

Green Paintshop



A bright outlook for the environment



Technologies · Systems · Solutions


Green Paintshop

Efficiency meets ecology



Automobile manufacturers rely on environmental friendliness and sustainability. Dürr, as the leading supplier of large volume paint shops, has pioneered this approach for many years.

Feed in primary energy and resources, draw off emissions and residual materials – and “do the painting in between”. How simple it used to be. Today a new wind is blowing. Anyone compiling a process balance sheet must always take the environmental impact into account. Primary energy and resources are both expensive and in short supply, and they are increasingly becoming a central aspect of companies’ process balance sheets. In addition emissions and waste products must be reduced significantly.

Dürr has optimized all paint shop processes in terms of their efficiency, and at the same time has found methods that contribute to sustainable and resource-conserving production. With its **Green Paintshop** Dürr highlights its understanding of an energy-optimized paint shop with proven environmental compatibility. 

Intelligent technologies from Dürr mean

- Less energy input
- Less CO₂ emissions
- Less paint consumption
- Less solvent consumption
- Less VOC emissions
- Less particle emissions
- Less water consumption
- Less waste water
- Less waste



Automotive production	Body shop	Paint shop	Final assembly
Total energy consumption	19 %	70 %	11 %
Electricity	35 %	45 %	20 %
Gas	4 %	92 %	4 %

Energy consumption in the production of a car

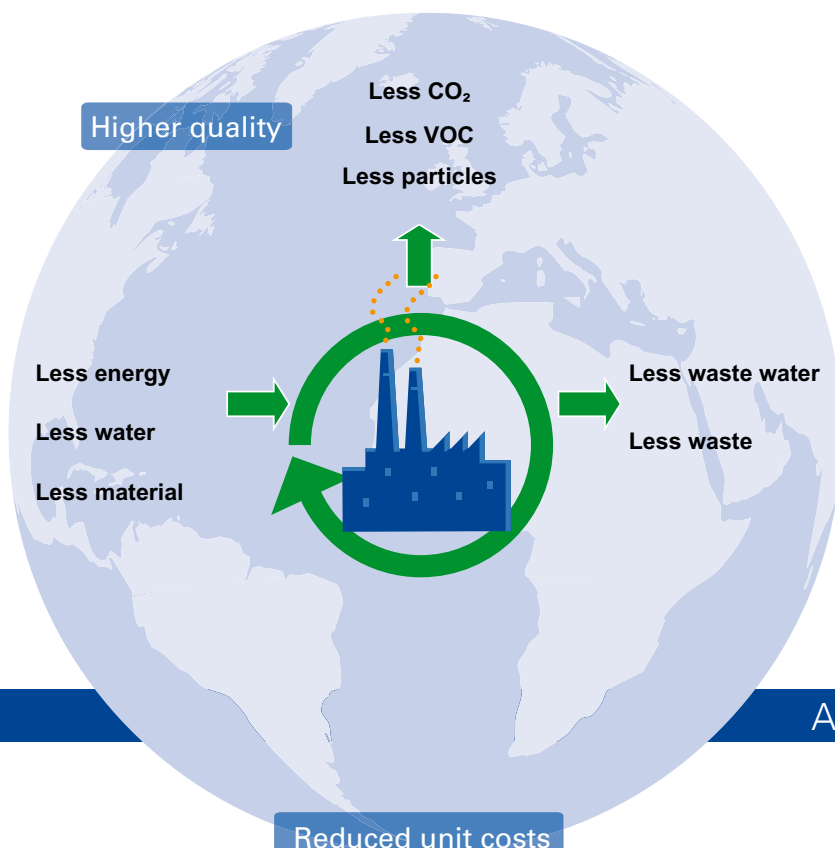
Automobile manufacturers do everything possible to reduce CO₂ emissions. They reduce the vehicle weight, improve fuel combustion and reduce friction and rolling resistance. Start-stop systems, hybrid drives, or the use of biofuels are also hot topics. But one thing is frequently forgotten: of the 18 tonnes of carbon dioxide that a car generates over the course of its life, at least 25 % is already caused during manufacturing of the vehicle. To put it even more clearly: the manufacturing process for each vehicle produces the same carbon footprint as would the driving of that vehicle for 25,000 kilometers.

