LEADING IN PRODUCTION EFFICIENCY

Ecopaint Training
TRAINING PROGRAM

www.durr.com

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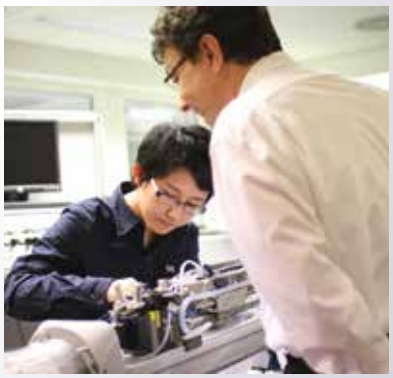

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ELECTRICAL MAINTENANCE

EcoRP6/7 F with **Eco**RC2

Target group

Maintenance personnel

Course objective

You will receive an overview of the electrical design of the system. You will carry out a fault analysis on the system's main subassemblies and can replace and parameterize the components. You will master the preventative maintenance intervals of the individual assemblies and position the robot independently by means of a teach pendant.

Admission requirements

Expert training in the area of electrical equipment or comparable long-term work experience.

Course structure

After a theoretical introduction you will work under the instruction of a trainer on special training models as well as PCs with configuration and diagnosis software and training robots.

Course contents

- Explanation of the process workflows
- Interface overview of the system
- System operation and safety-related aspects
- Design of the wiring diagrams
- **Eco**RC2 robot controller maintenance, hardware and software
- Process configuration via cfg editor and additional tools in **Eco**Screen 3D-OnSite
- **Eco**Screen operating and monitoring functions
- Design, function and maintenance of **Eco**Drive systems
- Mastering robot axes
- Design, function and maintenance of the valve system, troubleshooting by means of a testing device
- Design, function and troubleshooting for the control circuits of air volume, air pressure and turbine speed
- Design, function and configuration of the Ex-Purge system
- Design, function and settings on high-voltage systems
- Design and troubleshooting for the sensors used in the system, with special testing devices
- Data backup via the backup service in **Eco**Screen 3D-OnSite
- Overview of the teach pendant menus, moving robots, starting existing programs and user pages for maintenance tasks

Course length/registration

Length: 5 days
Identification: DT-01 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

ELECTRICAL MAINTENANCE

EcoRP E/L mit EcoRC2

Target group

Maintenance personnel

Course objective

You will receive an overview of the electrical design of the robot system. You will carry out a fault analysis on the system's main subassemblies and can replace and parameterize the components. You will master the preventative maintenance intervals of the individual assemblies and position the robot independently by means of a teach pendant.

Admission requirements

Expert training in the area of electrical equipment or comparable long-term work experience.

Course structure

After a theoretical introduction you will work under the instruction of a trainer on special training models as well as on PCs with configuration and diagnosis software and on training robots.

Course contents

- Explanation of the process workflows
- Interface overview of the system
- System operation and safety-related aspects
- Design of the wiring diagrams and explanation of cable replacement
- Maintenance, hardware and software of the **Eco**RC2 robot controller
- Process configuration via cfg editor and additional tools in **Eco**Screen 3D-OnSite for offline programming, parametrization, diagnosis, configuration
- **Eco**Screen operating and monitoring functions
- Design, function and maintenance of **Eco**Drive systems
- Mastering robot axes
- Cable replacement
- Design, function and maintenance of the valve system, troubleshooting by means of a testing device
- Design, function and troubleshooting for the control circuits of air volume, air pressure and turbine speed
- Design, function and parametrization of the Ex-Purge system
- Design and function of the input/output subassemblies
- Design, function and settings on the high-voltage system
- Design and troubleshooting for the sensors used in the system, with special testing devices
- Data backup via the backup service in **Eco**Screen 3D-OnSite
- Overview of the teach pendant menus, moving robots, starting existing programs and user pages for maintenance tasks

Course length/registration

Length: 5 days
Identification: DT-02 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

ELECTRICAL MAINTENANCE

EcoRP E/L

Target group

Maintenance personnel

Course objective

You will receive an overview of the electrical design of the system. You will carry out a fault analysis on the system's main subassemblies and can replace and parameterize the components. You will master the preventative maintenance intervals of the individual assemblies and position the robot independently by means of a teach pendant.

Admission requirements

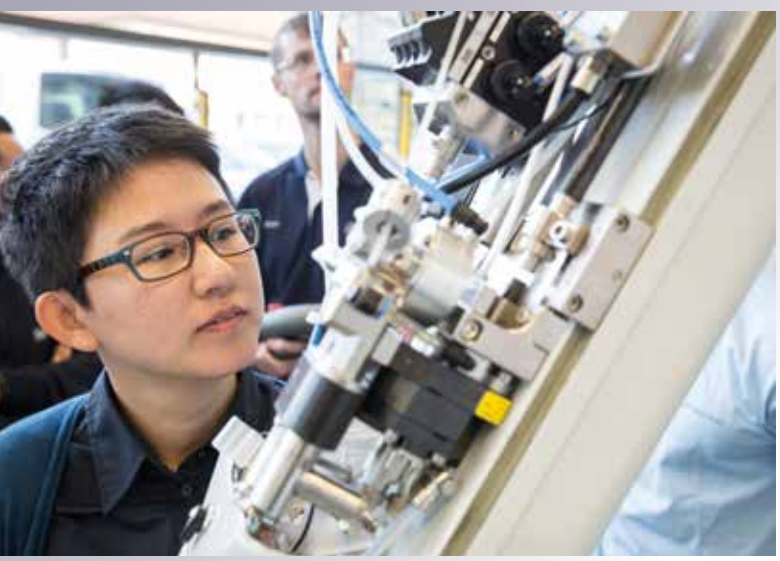
Expert training in the area of electrical equipment or comparable long-term work experience.

Course structure

After a theoretical introduction you will work under the instruction of a trainer on special training models as well as PCs with configuration and diagnosis software and training robots.

Course contents

- Explanation of the process workflows
- Interface overview of the system
- System operation and safety-related aspects
- Design of the wiring diagrams
- Maintenance, hardware and software of the **Eco**RPC robot controller
- Process configuration via cfg editor and additional tools in **Eco**Screen 3D-OnSite
- **Eco**Screen operating and monitoring functions
- Design, function and maintenance of **Eco**Drive systems
- Mastering robot axes
- Cable replacement
- Design, function and maintenance of the valve system, troubleshooting by means of a testing device
- Design, function and troubleshooting for the control circuits of air volume, air pressure and turbine speed
- Design, function and configuration of the Ex-Purge system
- Design and function of the input/output subassemblies
- Design, function and settings on the high-voltage system
- Design and troubleshooting for the sensors used in the system, with special testing devices
- Data backup via the backup service in **Eco**Screen 3D-OnSite
- Overview of the teach pendant menus, moving robots, starting existing programs and user pages for maintenance tasks



Course length/registration

Length: 5 days
Identification: DT-03 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

ELECTRICAL MAINTENANCE

Sealing installations

Target group

Maintenance personnel

Course objective

You will receive an overview of the electrical design of the plant. You will carry out a fault analysis on the system's main subassemblies and can replace and parameterize the components. You will master the preventative maintenance intervals of the individual assemblies and position the robot independently by means of a teach pendant.

