter modules
- Operating modes and pneumatic control unit of the filter modules
- Limestone supply and residual material disposal to/from filter modules and silos
- Health & safety instructions for plant operation
- Design and functions of the visualization
- Central start of the spray booth
- Switching between automatic and manual mode
- Adjusting and modifying parameters
- Analyzing trend values using the visualization system
- Monitoring process parameters
- Detecting irregularities
- Local operating elements

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Process technology

EcoDryScrubber and EcoDryX | Compact course

116 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel, manufacturing personnel, planning personnel, management, employees interested in technology

COURSE OBJECTIVE

You will develop a basic understanding of the paint overspray separation systems at Dürr. You will become familiar with the general design and function, and learn about the differences between the systems.

ADMISSION REQUIREMENTS

A basic understanding of system processes and technical relationships is an advantage

COURSE STRUCTURE

This course uses models and drawings to explain the design and function of the paint overspray separation systems **Eco**DryScrubber and **Eco**Dry X. At the end of the course a test system of the **Eco**DryScrubber and **Eco**Dry X will be shown.

COURSE CONTENT

- System overview and relationship between spray booth and paint overspray separation system
- Design of the paint overspray separation system **Eco**DryScrubber
- Design of the paint overspray separation system **Eco**Dry X
- Differences from other paint overspray separation methods
- Components and functions of the paint overspray separation system **Eco**DryScrubber (filter modules, pneumatic control unit, material supply, silos)
- Components and functions of the paint overspray separation system **Eco**Dry X (filter trolleys, filter boxes, replacement concept)
- Current trends in paint overspray separation
- Plant tour in the research center

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Process technology

EcoDry X | Maintenance

117 | BASIC | 0.5 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with the paint overspray separation system **Eco**Dry X and its most important components and functions. You will also learn how to use the technical documentation to determine maintenance intervals, and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience. A basic knowledge of spray booths is an advantage.

COURSE STRUCTURE

This course uses models and drawings to explain the design and function of the paint overspray separation system **Eco**Dry X. Detailed technical documentation is used as a reference for determining the relevant maintenance and cleaning tasks. Depending on plant availability, selected maintenance or cleaning tasks are demonstrated. The course can be integrated into the course on spray booths and air supply units.

COURSE CONTENT

- System overview and relationship between spray booth and paint overspray separation system
- Basic design of the paint overspray separation system **Eco**Dry X
- Paint overspray separation process in various filter stages
- Components of the filter trolleys
- Assembly of filter boxes
- Components of the filter exchange station
- Filter exchange concept and exchange intervals of filter trolleys and filter boxes
- Structure of the technical documentation
- Maintenance tasks and cleaning intervals according to the maintenance list
- Location of the plant's control cabinets
- Health & safety instructions for maintenance tasks and cleaning operations
- Local operating elements at the exchange station

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Process technology

EcoDry X | Operation

118 | BASIC | 0.5 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Operating personnel

COURSE OBJECTIVE

You will become familiar with the paint overspray separation system **Eco**Dry X with its most important components and functions. You will then be able to safely operate the plant via the visualization and other operating elements.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience. A basic knowledge of spray booths is an advantage.

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the paint overspray separation system **Eco**Dry X. The course closes with hands-on training using both the visualization and other operating controls.
The course can be integrated into the course on spray booths and air supply units.

COURSE CONTENT

- System overview and relationship between spray booth and paint overspray separation system
- Basic design of the paint overspray separation system **Eco**Dry X
- Paint overspray separation process in various filter stages
- Components of the filter trolleys
- Assembly of filter boxes
- Components of the filter exchange station
- Filter exchange concept and exchange intervals of filter trolleys and filter boxes
- Structure of the technical documentation
- Maintenance tasks and cleaning intervals according to the maintenance list
- Location of the plant's control cabinets
- Health & safety instructions for maintenance tasks and cleaning operations
- Local operating elements at the exchange station

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Process technology

Deionization system (DI plant) | Maintenance

119 | BASIC | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with the deionization system and its most important components and functions. You will also learn how to use the technical documentation to determine the maintenance and rinsing intervals, and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the deionization system to you. Detailed technical documentation is used as a reference for determining the operating concept as well as the relevant maintenance tasks and rinse processes. Depending on plant availability, selected maintenance tasks and rinse processes are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- Process stages in a DI plant with reverse osmosis units or ion exchangers
- Comparison of different filtration techniques (macrofiltration, microfiltration, ultrafiltration, cross-flow membrane filtration, reverse osmosis)
- Components of water and particle types in fresh/industrial water
- Chemical principles for the preparation of deionized water
- Design and function of process tanks, filter stages, reverse osmosis units or ion exchangers, and accessories for plant regeneration
- Structure of the technical documentation
- Maintenance tasks and cleaning/rinse intervals according to the maintenance list
- Location of the plant's control cabinets
- Health & safety instructions for maintenance tasks and cleaning operations
- Health & safety instructions for handling chemicals
- Introduction to the operating concept (basic functions of the visualization)
- Practical demonstration of replacing spare and wear parts, depending on plant availability

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Process technology

Deionization system (DI plant) | Operation

120 | BASIC | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Operating personnel

COURSE OBJECTIVE

You will become familiar with the deionization system and its most important components and functions. You will then be able to safely operate the plant via the visualization and other operating elements.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the of the deionization system to you. The course closes with hands-on training using both the visualization and other operating controls.

COURSE CONTENT

- Process stages in a DI plant with reverse osmosis units or ion exchangers
- Design and function of process tanks, filter stages, reverse osmosis unit or ion exchangers, and accessories for plant regeneration
- Health & safety instructions for operating the DI plant
- Handling and dosing of chemicals
- Structure of the technical documentation
- Design and functions of the visualization
- Central start of the plant
- Switching between automatic and manual mode
- Switching between the plant's operating modes
- Adjusting and modifying parameters
- Analyzing trend values using the visualization system
- Monitoring process parameters and detecting irregularities
- Local operating elements

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Process technology

Wastewater plant | Maintenance

121 | BASIC | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with the wastewater plant and its most important components and functions. You will also learn how to use the technical documentation to determine the maintenance and rinsing intervals, and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the wastewater plant. Detailed technical documentation is used as a reference for determining the operating concept as well as the relevant maintenance tasks and rinse processes. Depending on plant availability, selected maintenance tasks and rinse processes are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- Chemical principles of wastewater treatment
- Acids and bases and their properties
- Types of wastewater and differences in post-treatment
- Process stages in wastewater treatment
- Introduction to separation and filtration techniques
  - Coagulation and flocculation
  - Sedimentation and flotation
  - Filtration and neutralization
- Design and components of the individual stages of the wastewater treatment plant
- Structure of the technical documentation
- Maintenance tasks and cleaning/rinse intervals according to the maintenance list
- Location of the plant's control cabinets
- Health & safety instructions for maintenance tasks and cleaning operations
- Health & safety instructions for handling chemicals
- Introduction to the operating concept (basic functions of the visualization)
- Practical demonstration of the replacement of spare and wear parts, depending on plant availability

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Process technology

Wastewater plant | Operation

122 | BASIC | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Operating personnel

COURSE OBJECTIVE

You will become familiar with the wastewater plant and its most important components and functions. You will then be able to safely operate the plant via the visualization and other operating elements.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the wastewater plant. The course closes with hands-on training using both the visualization and other operating controls.

COURSE CONTENT

- Process stages in the wastewater treatment plant
- Design and components of the individual stages of the wastewater treatment plant
- Health & safety instructions for operating the wastewater treatment plant
- Handling and dosing of chemicals
- Structure of the technical documentation
- Design and functions of the visualization
- Central start of the plant
- Switching between automatic and manual mode
- Operating modes
- Adjusting and modifying parameters
- Analyzing trend values using the visualization system
- Monitoring process parameters and detecting irregularities
- Local operating elements

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Process technology

Air pollution control system Oxi.X with VOC concentration system Sorpt.X | Maintenance

123 | BASIC | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with the air pollution control system and its most important components and functions. You will also learn how to use the technical documentation to determine the maintenance intervals, and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the air pollution control system. Detailed technical documentation is used as a reference for determining the operating concept and the relevant maintenance tasks. Depending on plant availability, selected maintenance tasks are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- Functional principle and task of the air pollution control system in a paint shop
- Physical principles of the air pollution control system
- Design and components of the VOC concentration system
- Design and components of the air pollution control system
- Functions of the VOC concentration system
  - Pre-filtration
  - Recirculation
  - System differential pressure monitoring
  - Temperature control
- Operating modes of the overall system (e.g. heat-up mode or fresh air mode)
- Structure of the technical documentation
- Maintenance tasks and cleaning intervals according to the maintenance list
- Location of the plant's control cabinets
- Health & safety instruction for maintenance tasks and cleaning operations
- Introduction to the operating concept (basic functions of the visualization)
- Practical demonstration of the replacement of spare and wear parts, depending on plant availability

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Process technology

Air pollution control system Oxi.X | Maintenance advanced

124 | ADVANCED | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will develop a thorough understanding for the air pollution control system Oxi.**X** through to detail components of the gas train. You will then be able to quickly identify irregularities during operation of the plant and apply problem-solving measures.

ADMISSION REQUIREMENTS

Participation in the maintenance course (#106) Oven or maintenance course (#123) Air pollution control, or comparable work experience

COURSE STRUCTURE

First there will be a short revision of the theory of air pollution control. Further maintenance tasks will then be practically trained on the plant. The course closes with a Q&A session on daily plant work.

COURSE CONTENT

- Repetition of the principles of air pollution control and burner technology
- Maintenance and preventive Maintenance of the air pollution control system
- Components of the gas train and their functions
- Troubleshooting and fault elimination on the gas train
- Design and function of the burner components of the air pollution control system
- Temperature control of the combustion chamber and the clean gas
- Settings at the burner during commissioning
- Health & safety instructions for maintenance tasks and cleaning operations
- Maintenance tasks and preventive Maintenance
- Inspection and repairs on hot bypass damper
- Removal and recommissioning of a burner

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Process technology

Air pollution control system Oxi.X with VOC concentration system Sorpt.X | Operation

125 | BASIC | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Operating personnel

COURSE OBJECTIVE

You will become familiar with the air pollution control system together with the most important components and functions. You will be able to safely operate the plant via the visualization and other operating elements.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the air pollution control system. The course closes with hands-on training using both the visualization and other operating controls.

COURSE CONTENT

- Functional principle and task of the air pollution control system in a paint shop
- Design and components of the VOC concentration system
- Design and components of the air pollution control system Oxi.**X**
- Functions of the VOC concentration system
  - Pre-filtration
  - Recirculation
  - System differential pressure monitoring
  - Temperature control
- Operating modes of the overall system (e.g. heat-up mode or fresh air mode)
- Health & safety instructions for operating the air pollution control system
- Design and functions of the visualization
- Central start of the plant
- Switching between automatic and manual mode
- Switching between the plant's operating modes
- Adjusting and modifying parameters
- Analyzing trend values using the visualization system
- Monitoring process parameters and detecting irregularities
- Local operating elements

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Process technology

Air pollution control system Oxi.X | Compact course

126 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel, manufacturing personnel, planning personnel, management, employees interested in technology

COURSE OBJECTIVE

You will develop a basic understanding of the air pollution control system Oxi.**X**. You will become familiar with the general design and function of the Oxi.**X** and learn about the differences from other air pollution control systems of DÜRR.

ADMISSION REQUIREMENTS

A basic understanding of system processes and technical relationships is an advantage

COURSE STRUCTURE

This course uses models and drawings to explain the design and function of the air pollution control system to you. At the end of the course a test system of the Oxi.**X** will be shown.

COURSE CONTENT

- Air pollution control products at Dürr
- Functional principle and task of the air pollution control system in a paint shop
- Design and components of the air pollution control system
- Components of the gas train and their functions
- Design and function of the burner components of the air pollution control system
- Current trends in air pollution control and energy recovery
- Plant tour in the research center

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Process technology

Fans | Maintenance advanced

127 | EXPERT | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will develop a thorough understanding of the maintenance tasks on fans. You will then be able to quickly and safely exchange components, remove individual fans, detect irregularities, and apply problem-solving measures.

ADMISSION REQUIREMENTS

Several years of professional experience in dealing with ventilation units

COURSE STRUCTURE

First there will be a short revision of the theory of fan technology. Advanced maintenance topics for fans will then be practically trained on the plant. The course is aimed at maintenance personnel who already have experience in dealing with ventilation units.

COURSE CONTENT

- Types and classification of fans regarding the motor type, rotational direction, and construction
- Basic knowledge of radial fans
- Type code for Dürr fans
- Maintenance and preventive maintenance of fans
- Removal of a fan from an air supply unit and/or an oven module, depending on availability
- Characteristic curves of fans
- Design and function of three-phase motors
- Measurement of current consumption at the fan
- Performing a vibration measurement on the fan
- Possibilities and types of vibration measurement
- Causes of vibrations and fault elimination
- Performing a volumetric flow rate calculation
- Performing a speed measurement
- Performing a pressure measurement (static, dynamic and overall)

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Conveyor technology

Paint shop conveyor technology | Maintenance

130 | BASIC | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with the conveyor elements for your area together, with a focus on the most important assemblies. You will also learn how to use the technical documentation to determine the maintenance and lubricating intervals, and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the individual conveyor elements. Detailed technical documentation is used as a reference for determining the relevant maintenance tasks. Depending on plant availability, selected maintenance tasks are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- Overview of the various conveyor types in a paint shop
- Plant numbering system for conveyor technology
- Sensor concept and sensor types for the transport of car bodies
- Material flow chart and conveyor layout – journey of a car body through the paint shop
- Conveyor elements with their assemblies, components, and functions
- Structure of the technical documentation
- Reading of service drawings
- Health & safety instructions for maintenance tasks
- Maintenance tasks and lubricating intervals according to the maintenance and lubricating plan
- Automatic lubrication systems
- Control concept of the plant with operating panels and visual display stations
- Location of the plant's control cabinets
- Introduction to the operating concept (basic functions of the operating panels)
- Practical demonstration of the replacement of spare and wear parts, depending on plant availability

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Conveyor technology

Paint shop conveyor technology | Maintenance advanced

131 | ADVANCED | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will develop a thorough understanding of the maintenance tasks for conveyor technology. You will then be able to quickly and safely replace spare and wear parts, detect irregularities during operation, and apply problem-solving measures.

ADMISSION REQUIREMENTS

Participation in the maintenance course (#130) Paint shop conveyor technology, or comparable work experience

COURSE STRUCTURE

First there will be a short introduction to the theory of your plant's conveyor technology. Further maintenance tasks for the conveyor system will then be practically trained on the plant. The course closes with a Q&A session on daily plant work.

COURSE CONTENT

- Repetition of the theory of conveyor technology
- Material flow chart and conveyor layout – journey of a car body through the paint shop
- Replacement of spare and wear parts using the technical documentation
- Practical exercises on the replacement of spare parts of certain conveyor elements
- Troubleshooting and fault elimination due to defective conveyor elements or plant downtime
- Discussion of current and frequently occurring issues relating to the daily plant work

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Conveyor technology

Paint shop conveyor technology | Operation

132 | BASIC | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Operating personnel

COURSE OBJECTIVE

You will become familiar with the conveyor technology for your area with a focus on its most important components. You will also learn the operating modes and become able to safely operate individual conveyor elements via the operating panels.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the individual conveyor elements. The course closes with hands-on training using both the visualization, control desks, and other operating controls.

COURSE CONTENT

- Overview of the various conveyor types in a paint shop
- Plant numbering system for conveyor technology
- Sensor concept and sensor types for the transport of car bodies
- Material flow chart and conveyor layout – journey of a car body through the paint shop
- Conveyor elements and their functions
- Health & safety instructions for operating the conveyor elements using the technical documentation
- Introduction to the operating concept (basic functions and advanced settings of the visualization and the operating panels)
- Local operating elements
- Operating modes (manual mode, automatic mode, setup mode)
- Troubleshooting and fault elimination due to defective conveyor elements and plant downtime
- Alarm lists

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Conveyor technology

RoDip® E | Maintenance

133 | BASIC | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with the RoDip® E plant with a focus on its most important assemblies and functions. You will also learn how to use the technical documentation to determine the maintenance intervals and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

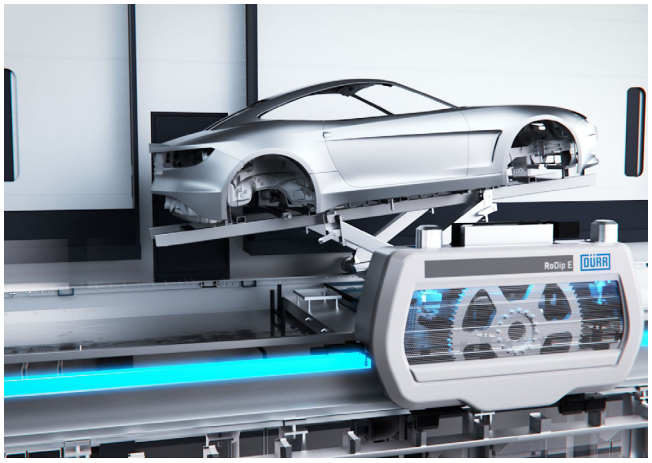
Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the RoDip® E plant. Detailed technical documentation is used as a reference for determining the operating concept and the relevant maintenance tasks. Depending on plant availability, selected maintenance tasks are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- Basics of the rotational dip process
- Variants of the RoDip®
- Layout of the plant for pretreatment and electrocoating
- Steps of the dip process and dip curves
- Components of the RoDip® E system (trolley, rotation carrier, transfer station, locking/unlocking station, maintenance station)
- Structure of the technical documentation
- Reading of service drawings
- Health & safety instructions for maintenance tasks
- Maintenance tasks and intervals according to the maintenance list
- Practical exercises on the replacement of spare and wear parts, depending on plant availability
- Location of the plant's control cabinets
- Introduction to the operating concept (functions of the operating panels and local operating elements)



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Conveyor technology

RoDip® E | Maintenance advanced

134 | ADVANCED | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will develop a thorough understanding of the maintenance tasks on the RoDip® E plant. You will then be able to quickly and safely replace spare and wear parts, detect irregularities, and apply problem-solving measures.

ADMISSION REQUIREMENTS

Participation in the maintenance course (#133) RoDip® E or comparable work experience

COURSE STRUCTURE

First there will be a short revision of the theory of the RoDip® E plant. Further maintenance tasks will then be practically trained on the plant. The course closes with a Q&A session on daily plant work.