With its concepts for a sustainable and resource efficient production Dürr turns all of the environmentally relevant screws: a smaller installation cross section with its resulting smaller space requirement reduces energy consumption. Material can be saved in the pretreatment with smaller tanks and in the topcoat by means of a higher application efficiency with efficient bell cups. Less material used, conversely, means less waste.

With each new future-oriented development Dürr keeps the environment in view: the **Green Paintshop** represents our commitment to sustainability.

Positive ecobalance

Energy demand is central to the issue of sustainability. In one year a large paint shop uses as much energy as a city with 50,000 inhabitants and associated commercial zone. In this way energy consumption is a key factor for the efficiency of the system. Dürr consistently contributes to an improvement in the energy balance and ecobalance of automobile painting. We would like to introduce to you how sustainably these innovations perform and thus preserve the opportunities of future generations.



A bright outlook for the environment

Right from the start: Pretreatment and electro coating – Heavy metal-free or with rotational dipping



Environmentally-friendly corrosion protection without heavy metals

Aquence™

Aquence™ is a chemical autodeposition alternative to phosphate and electrocoating steps. The **Aquence™** process is being further developed in cooperation with Henkel. In just a few process stages this innovative technology creates high-quality corrosion protection without the use of heavy metals. The aqueous organic solution builds up a coating film wherever the chemicals come into contact with ferrous metal. A deciding cost factor is that the whole process is chemically induced and no electricity is required. Fewer process stages and less equipment result in a significant reduction in painting costs.

Ecopaint RoDip

Energy savings start with pretreatment and electro coating. By using **RoDip** the process of dipping, flooding and draining is optimized due to the rotation of the entire car body in the tank. **RoDip** means significant savings for material, energy and personnel as well as lower maintenance costs and building investments, and thus meaningful cost per unit (CPU) savings.

A sample calculation for a European plant with a capacity of 300,000 bodies per year reveals CPU savings of nearly 16 % per body. The first contributing factor is the opportunity to save space: Due to the 360° rotation in the dip tank, entrance and exit ramps are not required and the tank can be significantly shortened. Further factors are reduced material and waste costs based on a smaller dip tank as well as energy conservation of over 35 % due to better circulation and heat efficiency. This technology also minimizes contamination, paint runs and sags, which improves not only the quality, but reduces repair, touch-up work and polishing and as a result personnel costs as well.

EcoMultiCyclone

An additional module with added value for our customers in the area of pre-treatment is the **EcoMultiCyclone** – a separation system for the removal of solid matter particles in the degreasing and rinsing zones. In addition to a significant increase in quality for the entire process, the filtration with the **EcoMultiCyclone** also opens up savings in terms of energy and resources. Compared to conventional filter systems it achieves an energy savings of 33 %. The efficient recovery of bath solutions leads to increased bath usage times and a reduction in chemical usage, and is sustainable in terms of its impact on the environment. And furthermore, you save on your costs per unit, piece-by-piece. ■■■■■■





Less material consumption and waste through more efficient paint application

Less paint through increased effectiveness in paint application, higher application efficiency, reduced overspray and less paint loss during color changes – these are the application technology contributions to the **Green Paintshop**. Advanced atomizer and color change technology are the keys to it.

EcoBell2 ICC

The **EcoBell2 ICC** high rotation atomizer possesses an integrated color changer for high-runner colors which reduces color change loss for high-runner colors to approx. 4 ml instead of the usual 40-50 ml per color change and atomizer. Due to this short color change time of approx. 6 seconds, productivity can be increased and up to 5 % more car bodies produced. Here as well: energy savings through increased productivity, reduced material usage and waste through reduced color loss.

