DÜRR

LEADING IN PRODUCTION EFFICIENCY

Ecopaint WetSystem

BUILDING A SOUND FOUNDATION

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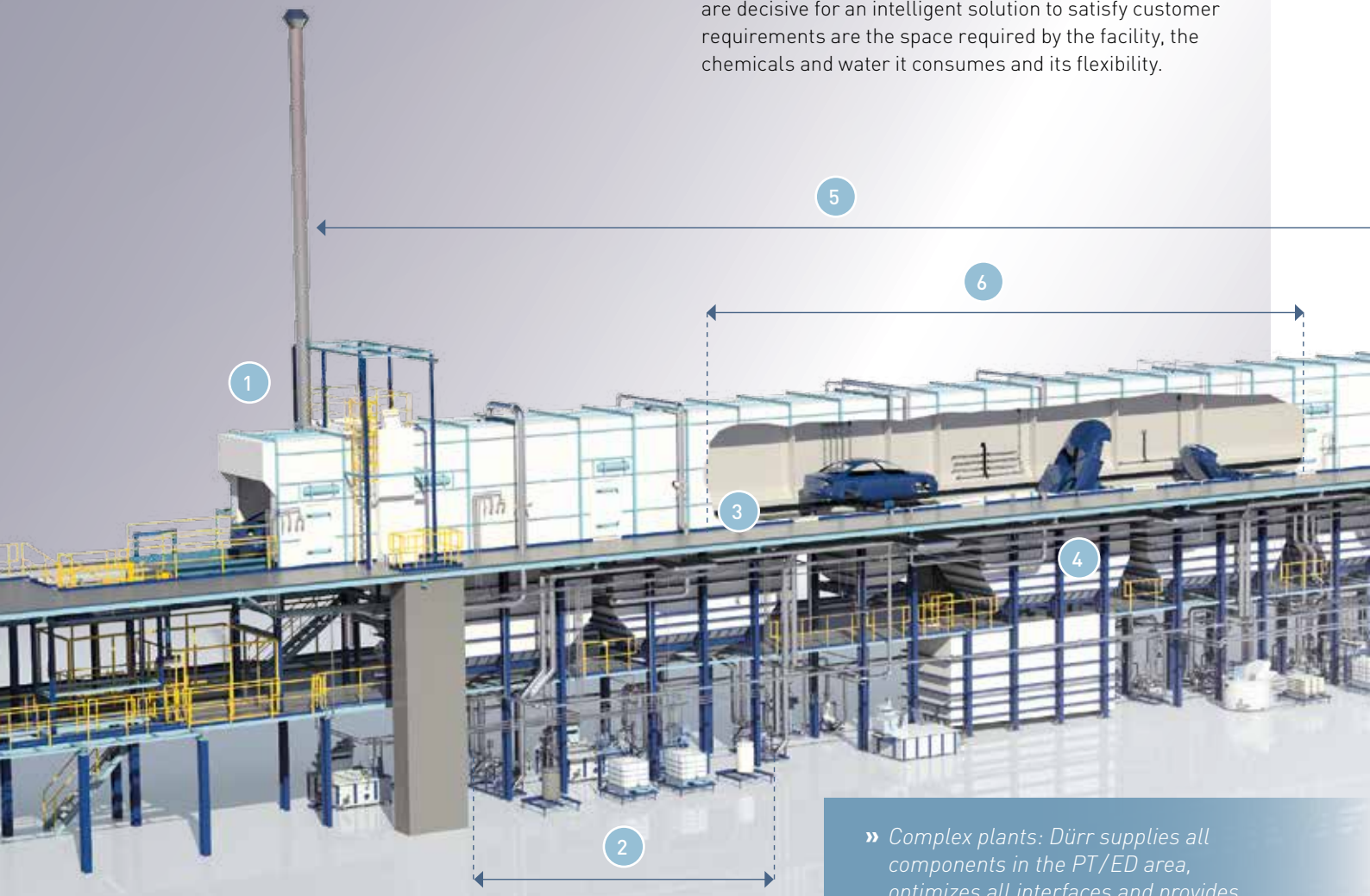
Ecopaint WetSystem – BUILDING A SOUND FOUNDATION

Dürr is a leading provider of high quality paint shops for the automotive industry and supplies turnkey equipment for the entire process from development to implementation from a single source.