COURSE CONTENT

- Repetition of the basics of RoDip® E
- Layout of the plant for pretreatment and electrocoating
- Components of the RoDip® E system (trolley, carrier, transfer station, locking/unlocking station, maintenance station)
- Replacement of spare and wear parts using the technical documentation
- Disassembly and assembly of a travel drive and rotary actuator or other components
- Feeding trolleys in and out
- Troubleshooting during plant downtime
- Discussion of current and frequently occurring issues relating to the daily plant work

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Conveyor technology

RoDip® E | Operation

135 | BASIC | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Operating personnel

COURSE OBJECTIVE

You will become familiar with the RoDip® E plant with a focus on its most important assemblies and functions. You will also learn the operating modes and become able to safely operate the plant.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the RoDip® E plant. The course closes with hands-on training using both the visualization, control desks, and other operating controls.

COURSE CONTENT

- Basics of the rotational dip process
- Versions of RoDip®
- Layout of the plant for pretreatment and electrocoating
- Steps of the dip process and dip curves
- Components of the RoDip® E system (trolley, rotation carrier, transfer station, locking/unlocking station, maintenance station)
- Structure of the technical documentation
- Health & safety instructions for operating the RoDip® E using the technical documentation
- Introduction to the operating concept (functions and advanced settings of the visualization and the operating panels)
- Local operating elements
- Introduction to the RoDip® E JobManager
- Operating modes of the plant (manual mode, automatic mode, setup mode, run mode)
- Troubleshooting and fault elimination due to defective conveyor elements or plant downtime

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Conveyor technology

RoDip® | Compact course

136 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel, manufacturing personnel, planning personnel, management, employees interested in technology

COURSE OBJECTIVE

You will develop a basic understanding of the RoDip® E and RoDip® M plants. You will also learn the general design, function, and the differences between the methods.

ADMISSION REQUIREMENTS

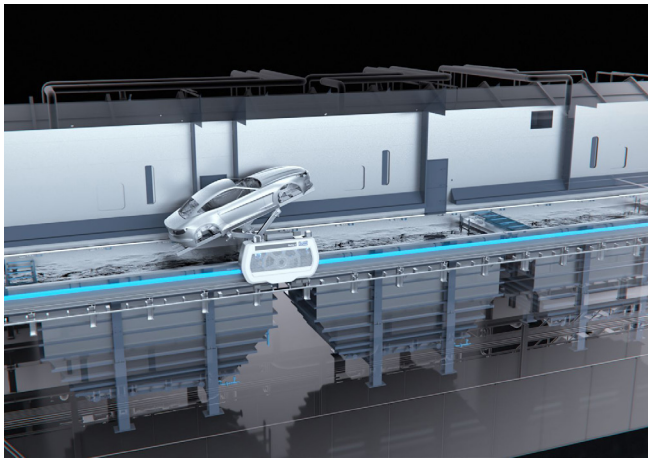
A basic understanding of system processes and technical relationships is an advantage

COURSE STRUCTURE

This course uses models and drawings to explain the design and function of the RoDip® E and RoDip® M plants. At the end of the course a test system of the RoDip® E will be shown.

COURSE CONTENT

- Basics of the rotational dip process
- Comparison with other dip methods
- Basic function of the RoDip® system, versions of RoDip®
- Layout of the plant for pretreatment and electrocoating
- Steps of the dip process and dip curves
- Components of the RoDip® E system (trolley, rotation carrier, transfer station, locking/unlocking station, maintenance station)
- Components of the RoDip® M system (rotation carrier, inlet and outlet tables, drive station, chain guide)
- Plant tour in the research center



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Conveyor technology

RoDip® M | Maintenance

137 | BASIC | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with the RoDip® M plant with a focus on its most important assemblies and functions. You will also learn how to use the technical documentation to determine the maintenance and lubricating intervals and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the RoDip® M plant. Detailed technical documentation is used as a reference for determining the operating concept and the relevant maintenance tasks. Depending on plant availability, selected maintenance tasks are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- Basics of the rotational dip process
- Versions of the RoDip®
- Layout of the plant for pretreatment and electrocoating
- Steps of the dip process and dip curves
- Components of the RoDip® M system (rotation carrier, inlet and outlet station, drive station, chain guide)
- Structure of the technical documentation
- Reading of service drawings
- Health & safety instructions for maintenance tasks
- Maintenance tasks and intervals according to the maintenance list
- Design and components of the automatic lubrication station for chain lubrication
- Practical exercises on the replacement of spare and wear parts, depending on plant availability
- Location of the plant's control cabinets
- Introduction to the operating concept (functions of the operating panels and local operating elements)

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Conveyor technology

RoDip® M | Maintenance advanced

138 | ADVANCED | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will develop a thorough understanding of the maintenance tasks on the RoDip® M plant. You will then be able to quickly and safely replace spare and wear parts, detect irregularities, and apply problem-solving measures.

ADMISSION REQUIREMENTS

Participation in the maintenance course RoDip® M, or comparable work experience

COURSE STRUCTURE

First there will be a short revision of the theory of the RoDip® M plant. Further maintenance tasks will then be practically trained on the plant. The course closes with a Q&A session on daily plant work.

COURSE CONTENT

- Repetition of the basics of RoDip® M
- Layout of the plant for pretreatment and electrocoating
- Components of the RoDip® M system (rotation carrier, inlet and outlet station, drive station, chain guide)
- Disassembly and assembly of a travel drive or other components
- Feeding rotation carriers in and out
- Troubleshooting and fault elimination due to defective conveyor elements or plant downtime
- Discussion of current and frequently occurring issues relating to the daily plant work

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Conveyor technology

RoDip® M | Operation

139 | BASIC | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Operating personnel

COURSE OBJECTIVE

You will become familiar with the RoDip® M plant with a focus on its most important assemblies and functions. You will also learn the operating modes and become able to safely operate the plant.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the RoDip® M. The course closes with hands-on training using both the visualization, control desks, and other operating controls.

COURSE CONTENT

- Basics of the rotation dip method
- Versions of RoDip®
- Layout of the plant for pretreatment and electrocoating
- Steps of the dip process and dip curves
- Components of the RoDip® M system (rotation carrier, inlet and outlet station, drive station, chain guide)
- Structure of the technical documentation
- Health & safety instructions for operating the RoDip® M using the technical documentation
- Introduction to the operating concept (functions and advanced settings of the visualization and the operating panels)
- Local operating elements
- Operating modes (manual mode, automatic mode, setup mode)
- Troubleshooting and fault elimination due to defective conveyor elements or plant downtime

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Conveyor technology

EcoProFleet | Maintenance

140 | BASIC | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with the driverless transport system **Eco**ProFleet with a focus on its most important components and functions. You will also learn how to use the technical documentation to determine the maintenance intervals, replace spare and wear parts, and safely maintain and operate the system.

ADMISSION REQUIREMENTS

Participation in the course (#101) Dürr Plant Basics or comparable work experience

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the **Eco**ProFleet system. Detailed technical documentation is used as a reference for determining the operating concept and the relevant maintenance tasks. Depending on plant availability, selected maintenance tasks are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- Basics of driverless transport systems
- Comparison with classic conveyor systems
- Technical data and capacities
- Design and components of the **Eco**ProFleet (vehicles, power supply, control unit, infrastructure)
- Structure of the technical documentation
- Maintenance tasks and intervals according to the maintenance list
- Design of the maintenance station
- Health & safety instructions for maintenance tasks
- Health & safety instructions and safety distances for operating the **Eco**ProFleet
- Meaning of the lighting elements
- Troubleshooting and emergency strategies in the event of malfunctions

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Conveyor technology

EcoProFleet | Compact course

141 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel, manufacturing personnel, planning personnel, management, employees interested in technology

COURSE OBJECTIVE

You will develop a basic understanding of the driverless transport system **Eco**ProFleet. You will become familiar with the general design, function, and the differences from classic conveyor systems.

ADMISSION REQUIREMENTS

A basic understanding of system processes and technical relationships is an advantage

COURSE STRUCTURE

This course uses models and drawings to explain the design and function of the **Eco**ProFleet system. At the end of the course a test system of the **Eco**ProFleet will be shown.

COURSE CONTENT

- Basics of driverless transport systems
- Comparison with classic conveyor systems
- Technical data and capacities
- Design and components of the **Eco**ProFleet (vehicles, power supply, control unit, infrastructure)
- Health & safety instructions and safety distances for operating the **Eco**ProFleet
- Meaning of the lighting elements
- Plant tour in the research center

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Control systems

Dürr control systems | Basics

150 | BASIC | 3 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel, PLC programmers

COURSE OBJECTIVE

You will become familiar with the control systems in your plant. You will learn about the relationships between mechanical and electrical components, as well as between PLC systems and the visualization. You will also become familiar with the design of the Dürr Basic Software (DBS) and its most important modules and functions.

ADMISSION REQUIREMENTS

Basic knowledge about the programming of the respective control systems, e.g. Siemens TIA Portal or Rockwell

COURSE STRUCTURE

First there will be a short introduction to the theory of control systems. You will then learn the basics about the PLC control systems of your paint shop by means of exercises and practical examples.

COURSE CONTENT

- Basics of the implemented software standard and its programming
- Plant overview and material flow chart
- Plant numbering system
- Design and hardware components of a control cabinet
- Circuit diagrams of the plant
- Control concept and network technology of the plant (networks, central and decentral control systems, signal exchanges)
- Design of the DBS (software architecture and program structure)
- Basic functions of the DBS
- Programming and parameterization of the function blocks (e.g. controller units, step sequences, drive modules)
- Programming of manual and automatic mode
- Programming and parameterization of alarm modules
- Safety programs and their properties
- Interface to the visualization
- Practical exercises on programming DBS function blocks

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Control systems

Process technology | Hardware and software

151 | ADVANCED | 1-2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Electrical maintenance, automation engineers

COURSE OBJECTIVE

You will become familiar with the hardware and software structure of the respective process technology PLC together with the associated visualization. You will then be able to parameterize individual components.

ADMISSION REQUIREMENTS

Participation in course (#150) Dürr control systems basics

COURSE STRUCTURE

This course uses the current PLC program to assist in explaining the hardware and software of the respective process equipment. Exercises and practical examples supplement the course.

COURSE CONTENT

- Design and function groups of the plant
- Plant hardware and circuit diagrams (central control cabinet, decentral operating elements, plant numbering system)
- Functions of the plant
- PLC program of the plant
- Hardware configuration
- Step sequences and operating modes
- Signal exchanges with other external and internal systems
- PLC safety program
- Software controller, e.g. temperature or level monitoring (parameters, controller units, program sequence)
- Operation and design of the visualization (e.g. status windows, operating elements)
- Practical exercises, troubleshooting and malfunction simulation

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Control systems

Conveyor | Hardware and software

152 | ADVANCED | 1-2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Electrical maintenance, automation engineers

COURSE OBJECTIVE

You will become familiar with the hardware and software structure of the respective conveyor PLC together with the associated visualization. You will then be able to parameterize individual components.

ADMISSION REQUIREMENTS

Participation in course (#150) Dürr control systems basics

COURSE STRUCTURE

This course uses the current PLC program to assist in explaining the hardware and software of the respective conveyor system. Exercises and practical examples supplement the course.

COURSE CONTENT

- Conveyor groups and conveyor elements of the plant
- Plant hardware and circuit diagrams (control cabinets, central cabinets, decentral operating elements, operating panels, plant numbering system)
- Control concept (central and decentral elements, communication, network)
- Configuration and parameterization of drive elements (e.g. motors, frequency converters)
- PLC programming structure for conveyor technology
- Standard function modules
- Operating modes (manual mode, automatic mode, setup mode)
- Interfaces to the centralized supervisory controls and visualization
- Locking devices with process and application technology
- PLC safety program
- Error analysis and recording of alarm signals
- Visualization (e.g. status windows, operating elements)
- Practical exercises, troubleshooting, and malfunction simulation

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Control systems

Rectifier **Eco**DCMACS | Hardware and software

153 | ADVANCED | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Electrical maintenance, automation engineers

COURSE OBJECTIVE

You will become familiar with the hardware and software structure of the rectifier system together with the associated visualization. You will also learn to create voltage profiles for different body types and to safely operate the plant.

ADMISSION REQUIREMENTS

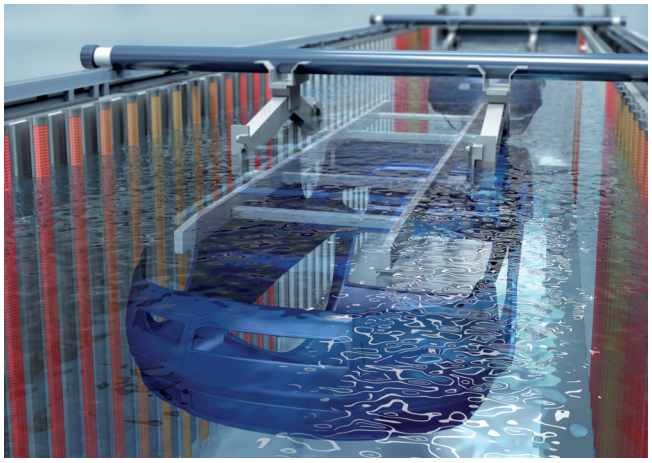
Participation in course (#150) Dürr control systems basics

COURSE STRUCTURE

This course uses the current PLC program to assist in explaining the hardware and software of the respective rectifier system. Exercises and practical examples supplement the course.

COURSE CONTENT

- Functional of the electrocoating and the rectifier system
- Function of integrated gate bipolar transistor and thyristors
- Structure of the circuit diagrams
- Design of the plant hardware (control cabinets, power rails, coupling thyristors)
- Functions of the rectifier system
  - Setting the voltage program
  - Setting the rectifier profile
  - Operating modes of the rectifier
  - Car body tracking
  - Type identification
- PLC program of the plant
- Safety devices
- Locking devices with other plants
- Operation and visualization
- Exchanging an integrated gate bipolar transistor
- Practical exercises, troubleshooting, and malfunction simulation



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Control systems

RoDip® E | Hardware and software

154 | ADVANCED | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Electrical maintenance, automation engineers

COURSE OBJECTIVE

You will become familiar with the hardware and software structure of the RoDip® E system together with the associated visualization. You will then be able to parameterize and safely operate the plant.

ADMISSION REQUIREMENTS

Participation in course (#150) Dürr control systems basics

COURSE STRUCTURE

This course uses the current PLC program to assist in explaining the hardware and software of the RoDip® E plant. Exercises and practical examples supplement the course.

COURSE CONTENT

- Design and function of the RoDip® E plant
- Design of the plant hardware (control cabinets, circuit diagrams)
- PLC program and plant-specific function blocks
- Section elements and areas
- Virtual positions
- Hardware of the rotation carrier
- Error analysis and recording of alarm signals
- Signal exchanges with other plants
- PLC safety program
- Status windows of the visualization
- Programming the operating modes (manual mode, automatic mode, setup mode, run mode)
- Programming the Emergency Stop function
- Specific software functions in the RoDip® JobManager (setting for routes and bodies, parameters)
- Practical exercises, troubleshooting and malfunction simulation

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Control systems

RoDip® E JobManager | Operation

155 | ADVANCED | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Electrical maintenance, automation engineers, process engineers, operating personnel

COURSE OBJECTIVE

You will become familiar with the user interface of the RoDip® JobManager. You will also learn how to create new motion programs, modify existing programs, and upload created programs to the PLC.

ADMISSION REQUIREMENTS

Basic knowledge of RoDip® E

COURSE STRUCTURE

Using a training environment this course serves as a step-by-step explanation of the RoDip® JobManager software with all its functions. Practical exercises on a test system supplement the course.

COURSE CONTENT

- System overview of the hardware architecture
- Explanation of the user interface of RoDip® JobManager software V2.7 or newer
- Properties of a route in the Route Editor
- Properties of the process tanks in the Tank Editor
- Modeling of a car body in the Body Editor
- Creating a motion program in the Motion Program Editor
- Simulating and validating the motion program
- Uploading the motion program to the RoDip® E controller

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Control systems

RoDip® M | Hardware and software

156 | ADVANCED | 1 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Electrical maintenance, automation engineers

COURSE OBJECTIVE

You will become familiar with the hardware and software structure of the RoDip® M system together with the associated visualization. You will also learn how to safely operate the plant.

ADMISSION REQUIREMENTS

Participation in course (#150) Dürr control systems basics

COURSE STRUCTURE

This course uses the current PLC program to assist in explaining the hardware and software of the RoDip® M plant. Exercises and practical examples supplement the course.

COURSE CONTENT

- System overview – Function of RoDip® M, components, skid transfer
- Hardware of the plant – Control cabinets, circuit diagrams
- PLC program – Plant-specific function blocks
- Error and plant-specific alarm processing
- Signal exchange
- Safety PLC
- Status windows of the visualization
- Manual and automatic modes
- Emergency stop functions
- Practical exercises
- Malfunction simulation

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02

Application technology

Robots | Electrics

EcoRPi E/L with EcoRPC2 | Maintenance

200 | BASIC | 5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the electrical design of your plant. You will be able to carry out an error analysis on the plant's main assemblies, and replace and parameterize the components. You will know the measures for preventive maintenance of the assemblies. You will be able to move the robots with the teach pendant.

ADMISSION REQUIREMENTS

Experts in the area of electrical equipment or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under the instruction of a trainer on special training models, on PCs with parameterization and diagnostic software, as well as on training robots.

COURSE CONTENT

- Safety aspects
- Explanation of the process sequences
- Overview of the plant's interfaces
- Control cabinets and electrical diagrams
- Design, function, and maintenance of the **Eco**RPC2
- Backup and restoring the functional and safe part (SCP) of the robot controller
- Backup log files
- Service-relevant functions and tools in **Eco**Screen 3D-OnSite/**DXQ**3D.onsite
- Operating, monitoring, and diagnostic functions of **Eco**Screen/**DXQ**equipment.operation and teach pendant
- Design, function and maintenance of the drive controllers and encoder boxes
- Mastering of robot axes
- Referencing and synchronizing the safe part of the robot controller
- Using the brake release device
- Cable replacement procedure
- Localizing the plant and robot components
- Design, function, and maintenance of the valve equipment
- Design, function of the turbine air heater
- Design, function of the feedback loops for air flow rate, air pressure, and turbine speed
- Design, function, and parameterization of the overpressure encapsulation system*
- Design and function of the input and output subassemblies
- Design, function, and procedure for replacing parts of the high-voltage system*
- Sensor equipment for process and handling*
- Overview of the teach pendant menus, moving robots, and starting existing programs
- Electrical maintenance of color change system on robots*

* where present

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E-Mail training@durr.com

Robots | Electrics

EcoRP E/L with EcoRPC V2/V3 | Maintenance

201 | BASIC | 5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the electrical design of the plant. You will be able to carry out an error analysis on the plant's main assemblies, and replace and parameterize the components. You will know the measures for preventive maintenance of the assemblies. You will be able to move the robots with the teach pendant.