EcoBell2 HD


The rotating atomizer optimized for interior painting brings a clearly increased application efficiency in comparison with pneumatic atomizers. The newly developed bell disk-air shaping system allows flexible adjustment of the spray jet on the object painted and provides a very accurately focused jet. In this way the interior paint finish efficiency improves on average by around 25 %, and in individual cases by up to 50 % with respective benefits for the paint consumption balance sheet.

EcoBell3

This new generation of atomizers for the electrostatic application of paint provides higher performance with

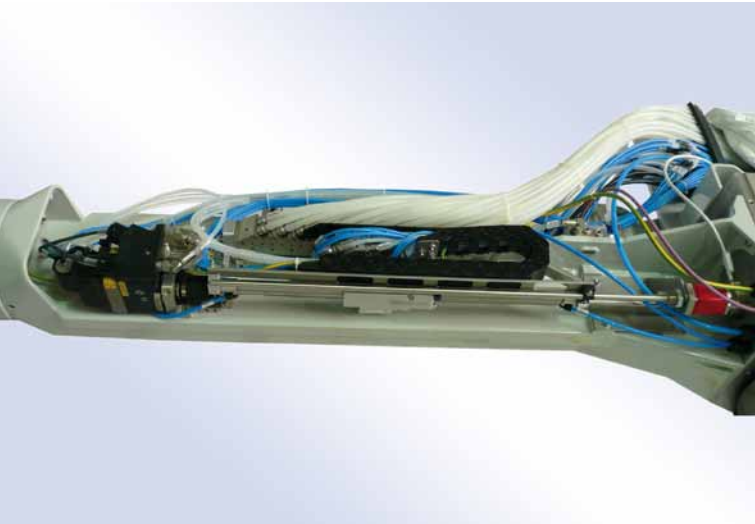


*Extremely effective for both interior and exterior painting in one zone: the new **EcoBell3** rotation atomizer.*

less complexity. The all-new atomizer surpasses all its predecessors with its performance by far. **EcoBell3** means uninterrupted coating of water-based paints with external charging without complex and costly electrical potential separation. **EcoBell3** is particularly suitable for interior painting, bumper painting, and combined zones with interior and exterior painting. 2K applications and an integrated color changer are realized via valve blocks. In the painting of attachable parts in particular, material savings are achieved through the higher efficiency of electrostatic application. 

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Intelligent application technology



Color change in less than 10 seconds with the *EcoLCC*



Robots on travel rails arranged one above the other shorten the booth length

EcoPurge LCC

With the **EcoLCC** color changer each color is activated by docking to the respective paint valve. This color changer no longer has a common paint channel. The paint hose leading to the paint atomizer has the same length for all paint colors. The push-out technique minimizes paint loss during color changes can therefore be used more easily and color losses are reduced. Paint carryover and the intrusion of paint through defective valves are technically impossible. Color change times drop to under 10 seconds. The reduction in color change times leads to a shorter cycle time with the resulting higher throughput with the same energy consumption. This technology reduces the paint loss per color change to less than 10-15 ml from the usual 40-50 ml.

Robots in the fast lane

Robots arranged on elevated travel rails improve accessibility during external finishing of the surfaces to be coated and this allows the use of narrower booths, which is directly reflected in lower operating costs. ■■■■■■

Robot EcoRP

Travel rails in the interior painting booth can be fitted one above the other. The handling robots for opening engine hoods on the upper travel rail can "overtake" the paint robot on the lower rail. Shorter booth lengths of 1 to 2 m are thereby possible and this reduces capital expenditure as well as operating costs.