ECO ⊕ EFFICIENCY

When optimizing processes and interfaces in a paint shop, Dürr focuses on its **ECO ⊕ EFFICIENCY** concept while paying particular attention to energy and material costs.

In our **Ecopaint** WetSystem installations, the criteria that are decisive for an intelligent solution to satisfy customer requirements are the space required by the facility, the chemicals and water it consumes and its flexibility.



» *Complex plants: Dürr supplies all components in the PT/ED area, optimizes all interfaces and provides for smooth setup on site.*

50 % of the surface quality are achieved in the pretreatment and cathodic dip painting stages.

More stability of values through optimal preparation

Once it has left the body shop and enters the paint shop, the car body is cleaned and degreased. These initial process steps are supported by rinsing cycles. In the subsequent cathodic dip painting stage, corrosion protection is applied. The professional pretreatment (PT) and electro dip painting (ED) stages are the basic building blocks for excellent coating in all following application processes. It is therefore all the more important that the process at the beginning of the painting stage should be efficient and quality-oriented.

Global and local

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 throughout all stages, not only when the facility is commissioned and operated but also when it needs retrofitting and refurbishing. Our portfolio is completed by a comprehensive spare parts scheme.

1 Airseal
2 Filtration
3 Conveyor system
4 Dip tank
5 Pretreatment zone (degreasing, rinsing, phosphating, passivating)
6 Tunnel segment
7 Exhaust air
8 Electro dip painting zone
9 Paint ultrafiltration unit
10 Electro dip painting tank

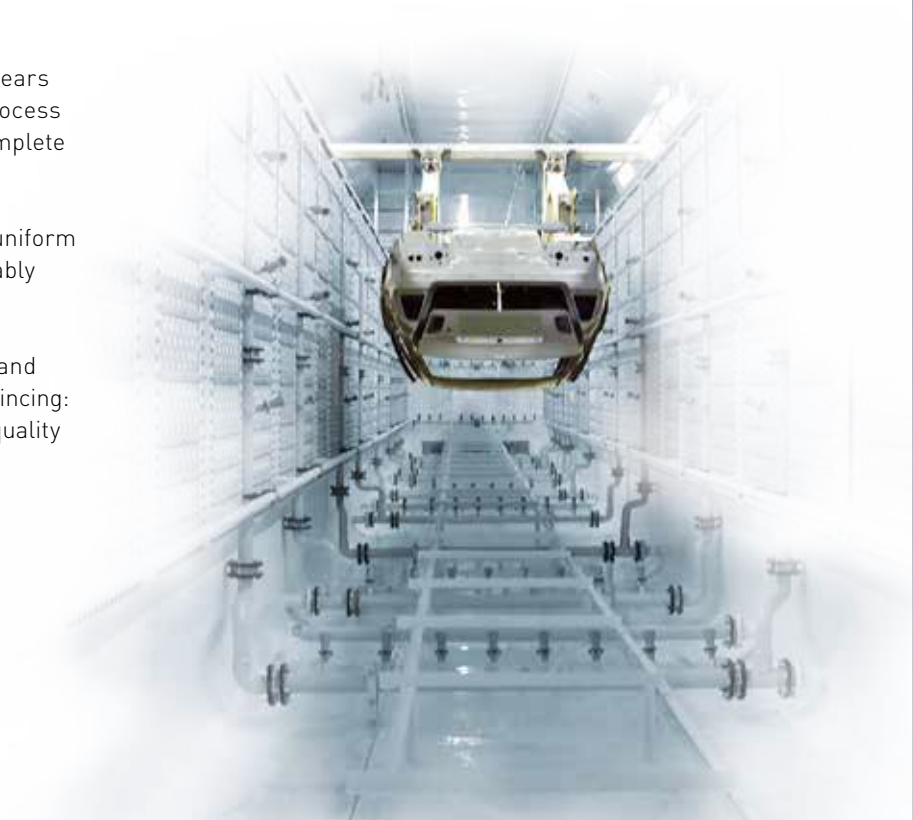
» ***Ecopaint*** *RoDip M at Audi Györ, Hungary.*

EFFICIENCY AND QUALITY THROUGH ROTATION

In the entire PT/ED process, Dürr has for many years relied on **Ecopaint** RoDip, an efficient rotary dip process which can be used as a conveyor system in the complete pretreatment and cathodic dip painting stages.