ADMISSION REQUIREMENTS

Experts in the area of electrical equipment or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under the instruction of a trainer on special training models, as well as on PCs with parameterization and diagnostic software, and on training robots.

COURSE CONTENT

- Safety aspects
- Explanation of the process sequences
- Overview of the plant's interfaces
- Control cabinets and electrical diagrams
- Design, function, and Maintenance of the **Eco**RPC
- backup and restoring the data of the robot controller
- backup log files
- Service-relevant functions and tools in **Eco**Screen 3D-OnSite
- Operating, monitoring, and diagnostic functions of **Eco**Screen and the teach pendant
- Design, function, and maintenance of the **Eco**Drive drive systems
- Mastering robot axes
- Using the brake release device
- Localizing the plant and robot components
- Design, function, and maintenance of the valve equipment
- Design, function of the turbine air heater
- Design, function for the feedback loops of air flow rate, air pressure, and turbine speed
- Design, function, and parameterization of the overpressure encapsulation system*
- Design and function of the input and output subassemblies
- Design, function, and settings of the high-voltage system*
- Sensor equipment for process and handling*
- Overview of the teach pendant menus, moving robots, and starting existing programs
- Maintenance of the electrical components on the robot's color change system*

* where present

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Robots | Electrics

EcoRP E/L with EcoRC2 | Maintenance

202 | BASIC | 5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the electrical design of your plant. You will be able to carry out an error analysis on the plant's main assemblies, and replace and parameterize the components. You will know the measures for preventive maintenance of the assemblies. You will be able to move the robots with the teach pendant.

ADMISSION REQUIREMENTS

Experts in the area of electrical equipment or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under the instruction of a trainer on special training models, as well as on PCs with parameterization and diagnostic software, and on training robots.

COURSE CONTENT

- Safety aspects
- Explanation of the process sequences
- Overview of the plant's interfaces
- Plant operation and safety aspects
- Design of the electrical diagrams and control cabinets
- Function and replacement of the hardware and software of the **Eco**RC2 robot controller
- Tools in **Eco**Screen 3D-OnSite for parameterization, diagnosis, and configuration
- Operating and monitoring functions of **Eco**Screen
- Design, function, and maintenance of the **Eco**Drive drive systems
- Mastering of robot axes
- Cable replacement procedure
- Design, function of the valve equipment
- Design, function, and troubleshooting for the feedback loops of air flow rate, air pressure, and turbine speed
- Design, function, and parameterization of the overpress. encapsulation system*
- Design and function of the input and output subassemblies
- Design, function, and settings on the high-voltage system*
- Design and troubleshooting of the used actuators and sensors with special test apparatus
- Data backup with the backup service in **Eco**Screen 3D-OnSite
- Overview of the teach pendant menus, moving robots, and starting existing robots, as well as user pages for maintenance tasks
- Fault elimination on system components

* where present

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Robots | Electrics

EcoRP 6/7 with EcoRC2 | Maintenance

203 | BASIC | 5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the electrical design of your plant. You will be able to carry out an error analysis on the plant's main assemblies, and replace and parameterize the components. You will know the measures for preventive maintenance of the assemblies. You will be able to move the robots with the teach pendant.

ADMISSION REQUIREMENTS

Experts in the area of electrical equipment or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under the instruction of a trainer on special training models, as well as on PCs with parameterization and diagnostic software, and on training robots.

COURSE CONTENT

- Safety aspects
- Explanation of the process sequences
- Overview of the plant's interfaces
- Plant operation and safety aspects
- Design of the electrical diagrams and control cabinets
- Function and replacement of the hardware and software of the **Eco**RC2 robot controller
- Tools in **Eco**Screen 3D-OnSite for parameterization, diagnosis, and configuration
- Operating and monitoring functions of **Eco**Screen
- Design, function, and maintenance of the **Eco**Drive drive systems
- Mastering of robot axes
- Cable replacement procedure
- Design, function of the valve equipment
- Design, function, and troubleshooting for the feedback loops of air flow rate, air pressure, and turbine speed
- Design, function, and parameterization of the overpress. encapsulation system*
- Design and function of the input and output subassemblies
- Design, function, and settings on the high-voltage system*
- Design and troubleshooting of the used actuators and sensors with special test apparatus
- Data backup with the backup service in **Eco**Screen 3D-OnSite
- Overview of the teach pendant menus, moving robots, and starting existing robots
- Fault elimination on system components

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Robots | Electrics

EcoRSi with EcoRPC2 | Maintenance

204 | BASIC | 3 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the electrical design of your plant. You will be able to carry out an error analysis on the plant's main assemblies, and replace and parameterize the components. You will know the measures for preventive maintenance of the assemblies. You will be able to move the robots with the teach pendant.

ADMISSION REQUIREMENTS

Experts in the area of electrical equipment or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under the instruction of a trainer on special training models, as well as on PCs with parameterization and diagnostic software, and on training robots.

COURSE CONTENT

- Safety aspects
- Explanation of the process sequences
- Overview of the plant's interfaces
- Control cabinets and electrical diagrams
- Design, function, and Maintenance of the **Eco**RPC2
- backup and restoring the functional and safe part (SCP) of the robot controller
- backup log files
- Service-relevant functions and tools in **Eco**Screen 3D-OnSite/**DXQ**3D.onsite
- Operating, monitoring, and diagnostic functions of **Eco**Screen/**DXQ**equipment.operation and teach pendant
- Design, function, and maintenance of the drive controllers and encoder boxes
- Mastering of robot axes
- Referencing and synchronization of the safe part of the robot controller*
- Using the brake release device
- Cable replacement procedure
- Localizing the plant and robot components
- Design, function, and maintenance of the valve equipment
- Design, function of the material temperature control
- Design and function of the input and output subassemblies
- Sensor equipment for process and handling*
- Overview of the teach pendant menus, moving robots, and starting existing programs

* where present

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Robots | Electrics

EcoRS with EcoRPC V2/V3 | Maintenance

205 | BASIC | 4 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the electrical design of your plant. You will be able to carry out an error analysis on the plant's main assemblies, and replace and parameterize the components. You will know the measures for preventive maintenance of the assemblies. You will be able to move the robots with the teach pendant.

ADMISSION REQUIREMENTS

Experts in the area of electrical equipment or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under the instruction of a trainer on special training models, as well as on PCs with parameterization and diagnostic software, and on training robots.

COURSE CONTENT

- Safety aspects
- Explanation of the process sequences
- Overview of the plant's interfaces
- Control cabinets and electrical diagrams
- Design, function, and Maintenance of the **Eco**RPC
- backup and restoring the data of the robot controller
- backup log files
- Service-relevant functions and tools in **Eco**Screen 3D-OnSite
- Operating, monitoring, and diagnostic functions of **Eco**Screen and teach pendant
- Design, function and maintenance of the **Eco**Drive drive systems
- Mastering of robot axes
- Using the brake release device
- Cable replacement procedure
- Localizing the plant and robot components
- Design, function, and maintenance of the valve equipment
- Design, function of the material temperature control
- Design and function of the input and output subassemblies
- Sensor equipment for process and handling*
- Overview of the teach pendant menus, moving robots, and starting existing programs

* where present

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Robots | Electrics

Analyzing and troubleshooting the plant's electrical components

206 | ADVANCED | 2 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will be able to detect and eliminate malfunctions that arise during operation of your plant. You will know the tools and diagnostic tools needed for diagnosis.

ADMISSION REQUIREMENTS

Specialists in the area of electrics or comparable long-term work experience; participation in a basic course or experience in handling Dürr plants

COURSE STRUCTURE

After an introduction to the theory, you will work under the instruction of a trainer on special training models, as well as on PCs with parameterization and diagnostic software, and on training robots. You will put your theoretical knowledge to immediate practical use on our training model and training robots. Various software tools and measuring instruments will be presented and used to detect and eliminate example errors.

COURSE CONTENT

- Overview of the plant configuration
- Safety aspects
- Presentation of various measuring instruments/test apparatus
- Softlog/**DXQ**equipment.analytics
- Diagnostic pages of the teach pendant
- Diagnostic possibilities of the drive controller
- Logfile changees
- Diagnosis by means of **Eco**Screen 3D-OnSite/**DXQ**3D.onsite
- Error analysis and elimination using practical exercises

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Robots | Mechanics

EcoRP E033i/L033i | Maintenance

210 | BASIC | 1.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the robot mechanisms and will know the basics for moving and operating the robot with the teach pendant

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on training robots. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the painting robot
- Safety aspects during maintenance tasks
- Protective overalls
- Using the brake release device
- Inspecting, maintaining and maintenance
- Changing the oil in the gearboxes
- Replacing the motors of axes 1 - 6
- Replacing the 1st gear stage of axis 1
- Replacing the 1st gear stage on axes 2 and 3
- Replacing the gear units of axes 4, 5 and 6
- Replacing the drive shafts of axes 4, 5 and 6
- Replacing the hand axis
- Replacing the connection hose of the hand axis
- Recommissioning - check operating safety
- Mastering, referencing, and synchronizing the axis drives, replacing the cables and hoses
- Basic operating functions on the teach pendant
- Operating mode selection on the operating panel
- Moving the robot in fixed positions (with teach pendant and via visualization)

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Robots | Mechanics

EcoRP E043i/L043i | Maintenance

211 | BASIC | 1.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the robot mechanisms and will know the basics for moving and operating the robot with the teach pendant

ADMISSION REQUIREMENTS

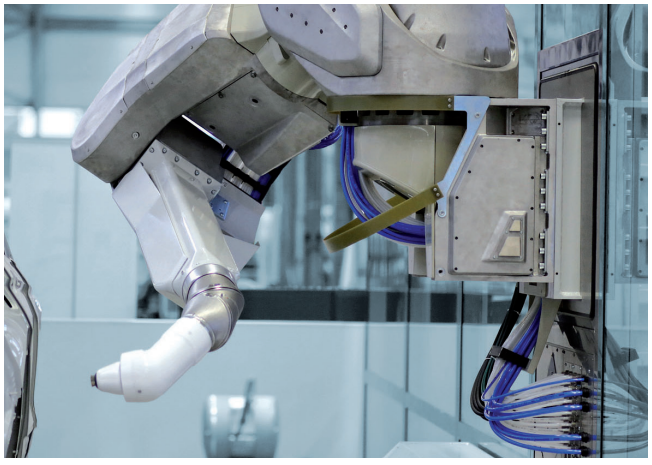
Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on training robots. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the painting robot
- Safety aspects during maintenance tasks
- Protective overalls
- Using the brake release device
- Inspecting, maintaining and maintenance
- Changing the oil in the gearboxes
- Replacing the motors of axes 1 - 6 and 21
- Replacing the 1st gear stage of axis 1
- Replacing the 1st gear stage on axes 2 and 3
- Replacing the gear units of axes 4, 5 and 6
- Replacing the drive shafts of axes 4, 5 and 6
- Replacing the hand axis
- Replacing the connection hose of the hand axis
- Recommissioning - check operating safety
- Mastering, referencing, and synchronizing the axis drives, replacing the cables and hoses
- Basic operating functions on the teach pendant
- Operating mode selection on the operating panel
- Moving the robot in fixed positions (with teach pendant and via visualization)



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Robots | Mechanics

EcoRP L030i | Maintenance

212 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the robot mechanisms and will know the basics for moving and operating the robot with the teach pendant

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on training robots. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the handling robot
- Safety aspects for maintenance tasks
- Protective overalls
- Using the brake release device
- Checking, maintaining, and maintenance
- Changing the oil in the gearboxes
- Replacing the motors of axes 1, 2 and Z
- Replacing the gearbox of axes 1 and 2 (theory)
- Replacing the angular gear of axis Z
- Replacing the spindle gear of axis Z
- Recommissioning - check operating safety
- Mastering the axis drives

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Robots | Mechanics

EcoRP E033/L033 | Maintenance

213 | BASIC | 1.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the robot mechanisms and will know the basics for moving and operating the robot with the teach pendant

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on training robots. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the painting robot
- Safety aspects during maintenance tasks
- Protective overalls
- Using the brake release device
- Inspecting, maintaining and maintenance
- Changing the oil in the gearboxes
- Replacing the motors of axes 1 - 6
- Replacing the 1st gear stage of axis 1
- Replacing the 1st gear stage on axis 2 and 3
- Replacing the gear units of axes 4, 5 and 6
- Replacing the drive shafts of axes 4, 5 and 6
- Replacing the hand axis
- Replacing the connection hose of the hand axis
- Recommissioning - check operating safety
- Mastering the axis drives
- Replacing the cables and hoses
- Basic operating functions on the teach pendant
- Operating mode selection on the operating panel
- Moving the robot in fixed positions (with teach pendant and via visualization)

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Robots | Mechanics

EcoRP L030 | Maintenance

214 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the robot mechanisms and will know the basics for moving and operating the robot with the teach pendant

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on training robots. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the handling robot
- Safety aspects for maintenance tasks
- Protective overalls
- Using the brake release device
- Checking, maintaining, and maintenance
- Changing the oil in the gearboxes
- Replacing the motors of axes 1 - 3
- Replacing axes 1 and 2 (theory)
- Replacing the angular gear of axis Z
- Replacing the spindle gear of axis Z
- Recommissioning - check operating safety
- Mastering the axis drives

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Robots | Mechanics

EcoRP 6 | Maintenance

215 | BASIC | 2 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the robot mechanisms and will know the basics for moving and operating the robot with the teach pendant

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on training robots. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the painting robot
- Safety aspects during maintenance tasks
- Protective overalls
- Using the brake release device
- Inspecting, maintaining, and maintenance
- Replacing the motors of axes 1 - 6
- Replacing the gearbox of axis 3
- Replacing the 1st gear stage on axes 1 and 2
- Replacing the weight compensation of axis 2
- Disassembling and assembling arm 2
- Replacing the hand axis
- Replacing the gear units of axes 4, 5 and 6
- Replacing the drive shafts of axes 4, 5 and 6
- Recommissioning - check operating safety
- Mastering the axis drives
- Basics for the replacement of cables and hoses
- Basic operating functions on the teach pendant
- Operating mode selection on the operating panel
- Moving the robot in fixed positions

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Robots | Mechanics

EcoRP 7 | Maintenance

216 | BASIC | 2.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the robot mechanisms and will know the basics for moving and operating the robot with the teach pendant

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on training robots. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the painting robot
- Safety aspects during maintenance tasks
- Protective overalls
- Using the brake release device
- Inspecting, maintaining, and maintenance
- Replacing the motors of axes 1 - 6
- Replacing the gearbox of axis 3
- Replacing the 1st gear stage on axes 1 and 2
- Replacing the weight compensation of axis 2
- Disassembling and assembling arm 2
- Replacing the hand axis
- Replacing the gear units of axes 4, 5 and 6
- Replacing the drive shafts of axes 4, 5 and 6
- Recommissioning - check operating safety
- Mastering the axis drives
- Basics for the replacement of cables and hoses
- Basic operating functions on the teach pendant
- Operating mode selection on the operating panel
- Moving the robot in fixed positions
- **Eco**Rail:
  - Replacing the gearbox of axis 7 (theory)
  - Replacing the drive gearwheel and toothed rack of axis 7 (theory)
  - Replacing the linear bearing, support rollers, and guides of axis 7 (theory)
  - Function, maintenance, and parameterizing of the central lubrication system of axis 7

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Robots | Mechanics

EcoRS 16 | Maintenance

217 | BASIC | 1.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the robot mechanisms and will know the basics for moving and operating the robot with the teach pendant

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on training robots. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the robot
- Safety aspects of maintenance tasks
- Using the brake release device
- Inspecting, maintaining, and maintenance
- Changing the oil in all the gearboxes
- Replacing the motors of axes 1 - 6
- Replacing the hand axis
- Replacing the drive shafts of axes 4-6
- Replacing the toothed belts of axes 4 and 5
- Recommissioning - check operating safety
- Mastering the axis drives
- Basic operating functions on the teach pendant
- Operating mode selection on the operating panel
- Moving the robot in fixed positions (with teach pendant and visualization)

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Robots | Mechanics

EcoRS 60 | Maintenance

218 | BASIC | 1.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the robot mechanisms and will know the basics for moving and operating the robot with the teach pendant

ADMISSION REQUIREMENTS

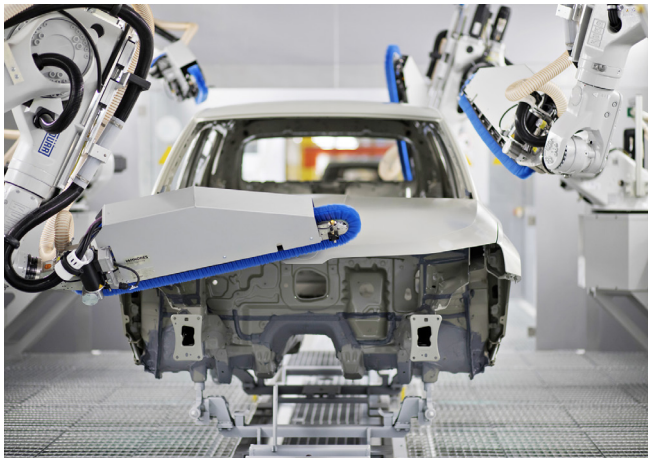
Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on training robots. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the robot
- Safety aspects of maintenance tasks
- Using the brake release device
- Inspecting, maintaining, and maintenance
- Changing the oil in all the gearboxes
- Replacing the motors of axes 1 - 6
- Replacing the hand axis
- Replacing the drive shafts of axes 4 - 6
- Replacing the toothed belts of axes 4 and 5
- Replacing the toothed belts of axes 5 and 6 in the hand axis
- Recommissioning - check operating safety
- Mastering the axis drives
- Basic operating functions on the teach pendant
- Operating mode selection on the operating panel
- Moving the robot in fixed positions (with teach pendant and visualization)



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Robots | Mechanics

EcoRail C| Maintenance

219 | BASIC | 0.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER'S TRAINING ECORAIL C

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the **Eco**Rail and you will know the basics for moving and operating the **Eco**Rail with the teach pendant

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on the **Eco**Rail C. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the **Eco**Rail
- Safety aspects for maintenance tasks
- Using the brake release device
- Inspections, maintenance, and repair tasks
- Replacing the felt gear on the toothed rack
- Replacing the motor of axis 7
- Replacing the angular gear
- Replacing the drive pinion
- Replacing the linear bearing
- Replacing the linear guide and toothed rack
- Replacing the guide rollers
- Basics of replacing cables and hoses
- Basic operating functions on the teach pendant and brake release device
- Operating mode selection on the operating panel
- Moving the robot in fixed positions (with teach pendant and visualization)

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Robots | Mechanics

EcoRail E | Maintenance

220 | BASIC | 0.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER'S TRAINING ECORAIL E

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the **Eco**Rail and will know the basics for moving and operating the **Eco**Rail with the teach pendant

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on the **Eco**Rail E. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the **Eco**Rail
- Safety aspects for maintenance tasks
- Using the brake release device
- Inspections, maintenance, and repair tasks
- Replacing the felt gear on the toothed rack
- Replacing the motor of axis 7
- Replacing the angular gear
- Replacing the drive pinion
- Replacing the linear bearing
- Replacing the linear guide and toothed rack
- Replacing the guide rollers
- Basics of replacing cables and hoses
- Basic operating functions on the teach pendant and brake release device
- Operating mode selection on the operating panel
- Moving the robot in fixed positions (with teach pendant and visualization)

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Robots | Mechanics

EcoRail HL/HS | Maintenance

221 | BASIC | 0.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER'S TRAINING **ECO**RAIL HL/HS

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the **Eco**Rail and will know the basics for moving and operating the **Eco**Rail with the teach pendant

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on the **Eco**Rail HL/HS. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the **Eco**Rail
- Safety aspects for maintenance tasks
- Using the brake release device
- Inspections, maintenance, and repair tasks
- Replacing the felt gear on the toothed rack
- Replacing the motor of axis 7
- Replacing the angular gear
- Replacing the drive pinion
- Replacing the toothed rack
- Replacing the support and guide rollers
- Replacing the roller guides
- Basics of replacing cables and hoses
- Basic operating functions on the teach pendant and brake release device
- Operating mode selection on the operating panel
- Moving the robot in fixed positions (with teach pendant and visualization)

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Robots | Mechanics

EcoRail X | Maintenance

222 | BASIC | 0.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER'S TRAINING ECORAIL X

TARGET GROUP

Maintenance personnel and employees interested in technology

COURSE OBJECTIVE

You will be familiar with the main tasks for maintaining and maintenance the **Eco**Rail and will know the basics for moving and operating the **Eco**Rail with the teach pendant

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an introduction to the theory, you will work under instruction on the **Eco**Rail X. All tasks necessary for maintaining and maintenance the robots will be performed. You will use the special tools provided for this work.