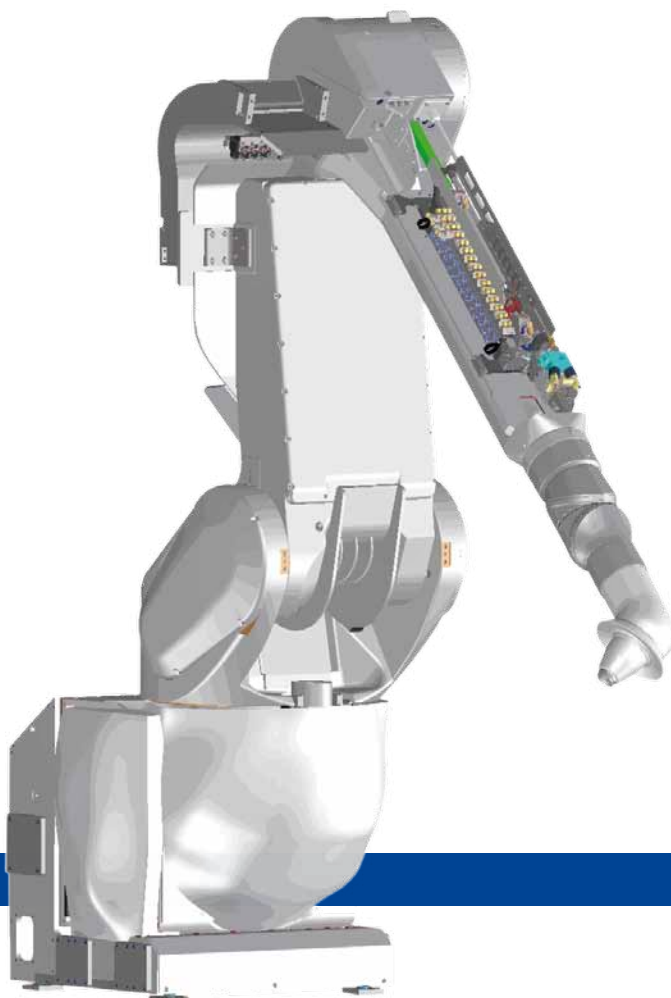
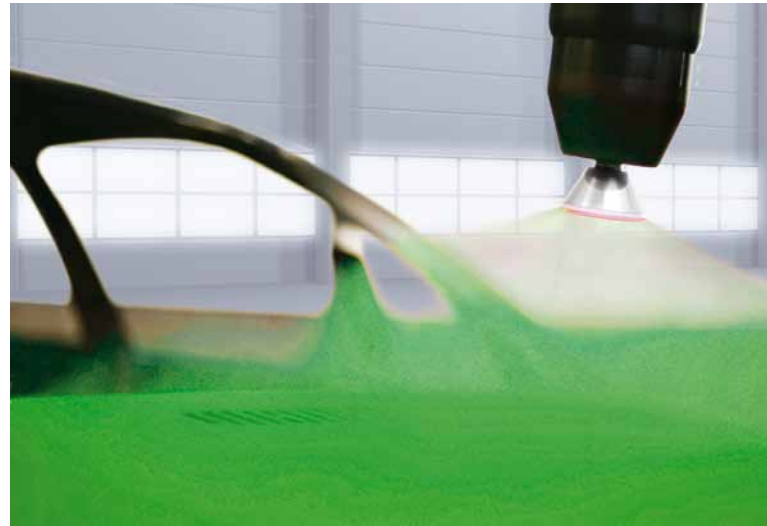
Extensive automation in the sealing processes such as seam sealing, underbody protection and cavity conservation leads to savings in personnel and material costs. The reduction in material consumption is a consequence of precise and reproducible automated process management, in particular by accurate dosing and movement synchronization. ■■■■■■

Plant technology that thinks ahead



Ecopaint Booth

The **Ecopaint Booth** spray booth is convincing with its compact robot zone that saves space and air. In this way overspray accumulation is reduced to a minimum. Advanced exhaust air systems efficiently vent the spray booth and thus ensure an improved energy balance. Reduced downdraft velocity in the cabin requires a smaller fresh air supply, and thus less energy is used for air treatment. The optimization of the air exchange rate also moves in the same direction. The use of a heat pump in the supply air unit contributes significantly to the optimal use of energy available in the process. ■■■■



EcoAirControl TH

This software controls the temperature and humidity in the booth during paint application. The temperature window moves as needed from 21° to 29°C, the humidity range runs from 62 % to 86 %. Consequently painting can be performed at the warmer upper end of the temperature window in summer, and in winter on colder lower end. Accordingly, air supplied from the outside requires less cooling, heating or humidification. This optimization allows a savings of around 12 % of the required energy. ■■■■

EcoRP L033 painting robot with EcoLCC color changer and EcoBell3 atomizer

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Overspray separation is now dry



60 % energy savings in the painting booth thanks to air recirculation

EcoDryScrubber

The **EcoDryScrubber** is a significant step nearer to “the green paint process”. This new overspray separation technology for wet painting saves 30 % of the energy needed in the entire paint shop. If only the booth area is considered, energy savings can be as high as 60 %.


