



LEADING IN PRODUCTION EFFICIENCY

# PLASTIC PAINTING

INTRODUCING SINGLE-SOURCE PLASTIC PAINTING





# EFFICIENCY AND SUSTAINABILITY IN FOCUS

**ECO+EFFICIENCY** – all of Dürr’s products and innovations focus on this key theme. We have developed the **Eco+Paintshop** for this purpose – a paint shop optimized for maximum efficiency, representing the benchmark in painting.

Dürr focuses on both efficiency and sustainability – which means that both energy and material costs are of special interest. These primary considerations are because we believe that the total cost of ownership should be optimized beyond the initial investment. Your space and operational requirements are additional decisive criteria for intelligently implementing a synergistic solution for plastic painting.



# DÜRR PROCESSES & EQUIPMENT FOR PLASTIC PAINTING

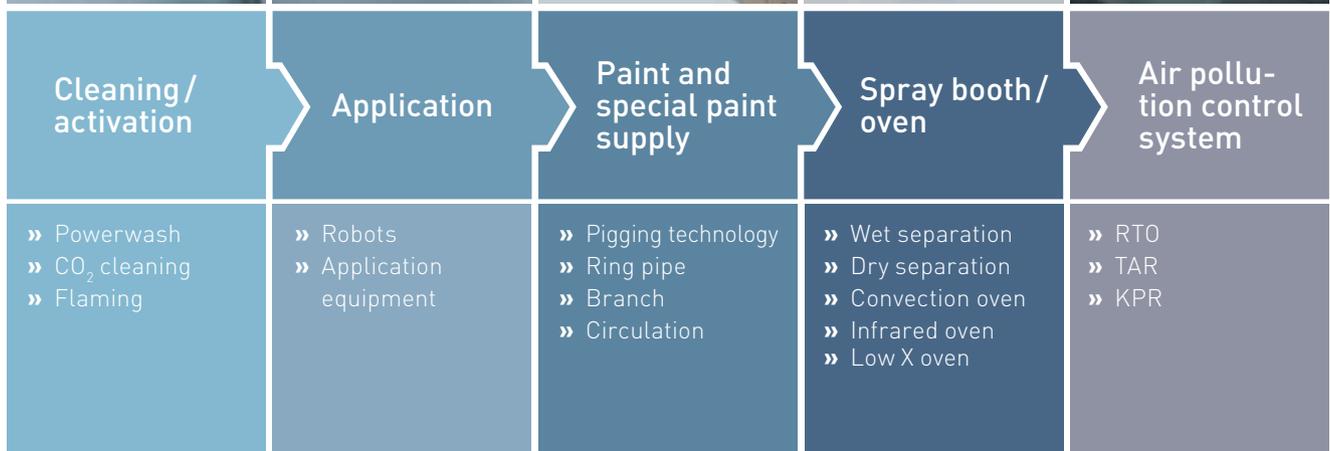
Dürr is pleased to announce that its entire product line and expertise is now available to support plastic painting – providing you with optimum and customer-oriented solutions founded on Dürr’s position as a world market leader in paint shops for the automotive industry.

Your plastic painting needs will benefit from Dürr’s single-source expertise because we have supplied turnkey plants for the entire process. From pre-planning to implementation – our in-house expertise in all processes is the backbone to your future plastic painting success.

Discover Dürr’s areas of expertise: cleaning and activation, application, paint separation, and finally, through exhaust air purification.

These solutions for application technology, paint supply, conveyor systems, booth construction, and ovens are manufactured around the world in Dürr’s own production facilities.

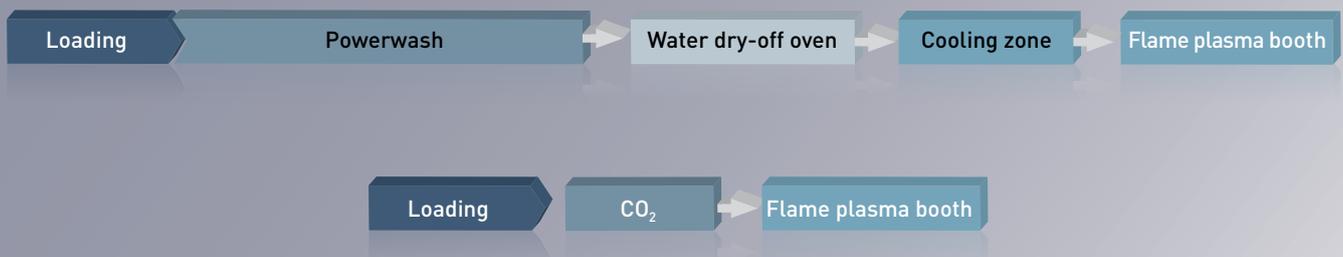
You can benefit from our comprehensive process knowledge when we design products, technologies, and processes to best suit your plastic painting requirements – whether you need a process with primer or without, a 3-wet process, or wet-on-wet painting.