COURSE CONTENT

- Design and function of the **Eco**Rail
- Safety aspects for maintenance tasks
- Using the brake release device
- Inspections, maintenance, and repair tasks
- Replacing the felt gear on the toothed rack
- Replacing the motor of axis 7
- Replacing the gearbox
- Replacing the drive pinion
- Replacing the toothed rack
- Replacing the upper and lower bearing blocks
- Replacing the support and guide rollers
- Replacing the roller guides
- Basics of replacing cables and hoses
- Basic operating functions on the teach pendant and brake release device
- Operating mode selection on the operating panel
- Moving the robot in fixed positions (with teach pendant and visualization)

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Robot | Programming

Teach programming with **DXQ**3D.onsite/**Eco**Screen 3D-OnSite

230 | BASIC | 5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Robot programmers, system operators, maintenance personnel, managers, personnel responsible for process, employees interested in programming

COURSE OBJECTIVE

You will know the basic terms of the robot technology. You will be familiar with the safety plans for robot stations. You will know the main design of the robot controller and its integration into the plant. You will be familiar with the coordinate systems important for the teach programming. You will be able to move Dürr robots with the aid of the teach pendant, write simple motion programs, and modify existing programs. You will know about the syntax and the most important commands of the programming language **Eco**Talk. You will be familiar with the most important functions of the offline programming system **DXQ**3D.onsite/**Eco**Screen 3D-OnSite.

ADMISSION REQUIREMENTS

Interest in programming and basic knowledge of automation

COURSE STRUCTURE

After a brief introduction of the robot technology (mechanical equipment and movements with the teach pendant) and safety-related instructions, you will learn and work on a training robot under the instruction of a trainer.

COURSE CONTENT

- Introduction
  - Mechanical design and electrical equipment of the **Eco**Paint robot
  - Integrating the robot controller into the plant, communication with other control units
- Programming practice
  - Selecting the operating modes at the station
  - Coordinate systems and their meaning
  - Functions and operating elements of the teach pendant
  - Basics of robot programming
  - Syntax and commands of the programming language **Eco**Talk
  - Path influence, Overlap and SPM
  - Design of sub- and main programs
  - Creating and integrating own sub- and main programs
- **DXQ**3D.onsite/**Eco**Screen 3D-OnSite
  - Function overview and menu structure
  - Creating, copying, inserting, and deleting projects and programs
  - Graphic editing of existing robot programs
  - Editing functions of the 3D graphics windows
  - Loading and editing workpiece graphics
  - Inserting and editing trigger commands
  - Explaining the brush concept and the brush editor
  - Backup function and change log
  - Configuration and process parameterization and process simulation tool (depending on license availability)

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Robot | Programming

Teach programming with **DXQ**3D.onsite/**Eco**Screen 3D-OnSite "Tracking"

231 | ADVANCED | 5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Robot programmers, specialized maintenance and operating personnel

COURSE OBJECTIVE

You will understand the necessity of calibrating tools and objects (workpiece), and be able to reproduce the relevant procedures. You will be capable of interpreting logical structures in the programs and understanding anti-collision interlocking between the individual robots. You will know the different declaration levels of the variables and be able to assess them. You will know the necessary commands for tracking, their use, and the procedure when determining the relevant parameters.

ADMISSION REQUIREMENTS

Participation in the basic course (course #230) in teach programming or comparable knowledge

COURSE STRUCTURE

You will be able to program with the teach pendant and with the programming software **DXQ**3D.onsite/**Eco**Screen 3D-OnSite. You will inspect and optimize the programs on the training system in tracking mode.

COURSE CONTENT

- Calibration
  - Calibrating tools
  - Calibrating objectives (workpiece) to world system
- Programming practice
  - Programming the logic structures
  - Creating/using variables on different declaration levels
  - Collision interlocking for rail tracking plants
- Tracking
  - Synchronizing the object (workpiece) to the conveyor
  - Programming and optimizing the modules on the tracking plant
  - Parameterizing the tracking system
- Simulation
  - Setting up, performing, and analyzing robot simulations (verifying reachability singularity, hand axis angle)
- Process
  - Explaining the parameterization (e.g. brush tables, time programs, etc.)
  - Parameterizing the process and process simulation tool (depending on license availability)

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Robot | Programming

Teach programming with **DXQ**3D.onsite/**Eco**Screen 3D-OnSite “Handling”

232 | ADVANCED | 5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Robot programmers, specialized maintenance and operating personnel

COURSE OBJECTIVE

You will understand the necessity of calibrating tools and objects, and can reproduce the relevant procedures. You will be capable of interpreting logical structures in the programs and understanding anti-collision interlocking between the individual robots. You will know the different declaration levels of the variables and be able to assess them. You will know the handler-specific commands of the **Eco**Talk programming language, their application and meaning, as well as the function and programming of the handler sensor technology.

ADMISSION REQUIREMENTS

Participation in the basic course (course #230) in teach programming or comparable knowledge

COURSE STRUCTURE

You will be able to program with the teach pendant and with the programming software **DXQ**3D.onsite/**Eco**Screen 3D-OnSite. You will inspect and optimize the programs on the training system in tracking mode.

COURSE CONTENT

- Calibration
  - Calibrating objects (workpieces) to the world system
  - Calibrating tools
- Programming practice
  - Programming the logic structures
  - Creating/using variables on different declaration levels
  - Collision interlocking between robots
- Handling
  - Hardware and function of the dealer sensor technology
  - Handler-specific commands of the **Eco**Talk programming language
  - Explaining the specific handling menus on the teach pendant and the visualization
  - Analyzing selected examples from real life
  - Testing and optimizing programs on the training plant
  - Possibilities for optimizing via **DXQ**3D.onsite/**Eco**Screen 3D-OnSite or teach pendant
- Simulation
  - Checking the dealer communication through the simulation of multiple robots
  - Testing for reachability, singularity, hand axis angle and other parameters for the track program of individual robots
- Process
  - Explaining the parameterization (e.g. brush tables, time programs, etc.)
  - Parameterizing the process and process simulation tool (depending on license availability)

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Robot | Programming

Teach programming with **DXQ**3D.onsite/**Eco**Screen 3D-OnSite "Handling/Tracking"

233 | ADVANCED | 8 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Robot programmers, specialized maintenance and operating personnel

COURSE OBJECTIVE

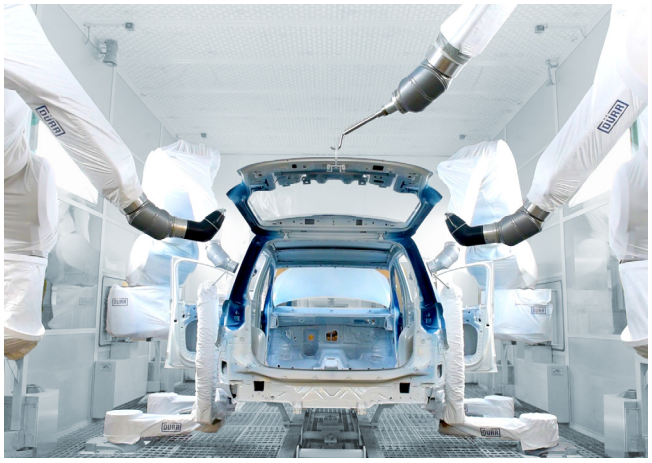
You will understand the necessity of calibrating tools and objects (workpiece), and be able to reproduce the relevant procedures. You will be capable of interpreting logical structures in the programs and understand interlocking between the individual robots. You will know the different declaration levels of the variables and be able to assess them. You will know the necessary commands for tracking, their use, and the procedure when determining the relevant parameters. You will know the handler-specific commands of the **Eco**Talk programming language, their application and meaning, as well as the function and programming of the handler sensor system.

ADMISSION REQUIREMENTS

Participation in the basic course (course #230) in teach programming or comparable knowledge

COURSE STRUCTURE

You will program with the teach pendant and with the programming software **DXQ**3D.onsite/**Eco**Screen 3D-OnSite. You will inspect and optimize the programs on the training system in Stop&Go and tracking mode.



COURSE CONTENT

- Calibration
  - Calibrating tools
  - Calibrating objects (workpieces) to the world system
  - Programming practice
  - Programming of the logic structures
  - Creating/using variables on different declaration levels
  - Collision interlocking for Stop&Go and rail tracking plants
- Handling
  - Hardware and function of the handler sensor technology
  - Handler-specific commands of the **Eco**Talk programming language
  - Explaining the specific handling menus on the teach pendant and the visualization
  - Analyzing selected examples from real life
  - Testing and optimizing programs on the training plant
  - Possibilities for optimizing via **DXQ**3D.onsite/**Eco**Screen 3D-OnSite or teach pendant
- Tracking
  - Synchronizing the object (workpiece) to the conveyor: Programming and optimizing the modules at the tracking plant
  - Parameterizing the tracking system
- Simulation
  - Setting up, performing, and analyzing robot simulations (checking reachability, singularity, hand axis angle)
- Process
  - Explaining the parameterization (e.g. brush tables, time programs, etc.)
  - Parameterizing the process and process simulation tool (depending on license availability)

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Robot | Programming

Teach programming with **DXQ**3D.onsite/**Eco**Screen 3D-OnSite “Sealing”

234 | ADVANCED | 5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Robot programmers, specialized maintenance and operating personnel

COURSE OBJECTIVE

You will understand the necessity of calibrating tools and objects, and be able to reproduce the relevant procedures. You will be capable of interpreting logical structures in the programs and recognizing interlocking between the individual robots. You will know the different declaration levels of the variables and be able to assess them. Furthermore, you will be familiar with the crucial special features of the sealing application and the application-specific process parameters.

ADMISSION REQUIREMENTS

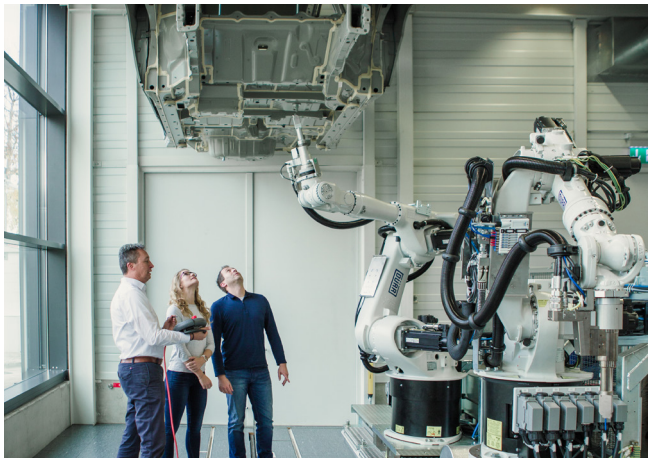
Participation in the basic course (course #230) in teach programming or comparable knowledge

COURSE STRUCTURE

You will program with the teach pendant and with the programming software **DXQ**3D.onsite/**Eco**Screen 3D-OnSite. You will inspect and optimize the programs on the training system.

COURSE CONTENT

- Calibration
  - Calibrating tools
  - Calibrating objectives (workpiece) to the world system
- Programming practice
  - Programming the logic structures
  - Creating/using variables on different declaration levels
  - Collision interlocking between robots
- Testing and optimizing programs
  - Possibilities of optimization via **DXQ**3D.onsite/**Eco**Screen 3D-OnSite and teach pendant
- Sealing
  - Basics of measuring systems
  - Explaining the process and nozzle selection
  - Explaining the tool (applicator)
- Simulation
  - Setting up, performing, and analyzing robot simulations (verifying reachability singularity, hand axis angle)
- Process
  - Explaining the parameterization (e.g. brush tables, time programs, etc.)
  - Parameterizing the process
  - Mastering/calibrating process components



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Robot | Programming

Programming for sealing cosmetic seam application (FAD, hem flange, roof seam) | Special course

235 | ADVANCED | 2 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS OF THE CUSTOMER

TARGET GROUP

Robot programmers, offliners, plant operators, maintenance personnel

COURSE OBJECTIVE

You will be able to adjust existing application programs and optimize them with the aid of **DXQ**3D.onsite or a teach pendant. You will be able to put application programs revised offline into operation. You will be able to analyze and optimize existing application processes.

ADMISSION REQUIREMENTS

Experience with production programs and associated vision systems

COURSE STRUCTURE

You will be able to program with the teach pendant and with the programming software **DXQ**3D.onsite/**Eco**Screen 3D-OnSite. You will inspect and optimize the programs on the training system.

COURSE CONTENT

- Vision systems
- Explaining the principle of location, tool, single seam measurement (track correction)
- Features of teaching fine seam applications
- Checking/inspecting transmitted measurement values
- Checking/inspecting (toolbox, BK sensor) teach variables
- Explaining variables used in the program
- Creating a program
- Analyzing, identifying, correcting, and optimizing sources of errors

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Robots | Operation

Robot stations | Operation

240 | BASIC | 3 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS / PRODUCTION FACILITIES OF THE CUSTOMER

TARGET GROUP

Plant operators, maintenance personnel, personnel responsible for process, programmers

COURSE OBJECTIVE

You will have the 'driver's license' for your plant. You will have learned to start the plant, operate it safely, check its operation, and do the right thing in the event of malfunctions. You will know how and where you can read or generate information about operating states. You will also be familiar with cleaning, maintenance and maintenance.

ADMISSION REQUIREMENTS

Basic technical knowledge

COURSE STRUCTURE

First, you will be given knowledge about the various components and processes and their interaction. Based on this you will learn and practice the safe operation of the plant in theory and practice. Starting up the plant, monitoring regular operation, and intervening in the event of malfunctions will be explained and to some extent practically carried out. Furthermore, moving the robot will be practiced both in automatic, manual and ghost mode as well as using the teach pendant. Process modifications and their inspection will also be demonstrated. Cleaning, maintenance, and maintenance and the associated dangers and necessities will be trained.

COURSE CONTENT

- Introduction to the customer-specific plant
  - Design and function of the robot zones
  - Explanation of the process sequences using the layouts and diagrams
  - Mechanical design of the painting robot **Eco**RP
  - Aspects of safety during operation and maintenance
  - Overview of control components and communication
- Operating the plant
  - Safe operation of the plant
  - Operating modes
  - Operating panel
  - Status line
  - **Eco**Screen - Operating and monitoring:
  - Reaction in the event of plant malfunctions
- Service and repairs:
  - Control RPC, LCC* referencing, backup, brake test and grinding in, pump wear inspection*, central lubrication, valve test*, language changeover
- Diagnosis:
  - PLC and Profinet diagnosis, Sercos 3 diagnosis, PLC and RPC FiFo, Ethercat diagnosis*
- Statistics:
  - Analyzing the production and alarm log
  - Maintenance assistant
- Procedure for accessing the plant
- Safe handling of the teach pendant
- Moving the robot with the teach pendant
- Moving the robot in fixed positions via visualization and teach pendant
- **Eco**Docu
- Cleaning operations - Maintenance on the atomizer
- Protective overalls*

* where present

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Robots | Operation

Robot stations | Operating and parameterizing

241 | BASIC | 5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS / PRODUCTION FACILITIES OF THE CUSTOMER

TARGET GROUP

Plant operators, maintenance personnel, personnel responsible for process, programmers

COURSE OBJECTIVE

You will have the 'driver's license' for your plant. You will have learned to start the plant, operate it safely, check its operation, and do the right thing in the event of malfunctions. You will know how and where you can read or generate information about operating states. You will also be familiar with cleaning, maintenance and maintenance. In addition to the contents of course #240 'Robot station/Operation', you will be able to parameterize the processes with **DXQ**3D.onsite/**Eco**Screen 3D-OnSite.

ADMISSION REQUIREMENTS

Basic technical knowledge

COURSE STRUCTURE

First, you will be given knowledge about the various components and processes and their interaction. Based on this you will learn and practice the safe operation of the plant in theory and practice. Starting up the plant, monitoring regular operation, and intervening in the event of malfunctions will be explained and to some extent practically carried out. Furthermore, moving the robot will be practiced both in automatic, manual and ghost mode as well as using the teach pendant. Process modifications and their inspection will also be demonstrated. Furthermore, you will be taught the possibilities of parameterization with **DXQ**3D-OnSite. Cleaning, maintenance, and maintenance and the associated dangers and necessities will be trained.

