

November 2010

Dear Sir or Madam,

With 48 offices and 31 production locations established in 21 countries Dürr is well positioned worldwide.

At present our key business area lies in Asia. Dürr Ecoclean is extending its filtration systems business across Europe and into Asia; in China we are realizing a number of exciting projects including the first fully automatic PT/EC system to be built for buses in China, a Green Paintshop for Chery at Dalian, and a paint shop for GAC Fiat at Changsha.

In addition Dürr News contains reports on several other products – such as *FASTplant®* and the *TARCOM V* burner – that are also proving very successful in Asia and beyond.

We hope you will enjoy reading this issue.

**Dürr News Editorial Team**

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**Yutong sets new standards – with a Dürr EC line for buses**

Yutong, China's largest manufacturer of buses, is setting new standards in pretreatment and cathodic dip painting of buses at its Zhengzhou factory. As part of an internal quality improvement offensive, the project – known as the Yutong Electrocoating Standard (YES) – is dedicated to achieving the best possible corrosion protection. For the planning and building of this new plant Yutong selected Dürr.

Until now, contrary to the norm in passenger car production, corrosion protection for buses was not brought about by dipping complete body shells. Instead 'in white' bodies were assembled from shell components fabricated, for example, from fully galvanized material. The protection attained was correspondingly less durable.

The pursuit of higher quality has led – as a result of the close cooperation between Yutong and Dürr – to the building of one of the most advanced pretreatment (PT) and EC systems for buses in China. Now, with utilization of the new plant, the quality of the corrosion protection applied to the buses meets international standards and reaches premium class passenger car level.

The EC plant was built in an free area between two existing production shops. This meant that major interfaces with both of these buildings had to be taken into consideration during planning and integrated into the layout. First of all Dürr developed a three dimensional planning concept based on a programmable overhead conveyor system. This enables assembled bodies to be taken direct from the body shop to the new PT/EC plant and then to be delivered to the paint shop. Within 18 months a fully automatic production line was put up at Zhengzhou incorporating 13 dip tanks, each of which measured 15x4x6m. In order to reduce investment cost the tanks were manufactured from concrete with a

stainless steel lining. Buses from 6 to 14 m in length can be coated in the tanks. The fully automatic and freely programmable heavy duty overhead crane system transports the bus bodies, which weigh up to 7.5 tons each, from tank to tank through the complete process. With seven cranes in operation 6.7 units per hour can be coated. An oven follows with a heating system that allows all six curing chambers to be operated independently so as to optimize energy management. A thermal oxidation exhaust air purification system ensures that emission of pollutants is kept to as low a level as possible and, via its high performance heat recovery system, the oxidizer also provides heating energy for the ovens. This results in significant additional savings in energy costs.

The Yutong/Dürr cooperation has definitely resulted in quality: the corrosion protection coating withstands the effects of 1,000 hours of salt water with no difficulty whatever. Yutong now gives a ten year rust perforation guarantee.

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**Hot seller – More than 100 TARCUM V burners sold**

Dürr's TARCUM V burner technology stands for lower burner fuel consumption and far better exhaust air purification emission values. More than 100 Dürr TARCUM V burners have been sold since their market launch at the end of 2008; all Dürr TAR oxidizer systems are now equipped with these new generation burners as standard.

The decisive advantage offered by the TARCUM V burner is its optimized flame geometry, which can be

likened to a rotating hollow cylinder. This not only produces a stable flame but one that also prevents heat concentration at its center. The self-regulating and highly effective kinetics of the process air and combustion gas mixture also bring significantly better temperature distribution within the combustion chamber. The whole of the chamber volume is utilized much more efficiently than previously. Depending on the application, combustion chamber temperature can be reduced by 25-40°C – yet emissions, whether from new systems or retrofitted existing units, will still comply with current exhaust air regulations. This enormous reduction in temperature saves up to 10% of burner fuel and also lengthens the life cycle of the TAR.