**CONVEYOR SYSTEMS, ELECTRICAL EQUIPMENT AND CONTROL, SUPERVISORY CONTROL, AND SERVICE**

# EFFICIENT CLEANING AND ACTIVATION

## » Powerwash process sequence



## » Process sequence with CO<sub>2</sub>

### Optimum pretreatment

How do you get the best possible quality in the painting process? Pretreatment.

A simple and effective way to increase your paint shop's efficiency is to clean components prior to painting. Harness Dürr's mastery in various cleaning technologies to obtain optimal pretreatment processes and applications that suit your cleaning requirements.

Powerwash is a proven technology that can be used for all types of cleaning. With powerwash, the parts are first degreased and then repeatedly rinsed.

A combination of tilting, vibrating tables and air blow zones effectively removes moisture from component surfaces – this ideally prepares the components for the next steps in the drying process.

Residue-free drying is ensured through the next steps in the drying process. Parts are blown off with air before proceeding to a dry-off oven. Parts then finish in a cooling zone.



### Powerwash

- » Excellent cleaning efficiency for plastic parts
- » Effective drying



» Surface activation via flaming

## Increase the surface tension and prepare it for painting

The plasma flame booth prepares the plastic surface through an adiabatic process to increase the surface tension and make it suitable for painting. The robot's installation-friendly design perfectly integrates the fuel supply and ignition cable – which accordingly improves accessibility.

## CO<sub>2</sub> cleaning

Dürr's CO<sub>2</sub> cleaning is an alternate cleaning method suitable for removing light contamination. This chemical-free method effectively cleans parts with both liquid and cryogenic CO<sub>2</sub>. Foreign matter that is removed from the component is separated from the CO<sub>2</sub>. No residue of the cleaning agent remains on the processed part. Exhaust air then removes dirt from the booth.

Our CO<sub>2</sub> cleaning supports Dürr's focus on both efficiency and sustainability. The CO<sub>2</sub> booth can fit in a small space – such as a length of 10 to 12 meters (33 to 39 feet). The process itself requires no water and also eliminates the need for an oven and a downstream cooling zone. Because no water is used, there is no need for waste water treatment.

Not only is space saved, but energy costs are reduced. No energy is required for heating a scrubbing solution or for operating the oven and pumps.



» CO<sub>2</sub> cleaning

# APPLICATION

## The perfect surface

Dürr's application equipment incorporates the highest quality standards to provide future-proof, versatile solutions to fulfill the paint requirements of automotive and supplier industries. Our technology is designed for low material consumption, while maintaining a high first-time-through (FTT) rate – this results in lower costs per unit.

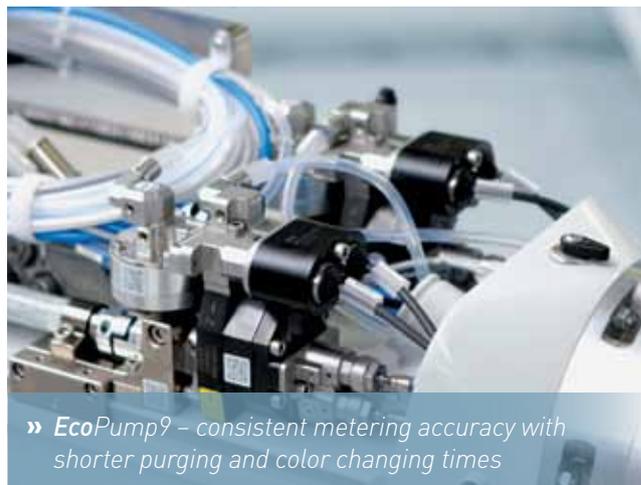
### The **EcoLCC2** color changer – fast, efficient, reliable

The **EcoLCC2** color changer features the shortest color change times and the lowest paint losses. It achieves selection of each individual color through use of paint valves and a docking station. Because each color has its own paint channel, color mixing is completely ruled out. The **EcoLCC2** color changer has a compact size and low weight – which makes it perfect for integration into the robot arm to ensure optimal paint application.