Admission requirements

Expert training in the area of electrical equipment or comparable long-term work experience.

Course structure

After a theoretical introduction you will work under the instruction of a trainer on special training models as well as PCs with configuration and diagnosis software and training robots.

Course contents

- Explanation of the process workflows and plant configuration based on layouts and schematics
- Communication structures: fieldbus and Ethernet connections between station and safety PLC, camera system, robot controller **Eco**RPC and visual display PC
- Operating modes and control desk functions, safety-related concept
- Configuration of the application process by means of **Eco**Screen 3D-OnSite
- Troubleshooting/fault correction and configuration by means of **Eco**Screen 3D-OnSite
- Procedure when replacing the robot controller
- **Eco**Screen operating and monitoring functions
- **Eco**RPC robot controller hardware
- Wiring diagrams of the control panels **Eco**PSMP, **Eco**SCMP and **Eco**RCMP
- Design and function of the **Eco**Drive systems, Sercos communication, parameterization, loading and backing up parameters, troubleshooting based on error messages, motor and servo amplifier exchange
- Overview of the teach pendant menus and user pages for maintenance tasks
- Handling the teach pendant
- Mastering robot axes and piston dosing unit drives
- Process workflows for dosing units and applicators
- Design, function and configuration of material temperature control
- Design and maintenance of the valve system

Course length/registration

Length: 4 days
Identification: DT-04 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MECHANICAL MAINTENANCE

EcoRP E033/L033

Target group

Maintenance personnel

Course objective

This course familiarizes you with the most important tasks for maintenance mechanical elements of robots and teaches principles for driving and operating the robot with the teach pendant.

Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

Course structure

After a theoretical introduction you will work on training robots, under instruction. You will use the special tools intended for these tasks.

Course contents

- Design and function of the paint robot
- Safety-related aspects for maintenance and servicing work
- Protective gear
- Handling the brake release device
- Maintenance work on the robot kinematics
  - Replacing the motors of axes 1-6
  - Replacing the drive unit of axis 1
  - Oil change on all gears
  - Replacing the gears on axes 2 and 3
  - Replacing the planetary offset gears of axes 4, 5 and 6
  - Replacing the drive shafts of axes 4, 5 and 6
  - Replacing the hand axis
  - Replacing the flexible protective conduit of the hand axis
- Measures before recommissioning
  - Checking operational safety
  - Mastering the axis drives
- Replacing cables and hoses
- Basic operating functions on the teach pendant
- Operating mode selection on operator panel
- Driving the robot into fixed positions (with teach pendant and via visual display)

Course length/registration

Length: 1.5 days
Identification: DT-05 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MECHANICAL MAINTENANCE

EcoRP E133/L133

Target group

Maintenance personnel

Course objective

This course familiarizes you with the most important maintenance work on the mechanical equipment of robots and teaches principles for driving and operating the robot with the teach pendant.

Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

Course structure

After a theoretical introduction you will work under instruction on training robots. You will use the special tools provided for this work.

Course contents

- Design and function of the paint robot
- Safety-related aspects for maintenance and maintenance work
- Protective gear
- Handling the brake release device
- Maintenance work on the kinematic equipment of robots
- Replacing the motors of axes 1-6
- Replacing the drive unit of axis 1
- Oil change on all gears
- Replacing the gears of axes 2 and 3
- Replacing the planetary offset gearbox of axes 4, 5 and 6
- Replacing the drive shaft of axes 4, 5 and 6
- Replacing the hand axis
- Replacing the protective hose of the hand axis
- Replacing the angular gear and drive gearwheel of axis 7
- Replacing the guide carriages of axis 7
- Measures before recommissioning
- Checking operational safety
- Mastering the axis drives
- Principles of replacing cables and hoses
- Basic operating functions on the teach pendant
- Operating mode selection on operator panel
- Driving the robot into fixed positions (with teach pendant and via visual display)
- Function, maintenance and parameterization of the central lubricating system of axis 7

Course length/registration

Length: 2 days
Identification: DT-06 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MECHANICAL MAINTENANCE

EcoRP L030

Target group

Maintenance personnel

Course objective

This course familiarizes you with the most important maintenance work on the mechanical equipment of robot, and teaches principles for driving and operating the robot with the teach pendant.

Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

Course structure

After a theoretical introduction you will work under instruction on training robots. You will use the special tools provided for this work.

Course contents

- Design and function of the handling robot
- Safety-related aspects for maintenance and servicing work
- Protective gear
- Handling the brake release device
- Maintenance work on the kinematic equipment of robots
  - Replacing the motors of axes 1-3
  - Replacing the bevel gear s of axes 1 and 2 (theory)
  - Replacing the cycloid gears of axes 1 and 2 (theory)
  - Replacing the angular gear of axis Z
  - Replacing the spindle gear unit of axis Z
- Measures before recommissioning
  - Checking operational safety
  - Mastering the axis drives

Course length/registration

Length: 1 day
Identification: DT-07 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MECHANICAL MAINTENANCE

EcoRP6/7

Target group

Maintenance personnel

Course objective

If mechanical problems occur on robots, the maintenance personnel's qualifications are vitally important in keeping downtimes as short as possible.
This course familiarizes you with the most important mechanical maintenance and maintenance work on robots, and teaches you principles for driving and operating the robot with the teach pendant.

Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

Course structure

After a theoretical introduction you will work under the instruction of a trainer on training robots, using special tools designated for this work.