Crucial here is the up to 95 % recirculation of booth air. Compared to conventional paint booths air recirculation clearly reduces the energy requirements for air treatment. In addition, the replacement of conventional wet scrubbers means that water is no longer needed for paint separation. Besides this large energy savings rate, the **EcoDryScrubber** sets itself apart because it protects resources due to reduced CO₂ and the complete prevention of paint particle emissions.

Waste prevention at its finest

Another positive point for the environment: the limestone powder used as the bonding agent in dry separation can be reused untreated in its saturated condition in other production processes such as in the cement industry or flue gas desulphurization – in contrast to wet separation paint sludge, which has to be disposed of as hazardous waste.

That this process also increases the quality of paint application is more than just a nice side effect, since air recirculation without much dependence on outside temperature and humidity represents the key to a globally stable process. Furthermore, this new technology requires no regulatory approval.

Wet in wet painting

Primer, base coat and topcoat in one line – that is the result of wet in wet painting. In the process, besides two ovens and their energy consumption, plenty of space is saved for just this oven as well as for cleaning and control stations. As a result the entire painting process is shortened. 

EcoDryScrubber – a water and chemical free separation process.

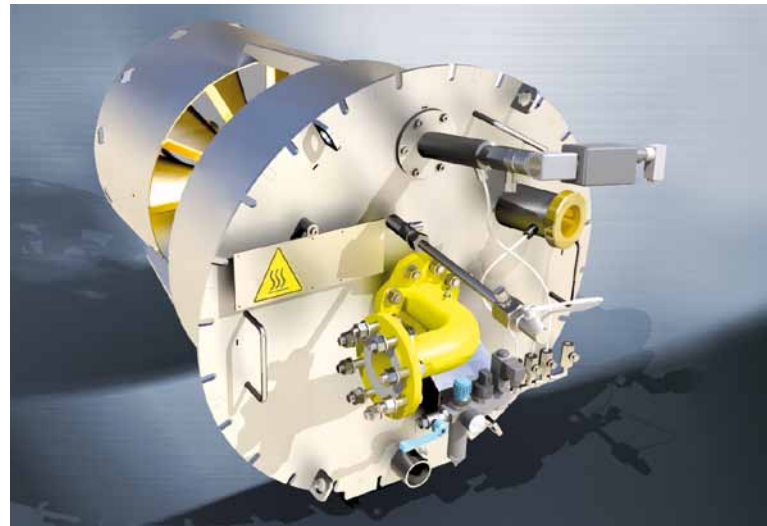




Ecopaint Oven is a drying system with integrated air management. A heat recovery system provides efficient energy usage starting in the thermal exhaust air purification. Through integrated interfaces all components and modules can be easily and individually combined. The compact design produces the highest quality and minimum unit costs. In this way the process conserves resources and has an energy savings of about 15%. Last but not least, the use of waste heat boilers and improved insulation contribute to an extension of the heating times.

What comes out at the top makes the difference

The independent Dürr business unit Environmental and Energy Systems is responsible for the environmental technology. With its innovative **Ecopure**® environmental technologies Dürr has provided environmental and economic pollution control for over 40 years. More than 4,000 systems for air purification installed around the world speak for themselves.