### **EcoPump9** – the new generation of compact metering pump

The **EcoPump9** metering pump accommodates all areas of application for both 1K and 2K paint materials. Its automatic pressure adjustment ensures consistent metering accuracy. To correspond with the compact design of the color changer, the **EcoPump9** is also optimized in size and weight for use in the robot arm.



The application equipment – such as the color changer, two metering pumps, and the corresponding high speed rotary atomizer – is integrated into the robot arm to minimize space requirements. This compact design means that the painting booth does not require installations on or in the booth wall. Additionally, this arrangement of components reduces paint loss and purging agent consumption by more than 30% – drastically reducing color change and purge times in the process.

## EcoBell3

The **EcoBell3** family of rotary atomizers is your answer for 1K or 2K, water based or solvent-borne paint. This atomizer is perfectly integrated into the paint robot and its performance surpasses all predecessors.

For use with water based paint, the **EcoBell3** features external charging through use of a very compact electrode ring – so there is no requirement for complex and expensive separation of potential. For solvent-borne paint, direct charging is integrated into the **EcoBell3**.

The **EcoBell3** is especially suitable for interior painting and bumper painting, and can be used in combined zones of interior and exterior painting. The spray pattern can also be adjusted for either detail or large surface painting. These attributes make the **EcoBell3** the ideal combination of high performance and process flexibility.

**EcoBell3**: a versatile solution for both detail work and large surfaces.



» *EcoBell3 Cx – minimum complexity, maximum area efficiency, high flexibility*

# ROBOTS

## Modular, lean and precise

In Dürr's product family, the **EcoRP L** is used for all painting tasks in plastic painting. The **EcoRP L** has up to seven axes of motion. This allows it to reach all surfaces optimally and ensure uniform paint application. The mechanical design of the robot allows for perfect integration of the components relevant to the process – such as application equipment, hose and cable routing – exactly at the positions that are necessary for the highly dynamic painting processes. This design guarantees the shortest possible signal reaction times, minimum consumption of paint and cleaning agents, and the maximum service life of the components.