Course contents

- Design and function of the paint robot
- Safety-related aspects for maintenance and serving work
- Protective gear
- Periodically recurring maintenance work
- Handling the brake loosening device
- Maintenance work on the robot kinematics
  - Replacing the motors of axes 1-6
  - Replacing the gear of axis 3
  - Replacing the weight counterbalance of axis 2
  - Dismounting and mounting arm 2
  - Replacing the hand axis
  - Replacing the gears of axes 4, 5 and 6
  - Replacing the drive shafts of axes 4-6
- Measures for recommissioning
  - Checking operational safety
  - Mastering the axis drives
- Principles of replacing cables and hoses
- Basic operating functions on the teach pendant
- Selecting operating modes at the operator panel
- Driving the robot into fixed positions (with teach pendant and via visual display)
- Only for **Eco**RP7:
  - Replacing gear of axis 7
  - Replacing drive gearwheel of axis 7
  - Replacing guide carriages and supporting rollers of axis 7
  - Function, servicing and parameterization of the central lubricating system of axis 7

Course length/registration

Length: 2 days
Identification: DT-08 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MECHANICAL MAINTENANCE

EcoRS 16

Target group

Maintenance personnel

Course objective

You will be capable of carrying out all the maintenance and maintenance work performed in the course contents and positioning the robot independently by means of the teach pendant. At the end of the course you will drive the robot into a secure initial position (e.g. basic position).

Admission requirements

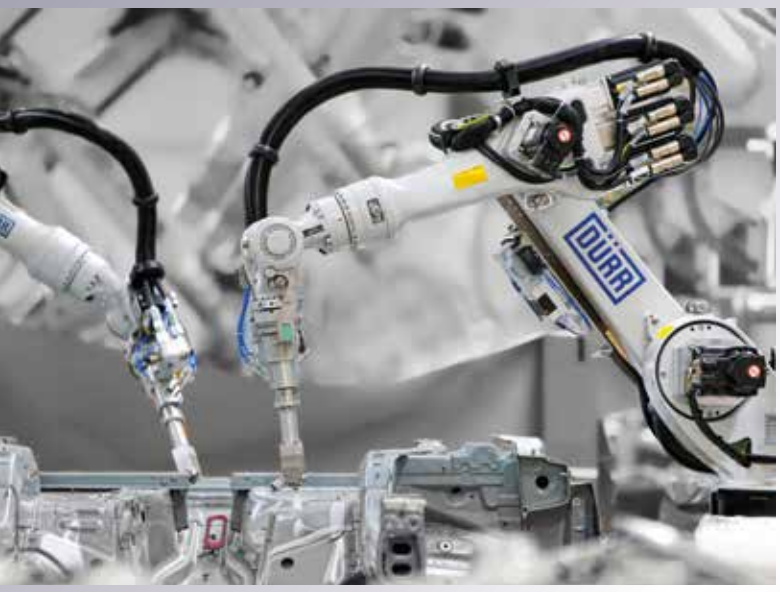
Expert training in the area of mechanical engineering or comparable long-term work experience.

Course structure

After a theoretical introduction you will work under the instruction of a trainer on training robots, using special tools designated for this work.

Course contents

- Design and function of the robot
- Safety-related aspects for maintenance and servicing work
- Periodically recurring maintenance work
- Handling the brake loosening device
- Maintenance work on the robot kinematics
  - Replacing the motors of axes 1-7
  - Oil change on all gears
  - Replacing cycloid gears of axes 2 and 3
  - Replacing the hand axis
  - Replacing the drive shafts of axes 4-6
  - Replacing the toothed belt of axes 4 and 5
  - Replacing the angular gear of axis 7
  - Replacing the drive gearwheel of axis 7
  - Replacing the guide rollers of axis 7
- Measures before recommissioning
  - Checking operational safety
  - Mastering the axis drives
- Basic operating functions on the teach pendant
- Operating mode selection on operator panel
- Driving the robot into basic position by means of teach pendant



Course length/registration

Length: 2 days
Identification: DT-09 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MECHANICAL MAINTENANCE

EcoRS 60

Target group

Maintenance personnel

Course objective

You will be capable of carrying out all the maintenance and servicing work performed in the course contents and positioning the robot independently by means of the teach pendant. At the end of the course you will drive the robot into a secure initial position (e.g. basic position).

Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

Course structure

After a theoretical introduction you will work under the instruction of a trainer on training robots, using special tools designated for this work.

Course contents

- Design and function of the robot
- Safety-related aspects for maintenance and servicing work
- Periodically recurring maintenance work
- Handling the brake loosening device
- Servicing work on the robot kinematics
  - Replacing the motors of axes 1-7
  - Oil change on all gears
  - Replacing cycloid gears of axes 2 and 3
  - Replacing the hand axis
  - Replacing the drive shafts of axes 4-6
  - Replacing the toothed belt of axes 4 and 5
  - Replacing the angular gear of axis 7
  - Replacing the drive gearwheel of axis 7
  - Replacing the guide rollers of axis 7
- Measures before recommissioning
  - Checking operational safety
  - Mastering the axis drives
- Basic operating functions on the teach pendant
- Operating mode selection on operator panel
- Driving the robot into basic position by means of teach pendant

Course length/registration

Length: 2 days
Identification: DT-10 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

PIG TECHNOLOGY

In series painting

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 on the systems currently used in the automotive and supplier industries that employ pig technology. You will familiarize yourself with the differences and commonalities in reflow and pushout technology and you will know the areas of application in which pig technology is advantageous compared to traditional technologies. You will master the typical maintenance, adjustment and parametrization tasks that are connected with the use of pig technology.

Admission requirements

Basic knowledge of series production, basic knowledge about operator interfaces, basic knowledge in electro-pneumatics and control equipment.

Course structure

Lots of visual aids, a series of function models and practical demonstrations of pig technology complement and emphasize the instructors' explanations.

Course contents

- Development of pig technology – pipeline > paint hose
- Function principle of pig technology for series painting
- Application possibilities for pig technology based on example cases
- Profitability assessment
- Typical design of reflow and pushout systems
- Use of pig technology for potential isolation when applying water-based paints
- Reflow systems in comparison to traditional paint supply systems in manual stations, robot zones and ESTA/AIR systems
- Pushout systems in comparison to other systems for the provision of special colors in fully automatic paint shops
- Presentation of **Eco**Purge P (EPP) paint supply technology for robots
- Special components, sensor system and pneumatic control loops for pig technology
- Sequence control system and parametrization of color change processes
- Preventive maintenance of pig technology
- Special functions of the operating and parametrization interface
- Practical exercises and demonstrations

Course length/registration

Length: 3 days
Identification: DT-11 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

PAINT SUPPLY

EcoSupply P

Target group

Maintenance personnel

Course objective

This course familiarizes you with the design of the special paint supply **Eco**Supply P. Process workflows and the most important commissioning work are taught as well as knowledge about parameterization and operation of the plant.

Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience. Knowledge of automobile painting in series production, basic knowledge of operator interfaces, basic knowledge in electropneumatics and control equipment.

Course structure

Under instruction from the trainer, you will carry out typical operation and maintenance work on the special paint supply and use the available tools, after the process workflows have been discussed, based on the pneumatics' schematics as well as the visual display images.