COURSE CONTENT

- Operating the plant
  - Introduction to the customer-specific plant
  - Operating the plant
  - Service and repair
  - Diagnosis
  - Statistics
  - Safe use of the teach pendant
  - Moving the robot with the teach pendant
  - Cleaning operations – Maintenance of the atomizer
  - **Eco**Docu
  - Protective overalls*
- Parameterizing the plant
  - Parameterizing with **Eco**Screen 3D-OnSite: Statistics, analyzing the production log, analyzing the alarm log, maintenance assistant
  - Parameterizing via **DXQ**3D.onsite/**Eco**Screen 3D-OnSite
  - Function overview and menu structure of **DXQ**3D.onsite/**Eco**Screen 3D-OnSite: Backup, visual analytics*, change log
  - Explanation of the program and graphics editor
  - Explanation of the used brush concept
  - Parameterizing and administration of brush tables Explanations of the parameterization of the robots
  - Explanation of the process sequences using time programs and schematics
  - Color, type, and color change allocations
  - Explanation of the most important functions of the configuration editor

* where present

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Material supply

Pig technology in series painting

250 | BASIC | 3 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS / PRODUCTION FACILITIES OF THE CUSTOMER

TARGET GROUP

Project planning and management personnel, maintenance and operating personnel for paint shops, and employees interested in technology

COURSE OBJECTIVE

You will receive an overview of the systems currently used in the automotive and supplier industries. You will familiarize yourself with the reflow and pushout technology and know the advantages of the pigging technology over traditional technologies. You will know the typical maintenance, adjustment, and parameterization tasks that are necessary in pigging technology and be able to perform these safely and specifically.

ADMISSION REQUIREMENTS

Basic knowledge of series painting, basic knowledge of mechatronics, electro-pneumatics, and control systems

COURSE STRUCTURE

You will learn more about the technical development of our high-quality special pig and familiarize yourself with the design and function. Using display models, e.g. cut-away models or 3D models, you will cement your understanding of the design and function of the components used. You will be able to perform maintenance tasks on our functional module under the instruction of our trainer. Practical demonstrations will enable the simulation of possible malfunctions, which can then be systematically analyzed and eliminated.

COURSE CONTENT

- Development of the pigging technology – pipeline, paint hose
- Pigging technology for the series painting
- Possible applications of the pigging technology using case studies
- Feasibility study
- Typical design of reflow and pushout systems
- Using the pigging technology for potential separation in the application of water-based paints
- Reflow systems compared to traditional paint supply systems in manual stations, robot zones, and ESTA/AIR plants
- Pushout systems compared to other systems for the supply of special colors in fully automatic paint shops
- Presentation of the **Eco**Purge P (EPP) paint supply equipment for robots
- Special components, sensors, and pneumatic feedback loops for the pigging technology
- Sequence controlling and parameterizing color change procedures
- Preventive maintenance of the pigging technology
- Special functions in the operating and parameterization interface
- Practical exercises and demonstrations

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Material supply

Special paint supply system - **Eco**Supply P

251 | BASIC | 2.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR TRAINING ROBOTS / PRODUCTION FACILITIES OF THE CUSTOMER

TARGET GROUP

Maintenance and operating personnel

COURSE OBJECTIVE

You will familiarize yourself with the design, basic functions, and important process steps of your **Eco**Supply P plant. You will be able to safely operate the plant and read off information about the current operating state. You will know the special tools and be able to use these safely in maintenance tasks. You will be able to analyze malfunctions, determine their cause, and eliminate them yourself.

ADMISSION REQUIREMENTS

Experts in the area of mechatronics or comparable long-term work experience. Knowledge of automotive series painting.

COURSE STRUCTURE

After you have familiarized yourself with the process sequences using pneumatic schematics and visualization images, you will perform typical maintenance and operating tasks on the **Eco**Supply P system under the instruction of the trainer. During these tasks, you will familiarize yourself with the special tools and practice using them safely and professionally.

COURSE CONTENT

- Basics of the pigging technology
- Plant-specific layouts and schematics
- Design and function of the source and destination stations
- Explanation of the individual process steps
- Design of the color, pneumatics, and control cabinets
- Design of the cleaning agent disposal system
- Design of the compressed air supply system (low and high pressure)
- Interaction of the mechanical, electrical, and electro-pneumatic plant components
- Communication between special paint supply plant and application stations
- Function and design of the time programs
- Parameterizing the most important factors
- Functions and design of the plant visualization
- Safety during operation and during maintenance and maintenance
- Operation of the special paint supply system in the operating modes and function of the operating elements
- Recurring checks
- Typical maintenance tasks
- Operation of the load cells
- Function and adjustment of the pig detection sensors
- Diagnosis possibilities via the plant visualization
- Data backup tools and concepts
- Fault detection and elimination on the mechanical, electrical, and pneumatic plant components

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Components

EcoBell3 | Maintenance

260 | BASIC | 1.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the **Eco**Bell3 atomizers. You will know how they function, their components, and how to maintain and service them. You will detect causes of malfunctions and be able to assess the wear and tear on important components. You will be familiar with the use of the Dürr special tools for the **Eco**Bell3.

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

You will first learn about the design of the **Eco**Bell3 and how it functions. With this knowledge, everyone will disassemble the atomizer. The functions of the components will be addressed again and the use of the Dürr special tools demonstrated and practiced. Assessing the condition of the components is another important issue. Next, everyone will reassemble the atomizer. The necessary special tools will also be used for this. Finally, the group will discuss the checking of the mounted atomizer.

COURSE CONTENT

- Design and function of the rotating atomizer
- Presentation of the **Eco**Bell3 atomizer family
- Paint types and loading versions
- Principle and theory of paint atomization
- Bell disk overview
- Periodically recurring maintenance and inspection tasks on the components
- Atomizer and bell disk cleaning
- Detection and avoidance of valve leaks
- Repair tasks on the rotation atomizer
- Preliminary work for replacing the atomizer
- Cleaning and checking
- Bell disk
- Retaining element on the bell disk
- External charge device
- Shaping air ring
- Brush ring
- Turbine
- Fiber optic cable
- Function valves and valve blocks
- Disassembly and assembly of paint pipe with nozzle, paint pipe centering
- Special aspects of the maintenance and maintenance of the atomizer housing
- Final check of the atomizer on the atomizer test bench

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Components

EcoBell2 | Maintenance

261 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the **Eco**Bell2 atomizers. You will know how they function, their components, and how to maintain and service them. You will detect causes of malfunctions and be able to assess the wear and tear on important components. You will be familiar with the use of the Dürr special tools for the **Eco**Bell2.

ADMISSION REQUIREMENTS

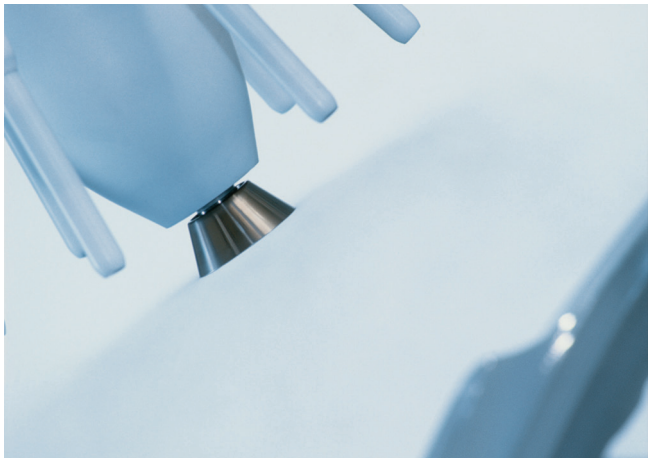
Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

You will first learn about the design of the **Eco**Bell2 and how it functions. With this knowledge, everyone will disassemble the atomizer. The functions of the components will be addressed again and the use of the Dürr special tools demonstrated and practiced. Assessing the condition of the components is another important issue. Next, everyone will reassemble the atomizer. The necessary special tools will also be used for this. Finally, the group will discuss the checking of the mounted atomizer.

COURSE CONTENT

- Design and function of the rotating atomizer
- Presentation of the **Eco**Bell2 atomizer family
- Paint types and loading versions
- Principle and theory of paint atomization
- Bell disk overview
- Periodically recurring maintenance and inspection tasks on the components
- Atomizer and bell disk cleaning
- Detection and avoidance of valve leaks
- Repair tasks on the rotation atomizer
- Preliminary work for replacing the atomizer
- Cleaning and checking
- Bell disk
- external charge device
- Shaping air ring
- Brush ring
- Turbine
- Fiber optic cable
- Function valves and valve blocks
- Disassembly and assembly of paint pipe with nozzle, paint pipe centering
- Special aspects of the maintenance and maintenance of the atomizer housing
- Final check of the atomizer on the atomizer test bench



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Components

EcoGun2 | Maintenance

262 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the **Eco**Gun2 atomizers. You will know how they function, their components, and how to maintain and service them. You will detect causes of malfunctions and be able to assess the wear and tear on important components. You will be familiar with the use of the Dürr special tools for the **Eco**Gun2.

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

You will first learn about the design of the **Eco**Gun2 and how it functions. With this knowledge, everyone will disassemble the atomizer. The functions of the components will be addressed again and the use of the Dürr special tools demonstrated and practiced. Assessing the condition of the components is another important issue. Next, everyone assembles the atomizer using the necessary special tools. Finally, you will learn to check the mounted atomizer.

COURSE CONTENT

- Design and function of the air atomizer
- Presentation of the **Eco**Gun2 atomizer family
- Principle and theory of paint atomization
- Periodic function checks
- Detecting malfunctions and wear and tear
- Cleaning the atomizer and specifically the air cap
- Preliminary work for replacing the atomizer
- Special aspects of assembling the air cap
- Maintaining and maintenance the atomizer
- Working on the connection block
- Replacing valves

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Components

EcoLCC2 | Maintenance

263 | BASIC | 1.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will be familiar with the **Eco**LCC2 color changer. You will know how it functions, its components, and how to maintain and service it. You will be able to operate, parameterize, and reference the **Eco**LCC2. You will detect causes of malfunctions and be able to assess the wear and tear on important components. You will be familiar with the use of the Dürr special tools for the **Eco**LCC2.

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering/electrical equipment or comparable long-term work experience

COURSE STRUCTURE

You will first learn about the design of the LCC2 color changer and how it functions. The process of color changing will also be discussed in all steps. With this knowledge, everyone will disassemble the color changer. The functions of the components will be addressed again and the use of the Dürr special tools demonstrated and practiced. Assessing the condition of the components is another important issue. Next, everyone will reassemble the color changer. Operation of the color changer will be explained and practiced with the **DXQ**/**Eco**Screen 3D-OnSite. This also includes referencing and the later checks during operation.

COURSE CONTENT

- Design and function of the color changer
- Process sequence - PushOut
- Parameters for rinse medium and compressed air
- Safety during operation
- Checks during operation
- Error diagnosis and troubleshooting
- Function of the paint pressure regulator
- Safety when working on the color changer
- Time program in manual mode
- Cleaning operations
- Tasks for maintaining and maintenance the color changer
- Referencing
- Operating and monitoring
  - Explanation of the overview and operating interface
  - Error messages
  - Process parameterization with **DXQ**3D.onsite/**Eco**Screen 3D-OnSite
  - purging programs

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Components

EcoLCC | Maintenance

264 | BASIC | 1.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will be familiar with the **Eco**LCC color changer. You will know how it functions, its components, and how to maintain and service it. You will be able to operate, parameterize, and reference the **Eco**LCC. You will detect causes of malfunctions and be able to assess the wear and tear on important components. You will be familiar with the use of the Dürr special tools for the **Eco**LCC. You will be able to operate and reference the color changer.

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering/electrical equipment or comparable long-term work experience

COURSE STRUCTURE

You will familiarize yourself with the LCC color changer. The process of color changing will also be discussed in all steps. With this knowledge, everyone will disassemble the color changer. The functions of the components will be addressed again and the use of the Dürr special tools demonstrated and practiced. Assessing the condition of the components is another important issue. Next, everyone will reassemble the color changer. Operation of the color changer will be explained and practiced with the **DXQ**/**Eco**Screen 3D-OnSite. This also includes referencing and the later checks during operation.

COURSE CONTENT

- Design and function of the color changer
- Process sequence - PushOut
- Parameters for rinse medium and compressed air
- Safety during operation
- Checks during operation
- Error diagnosis and troubleshooting
- Function of the paint pressure regulator
- Safety when working on the color changer
- Time program in manual operating mode
- Cleaning operations
- Tasks for maintaining and maintenance the color changer
- Referencing
- Operating and monitoring
  - Explanation of the overview and operating interface
  - Error messages
  - Process parameterization with **DXQ**3D.onsite/**Eco**Screen 3D-OnSite
  - purging programs

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Components

EcoBell Cleaner and EcoBell Purge Box | Maintenance

265 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the **Eco**Bell Cleaners. You will know how they function, their components, and how to maintain and service them. You will be able to operate and parameterize the **Eco**Bell Cleaner. You will detect causes of malfunctions and be able to assess the wear and tear on important components. You will be familiar with the use of the Dürr special tools for the **Eco**Bell Cleaner.

ADMISSION REQUIREMENTS

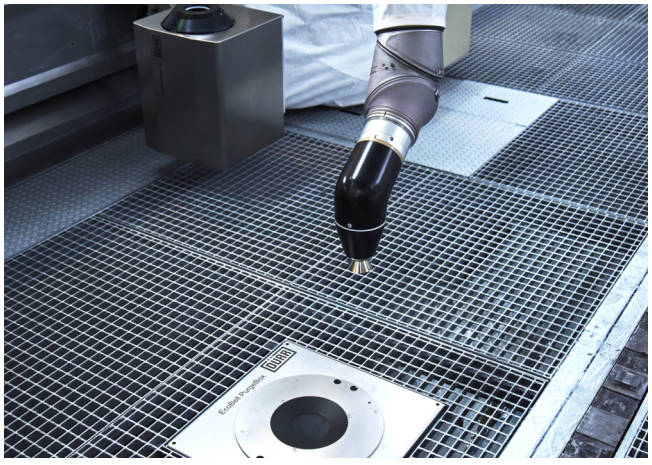
Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

You will learn the process-related basics of automated cleaning. The associated risks and dangers will be discussed. The design and function, checks during operation of the cleaning equipment, and the maintaining and maintenance tasks for the various **Eco**Bell Cleaners will then be discussed, demonstrated, and practiced. The possibilities for operating and monitoring the **Eco**Bell Cleaner with **DXQ**/ **Eco**Screen 3D-OnSite will also be demonstrated by way of example.

COURSE CONTENT

- Basics for the automated cleaning of **Eco**Bell atomizers
- Cleaning process
- Requirements for the programs of the robots
- Safety during operation and when working on the cleaning equipment
- **Eco**Bell Cleaner D
  - Design and function
  - Checks during operation
  - Maintenance and maintenance
- Eco Bell Cleaner D2
  - Design and function
  - Checks during operation
  - Maintenance and maintenance
- **Eco**Bell Tool Cleaner B
  - Design and function
  - Checks during operation
  - Maintenance and maintenance
- **Eco**Bell Purge box
  - Design and function
  - Checks during operation
  - Maintenance and maintenance
- Operating and monitoring



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Components

EcoPump (dosing pumps), paint pressure regulator and valves | Maintenance

266 | BASIC | 0.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the following products:

- **Eco**Pump – paint dosing pump
- Pressure regulator
- Hose connections
- Valves

You will know the design of these products and how they function. You will know the possible and necessary function checks and be able to maintain and service the products.

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

You will familiarize yourself with all aspects of the design and function of the following products:

- Paint dosing pump
- Pressure regulator
- Hose connections
- Valves

You will know the possibilities of the checks during operation and master the maintenance and maintenance tasks. The work will be performed with the necessary special tools.

COURSE CONTENT

- Design and function of the dosing pumps **Eco**Pump series 5 - 9
  - Checks during operation
  - Maintenance and maintenance tasks
  - Automated pump wear and tear check
- Design and function of the pressure regulators of series 6 and 7
  - Checks during operation
  - Maintenance and maintenance tasks
- Hose connections **Eco**Plug
- Design and function overview of the product family
- Design and function of the valves series 4 - 7
  - Checks during operation
  - Maintenance and maintenance tasks

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Components

Service tools | Maintenance

267 | BASIC | 0.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the following products:

- **Eco**Tester Atomizer
- **Eco**Tester Shaping Air
- **Eco**Bell Partscleaner

You will know how these products are designed, how they function, and how you can use them. You will be able to operate, maintain and service the devices.

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

You will be given explanations on the design, functions, and process sequences of the various devices. You will then work under instruction on the various devices and use the available Dürr special tools. Maintenance and maintenance tasks as well as any work for eliminating malfunctions will be discussed and carried out.

COURSE CONTENT

- **Eco**Tester Atomizer
  - Overview, technical data, design and function, test processes, operating and monitoring
- **Eco**Tester Shaping Air
  - Overview, technical data, design and function, operation
- **Eco**Bell Partscleaner
  - Overview, technical data, design and function, operation

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Components

EcoGun 3D/EcoGun2 3D | Maintenance

268 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the **Eco**Gun 3D/**Eco**Gun2 3D. You will know how it functions, its components, and how to maintain and service it. You will detect causes of malfunctions and be able to assess the wear and tear on important components. You will be familiar with the use of the Dürr special tools for the **Eco**Gun2.

ADMISSION REQUIREMENTS

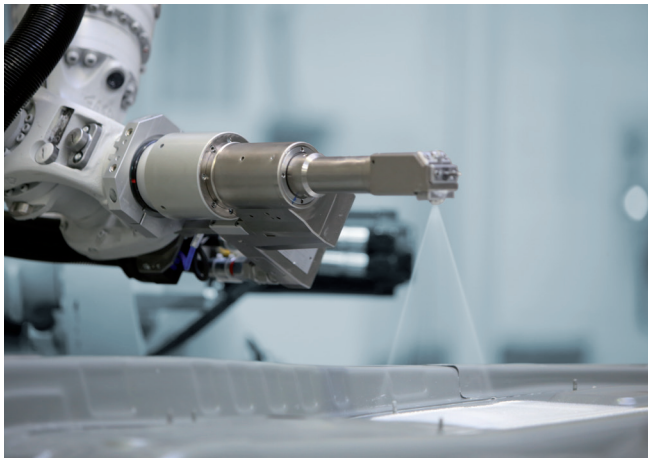
Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an explanation of the design, functions, and the process sequences, you will work under instruction on the **Eco**Gun 3D/**Eco**Gun2 3D and use the available Dürr special tools.