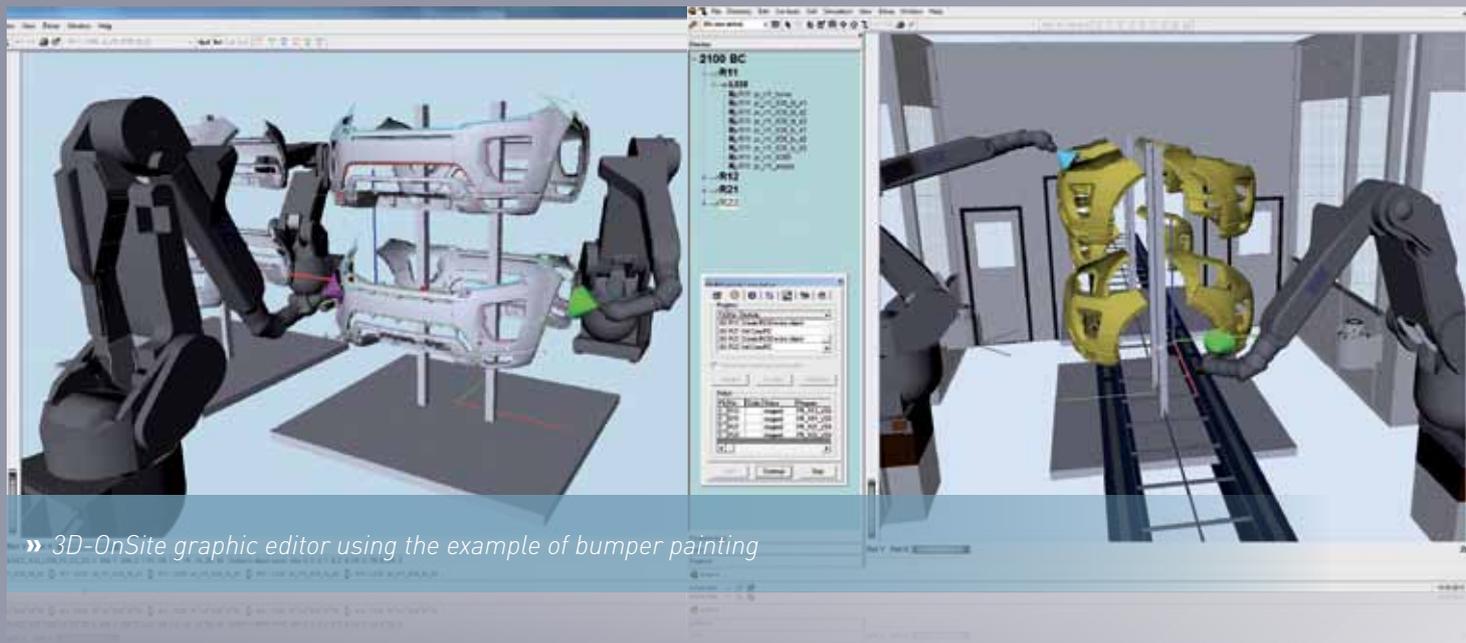


» Bumper painting in the test center



» Dürr paint robots in the assembly shop in Bietigheim-Bissingen

# CONTROL EQUIPMENT



## Control platform for movement and process

All **Ecopaint** robot systems can be centrally controlled with the **EcoRPC** (Robot Programmable Controller). This control platform provides extremely accurate control of process components and path switching points. It also enables instantaneous loading and processing of color change and application programs. The robot's control system, safety controller, and power supply are located at an operator-friendly height on the control panels near the booths. All movement programming can be easily created with the **EcoScreen** interface.

**EcoScreen 3D-OnSite** is a perfectly adapted programming and simulation system. Operation and diagnostics are performed via the plant visual display system **EcoScreen**. The **EcoScreen** MMI and the operator console are attached to the control panel of the station control system.

# PAINT SUPPLY/ SPECIAL PAINT SUPPLY SYSTEM

The **Ecopaint** Supply product line is advantageous for all types of paint supply systems. The supply scope encompasses various versions of the traditional ring-pipe systems, as well as automatically piggable paint supply systems – featuring short color change times and minimal paint and purging agent losses.

## Ecopaint Supply

- » Paint mix rooms
- » Paint supply systems, ring-pipe systems
- » Paint supply systems for special paints
- » Central compressed air supply systems



» *EcoSupply P – automatic paint cabinets, 25-l hobcock*



» *EcoSupply P – highly flexible and efficient:  
Piggable paint station from Dürr*

## EcoSupply P

The number of paints used in automotive paint finishing has multiplied in recent years. Commercial vehicle manufacturers and plastic paint shops especially use more than 100 different paint colors – this large quantity of paints necessitates use of flexible and piggable paint systems.

**EcoSupply P** is a standardized, modular, and piggable paint supply system that is suitable for both water-based paint and solvent-borne paint application. It fulfills the need for a piggable system to accommodate the increasing variety of paints – from special paints, to customer-specific paints, to small batch paints – **EcoSupply P** ensures efficient processes.

This modular and piggable paint supply system from Dürr is attracting more and more customers due to:

- » Reduced paint loss
- » Diminished purging agent consumption
- » Very short color change times

# EFFICIENT OVERSPRAY SEPARATION

Dürr offers the best solution for every requirement, be it with the traditional wet separation or with innovative dry separation.

## Traditional wet separation

Every second paint shop is still equipped with a wet scrubber. **EcoEnvirojet 3** from Dürr is simple to operate and to clean. The system is superbly accessible and exemplary for all requirements related to maintenance and disposal. At the same time, it features an optimum eco balance.

**EcoEnvirojet 3S** is a variant with a significantly lower overall height. As the paint spray booth can be installed at the same level as the oven, completely new, compact layout concepts are now possible. Wherever a low height is to be combined with optimum paint separation – be it in new or modified plants – the **EcoEnvirojet 3S** can be used with minimum space requirements.

The **EcoVertijet** is a particularly space-saving variant. The simple design creates a robust solution that is easy to clean and maintain.

WET SEPARATION			
	EcoVertijet	EcoEnvirojet 3S	EcoEnvirojet 3
			
CHARACTERISTICS	<ul style="list-style-type: none"> <li>» Wet scrubber with water wall</li> <li>» One-sided robot arrangement</li> <li>» Overall height &lt; 1.2 m</li> <li>» Air flow to central extraction unit</li> </ul>	<ul style="list-style-type: none"> <li>» Wet scrubber with and without water wall</li> <li>» One- and two-sided robot arrangement</li> <li>» Overall height &lt; 1.4 m</li> </ul>	<ul style="list-style-type: none"> <li>» Traditional wet scrubber</li> <li>» One- and two-sided robot arrangement</li> <li>» Overall height &gt; 3.5 m</li> </ul>
PAINT ABSORPTION	+	+	++
EMISSIONS	< 3 mg/Nm <sup>3</sup>		
PRESSURE DROP	Constant, independent of paint load		