Course contents

- Process
  - Principles of pig technology
  - Plant-specific layouts and schematics
  - Design and function of the source and target stations
  - Explanation of the individual process steps
  - Design of the paint, pneumatic and electrical panels
  - Design of contaminated solvent disposal
  - Design of compressed air supply (low and high pressure)
  - Interaction of the mechanical, electrical and electro-pneumatic plant components
  - Function, design and parameterization of the time programs
  - Functions and structure of the visual display system
- Operating the special paint supply in the operating modes and function of the operating elements
- Design of the source and target stations
- Typical maintenance and service work
- Communication between special paint supply and application stations
- Recurring checks
- Function/adjustment/calibration of the load cells
- Function and adjustment of the pig detection sensors
- Diagnosis possibilities via visual display system
- Data backup tools and concepts
- Fault detection and correction on the mechanical, electrical and pneumatic plant components

Course length/registration

Length: 2.5 days
Identification: DT-12 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MAINTENANCE

Color changer **Eco**LCC

Target group

Mechanical/electrical maintenance personnel and plant operators as well as employees interested in technology.

Course objective

In this course, you will receive a comprehensive introduction into the design and function of the color changer as well as into its operation and parametrization. The tasks necessary for maintenance and potential fault correction will be explained to you and carried out on the display model.

Admission requirements

Expert training in the area of mechanical/electrical engineering or comparable professional experience.

Course structure

After an explanation of the design and functions, as well as the process workflows, you will work under instruction on the color changer and use the available Dürr special tools. The visualization software **Eco**Screen 3D-OnSite is used for operating and programming functions.

Course contents

- Design and function
  - Color changer paint supply
  - Carriage functions
  - Positioning and path measurement
- Process workflow
  - Explanations on the topic of atomizers
  - Valve designations and functions
  - Control functions and time program fetches in manual mode
- Operation
  - Checks during operation
  - Setting parameters for rinse medium and compressed air
  - Fault diagnosis and problem solving
  - Adjusting the paint pressure regulator
- Maintenance
  - Carrying out cleaning and maintenance work
  - Maintenance work on the caddy
  - Maintenance work on the linear drive
  - Introduction to identification travel software
  - Referencing the system
    - Identification travel
    - Referencing
    - Learning travel
- **Eco**Screen
  - Explanation of the overview and operating interface
  - Resolving fault messages
- Process parametrization with **Eco**Screen 3D-OnSite
  - Design of purging programs
  - Editing pruging programs

Course length/registration

Length: 2 days
Identification: DT-13 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MAINTENANCE

Color changer **Eco**LCC2

Target group

Mechanical/electrical maintenance personnel and plant operators as well as employees interested in technology.

Course objective

In this course, you will receive a comprehensive introduction into the design and function of the color changer as well as into its operation and parametrization. The tasks necessary for maintenance and potential fault correction will be explained to you and carried out on the display model.

Admission requirements

Expert training in the area of mechanical/electrical engineering or comparable long-term professional experience.

Course structure

After an explanation of the design and functions as well as the process workflows, you will work under instruction on the color changer and use the available Dürr special tools. The visualization software **Eco**Screen 3D-OnSite is used for operating and programming functions.

Course contents

- Design and Function
  - Color changer paint supply
  - Carriage functions
  - Positioning and path measurement
- Process workflow
  - Explanations on the topic of atomizers
  - Valve designations and functions
  - Control functions and time program fetches in manual mode
- Operation
  - Checks during operation
  - Setting parameters for rinse medium and compressed air
  - Fault diagnosis and problem solving
  - Adjusting the paint pressure regulator
- Maintenance
  - Carrying out cleaning and maintenance work
  - Maintenance work on the caddy
  - Maintenance work on the linear drive
  - Referencing the system
- **Eco**Screen
  - Explanation of the overview and operating interface
  - Resolving fault messages
- Process parametrization with **Eco**Screen 3D-OnSite
  - Design of purging programs
  - Editing purging programs

Course length/registration

Length: 2 days
Identification: DT-14 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MAINTAINANCE

EcoBell2

Target group

Maintenance personnel

Course objective

After participating in the course successfully, you will be capable of carrying out the maintenance work specified in the course contents. You will be able to evaluate the wear condition independently and replace worn parts.

Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

Course structure

After a theoretical introduction, you will carry out the work under the instruction of a trainer on real atomizers.

Course contents

- Design and function of the rotating atomizer
- Paint types and loading variants
- Principle and theory of paint atomization
- Coat build-up and effect paints
- Bell disk overview
- Safety-related aspects for maintenance and servicing work
- Periodic maintenance and inspection work
- Atomizer and bell disk cleaning
- Recognizing valve leaks
- Maintenance work on the rotating atomizer
  - Atomizer exchange
  - Exchanging and cleaning bell disk
  - Dismantling and installing bell disk
  - Exchanging and cleaning shaping air ring
  - Exchanging and cleaning exterior charging device
  - Dismantling and installing exterior charging device
  - Exchanging resistors and electrode tips
  - Exchanging brush ring
  - Exchanging bearing unit (turbine)
  - Exchanging fiber optic cable
  - Exchanging function valves
  - Dismantling and installing function valves
  - Dismantling and installing paint pipe with nozzle, paint pipe centering
- Calibration tool

Course length/registration

Length: 1 day
Identification: DT-15 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MAINTAINANCE

EcoBell2 ICC

Target group

Maintenance personnel

Course objective

After participating in the course successfully you will be capable of carrying out the maintenance work specified in the course contents. You will be able to evaluate the wear condition independently and replace worn parts.

Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

Course structure

After a theoretical introduction, you will carry out the work under the instruction of a trainer on real atomizers.

Course contents

- Design and function of the rotating atomizer
- Paint types and loading variants
- Functionality of paint atomization
- Coat build-up and effect paints
- Bell disk overview
- Safety-related aspects for maintenance and
- servicing work
- Periodic maintenance and inspection work
- Atomizer and bell disk cleaning
- Evaluating the wear condition
- Recognizing valve leaks
- Maintenance work on the rotating atomizer
  - Atomizer exchange
  - Exchanging and cleaning bell disk
  - Dismantling and installing bell disk
  - Exchanging and cleaning shaping air ring
  - Exchanging and cleaning exterior charging device
  - Dismantling and installing exterior charging device
  - Exchanging resistors and electrode tips
  - Exchanging brush ring
  - Exchanging bearing unit (turbine)
  - Exchanging fiber optic cable
  - Exchanging function valves
  - Dismantling and installing function valves
  - Dismantling and installing paint pipe with nozzle, paint pipe centering
- Calibration tool

Course length/registration

Length: 1 day
Identification: DT-16 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MAINTAINANCE

EcoBell2 SL

Target group

Maintenance personnel

Course objective

After participating in the course successfully you will be capable of carrying out the maintenance work specified in the course contents. You will be able to evaluate the wear condition independently and replace worn parts.

Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

Course structure

After a theoretical introduction you will carry out the work under the instruction of a trainer on real atomizers.

Course contents

- Design and function of the rotating atomizer
- Paint types and loading variants
- Functionality of paint atomization
- Coat build-up and effect paints
- Bell disk overview
- Safety-related aspects for maintenance and servicing work
- Periodic maintenance and inspection work
- Atomizer and bell disk cleaning
- Recognizing valve leaks
- Maintenance work on the rotating atomizer
  - Atomizer exchange
  - Exchanging and cleaning bell disk
  - Dismantling and installing bell disk
  - Exchanging and cleaning shaping air ring
  - Exchanging and cleaning exterior charging device
  - Dismantling and installing exterior charging device
  - Exchanging resistors and electrode tips
  - Exchanging brush ring
  - Exchanging bearing unit (turbine)
  - Exchanging fiber optic cable
  - Exchanging function valves
  - Dismantling and installing function valves
  - Dismantling and installing paint pipe with nozzle, paint pipe centering
- Calibration tool

Course length/registration

Length: 1 day
Identification: DT-17 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MAINTAINANCE

EcoBell3

Target group

Maintenance personnel

Course objective

After participating in the course successfully you will be capable of carrying out the maintenance work specified in the course contents. You will be able to evaluate the wear condition independently and replace worn parts.

Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

Course structure

After a theoretical introduction you will carry out the work under the instruction of a trainer on real atomizers.

Course contents

- Design and function of the rotating atomizer
- Paint types and loading variants
- Functionality of paint atomization
- Coat build-up and effect paints
- Bell disk overview
- Safety-related aspects for maintenance and servicing work
- Periodic maintenance and inspection work
- Atomizers and bell disk cleaning
- Recognizing valve leaks
- Maintenance work on the rotating atomizer
  - Atomizer exchange
  - Exchanging and cleaning bell disk
  - Dismantling and installing bell disk
  - Exchanging and cleaning shaping air ring
  - Exchanging and cleaning exterior charging device
  - Dismantling and installing exterior charging device
  - Exchanging resistors and electrode tips
  - Exchanging brush ring
  - Exchanging bearing unit (turbine)
  - Exchanging fiber optic cable
  - Exchanging function valves
  - Dismantling and installing function valves
  - Dismantling and installing paint pipe with nozzle, paint pipe centering
- Calibration tool

Course length/registration

Length: 1 day
Identification: DT-18 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

MAINTAINANCE

EcoGun2

Target group

Maintenance personnel

Course objective

After participating in the course successfully you will be capable of carrying out the maintenance work specified in the course contents. You will be able to evaluate the wear condition independently and replace worn parts.

Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

Course structure

After a theoretical introduction you will carry out the work under the instruction of a trainer on real atomizers.

Course contents

- Mechanical design and function of the air atomizer
- Paint types
- Coat build-up and effect paints
- Spray head alignment
- Safety-related aspects for maintenance and servicing work
- Periodic maintenance and inspection work
- Atomizer and air cap cleaning
- Recognizing valve leaks
- Maintenance work on the air atomizer
  - Atomizer exchange
  - Exchanging and cleaning air cap
  - Air cap positioning
  - Dismantling and installing spray head
  - Dismantling and installing connection block
  - Exchanging function valves
  - Dismantling and installing function valves
- Calibration tool
- **Eco**Gun CupCleaner (optional)
  - Design and function
  - Maintenance and cleaning

Course length/registration

Length: 1 day
Identification: DT-19 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

APPLICATION TECHNOLOGY

In automotive series painting

Target group

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

Course objective

After completion of the seminar you will have an overview of the application technology currently used in automotive series painting: from car body cleaning before the primer application, to the application of the finish paint. You will know different paint materials, paint dosing techniques as well as the current robot technology.

Admission requirements

None

Course structure

Based on the relevant system schematics and layouts you will receive demonstrative and practical explanations of painting processes and the components used for them.

Course contents

- Typical system configurations for primer and top coat application
- Application principles for solvent-based and water-borne paints
- Application of effect base coats
- Pneumatic and electrostatic atomizers
- Control circuits for pneumatics, high-voltage and drives
- Influencing factors of various parameters on the painting result
- Paint supply and paint dosing technology – various systems and latest developments
- Techniques for the automatic application of special colors
- Interior painting with robots
- Exterior painting with robot technology
- New developments in atomizer technology
- Functions and process workflows on the bell disk
- Painting guidelines for **Eco**Bell rotating atomizers
- Product quality check at Dürr
- Practical demonstrations

Course length/registration

Length: 4 days
Identification: DT-20 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

EFFECT PAINTING

In series painting

Target group

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

Course objective

The qualification of the responsible personnel is of vital significance for achieving a consistent quality in effect finishing. This course will show you how to systematically approach the sophisticated and often precarious topic of effect finishing, and attain improvements in quality via the targeted exertion of influence. For example parameters are varied, spray patterns are measured and optimized for a good effect development and different bell disks and their paint qualities are compared.

Admission requirements

Basic knowledge of paint finishing.

Course structure

In the theoretical part of the course, different application procedures and associated atomizers will be presented 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 implement the theoretical knowledge in the development of optimum parameters of effect finishing, relevant to the application as well as their assessment and evaluation.

Course contents

- Principles of electrostatic and pneumatic paint finishing
- Atomization technologies and loading procedures with the example of pneumatic and rotary atomization
- Presentation of the **Eco**Gun atomizers
- Areas of use and application examples for
- **Eco**Gun atomizers in relation to effect finishing
- Areas of use and application examples for **Eco**Bell atomizers and bell disk types in relation to effect finishing
- Spray pattern analysis and evaluation (SB50) in relation to the **Eco**Bell bell disk types
- Comparison of effect finishing using the example of
  - bell-bell finishing
- Definition of good effect finishing
- Representation of color tone influences via the parametrization of **Eco**Bell atomizers
- Presentation of **Eco**Bell M
  - Painting process
  - Components

Course length/registration

Length: 4 days
Identification: DT-21 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

PARAMETRIZATION

EcoBell2 HD

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

The theoretical basics necessary for parametrization will be imparted to you in this course, and the operating principle of this innovative atomizer system will be explained. In the practical part you will learn how to create a reference spray pattern through targeted variation of the process parameters and investigate the influences of parameter changes on the resulting paint finish.

Admission requirements

Basic knowledge of paint finishing.