COURSE CONTENT

- Design and function
- Process sequence
- Explanations on the schematic
- Operating the plant
- Safety aspects
- Valve designations and functions
- Manual valve switching
- Error diagnosis and troubleshooting
- Maintenance and service
- Working on the plug connectors
- Replacing defective hoses and cables
- Replacing nozzles
- Replacing sensors
- Replacing material heater (option)
- Working on the circulation control valve
- Working on the flange pipe
- Replacing O-rings in the flanges
- Working on the valve block
- Removing application device from robot
- Working on the rotary feedthrough
- Occurrence of leaks
- Disassembly and assembly of the rotary feedthrough



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Components

EcoGun 3D HF | Maintenance

269 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the **Eco**Gun 3D HF. You will know how it functions, its components, and how to maintain and service it. You will detect causes of malfunctions and be able to assess the wear and tear on important components. You will be familiar with the use of the Dürr special tools for the **Eco**Gun 3D HF.

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an explanation of the design, functions, and the process sequences, you will work under instruction on the **Eco**Gun 3D HF and use the available Dürr special tools.

COURSE CONTENT

- Design and function
- Process sequence
- Explanations on the schematic
- Operating the plant
- Safety aspects
- Valve designations and functions
- Manual valve switching
- Error diagnosis and troubleshooting
- Maintenance and service
- Working on the plug connectors
- Replacing defective hoses and cables
- Replacing nozzles
- Replacing sensors
- Replacing material heater (option)
- Working on the circulation control valve
- Working on the flange pipe
- Replacing O-rings in the flanges
- Working on the valve block
- Removing application device from robot
- Working on the rotary feedthrough
- Occurrence of leaks
- Disassembly and assembly of the rotary feedthrough

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Components

EcoGun2 MD | Maintenance

270 | BASIC | 0.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the **Eco**Gun 2 MD. You will know how it functions, its components, and how to maintain and service it. You will detect causes of malfunctions and be able to assess the wear and tear on important components. You will be familiar with the use of the Dürr special tools for the **Eco**Gun 2 MD.

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an explanation of the design, functions, and the process sequences, you will work under instruction on the **Eco**Gun 2 MD and use the available Dürr special tools.

COURSE CONTENT

- Design and function
- Process sequence
- Explanations on the schematic
- Operating the plant
- Safety aspects
- Valve designations and functions
- Manual valve switching
- Error diagnosis and troubleshooting
- Maintenance and service
- Working on the plug connectors
- Replacing defective hoses and cables
- Replacing nozzles
- Replacing sensors
- Replacing material heater (option)
- Working on the circulation control valve
- Working on the flange pipe
- Replacing O-rings in the flanges
- Working on the valve block
- Removing application device from robot
- Working on the rotary feedthrough
- Occurrence of leaks
- Disassembly and assembly of the rotary feedthrough

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Components

EcoShot Meter| Servicing

271 | BASIC | 0.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will be familiar with the **Eco**Shot Meter. You will know how it functions, its components, and how to maintain and service it. You will detect causes of malfunctions and be able to assess the wear and tear on important components. You will be familiar with the use of the Dürr special tools for the **Eco**Shot Meter.

ADMISSION REQUIREMENTS

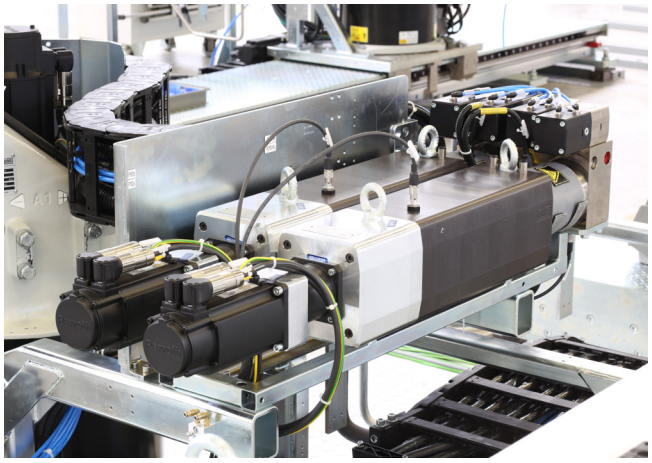
Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an explanation of the design, functions, and process sequences, you will work under instruction on the **Eco**Shot Meter and use the available Dürr special tools.

COURSE CONTENT

- Design and function
- Process sequence
- Explanations on the schematic
- Operating the plant
- Safety aspects
- Valve designations and functions
- Manual valve switching
- Error diagnosis and troubleshooting
- Maintenance and service
- Working on the plug connectors
- Replacing defective hoses and cables
- Replacing nozzles
- Replacing sensors
- Replacing material heater (option)
- Working on the circulation control valve
- Working on the flange pipe
- Replacing O-rings in the flanges
- Working on the valve block
- Removing application device from robot
- Working on the rotary feedthrough
- Occurrence of leaks
- Disassembly and assembly of the rotary feedthrough



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Components

EcoPump HP/HPE and EcoPUC | Maintenance

272 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the **Eco**Pump HP/HPE and **Eco**PUC. You will know how it functions, its components, and how to maintain and service it. You will detect causes of malfunctions and be able to assess the wear and tear on important components. You will be familiar with the use of the Dürr special tools for the **Eco**Pump HP/HPE and **Eco**PUC.

ADMISSION REQUIREMENTS

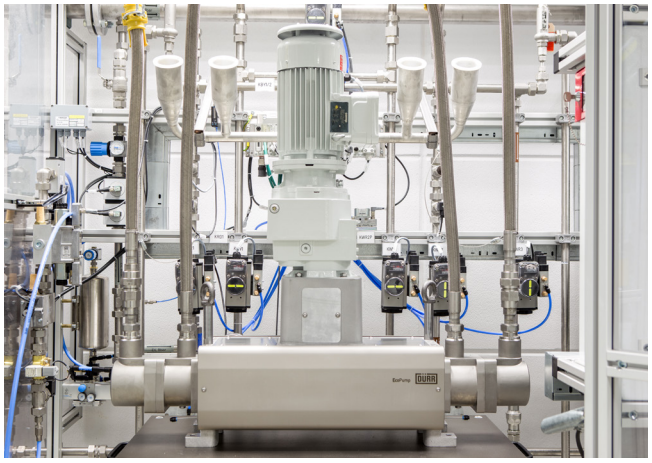
Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an explanation of the design, functions, and process sequences, you will work under instruction on the HP/HPE and **Eco**PUC, and use the available tools.

COURSE CONTENT

- Design and function
- Process sequence
- Safety aspects
- Error diagnosis and troubleshooting
- Maintenance and service
- Lubricating pistons
- Checking pressurized parts for leaks
- Replacing piston seals
- Operating and parameterizing



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Components

EcoPump VP | Maintenance

273 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will know the **Eco**Pump VP. You will know how it functions, its components, and how to maintain and service it. You will detect causes of malfunctions and be able to assess the wear and tear on important components. You will be familiar with the use of the Dürr special tools for the **Eco**Pump VP.

ADMISSION REQUIREMENTS

Experts in the area of mechanical engineering or comparable long-term work experience

COURSE STRUCTURE

After an explanation of the design and functions, as well as the process sequences, you will work under instruction on the VP pumps and use the available Dürr special tools.

COURSE CONTENT

- Design and function
- Process sequence
- Safety aspects
- Error diagnosis and troubleshooting
- Maintenance and service
- Checking pressurized parts for leaks
- Replacing piston seals
- Operating and parameterizing

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Components

EcoDose 2K | Maintenance

274 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Users and installation personnel

COURSE OBJECTIVE

You will know the **Eco**Dose 2K. You will know how it functions and be able to operate and parameterize it. You will know its components and how to maintain and service them. You will be able to identify causes of malfunctions and assess the wear of important components. You will be familiar with the use of the Dürr special tools for the **Eco**Dose 2K.

ADMISSION REQUIREMENTS

Interest in the technology and technical understanding

COURSE STRUCTURE

First, you will be given knowledge about the design and function of the plant and about the processes. Based on this you will learn and practice the safe operation of the plant and its components in theory and practice. Monitoring operation and intervening in the event of malfunctions will be explained and to some extent carried out by way of practice. Cleaning and maintaining the plant and the associated necessities and dangers will be trained. The maintenance tasks will be explained and carried out on a training model. The necessary Dürr special tools will be shown and used.

COURSE CONTENT

- Design and function of the **Eco**Dose 2K
- Process technology 2K
- Safety aspects
- User interface
- Operating the plant
- Checks during operation
- Cleaning the plant
- Maintenance and service
  - Flowmeter measuring cells
  - Color changer
  - Replacing valves
  - Filters
  - Pistol cleaning equipment
- Volume calibration of components A/B
- Calibrating
- Pistol cleaning box
- Software update
- Ethernet connection

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Components

EcoBell2 SL package with **Eco**AUC controller | Maintenance

276 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Users and service personnel

COURSE OBJECTIVE

You will know the **Eco**Bell2 SL package with **Eco**AUC controller. You will know how it functions and be able to operate and parameterize it. You will know its components and how to maintain and service them. You will be able to identify causes of malfunctions and assess the wear of important components. You will be familiar with the use of the Dürr special tools for the **Eco**Bell2 SL package with **Eco**AUC controller.

ADMISSION REQUIREMENTS

Interest in the technology and technical understanding

COURSE STRUCTURE

First, you will be given knowledge about the design and function of the atomizer and about the processes. Based on this you will learn and practice the safe operation and the operation of the atomizer and the controller in theory and practice. Monitoring operation and intervening in the event of malfunctions will be explained and to some extent carried out by way of practice. Cleaning and maintaining the atomizer and the associated necessities and dangers will be trained. The maintenance tasks will be explained and carried out on a training model. The necessary Dürr special tools will be shown and used.

COURSE CONTENT

- Design and function of the **Eco**Bell2 SL
- Process technology of the rotating atomizer
  - Types of paint
  - Electrostatic charging
  - Overview of bell disk
- Safety aspects
- Operating the **Eco**AUC controller
  - Time programs
  - Software update
  - Ethernet connection
- Checks during operation
- Cleaning the plant
- Maintenance and service
  - Bell disk
  - Shaping air ring
  - External charge – resistors and electrode tips
  - Brush ring
  - Turbine
  - Fiber optic cable
  - Valves
  - Paint pipe
- Calibrating - volume calibration

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Processes and quality

Application technology in automotive series painting

280 | BASIC | 2.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel, planning personnel, management, employees interested in technology

COURSE OBJECTIVE

You will have an overview of the application technology currently used in the series painting of cars, from body dusting before primer application to the application of top coat and clear coat. You will know the various paint materials, paint dosing technologies and the present Dürr robot equipment.

ADMISSION REQUIREMENTS

—

COURSE STRUCTURE

The various painting processes will be vividly and practically presented to you and many details explained to you using selected plant schematics and layouts.

COURSE CONTENT

- Typical plant configurations for primer and top coat application
- Application principles for solvent-based and water-based paints
- Application of effect case coats
- Pneumatic and electrostatic atomizers
- Feedback loops for pneumatics, high voltage, and drives
- Influencing factors of various parameters on the painting outcome
- Paint supply and paint dosing equipment – various color change systems – latest developments
- Technologies for the automatic application of special colors
- Internal and external painting with robots
- New developments in atomizing technology
- Functions and process sequences at the bell disk
- Painting guidelines for **Eco**Bell rotating atomizers

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Processes and quality

Effect painting in automotive series painting

281 | BASIC | 5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Plant operators, persons responsible for the painting process, quality assurance personnel, maintenance mechanics or employees with comparable professional experience

COURSE OBJECTIVE

You will know what matters in the effect finishing in automotive series painting. You will know how to systematically approach the sophisticated and often precarious topic of effect finishing, and attain improvements in quality via the targeted exertion of influence. You will have measured spray patterns, compared various bell disks and their painting qualities, varied parameters, and optimized the them for formation of a good effect.

ADMISSION REQUIREMENTS

Basic knowledge of paint finishing

COURSE STRUCTURE

In the theoretical part of the course, different application procedures will be presented to you, and their most important areas of application and parameters for effect finishing relevant to the application will be explained. In the practical part of the course, you will put the theoretical knowledge to use in painting trials.

COURSE CONTENT

- Definition of a good effect finish
- Atomizing technologies
  - Pneumatic atomizing
  - Atomizing with high rotation
- Charging procedure
  - Direct charging
  - External charging
- Currently used Dürr atomizer ranges
- Areas of use and example applications for **Eco**Gun atomizers
- Areas of use and example applications for **Eco**Bell atomizers and bell disk types
- Parameterization of **Eco**Bell atomizers
- Paint trials: Influences of different atomizers and brush settings
- Spray pattern analysis (SB50) and evaluation (optional)
- **Eco**Screen
- **DXQ**3D.onsite

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Processes and quality

Painting process and quality | Optimization

282 | BASIC | 10 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Robot programmers, system operators, maintenance personnel, managers, personnel responsible for process, employees interested in programming

COURSE OBJECTIVE

You are familiar with the operation of the plants and the Dürr safety plan for robots. You will know the fundamental design of the robot controller, integration into the plant, as well as the different coordinate systems that are important for teach programming. You will be capable of moving Dürr robots with the aid of a teach pendant, writing simple movement programs, or modifying existing programs. You will be able to edit offline programming systems with the help of **DXQ**3D.onsite/**Eco**Screen 3D-OnSite. You will be able to independently generate the optimal painting parameters with your existing application technology, which are necessary for high-quality robot painting.

ADMISSION REQUIREMENTS

Basic knowledge of automated painting technology, interest in programming, basic technical knowledge

COURSE STRUCTURE

In the first step, you will instructed how to operate the plant. This will be followed by programming a painting program and all its details. You will also be given a lot of useful information on the painting process and the painting quality.

COURSE CONTENT

- Selecting the operating modes for using a paintable process
- Process-relevant options of the visualization **DXQ**equipment.operation/**Eco**Screen
- Integration of the written programs into automatic/ghost mode
- Analyzing errors at the station and robot
- Programming with **DXQ**3D.onsite/**Eco**Screen 3D-OnSite
- Basics of painting parameters for brush concept and brush editor, as well as trigger commands
- Creating and optimizing a painting program with **DXQ**3D.onsite/**Eco**Screen 3D-OnSite and the teach pendant
- Painting process (layer thicknesses, color tone, appearance optimization)
- Creation of static and dynamic spray patterns
- Parameters for influencing the parameterization of the applications
  - Wet paint trials with qualitative data analysis
  - Color tone quality: CIELab, color place, color difference, color tolerance window, master management
  - Parameters for influencing the color tone setting via parameterization of the applications as well as error handling strategies for car painting
- Wet paint trials with qualitative data analysis
- Appearance quality: Short Wave, Long Wave, DOI etc.
- Parameters for influencing appearance setting via parameterization of the applications as well as error handling strategies for car painting
- Wet paint trials with qualitative data analysis

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Processes and quality

Painting process and quality | Optimization advanced course

283 | ADVANCED | 10 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Robot programmers, system operators, maintenance personnel, managers, personnel responsible for process, employees interested in programming

COURSE OBJECTIVE

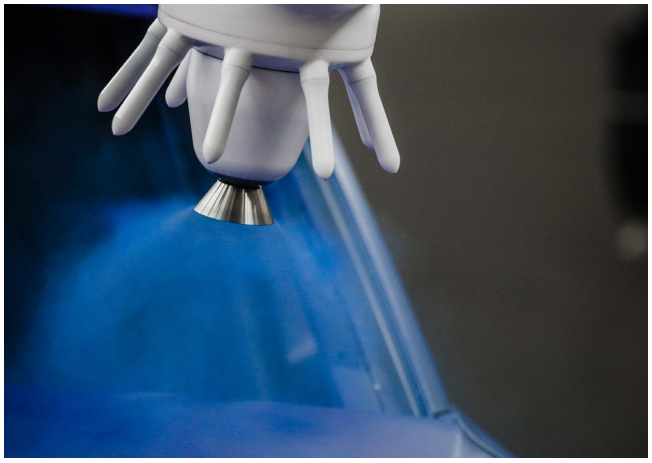
You will be capable of modifying existing painting programs with the help of **DXQ**3D.onsite/**Eco**Screen 3D-OnSite or a teach pendant, as well as optimizing them with Dürr auxiliary tools. You will also master the integration of the revised painting programs and process data into the plant. You will be capable of optimizing, analyzing, and re-parameterizing your existing painting process in order to adjust the quality of your process.

ADMISSION REQUIREMENTS

Conclusion of 'Painting process and quality' (course #282), basic knowledge of automated painting technology, interest in programming, basic technical knowledge

COURSE STRUCTURE

In the first step, you will instructed how to operate the plant. This will be followed by programming a painting program and all its details. You will also be given a lot of useful information on the painting process and the painting quality.



COURSE CONTENT

- Plant operation/parameters
- Time programs
- Color change allocation
- Color allocation
- Percentage impact
- Rinse parameters
- Type allocation
- CFG editor
- Integration of the created programs into automatic/ghost mode
- Option: Visual Analytics programming using **DXQ**3D.onsite/**Eco**Screen 3D-OnSite
- Calibration of a TCP
- Creating, checking, correcting teach programs with the help of the laser programming aid
- Explaining painting defects through painting program
- Simulation
- Checking and correcting the programs with the help of the simulation tool
- Painting process (layer thicknesses, color tone, appearance optimization)
- Repetition and refreshing of various topics from Part 1
- Cost optimization vs. quality increase, quality changes during cycle time reduction and increase (color tone and appearance of wet paint trials with qualitative data analysis)
- Creation of process windows and brush catalogs for the individual applications/paint layers (wet paint trials with qualitative data analysis)

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Processes and quality

Atomizer | Parameterization

284 | BASIC | 4 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Plant operators, persons responsible for the painting process, quality assurance personnel, maintenance mechanics or employees with comparable experience

COURSE OBJECTIVE

You will know the most common types and variants of the Dürr atomizers and their applications. You will have the necessary knowledge about the atomizing of paint and about the systematic parameterization and optimization of painting processes. You will know in theoretical terms how to achieve an optimal paint finish.

ADMISSION REQUIREMENTS

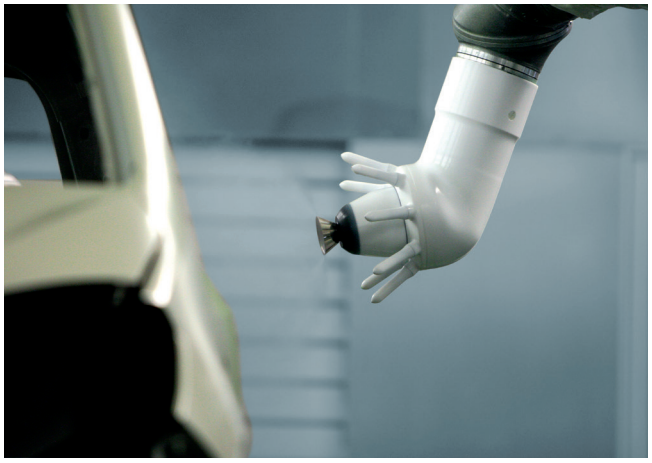
Basic knowledge of automated painting technology

COURSE STRUCTURE

You will be given an overview of various application methods and Dürr atomizers. The most important applications and application-relevant parameters will be explained. Starting from a master brush, the impacts on spray pattern and painting outcome will be analyzed by making changes to the parameters.