Efficient exhaust air purification through optimized flame geometry

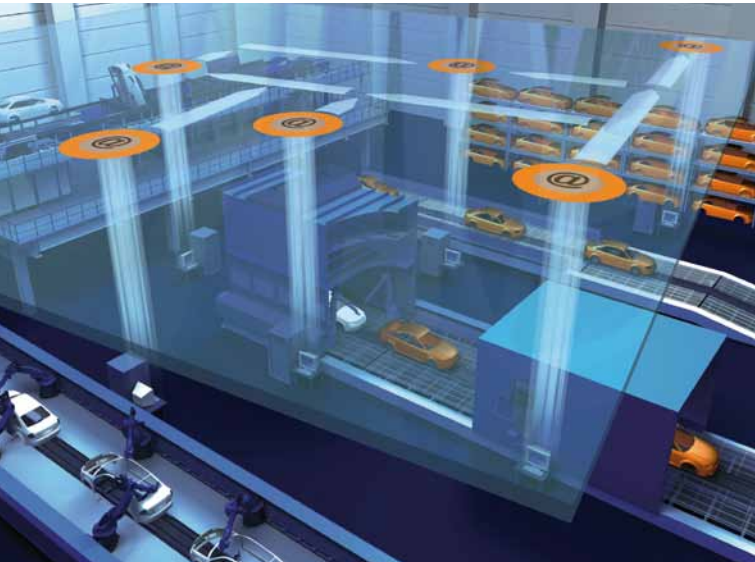
With the environmentally friendly gas purification in itself, we still attach great importance to conserving resources. Specific examples of “green” solutions are so-called combination processes, among others. In this case during the incineration of pollutants the hot exhaust air is heated to over 750° Celsius and is “used twice” as heating energy for the drying process after the combustion process.

For versatile thermal exhaust air purification systems (TAR), Dürr has developed the new **TARCOM V** gas burner for even more efficient exhaust air purification. The **TARCOM V** burner is ideal not only for new TAR-installations, even existing systems can be upgraded at any time around the world, resulting directly in massive energy savings. ■■■■■■



A bright outlook for the environment

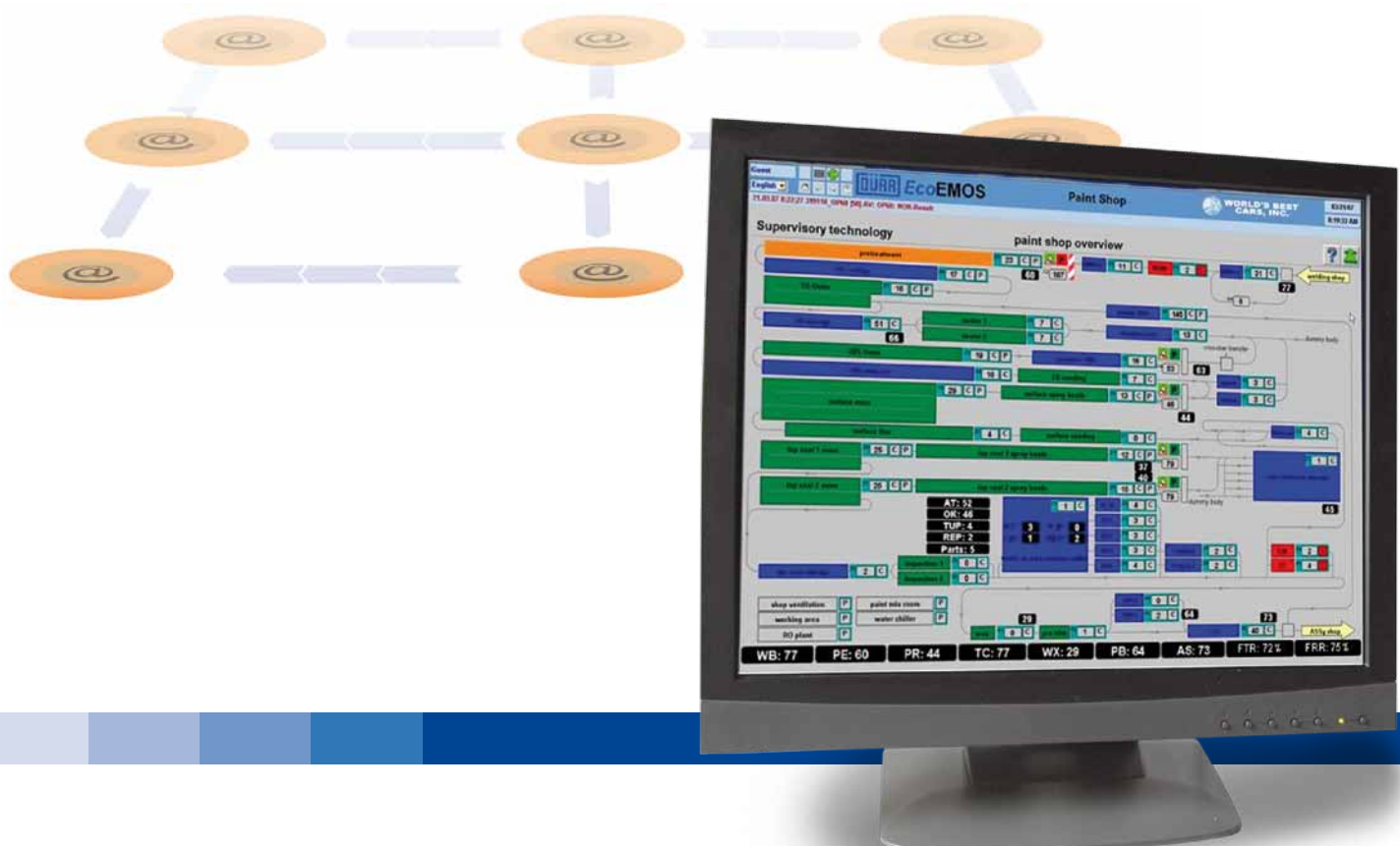
Energy optimization – Full control at a glance