Ecopaint RoDip ensures high quality results with uniform coating thicknesses and few faults, thus considerably reducing the extent of rework.

Ecopaint RoDip reduces the length of the facility and saves valuable space. And the result is always convincing: excellent corrosion protection, first-class surface quality and low operating costs.



	Ecopaint RoDip M	Ecopaint RoDip E
		
Technology	+	+
Flexibility	+	++
Drive	Robust conveyor chain on both sides of the tank	Electrically driven transport unit on one side
Rotation	Rotation by V-shaped guide track	Rotation by separate drive
Return line	Return line below the tank	Fast return line on the side of the tank
Mobility	Continuous operation	Continuous and stop-and-go operation
		

Ecopaint RoDip M

Ecopaint RoDip M features a chain drive on either side of the tank. The chain drive pulls the carrier through the process line. Rotation is initiated by V-shaped guide tracks arranged on the side of the tank. This facilitates both linear and rotating movements. The robust mechanical **Ecopaint** RoDip M version is excellently suited for high production rates of 40 to 100 units per hour.

Ecopaint RoDip E

Ecopaint RoDip E is operated with electrically driven carrier units on one side of the tank where both the conveyor and the rotary drives are arranged. An absolute displacement measurement system and a WLAN radio system ensure optimal communication among the carrier units.

A new control that is compatible with all leading SP controls has been developed for **Ecopaint** RoDip E. Safe operation without any disturbances is achieved by means of a 5-GHz frequency band for data communication.

An optimized Job Manager, i.e. software specifically developed for programming body-specific process sequences, allows up to 20 different dip curves and high production capabilities.

Ecopaint RoDip for commercial vehicles

Based on the development of a new heavy-duty carrier, **Ecopaint** RoDip E is also suitable for coating commercial vehicles. This carrier unit transports commercial vehicles and minivans through the pretreatment and dip painting stages.

» ***Ecopaint*** *RoDip E is also suitable for commercial vehicles.*

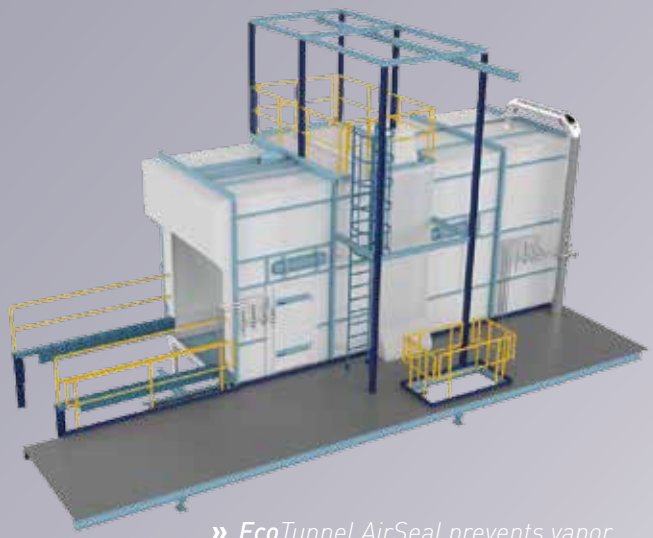
OPTIMIZED OVERALL SYSTEMS

It is important that all components interact perfectly with each other in the entire cleaning, pretreatment and ED process. Dürr ensures that workflows are smooth, from the pump and conveyor systems to the overall system.