COURSE CONTENT

- Presentation of the Dürr atomizer ranges
- Basics of pneumatic and electrostatic painting technology
- Applications of the various atomizer types
- Influence of the bell disk knurling and the shaping air ring on the spray pattern
- Analyzing and evaluating of spray patterns (SB50)
- Influences of various painting parameters on the master brush (SB50)
- Bell disk speed
- Shaping air volume LL1/LL2
- Paint volume
- Influence of the high voltage
- Influence of the painting distance
- Influence of various bell disk types on the painting outcome
- Influence of the SB50 on the layer thickness
- Analysis of layer thickness errors with incorrect SB50 and incorrect movement paths
- **Eco**Screen
- **DXQ**3D.onsite



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Processes and quality

EcoBell3 | Parameterization

285 | BASIC | 4 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Plant operators, persons responsible for the painting process, quality assurance personnel, project planning personnel, maintenance personnel or employees with comparable professional experience

COURSE OBJECTIVE

You will know the **Eco**Bell3 atomizer range and know how the various types are used and what they are used for. You will have used a robot to perform several painting trials and varied different process parameters. You will know how the various parameters influence the spray pattern and can create a reference spray pattern.

ADMISSION REQUIREMENTS

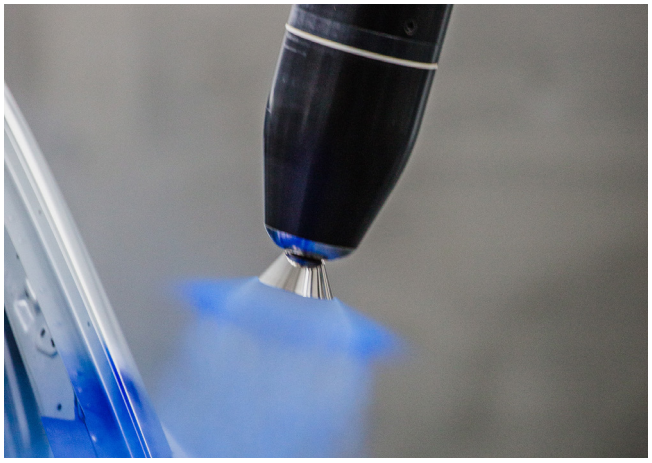
Basic knowledge of automated painting technology

COURSE STRUCTURE

You will receive an overview of the various **Eco**Bell3 atomizers and their applications. Your theoretical knowledge will be applied in practice. In a robot booth, you will generate dynamic spray patterns that you analyze and evaluate with special measuring instruments. You will influence the painting quality with targeted and systematic changes to the painting parameters.

COURSE CONTENT

- **Eco**Bell3 atomizer range
- Applications of the various atomizer types
- Influence of the bell disk knurling and the shaping air ring on the spray pattern
- Creating a master brush
- Creating, analyzing, and evaluating of spray patterns (SB50)
- Influences of various painting parameters on the master brush (SB50)
- Bell disk speed
- Shaping air volume LL1/LL2
- Paint volume
- Influence of the high voltage
- Influence of the painting distance
- Influence of various bell disk types on the painting outcome
- Influence of the SB50 on the evenness of the layer thickness
- Analysis of layer thickness errors with incorrect SB50 and incorrect movement paths
- **Eco**Screen
- **DXQ**3D.onsite



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Processes and quality

Purging and color change processes | Optimization

286 | BASIC | 2 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Plant operators, maintenance personnel, personnel responsible for the process, and quality assurance personnel

COURSE OBJECTIVE

You will know the color change involves. You will know the details and know what influence the various components of the paint supply system have on the color change. You will be able to identify and eliminate errors and malfunctions in the color change. You will be able to detect and solve quality and contamination problems and minimize rinse agent consumption and component wear.

ADMISSION REQUIREMENTS

Basic knowledge of automated painting technology

COURSE STRUCTURE

You will develop complete color change programs with the aid of different atomizer schematics. The Dürr atomizer technology and its color change functions will be explained to you, as will different variants of flushing and loading programs. You will be given recommendations for program sequences, settings for successful color changes, as well as the possibilities for evaluating the quality of a color change. You will develop the necessary practical knowledge about color change cycles, their evaluation, and assessment via fault simulation.

COURSE CONTENT

- Analyzing the paint supply using various atomizer schematics
- Technical conditions
- Rinse and color change procedures
- Color changer
- Pressure regulator
- Hose types
- Dosing pump
- Atomizer
- Color nozzle
- Bell disk
- Parameters for pulse air and rinse agent and their verification
- Editing of long rise, pressure, and short purging programs with **DXQ**/**Eco**Screen 3D-OnSite
- Editing the color change allocation tables
- Critical analysis of non-optimized time programs
- Creating and checking a color change program
- Errors in color change programs – practical examples
- Manipulation of parameters
- Manipulation of various basic program steps
- Incorrect dosing pump parameterization
- Incorrect valve activation
- Modification of the valve switching times

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Processes and quality

Sealing process and application technology

287 | BASIC | 5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Project planning and management personnel, personnel responsible for the process, operating personnel

COURSE OBJECTIVE

You will have an overview of typical sealing applications with robot application and the corresponding plant design. You will know the components and systems for material supply, conditioning, and application as well as the robot and control technology used.

ADMISSION REQUIREMENTS

Basic knowledge of automated process equipment

COURSE STRUCTURE

You will receive important information about equipment and processes in compact form by means of specially prepared teaching materials. You will be introduced to numerous systems and components by means of display models. Seams will be applied in the practical part of the course, and the effects of the fundamental process parameters will be demonstrated.

COURSE CONTENT

- Presentation of different sealing applications based on layouts and process schematics: Seam sealing, underbody coating, rocker panel application, insulation injectors, door rebate applications
- Metering technique for high-viscosity materials – design and function: pressure-controlled dosing system **Eco**Flow, volume-controlled dosing system **Eco**Flow PCL, electrical piston dosing system **Eco**Shot Meter
- Applicators – design and function: **Eco**Gun 1D, **Eco**Gun2 3D, **Eco**Gun 3D, electrically driven agitator, **Eco**Gun2 MD, **Eco**Gun MD for rocker panel application
- Material temperature control systems – design and function: heat exchangers, temperature control hoses, electric heating elements
- Robot technology robot **Eco**RS – traversing rail **Eco**Rail
- Control systems – design and function: control and operating concept, movement and process control unit **Eco**RPC
- Modular control cabinet range **Eco**RCMP/**Eco**SCMP/ **Eco**PSMP
- Drive technology **Eco**Drive
- Safety engineering and concept
- Sensors, camera systems for body position measurement and seam correction
- Visualization and programming **DXQ**/**Eco**Screen 3D-OnSite
- teach pendant
- Process practice of PVC application: process parameters and their effects, application on test sheets, analysis of the effects of diverse parameter

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17
22

03

Final assembly systems

Gluing

EcoRAM stations | Operation

290 | BASIC | 0.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Operating personnel

COURSE OBJECTIVE

You will know the design and functions of the material supply system. You will operate the plant and detect malfunctions during operation.

ADMISSION REQUIREMENTS

Basic knowledge of automated process equipment

COURSE STRUCTURE

First, you will be given full information on the design and function of the plant and its components. Next, you will learn everything about switching the plant on and off, performing checks during operation, relieving pressure, and recommissioning the plant after extended pauses. The work steps will be practiced hands-on and the change of tank will also be performed.

COURSE CONTENT

- **Eco**RAM station
  - Tank change
  - Pressure relief
  - Pneumatics
  - Heating circuits
- Operation
  - Health & safety information
  - Operating concept
  - Error messages
  - Material properties

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Gluing

EcoRAM stations | Maintenance

291 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance staff

COURSE OBJECTIVE

You will know the design and functions of the material supply system. You will be able to eliminate malfunctions during operation and master the maintenance and maintenance of the component in theory and practice.

ADMISSION REQUIREMENTS

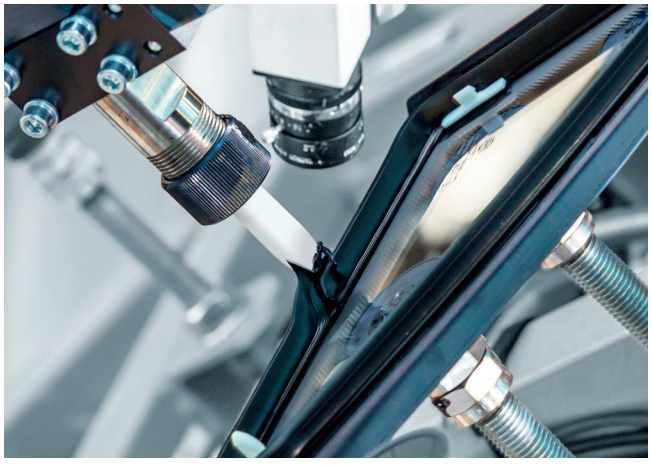
Basic knowledge of automated process equipment

COURSE STRUCTURE

Once you are familiar with the theory of the design and functions of the material supply system and its components, you will work under instruction on the various components. The work steps relating to operation as well as for maintaining and maintenance the plant will be explained and carried out practically. The various process parameters will be dealt with in depth. You will learn how a material tank is changed. Any malfunctions and their elimination will be explained.

COURSE CONTENT

- **Eco**RAM station
  - Tank change
  - Pressure relief
  - Pneumatics
  - Heating circuits
- Operation
  - Health & safety information
  - Operating concept
  - Error messages
  - Material properties
- Mechanics
  - Maintenance and maintenance
  - Drive (pneumatic)
  - Material conveying
  - Follow plate



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Gluing

Application and metering technology | Maintenance

292 | BASIC | 3 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance staff

COURSE OBJECTIVE

You will know the design and functions of the application and metering technology of the gluing system. You will be able to eliminate malfunctions during operation and master the maintenance and maintenance of the component in theory and practice.

ADMISSION REQUIREMENTS

Basic knowledge of automated process equipment

COURSE STRUCTURE

Your training will focus on the pneumatic actuator, material conveying, controlling, and working pressure. You will be able to disassemble the components and professionally reassemble them. During this work, the details of operation, maintenance, and maintenance as well as any malfunctions will be addressed. Plant operation and changing the material tanks will also be dealt with.

COURSE CONTENT

- Metering technique
  - **Eco**Shot Meter (300, 600)
  - Pressure regulator
  - Referencing/calibrating with the teach pendant
- Application technology
  - **Eco**Valve 200
  - **Eco**Gun
  - Backup system (manual)
  - Heating hoses
- Mechanics
  - Health & safety information
  - Pressure relief
  - Maintenance and maintenance
  - Assembly and disassembly of the components

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Conveyor technology

Conveyor technology final assembly | Maintenance of the floor conveyors

310 | BASIC | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with the conveyor elements for your area together with the most important assemblies. You will also learn how to use the technical documentation to determine maintenance and lubrication intervals, and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

A thorough understanding of the conveyor system and its technical relationships is an advantage

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the individual conveyor elements. Detailed technical documentation is used as a reference for determining the operating concept and the relevant maintenance tasks. Depending on plant availability, selected maintenance tasks are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- Overview of the various conveyor types in final assembly
- Plant numbering system for conveyor technology
- Sensor concept and sensor types for the transport of bodies
- Conveyor system layout – journey of a body through final assembly
- Conveyor elements with their assemblies, components, and functions
- Structure of the technical documentation
- Reading of service drawings
- Safety instructions for maintenance tasks
- Maintenance tasks and lubricating intervals according to the maintenance list
- Controls concept of the plant with operating panels
- Location of the plant's control cabinets
- Introduction to the operating concept (basic functions of the operating panels)
- Practical demonstration of the replacement of spare and wear parts, depending on plant availability

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Conveyor technology

Conveyor technology final assembly | Maintenance of EMS systems

311 | BASIC | 2 DAYS | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Maintenance personnel

COURSE OBJECTIVE

You will become familiar with the most important assemblies of the EMS conveyor system. You will also learn how to use the technical documentation to determine maintenance and lubrication intervals, and to safely maintain and operate the plant.

ADMISSION REQUIREMENTS

A thorough understanding of the EMS conveyor and its technical relationships is an advantage

COURSE STRUCTURE

This course uses an abundance of technical drawings and vivid graphics to assist in explaining the design and function of the individual conveyor elements. Detailed technical documentation is used as a reference for determining the operating concept and the relevant maintenance tasks. Depending on plant availability, selected maintenance tasks are demonstrated and then performed with hands-on practice by the participants.

COURSE CONTENT

- Design, components, and function of the EMS system
- Discussion of the rail layout
- Design and components of the transfer stations to the floor conveyor system
- Components and functions of the maintenance station
- Structure of the technical documentation
- Reading of service drawings
- Safety instructions for maintenance tasks
- Maintenance measures and intervals according to the maintenance list
- Controls concept of the plant with operating panels and visualization stations
- Location of the plant's control cabinets
- Introduction to the operating concept (basic functions of the operating panels)
- Practical demonstration of the replacement of spare and wear parts, depending on plant availability
- Feeding an EMS hanger in and out
- Setting, checking, and referencing an EMS hanger using a jig

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Conveyor technology

Floor conveyor technology final assembly | Hardware and software

312 | ADVANCED | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Electrical maintenance, automation engineers

COURSE OBJECTIVE

You will become familiar with the hardware and software design of the respective PLC of the floor conveyor system. You will then be able to parameterize individual components.

ADMISSION REQUIREMENTS

Basic knowledge about the programming of the control systems used, e.g. Siemens TIA Portal or Rockwell

COURSE STRUCTURE

This course uses the current PLC program to assist in explaining the hardware and software of the respective conveyor system. Exercises and practical examples supplement the course.

COURSE CONTENT

- Conveyor groups and conveyor elements of the final assembly
- Plant hardware and circuit diagrams (control cabinets, central cabinet, decentral operating elements, operating panels)
- Safety layout (central and decentral elements, communication, network)
- Configuring and parameterizing drive elements (e.g. motors, frequency converters)
- PLC programming structure for the conveyor system
- Standard function modules
- Operating modes (manual mode, automatic mode, setup mode)
- PLC safety program
- Error analysis and recording of alarm signals
- Practical exercises, troubleshooting, and malfunction simulation

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Conveyor technology

Conveyor technology final assembly EMS systems | Hardware and software of EMS hangers

313 | ADVANCED | 1 DAY | 6 PERSONS | CUSTOMER PLANT

TARGET GROUP

Electrical maintenance, automation engineers

COURSE OBJECTIVE

You will become familiar with the hardware and software structure of the respective PLC of the EMS conveyor system (hangers). You will then be able to parameterize individual components.

ADMISSION REQUIREMENTS

Basic knowledge about the programming of the control systems used, e.g. Siemens TIA Portal or Rockwell

COURSE STRUCTURE

This course uses the current PLC program to assist in explaining the hardware and software of the respective conveyor system. Exercises and practical examples supplement the course.

COURSE CONTENT

- Assemblies and components of the EMS systems
- Plant hardware and circuit diagrams (control cabinets, central cabinet, decentral operating elements, operating panels)
- Safety layout
- Control concept (central and decentral elements, communication, network)
- Configuring and parameterizing drive elements (e.g. motors, frequency converters)
- PLC programming structure for the EMS system
- Standard function modules
- Operating modes (manual mode, automatic mode, setup mode)
- PLC safety program
- Error analysis and recording of alarm signals
- Practical exercises, troubleshooting, and malfunction simulation

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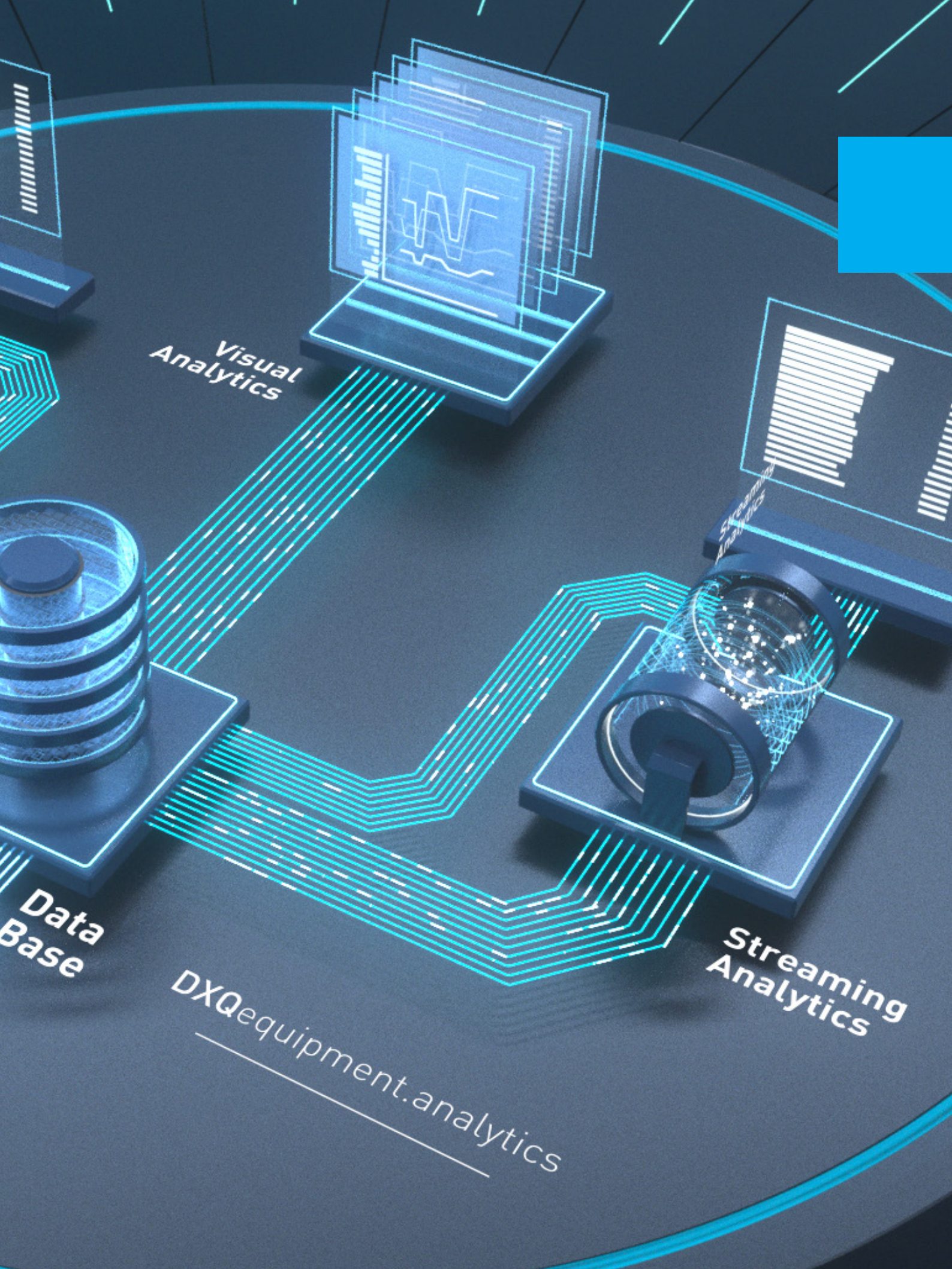
Visual Analytics
Data Base
Streaming Analytics
DXQequipment.analytics

04

Digital products

DXQoperate

DXQequipment.maintenance | Operation and Maintenance

400 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Operating personnel, maintenance personnel tasked with caring for the maintenance assistant

COURSE OBJECTIVE

You will become familiar with the use of **DXQ**equipment. maintenance during maintenance. You will be capable of modifying existing maintenance tasks, defining your own maintenance tasks, and adding additional information to **DXQ**equipment.maintenance.