» View of the maintenance walkway of EcoDryScrubber

## Innovative dry separation

Dry separation eliminates the need for binding the paint overspray with a water-chemical mixture. Dürr offers two different variants: With the **EcoDryScrubber**, the overspray is mixed with an eddy of ultra-fine limestone powder below the spray booth and, bound to these particles, is filtered out of the air flow. Despite air recirculation mode, there is no need to change filters periodically. Using the **EcoDryScrubber**

also saves energy on air conditioning, thus making an important contribution to lowering the operating costs. **EcoDry X** is a low-cost and easy-to-use technology. It is based on very simple, replaceable cardboard one-way filters beneath the spray booth, which can generally be disposed of as industrial waste.

DRY SEPARATION		
	EcoDry X	EcoDryScrubber
		
CHARACTERISTICS	<ul style="list-style-type: none"> <li>» Dry separation with cardboard filters</li> <li>» Simple, stable process</li> <li>» Manual filter change</li> </ul>	<ul style="list-style-type: none"> <li>» Dry separation with limestone powder</li> <li>» Highest removal efficiency</li> <li>» Long filter service life</li> </ul>
PAINT ABSORPTION	+	++
EMISSIONS	0.5–3.0 mg/Nm <sup>3</sup>	< 0.1 mg/Nm <sup>3</sup>
PRESSURE DROP	Rising	Constant



» Ovens from Dürer achieve minimum heat-up times, low space requirements, and reduced energy consumption

# ENERGY EFFICIENT DRYING

Plants from Dürer are especially energy efficient. By constantly developing and improving our ovens, we equip our plants with the latest technologies and ensure environmentally friendly processes.

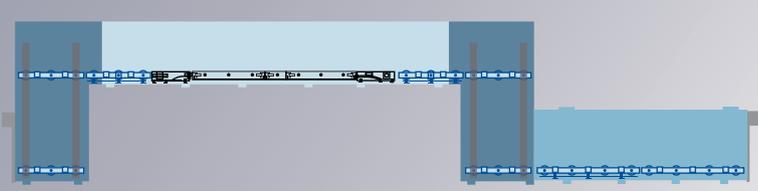
The oven processes and their high temperatures offer an enormous energy saving potential. Dürer therefore offers its oven systems of the type **Ecopaint Oven** with integrated air management. The optimization of the plant's heat-up times, the use of the waste heat, and the improvement of the insulation contribute to significant energy savings.

The heat exchanger systems integrated into the thermal air pollution control plant ensure efficient energy use. The inclusion of the spray booth exhaust air with optional concentration of the solvents ensures maximum efficiency and energy recovery in air pollution control.



» Straight through oven (side view)

**Oven installation at the same level as the spray booth** – results in a flow-optimized geometry of the air seal, less contamination due to reduced conveyor system, low overall height



» Bottom-entry oven (side view)

**Oven installation above the spray booth** – ensures thermal separation of warm air and cold air through optimized plant geometry

- Air seals
- Roller bed
- Cooling zone
- Oven
- Suspension chain convey
- Elevator (for bottom-entry oven)

# OPTIMIZED AIR POLLUTION CONTROL

In the area of air pollution control, Dürr offers the latest plant technology for efficient disposal of exhaust gases and residues. The **Ecopure** RTO air pollution control system cleans the process exhaust air through combustion.

The air pollution control system is specially adapted to the spray booth and oven concept. With the integrated complete solutions from a single source, we enable significant energy savings, short planning and implementation time frames, as well as simple maintenance and operation.

With technologies such as micro gas turbines, ORC (Organic Rankine Cycle), heat exchangers and heat pumps, Dürr uses excess process heat, waste heat, and conventional and alternative fuels to store, electrify, transmit, or transform energy.



» Air pollution control system *Ecopure* RTO

## Global presence

Dürr incorporates its broad and worldwide experiences into all projects in a profitable manner.

Our worldwide service network has a high level of commitment and is available in all stages from commissioning to ongoing operation. A comprehensive spare parts concept rounds off the portfolio.

We will gladly advise you on questions on modifications and modernization.



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
- » **Measuring and Process Systems:** balancing and cleaning systems as well as testing and filling technology
- » **Clean Technology Systems:** exhaust-air purification systems and energy-efficiency technology
- » **Woodworking Machinery and Systems:** machinery and systems for the woodworking industry

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