Intelligent planning

To be optimal, any process must start with planning the particular car body in a dedicated way. For example, Dürr's planning experts use computer-assisted flow simulations to find the ideal equipment of the ED tanks and reach an optimal coating result.

» *Modular pre-assembled dip tanks for short installation times.*



» ***Eco**Tunnel AirSeal prevents vapor and moisture from leaking and minimizes energy requirements.*

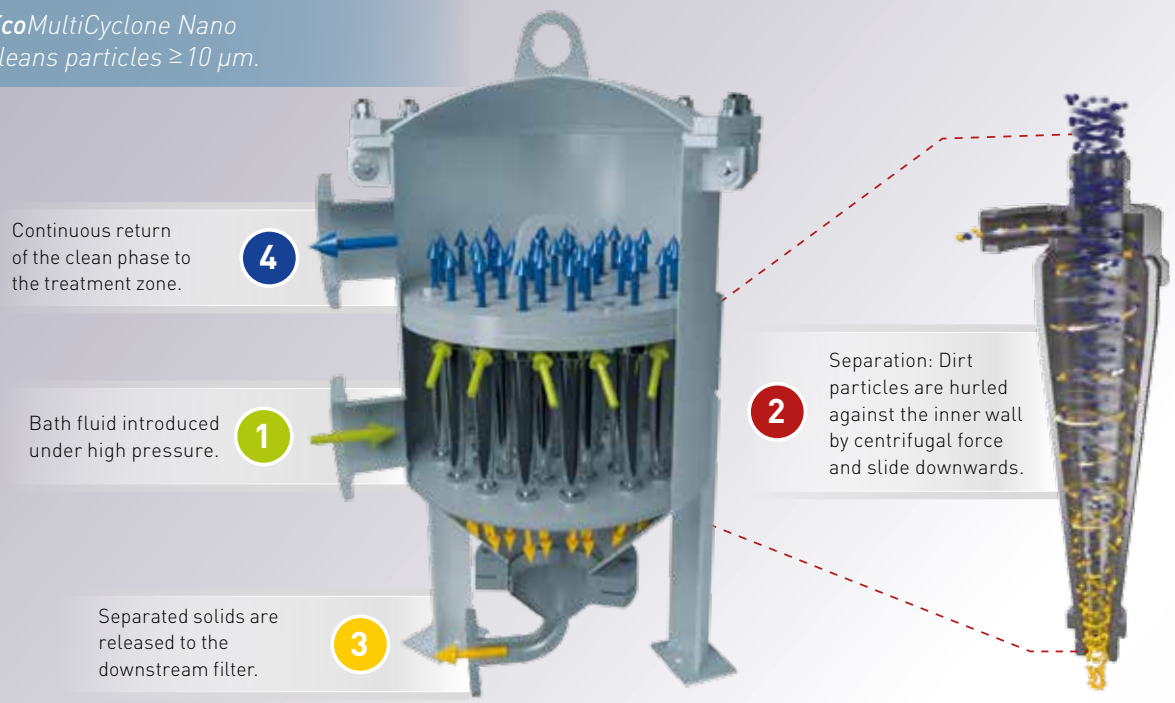
» *Pre-assembled paint ultrafiltration unit.*

Using standardized components and parts as well as a perfectly adapted conveyor system, we are able to design, integrate and implement efficient and high quality facilities:

- Dip and spray tanks
- Modular tunnel segments with integrated systems
- Filter systems for bath management
- Pump, filter and heat exchanger assemblies
- Ultrafiltration units for paint and oil
- Standardized dialysis cells

Many of these components are produced in the Dürr production facilities in China, Mexico, Poland, Austria, Italy and Germany.

» ***Eco**MultiCyclone Nano*
cleans particles ≥ 10 µm.



Increased bath quality – increased coating quality

Optimal bath management extends bath service times, thus reducing the consumption of chemicals and water. To achieve this, Dürr offers different options ranging from simple bag or band filters to highly efficient separation systems such as **Eco**MultiCyclone or magnetic separators.