Course structure

The knowledge you have acquired will be implemented in the practical part, in which you will create spray patterns in a robot booth, which you will analyze and evaluate with the use of special measuring devices. You will learn how to control and optimize the paint quality through targeted and systematic changing of the process parameters.

Course contents

- Principles of electrostatic and pneumatic paint finishing
- Atomization technologies and loading procedures with the example of a standard bell disk and HD atomization
- Presentation of **Eco**Bell atomizer technology, its functions, as well as resulting parameters
- Presentation of **Eco**Bell bell disk types and their areas of application
- Presentation of the **Eco**Bell2 HD process
- Influences of bell disk knurling
- Spray pattern analysis and evaluation (SB50) in relation to the **Eco**Bell2 HD bell disk types (air flow profiles)
- Presentation of the bell disk checks
- Influences of parametrization on **Eco**Bell2 HD bell disks
- Creation of a master brush
- Spray pattern analysis and evaluation **Eco**Bell2 HD (SB50)
- Compiling influences of different painting parameters on the master brush (SB50)
- Testing different parameters
  - Bell disk speed
  - Shaping air quantity
  - Paint quantity
  - Influence of high voltage
  - Influence of painting distance
  - Influence of different bell disk typesEinfluss der Lackierparameter auf die Tropfenausbildung
- Influence of the painting parameters on droplet formation
- Influence of knurling on droplet formation
- Influence of the SB50 on the extent of uniform coating thickness
- Developing the robot's movement paths with **Eco**Bell2 HD
- Analysis of coating thickness errors in the case of incorrect SB50 and incorrect movement paths

Course length/registration

Length: 2 days
Identification: DT-22 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

PARAMETRIERUNG

EcoBell3

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

The theoretical basics necessary for parametrization will be imparted to you in this course, and the operating principle of this innovative atomizer system will be explained. In the practical part, you will learn how to create a reference spray pattern through targeted variation of the process parameters, and investigate the influences of parameter changes on the resulting paint finish.

Admission requirements

Basic knowledge of paint finishing.

Course structure

The knowledge you have acquired will be implemented in the practical part, in which you will create spray patterns in a robot booth, which you will analyze and evaluate with the use of special measuring devices. You will learn how to control and optimize the paint quality through targeted and systematic changing of the process parameters.

Course contents

- Principles of electrostatic and pneumatic paint finishing
- Atomization technologies and loading procedures with the example of a standard bell disk and
- HD atomization
- Presentation of **Eco**Bell3 atomizer technology, its functions, as well as resulting parameters
- Presentation of **Eco**Bell3 bell disk types and their areas of application
- Presentation of the **Eco**Bell3 process
- Influences of bell disk knurling
- Spray pattern analysis and evaluation (SB50) in relation to the **Eco**Bell3 bell disk types
- Presentation of the bell disk checks
- Influences of parametrization on **Eco**Bell3 bell disks
- Creation of a master brush
- Spray pattern analysis and evaluation **Eco**Bell3 (SB50)
- Compiling influences of different painting parameters on the master brush (SB50)
- Testing different parameters
  - Bell disk speed
  - Shaping air quantity
  - Paint quantity
  - Influence of high voltage
  - Influence of painting distance
  - Influence of different bell disk types
- Influence of the painting parameters on droplet formation
- Influence of knurling on droplet formation
- Influence of the SB50 on the extent of uniform coating thickness
- Analysis of coating thickness errors in the case of incorrect SB50 and incorrect movement paths

Course length/registration

Length: 2 days
Identification: DT-23 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

OPTIMIZATION

Purge and color change process

Target group

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

Course objective

This course will demonstrate the correct way of parametrization and editing of color changing processes and will clarify the necessary technical requirements. By implementing your acquired expert knowledge, color change errors and the resulting quality and contamination problems in the production plant as well as rinsing agent consumption and component wear, can be minimized.

Admission requirements

Knowledge in handling automatic paint shops.

Course structure

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

Course contents

- Analysis of different atomizer schematics with regard to color change problems
- Presentation of the technical requirements
- Presentation of the components involved in purge and color change processes, and their influences
  - Color changer
  - Paint pressure regulator
  - Hose types
  - Dosing pump
  - Atomizer
  - Paint nozzle
  - Bell disk
- Atomizer parameters and their influences
- Presentation of inspections on leakage detection
- Pressure and/or quantity settings for pulse air and rinsing agent, and their inspection
- Editing long purge, pressing and short purge programs with **Eco**Screen 3D-OnSite
- Editing the color change allocation spreadsheets
- Critical analysis of non-optimized time programs
- Creating and checking a color change program
- Generating diverse faults in color change programs; inspection of the color change quality after each alteration
  - Manipulation of parameter settings
  - Manipulation of different basic program steps
  - Incorrect dosing pump parametrization
  - Incorrect valve activation
- Disassembling the components relevant to color changing and evaluation of the degree of contamination

Course length/registration

Length: 2 days
Identification: DT-24 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

ATOMIZER

Parametrization

Target group

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

Course objective

This course will familiarize you with the most common atomizer types and variants as well as their areas of application. You will be taught the essential knowledge in atomizer theory, whereby the requirement for the correct and systematic parametrization of the painting process is met.

Admission requirements

Basic knowledge of paint finishing.

Course structure

Different application procedures and associated atomizers will be presented and their most important areas of application and parameters relevant to the application will be explained. Starting with a master brush, the effects of parametrization changes on the spray pattern and painting result will be analyzed.

Course contents

- Principles of electrostatic and pneumatic paint finishing
- Atomization technologies and loading procedures with the example of pneumatic and rotary atomization
- Presentation of the **Eco**Gun range of atomizers and their functions, as well as the resulting parameters
- Presentation of the **Eco**Bell atomizers and their functions, as well as resulting parameters
- Presentation of bell disk types and their areas of application with the **Eco**Bell atomizers
- Influences of the bell disk knurling on the atomization
- Spray pattern analysis and evaluation (SB50) in relation to the bell disk types (flow profiles)
- Presentation of the bell disk checks
- Influences of parametrization on the bell disks
- Presentation of the technical requirements
- Spray pattern analysis and evaluation (SB50)
- Compile influences of different painting parameters on the master brush (SB50)
- Testing different parameters such as bell disk speed, shaping air quantity, paint quantity, influence of high voltage and influence of the painting distance
- Influence of different bell disk groups
- Influence of the painting parameters on droplet formation
- Influence of knurling on the extent of uniform coating thickness
- Influence of the SB50 on the extent of uniform coating thickness
- Analysis of coating thickness errors in the case of incorrect SB50 and incorrect movement paths

Course length/registration

Length: 3 days
Identification: DT-25 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

SEALING

Processes and application technology

Target group

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

Course objective

You will receive and overview of typical sealing applications with robot application and the corresponding plant design. Components and systems for material supply, conditioning and application will also be presented as will the robot and control technology. The fundamental learning contents will be illustrated by practical examples and presentations.