Clear recording of energy data with EcoEMOS

It is not enough to develop energy-saving and environmentally friendly technologies – you must also apply it correctly and operate in a resource-saving manner. For this, Dürr has extended its globally deployed **EcoEMOS** supervisory control technology by adding an interesting component – the **EcoEMOS** Energy software module. This tool facilitates targeted evaluation of consumption data. In this way unnecessary points of consumption can be identified and eliminated when compared with customized reference curves.

In addition, a focused and automated reduction of consumption during non-production times can be achieved by **EcoEMOS** in combination with the working schedule. This new module developed by Dürr on the basis of longstanding experience offers very practical possibilities for energy-conscious and environmentally friendly plant operation in an energy-intensive environment.





**Paint shop assessment:
Expert check for your plant**


There is vast potential for optimization, when existing plants are given a closer look. Dürr has therefore already conducted successful assessments of paint shops for customers in Europe, Asia and the USA. As the world's leading paint shop supplier Dürr possesses total process know-how in industrial painting. The assessments already carried out have shown that plant checks hold great potential for optimization and cost savings.

The surveys can be conducted under a wide variety of aspects. Depending on the needs and priorities of the customer, focus can be placed on energy and material efficiency, on capacity adjustments or on the optimal implementation of statutory provisions. Another process that benefits from such an assessment is of course benchmarking.



The experts at Dürr will gladly identify your plant's green potential.

Green – even under our own roof

Dürr has developed a sustainable energy strategy for its new central location in Bietigheim-Bissingen which in 2008 was awarded the Solar Prize. The new campus building complex relies on geothermal energy, geothermal heat exchangers, photovoltaics, heat recovery and two block heating power plants with an absorption chiller. Thanks to the economically and ecologically sound approach 50 % less energy is required than with conventional energy supply. CO₂ emissions have been reduced by 60 %, or by 2,000 tonnes per year. 



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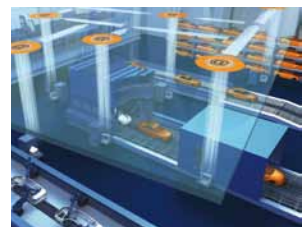


The **Green Paintshop** from Dürr

- decreases energy consumption
- reduces CO₂ emissions
- decreases water requirements
- reduces the use of materials
- decreases waste

while at the same time improving plant efficiency,
increasing quality and reducing unit costs.

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