EcoMultiCyclone	Nano	Micro
Flow	1.65 m^3/h	12 – 15 m^3/h
Pressure loss	2.3 – 2.7 bar	0.8 – 1.2 bar
d 50	6 µm	15 µm
90 %	10 µm	30 µm
100 %	20 µm	50 µm

EcoMultiCyclone – high bath cleaning efficiency

With its two **Eco**MultiCyclone Micro and Nano versions, Dürr offers efficient and low-maintenance options for cleaning the bath. **Eco**MultiCyclone Micro removes particles in excess of 25 µm from degreasing zones I and II in a continuous process. Subsequently, **Eco**MultiCyclone Nano removes particles in excess of 10 µm.

Magnetic separator with continuous operation

Dürr's newly developed magnetic separator allows continuous operation without any interruption. Due to the downward movement of the helically arranged magnets, the particles are continuously removed and discharged to the bottom.

EFFICIENT ELECTRO DIP COATING

The quality and efficiency of an ED process provided by Dürr depend on numerous individual factors and technologies. In this context, we direct our focus on saving energy.

Dürr relies on cross-process optimization approaches which help to save energy even in places where much potential has already been exhausted.

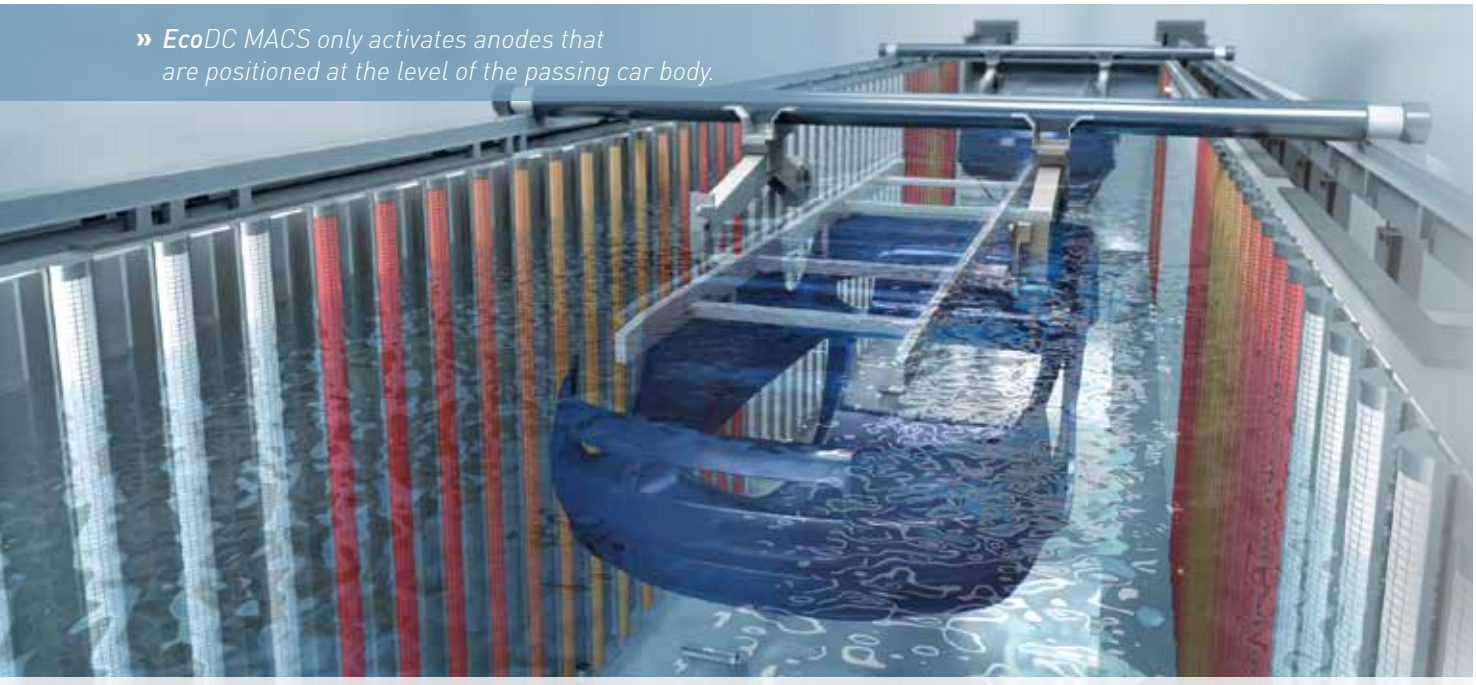
EcoDC MACS – Optimized anode control

To improve the active power in the ED tank, Dürr relies on **Eco**DC MACS: In combination with especially developed rectifier modules, the innovative modular control concept makes operation possible with an unprecedented flexibility. The new rectifier generation consists of small transportable units which feature IGBT technology and therefore reach extremely small residual ripples with superior efficiency.

Anodes are separately activated and deactivated with **Eco**DC MACS. As a result, the voltage profile is optimized and runs through the ED tank with the movement of the car body.

EcoDC MACS benefits

- Increased energy efficiency
- Increased availability
- High coating quality
- Modular design