Admission requirements

Basic knowledge of process automation.

Course structure

The multitude of content will be imparted to you based on specially prepared teaching material Display models are available for numerous discussed systems and components. Seams will be applied in the practical part of the course and the effects of the fundamental process parameters will be demonstrated.

Course contents

- Presentation of different sealing applications based on layouts and process schematics: seam sealing, underbody sealing, door sill application, insulating material spraying, door rebate application
- Dosing equipment for highly viscous 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**Gun 3D, electrically driven agitator, **Eco**Gun MD for door sill application
- Material temperature control systems – design and function: heat exchangers, temperature control hoses, electrical heating elements
- Robot technology – design and function: robot **Eco**RS, displacement rail **Eco**Rail
- Control technology – design and function: control and operating concept, movement and process control **Eco**RPC
- Modular control panel family **Eco**RCMP/**Eco**SCMP/**Eco**PSMP
- Drive technology **Eco**Drive
- Safety equipment and concept
- Sensory system, camera systems for body position measurement and seam correction
- Visualization and programming: **Eco**Screen 3D-OnSite
- Teach pendant
- PVC application process practice: process parameters and their effects, application on test sheets, analysis of the effects of diverse parameter alterations

Course length/registration

Length: 5 days
Identification: DT-26 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

BASIC COURSE

Teach programming/**Eco**Screen 3D-OnSite

Target group

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

Course objective

At the end of the course, you will be familiar with the basic terms of robot technology and safety concepts for robots. You will know the fundamental design of the robot controller and integration into the entire system 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 the teach pendant, writing simple movement programs and modifying existing programs. You will know the syntax and most important commands of the programming language **Eco**Talk and you will be familiar with the most important functions of **Eco**Screen 3D-OnSite, the offline programming system.

Admission requirements

Interest in programming and basic knowledge of automation.

Course structure

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

Course contents

- Introduction
  - Mechanical design and electrical equipment of the **Ecopaint** robot
  - Integrating the robot controller into the entire system; communication with other controllers
- Programming practice
  - Selecting the operating modes on the station
  - Coordinate systems and their meaning
  - Functions and operating elements of the teach pendant
  - Basics of robot programming
  - Syntax and range of commands of the programming language **Eco**Talk
  - Route influence Overlap and SPM
  - Design of main and subprograms
  - Analysis of existing programs from production practice, based on selected program examples
  - Creation and integration of own main and subprograms on training robots
- **Eco**Screen 3D-OnSite
  - Overview of functions and menu structure of **Eco**Screen 3D-OnSite
  - Creating, copying, inserting and deleting of projects and programs
  - Graphic editing of existing robot programs
  - Explanation of the editing function of the
  - 3D graphic window
  - Loading and editing body graphic
  - Inserting and editing trigger commands
  - Explaining the brush concept and brush editor
  - Backup function and change journal

Course length/registration

Length: 5 days
Identification: DT-27 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

ADVANCED COURSE

Teach programming/**Eco**Screen 3D-OnSite “Tracking”

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 understand 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 (DT-27) in teach programming or comparable knowledge.

Course structure

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

Course contents

- Calibration
  - Calibration of objects (body) to world system
  - Calibration of tools
- Programming practice
  - Programming the logic structures
  - Creating/using variables at different declaration levels
  - Anti-collision interlock on rail tracking lines
- Tracking
  - Synchronizing the object (car body) to the conveyor
  - Programming and optimizing the modules on the tracking line
  - Parameterizing the tracking system
- Simulation
  - Set up, perform and evaluate robot simulation (checking reachability, singularity, hand axis angle)
- Process
  - Explanation of brush tables and time programs
  - Parametrization of the process

Course length/registration

Length: 5 days
Identification: DT-28 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

ADVANCED COURSE

Teach programming/**Eco**Screen 3D-OnSite "Handling"

Target group

Robot programmers, specialized maintenance and operating personnel.

Course objective

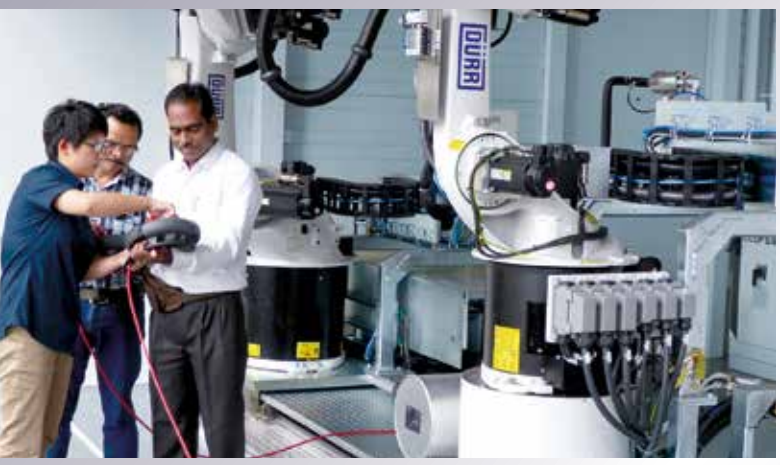
You will understand the necessity of calibrating tools and objects and can reproduce the relevant procedures. You will be capable of interpreting logical structures in the programs and understand anti-collision interlocking between the individual robots. You will know the different declaration levels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

Admission requirements

Participation in the basic course (DT-27) in teach programming or comparable knowledge.

Course structure

You will program with the teach pendant and with the programming software **Eco**Screen 3D-OnSite. You will test and optimize the programs on the training system in tracking mode.



Course contents

- Calibration
  - Calibration of objects (car body) to world system
  - Calibration of tools
- Programming practice
  - Programming the logic structures
  - Creating/using variables at different declaration levels
  - Anti-collision interlock between robots
- Handling
  - Integrating the handler communication in main programs
  - Hardware and functioning principle of the force sensor system
  - Handler-specific range of commands of the **Eco**Talk programming language
  - Explanation of the specific handling menus on the teach pendant and the visualization
  - Analysis of selected examples from production practice
  - Testing and optimizing programs on the training system
  - Possibilities and limits of optimization via **Eco**Screen 3D-OnSite
- Simulation
  - Checking the handler communication by simulating several robots
  - Testing for reachability, singularity, hand axis angle and other parameters for the movement path programs of individual robots
- Process
  - Explanation of brush tables and time programs
  - Parametrization of the process

Course length/registration

Length: 5 days
Identification: DT-29 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

ADVANCED COURSE

Teach programming/**Eco**Screen 3D-OnSite "Handling/Tracking"

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 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 be informed about the commands specific to the handler of the programming language **Eco**Talk, their application and meaning as well as the functioning principle and programming of the handler sensor system.