ADMISSION REQUIREMENTS

Basic knowledge of automated painting technology

COURSE STRUCTURE

You will be given a general overview of using **DXQ**equipment. maintenance. You will be shown how existing maintenance lists are modified and how to use the integrated editor to create new maintenance tasks and incorporate the necessary information.

COURSE CONTENT

- Overview of **DXQ**equipment.maintenance
- Editor functions
- Modifying existing maintenance tasks
- Creating new maintenance tasks
- Incorporating additional sources of information
- Backup data

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DXQoperate

DXQequipment.operation Process & Conveyor | Administration

401 | ADVANCED | 3 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

System administrators, automation technicians

COURSE OBJECTIVE

You will develop a thorough understanding about the system architecture and background functions of the plant visualization, as well as about the connection to the control systems.

ADMISSION REQUIREMENTS

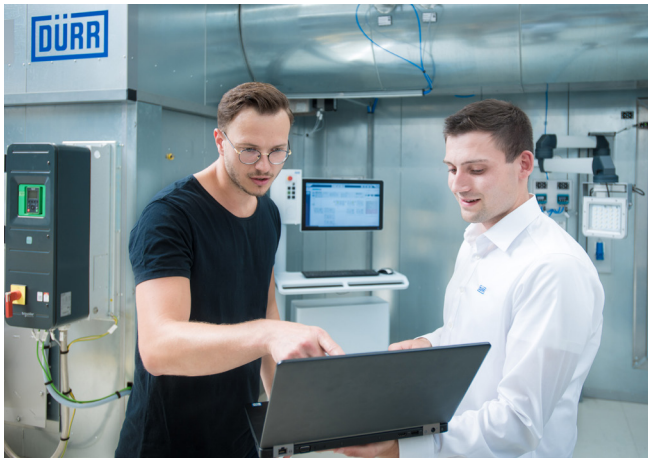
Participation in course Dürr Control Systems Basics

COURSE STRUCTURE

First there will be an introduction to the theory of the plant visualization for process and conveyor technology. The administration and maintenance of the plant visualization will then be explained by means of exercises and practical examples.

COURSE CONTENT

- Overview of the **DXQ** products
- Basics of **DXQ**equipment.operation
- Network overview and system architecture (front end, back end, services and tools, communication, database)
- Installing the system (system requirements, necessary software, browser settings)
- Connecting a PLC to the system and adding to the front end
- Configuring the services (e.g. I/O manager, alarm server, and trend server)
- Setting up the additional functions (language manager, system manager)
- Configuring the front end (framework)
- Creating a backup
- Practical exercises: Setting up a server PC and setting up a client PC



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DXQoperate

DXQequipment.operation Process & Conveyor | Engineering

402 | EXPERT | 2 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

System administrators, automation technicians

COURSE OBJECTIVE

You will learn to independently modify the user interface of the plant visualization for process and conveyor technology, and be capable of adding and parameterizing new components.

ADMISSION REQUIREMENTS

Participation in the administrator course **DXQ**equipment.operation

COURSE STRUCTURE

First there will an introduction to the theory of the plant visualization for process and conveyor technology. The creation of the user interface of the plant visualization will then be explained by means of exercises and practical examples.

COURSE CONTENT

- Repetition of the basics of **DXQ**equipment.operation
- Preparing and configuring the tools and database for creating the user interface
- Creating apps
- Creating animations
- Creating page links
- Using the library elements
- Configuring the framework
- Exporting user interfaces and integrating them into the visualization
- Practical exercises: Creating new library elements and creating a new page in the plant visualization with function groups and function elements

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DXQanalyze

DXQequipment.analytics application technology | Operation and Maintenance

410 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Operating personnel, maintenance personnel, personnel responsible for the process and quality assurance personnel

COURSE OBJECTIVE

You will be able to operate and use Visual Analytics for robots. By implementing the acquired knowledge, you will be able to evaluate process-relevant signals and to identify and correct deviations of the plant from the optimal condition.

ADMISSION REQUIREMENTS

Basic knowledge of automated painting technology

COURSE STRUCTURE

You will be given an overview of how to use Visual Analytics and its most important functions. The data from a robot control will be obtained and interpreted on the basis of a typical atomizer schematic.

COURSE CONTENT

- Overview of **DXQ**equipment.analytics
- Necessary prerequisites
- Incorporating into the software design
- Connecting to a database
- Using schematics
- Downloading data
- Displaying signals
- Settings
- Saving and restoring data
- 3D presentation
- Search functions
- Filter functions

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DXQanalyze

DXQequipment.analytics Process technology | Operation

411 | BASIC | 0.5 DAYS | 6 PERSONS | CUSTOMER PLANT OR REMOTE

TARGET GROUP

Operating personnel, maintenance personnel, personnel responsible for the process and quality assurance personnel

COURSE OBJECTIVE

You will be able to operate and use **DXQ**equipment.analytics for process technology. By implementing the acquired knowledge, you will be able to evaluate process-relevant signals and to identify and correct deviations of the plant from the optimal condition.

ADMISSION REQUIREMENTS

Basic knowledge of automated painting technology and participation in the operating course of the respective process equipment

COURSE STRUCTURE

You will be given an overview of how to use **DXQ**equipment. analytics and its most important functions. Current production data will be analyzed and interpreted on the basis of your **Eco**Dry X, oven or rectifier system.

COURSE CONTENT

- Overview of **DXQ**equipment.analytics
- Overview of the system structure
- Display functions and presentations
- Settings in the user interface
- Plant-specific functions of **Eco**Dry X, ovens, and rectifier
- Using filter functions
- Using search functions

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DXQanalyze

DXQequipment.analytics Visual Analytics | Application

412 | ADVANCED | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel, personnel responsible for the process and quality assurance personnel

COURSE OBJECTIVE

You will be familiar with targeted troubleshooting in the robot using Visual Analytics. You will be capable of analyzing process-relevant signals, detecting errors, and allocating these to process components.

ADMISSION REQUIREMENTS

Course (#401) **DXQ**equipment.analytics

COURSE STRUCTURE

You will be given an overview of how Visual Analytics is used for troubleshooting. Data from a robot controller will be obtained on the basis of a typical atomizer schematic and these data interpreted to allocate them to various sources of errors in hardware and software.

COURSE CONTENT

- Overview of **DXQ**equipment.analytics
- Loading process-relevant data
- Using filter functions
- Using search functions
- Using the 3D presentation
- Interpreting the signals
- Eliminating errors
- Using events
- Backup results

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DXQanalyze

DXQequipment.analytics Advanced Analytics | Application

413 | ADVANCED | 0.25 DAY | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

Maintenance personnel, personnel responsible for the process and quality assurance personnel

COURSE OBJECTIVE

You will use Advanced Analytics for continuous process monitoring

ADMISSION REQUIREMENTS

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COURSE STRUCTURE

You will be given an overview of how Advanced Analytics is used for continuous process monitoring. To this end, the signal analysis of the individual modules will be explained.

COURSE CONTENT

- Overview of **DXQ**equipment.analytics Advanced Analytics
- Advanced Analytics functions
- Operating modes
- Basics of Advanced Analytics

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DXQcontrol

DXQbasic.connect BaseCom Integration

420 | BASIC | 2.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

System administrators, automation technicians, and suppliers who make a connection to **DXQ**control

COURSE OBJECTIVE

You will develop a thorough understanding about the integration of the BaseCom modules into the PLC control unit (TIA Portal). You will also learn how to configure the module interfaces.

ADMISSION REQUIREMENTS

Programming knowledge in Siemens TIA Portal, knowledge of the plant software

COURSE STRUCTURE

First there will an introduction to the theory of BaseCom. The integration of BaseCom modules and the configuration of module interfaces will then be explained by means of practical exercises.

COURSE CONTENT

- Overview of **DXQ**control
- Task of the BaseCom elements in the plant software
- Design of the engineering matrix (BaseCom functions, allocation of the BaseCom modules to the control units, nomenclature of the module designation)
- Design and components of the BaseCom library (explanation of the module structure and the control unit structure)
- Configuring the module interfaces using the interface descriptions
- Practical exercises: Implementation according to guideline - BaseCom integration for the modules Switching and Tracking Point
- The following functions are covered in the training:
  - Tracking Point (TRP)
  - Switching (SW)
  - Production Data Collection (PDC)
  - Production Data Definition (PDD)
  - If the plant has a high-bay storage area, training will additionally be given on the function Storage Control (StC). (0.5 days)
  - If the engineering matrix contains a Work Order Execution (WOE), training will additionally be given on this function. (0.5 day)

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DXQcontrol

DXQbasic.connect BaseCom Integration | Advanced TIA

421 | ADVANCED | 1.5 DAYS | 6 PERSONS | DÜRR TRAINING CENTER

TARGET GROUP

System administrators, automation technicians, and suppliers who already have experience of STEP 7 BaseCom modules

COURSE OBJECTIVE

You will develop a thorough understanding about the integration of the BaseCom modules into the PLC control unit (TIA Portal). You will also learn how to configure the module interfaces.

ADMISSION REQUIREMENTS

Experience with the integration of BaseCom modules into Siemens SIMATIC STEP 7, programming knowledge in Siemens TIA Portal, knowledge of the plant software

COURSE STRUCTURE

First there will a brief introduction to the theory of BaseCom. The basic differences between the STEP 7 and TIA BaseCom modules will then be explained using practical exercises. You will also learn how to configure the module interfaces.

COURSE CONTENT

- Overview of **DXQ**control
- Differences in the BaseCom integration between Siemens STEP 7 and TIA Portal (data handling, new PLC data types, effects on the module infrastructure)
- Changes in the BaseCom library in TIA Portal compared to Siemens STEP 7
- Configuring the module interfaces using the interface descriptions
- Practical exercises: Implementation according to guideline - BaseCom integration for the modules Switching and Tracking Point
- The following functions are covered in the training:
  - Tracking Point (TRP)
  - Switching (SW)
  - Production Data Collection (PDC)
  - Production Data Definition (PDD)
  - If the plant has a high-bay storage area, training will additionally be given on the function Storage Control (StC). (0.5 day)
  - If the engineering matrix contains a Work Order Execution (WOE), training will additionally be given on this function. (0.5 day)

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myDAS

myDAS basic training for users – Primas module

430 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER PLANT

TARGET GROUP

Operating personnel, maintenance personnel, personnel responsible for the process, as well as quality assurance and IT personnel

COURSE OBJECTIVE

You will be familiar with the basics of Primas. The basic training will enable you to analyze process-relevant signals with the aid of simple diagnostic images and data search functions.

ADMISSION REQUIREMENTS

Basic knowledge of Windows, basic knowledge of plant/ application

COURSE STRUCTURE

You will be given a general overview of the process diagnostic system myDAS. You will be shown how you can search for individual workpieces or process steps using predefined functions and analyze process signals in a y-t graphic. The focus here is on creating diagnostic images for basic error analysis of the plant with practical examples and exercises.

COURSE CONTENT

- Introduction to the system design
- Analyzing data with Primas:
  - Navigation in Primas
  - Tools
  - Data search functions: creating standard diagnostic triggers (search by date/time or indexes, e.g. body identification, type)
  - Creating standard diagnostic images and use of symmetries
  - Performing a data analysis in a y-t graphic: Signal selection and functionalities for graphic analysis
  - Data archiving and reloading
- Error analysis on the plant
- Using the message monitor
- Accessing the track visualization
- Practical exercises

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myDAS

Extended myDAS training for users – Primas modules, ADS Agent

431 | BASIC | 1 DAY | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER PLANT

TARGET GROUP

Operating personnel, maintenance personnel, personnel responsible for the process, as well as quality assurance and IT personnel

COURSE OBJECTIVE

You will be familiar with the use of Primas. The extended myDAS training will enable you to analyze process-relevant signals in depth with the aid of individual diagnostic images and data search functions. Through the analysis of exceeded limit values and key indicators of individual process steps, you will have the basics for detecting plant errors and performing proactive maintenance.

ADMISSION REQUIREMENTS

Course (#430) myDAS basic training, knowledge of plant/ application

COURSE STRUCTURE

You will be given a deeper insight into the possibilities of the process diagnostic system myDAS. You will be shown how you can analyze individual workpieces or process steps with individual, more complex data search functions. Through the additional analysis of limit values and simple key indicators, you will be able to do more than pinpoint the causes of plant errors. Being able to identify trends can also support you with assessing the plant's condition and proactively avoiding malfunctions.

COURSE CONTENT

- Data analysis with Primas
  - User rights
  - User-related layouts
  - Data search functions: Creating complex diagnostic triggers, extended indexing, analyzing exceeded limit values, determining simple key indicators
- Trigger for cross-level diagnosis
  - Creating diagnostic images: Extended properties of diagnostic images (range of analog values, their determination, etc.), images for cross-level diagnosis, hierarchical links
  - Multilayer analysis
- ADS Agent: Extended functions, message monitor

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myDAS

myDAS training for developers – Primas, Dnet, Dserve modules

432 | ADVANCED | 2 DAYS | 6 PERSONS | DÜRR TRAINING CENTER OR CUSTOMER PLANT

TARGET GROUP

Maintenance personnel, personnel responsible for the process and IT personnel

COURSE OBJECTIVE

You will be familiar with the basic functions for the development of algorithms with Dnet and their automated processing in Dserve. The myDAS training for developers will enable you to monitor process signals with automation.

ADMISSION REQUIREMENTS

Course (#431) Extended myDAS training, good knowledge of plant/applications, good knowledge (operators, functions)

COURSE STRUCTURE

You will be given an overview of the basic functions for automatic data analysis with myDAS. Examples will be used to show you how to create simple algorithms with Dnet by linking process signals with the aid of mathematical operators and functions. These algorithms can be used for the manual search in Primas after plant errors or for generating key indicators. The Dserve module then offers you extensive possibilities for automating the calculations, in order to monitor entire plants and to create and export (quality) key indicators.

COURSE CONTENT

- Creating algorithms in Dnet
- Creating diagnostic images
- Creating extended diagnostic triggers
- Creating diagnostic procedures in Dserve

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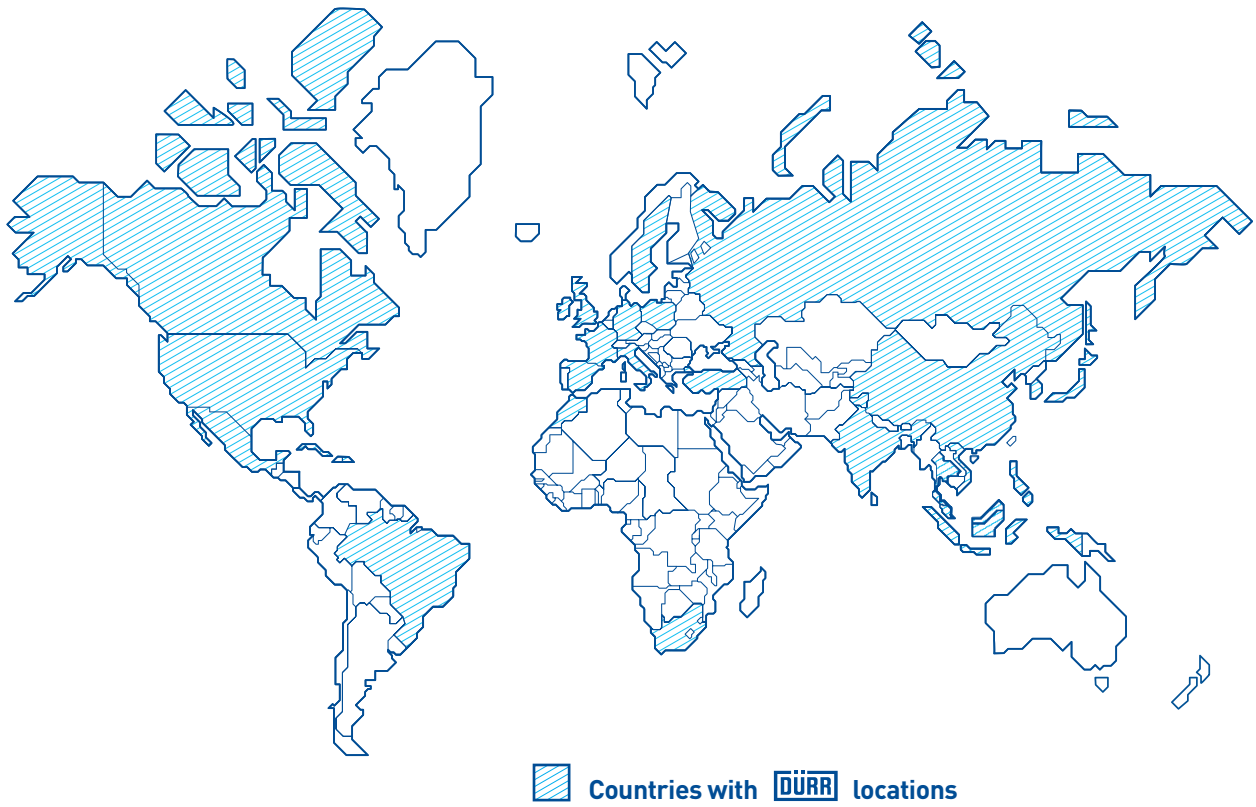

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