- Easy expansion
- Small footprint
- No standby rectifiers needed



» *EcoDC MACS only activates anodes that are positioned at the level of the passing car body.*

» *Half-round dialysis cells of type **Eco**Cell DC 3000.*

» *Sample for a submersible horizontal anode.*

The ideal dialysis cell for your requirement

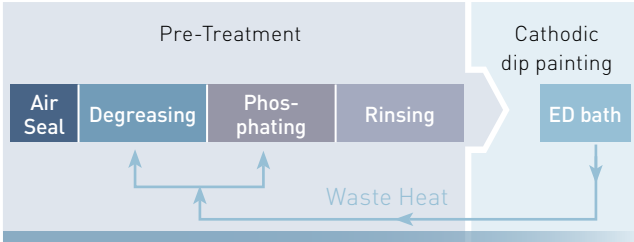
Dürr manufactures dialysis cells which need especially low maintenance and have particularly been developed for use in ED dip tanks. These cells can be provided in flat, round and half-round shape. Round anodes are available open or closed. Both can be installed horizontally as submerged cells.

Anodes and the membranes can be easily exchanged. There is no need to open the cell and empty the tank to replace the anodes. If additional horizontal dialysis cells are applied, the coating can be increased at critical points, e.g. for rocker panels.

Dürr offers further developments which are: a flat cell with a twin anode plate (split anode) for easy handling; and the possibility to vertically mask a part of the anode, to more intensly energize critical parts of the body.

Optimized energy efficiency

Waste heat from the ED bath can be used in the pretreatment stage to reach the operating temperature by means of heat pumps. Dürr uses an **innovative high-temperature heat pump**. This pump cools the bath medium of the ED tank down to an operating temperature of 28 to 32 °C in a manner unharmful to the paint. Unlike other customary methods, the excess heat that is removed from the process is not disposed of but is returned to the pretreatment zone along with the supplied drive energy of the heat pump.



» *Waste heat from the ED area is re-used for pretreatment.*

ALTERNATIVE CONVEYOR SYSTEM

On the customer's request, Dürr offers other proven conveyor systems for pretreatment and dip painting, which are suitable for high production capabilities.

Electric monorail system:

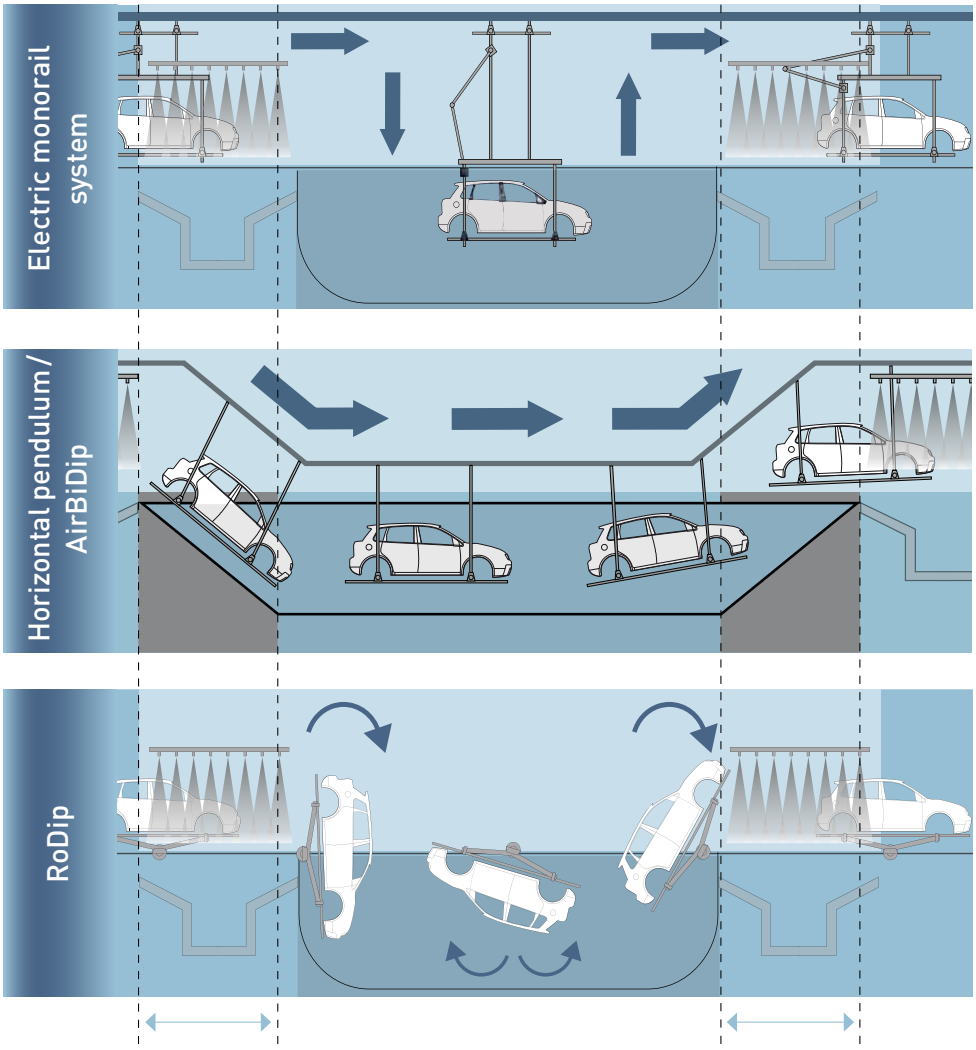
- Tilting between 10 and 15°
- Ideal for small capacities
- Mainly stop-and-go operation

Horizontal pendulum/ AirBiDip:

- Continuous operation
- No rotation
- Inclined inlet/exit sections between 30 and 45°

Ecopaint RoDip:

- No inclined inlet/exit sections
- Rotation of the car body
- High coating quality
- Optional continuous or stop-and-go operation



» *Conveyor systems in comparison.*

WATER – TREATMENT AND REUSE

In many countries, water is an essential resource. An efficient and environmentally compatible paint shop should therefore not consume more water than absolutely necessary and prepare the water optimally before introducing it into the local waste water systems.

Dürr focuses on minimized water consumption in every process step. Nevertheless, the processes consume large volumes of water which moreover has to be prepared to achieve an optimal painting process in the pretreatment and dip painting stages. Reverse osmosis or the Ion EX ion exchanger helps Dürr to reach the desired water purity for the various process stages.

Individually designed water treatment

Before it is introduced into the public discharge systems, the waste water is treated appropriately. Dürr relies on its broad experience and designs the waste water treatment as individually required by local requirements and regulations. The process flow depends on the contamination degree, the particular national legislation, and the throughput rate in the facility. Dürr offers a wide product range which allows the modular setup of any facility in a particular case, including all dosing and storage devices. Processes resulting from precipitation, neutralization, separation, and filtration are individually coordinated with each other and monitored continuously before the water can be discharged to the sewer system.

» *Modular and powerful waste water treatment systems.*

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