Admission requirements

Participation in the basic course (DT-27) in teach programming or comparable knowledge.

Course structure

You will program with the teach pendant and with the programmer software **Eco**Screen 3D-OnSite. You will test and optimize the programs on the training system in tracking mode.

Course contents

- Calibration
  - Calibration of objects (car body) to world system
  - Calibration of tools
- Programming practice
  - Programming the logic structures
  - Creating/using variables at different declaration levels
  - Anti-collision interlocking on Stop & Go and rail tracking lines
- Handling
  - Integrating the handler communication in main programs
  - Hardware and functioning principle of the force sensor system
  - Handler-specific range of commands of the **Eco**Talk programming language
  - Explanation of the specific handling menus on the teach pendant and the visualization
  - Analysis of selected examples from production practice
  - Testing and optimizing programs on the training system
  - Possibilities and limits of optimization via **Eco**Screen 3D-OnSite
- Tracking
  - Synchronizing the object (car body) to the conveyor
  - Programming and optimizing the modules on the tracking line
  - Parameterization of the tracking system
- Simulation
  - Setting up, carrying out and evaluating the robot simulation (checking reachability, singularity, hand axis angle)
- Process
  - Explanation of brush tables and time programs
  - Parametrization of the process

Course length/registration

Length: 8 days
Identification: DT-30 (Please state when you register)

CONTACT

Dürr Systems AG
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74321 Bietigheim-Bissingen
Phone: +49 7142 78-2245
Email: training-apt@durr.com

ADVANCED COURSE

Teach programming/**Eco**Screen 3D-OnSite "Sealing"

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 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

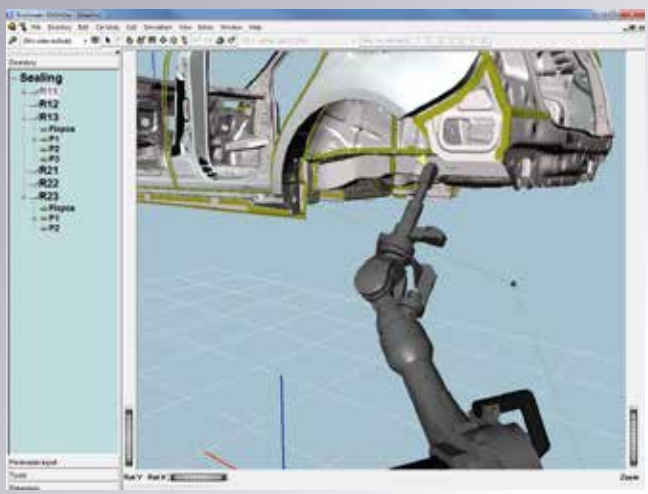
Participation in the basic course (DT-27) in teach programming or comparable knowledge.

Course structure

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

Course contents

- Calibration
  - Calibration of objects (car body) to world system
  - Calibration of tools
- Programming practice
  - Programming the logic structures
  - Creating/using variables at different declaration levels
  - Anti-collision interlock between robots
  - Testing and optimizing programs
  - Possibilities and limits of optimization via **Eco**Screen 3D-OnSite
- Sealing
  - Basics of the application ranges
  - Basis of the measuring systems
  - Explanation of the process and the nozzle selection
  - Explanation of the tool (applicator)
- Simulation
  - Setting up, carrying out and evaluating robot simulation (checking reachability, singularity, hand axis angle)
- Process
  - cfg settings
  - Explanation of brush tables and time programs
  - Mastering/calibrating components



Course length/registration

Length: 5 days
Identification: DT-31 (Please state when you register)

CONTACT	
Dürr Systems AG	Carl-Benz-Str. 34 74321 Bietigheim-Bissingen Phone: +49 7142 78-2245 Email: training-apt@durr.com

CONDITIONS OF REGISTRATION AND PARTICIPATION

Registration
Registrations, confirmations and appointments must be made in writing. The number of participants is limited to 6 people per course.

Course fee
The prices indicated at the time of registration are applicable for the course fee. These are net prices per course plus statutory value added tax and are to be paid at the end of the training. Travel and accommodation expenses as well as the costs of local transfers are not included in the course price.

Cancellation
A course registration must be canceled in writing. Cancellation up to 3 weeks before the course begins is free of charge. Cancellation up to 2 weeks before the course begins will be charged at 50 % of the course price; cancellation made after that time as well as no-shows are charged at 100 % of the course price. However, a replacement participant may be nominated.

Abandonment/absence
We will inform you immediately if a course has to be abandoned or cannot be completed due to the absence of a trainer or for important reasons for which Dürr is not responsible. At the same time, we will propose an alternative date. However, this shall not give right to any further claims.

Accommodation
Please let us know if we can assist you with making your hotel reservation.
Please note that all liabilities in respect of the hotel must be settled by the course participants and/or the participants' company.

Right of modification
We reserve the right to adapt the training contents to reflect the state of the art or the respective training needs. Special attention is drawn in this regard to the entry requirements specified in the respective course programs.

Safety regulations
The course participants are required to abide by the applicable safety and accident avoidance regulations. If personal protective equipment is a requirement of participation, this must be brought along by the participants and worn during the training.

Exclusion of liability
The information in the training courses and in the training documents is imparted by us to the best of our knowledge and in good conscience. However, we are unable to accept any liability for any errors in the technical information that is conveyed in the training courses either verbally or in writing, or contained in the training documents or data carriers provided. Neither are we able to accept any liability for any damage or sub sequential damage resulting from such errors.

Copyright
Duplication of the training documents for unauthorized purposes or the forwarding, utilization and communication of its contents to third parties is prohibited. The same applies to documents or programs provided on data carriers. The software provided for training purposes must not be removed, modified, copied in part or used in any other unauthorized manner.

LEADING IN PRODUCTION EFFICIENCY

Dürr – Leading in Production Efficiency

Five divisions, one goal: maximum production efficiency for our customers

- **Paint and Final Assembly Systems:** paint shops and final assembly systems for the automotive industry
- **Application Technology:** robot technologies for the automatic application of paint as well as sealants and adhesives
- **Clean Technology Systems:** exhaust-air purification systems and energy-efficiency technology
- **Measuring and Process Systems:** balancing systems as well as assembly, testing and filling technology
- **Woodworking Machinery and Systems:** machinery and systems for the woodworking industry