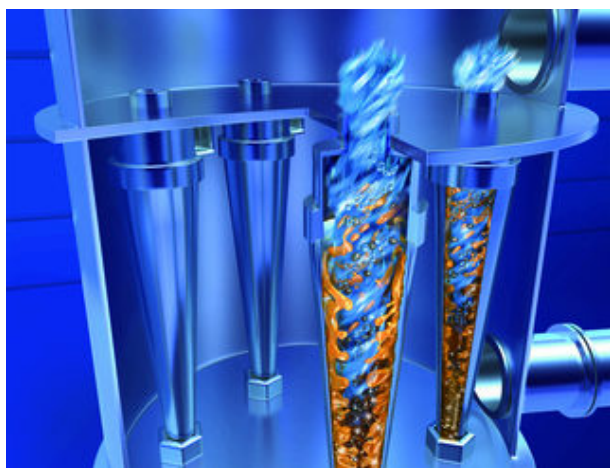
Dürr equips all *Ecopure*® TAR IV oxidizers, the latest generation of recuperative thermal exhaust air purification systems, with the TARCOM V burner as standard. Clean gas values that are markedly lower than the maximum levels permitted under statutory regulations are achievable with Dürr TAR systems, especially with the significant contribution made by TARCOM V burners.

Convincing improvements can also be attained with retrofitted systems – irrespective of whether the systems were originally supplied by Dürr or by other manufacturers. In the case of every retrofit so far carried out it has proved possible, at the very least, to achieve the values required under current clean gas regulations and to maintain this performance on a sustained basis.

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**EcoMultiCyclone heads West – Ford opts for Dürr’s cost saving multicyclones**

From 2011 onwards Ford will be introducing Dürr’s high performance *EcoMultiCyclone* at its Louisville works in USA. 11 cyclones will filter liquid from pretreatment baths in the paint shop.

Worldwide, 22 *EcoMultiCyclones* are already in operation for Ford. So far however, only outside the USA. Now these high performance separation systems have proved convincing to Ford in the USA too. The *EcoMultiCyclone* separators to be utilized at Ford Louisville are designed to filter a total of 1,260 m<sup>3</sup> of process liquid per hour. Their high separation efficiency considerably reduces the amount of repair work required on body shells and also cuts costs as a result.

The *EcoMultiCyclone* is a mechanical separator with no internal moving parts. Depending on requirements, the separator is equipped with either 6 or 12 cyclone elements made of highly abrasion-resistant plastic material and it is designed to handle a throughput volume of 60 m<sup>3</sup>/hr or of 120 m<sup>3</sup>/hr. The very positive ecobalance aspects of the *EcoMultiCyclone* are persuasive. In comparison with conventional filter systems energy consumption is reduced by a third. High filtration efficiency lowers chemical consumption and lengthens bath content life cycles. Having a bath volume of 50 to 70 m<sup>3</sup>/hr, the volume of waste water normally drained away at a rate of 2 m<sup>3</sup>/hr per hour can be halved with the *EcoMultiCyclone*. Also in the separation system’s favour is the low maintenance frequency it requires: as no opening in the system is smaller than 25 mm, the filter is not susceptible to blockages. The cyclone inserts generally last an average of two years, requiring maintenance only once a year. On average the investment in a Dürr *EcoMultiCyclone* is normally amortized in less than two and a half years.

So far Dürr has installed more than 300 cyclones worldwide for the automobile industry. Further areas of utilization are currently under evaluation and testing – and showing a positive trend. In 2011 Dürr anticipates that other fields of application will be added, where it will be possible to integrate *EcoMultiCyclone* in the process as standard.

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### **FASTplant® six years on – Versatile and flexible assembly**

The modular final assembly system FASTplant® has proved itself since entering the market in 2004. The wide spectrum of applications for the system – ranging from automotive test plants to mass passenger car production and from pre-assembly of aircraft wings to motor cycle manufacture – demonstrates just how versatile it is. Ongoing development on the basis of practical experience means that today FASTplant® can be utilized more flexibly than ever before.

Daimler was the first to put its trust in FASTplant® when it built a six module pilot plant at Sindelfingen (Germany) in 2004. Further test plants followed for Toyota at Valenciennes (France), Ford at Cologne and VW at Mosel (both Germany). This was because the rapid installation and high adaptability characteristics of FASTplant® make it particularly suitable for test programs involving a variety of models and prototypes.

The first customer, Daimler, relocated its FASTplant® system three times within a period of six years and is now utilizing it at its fourth location. Other OEMs, such as BMW and Audi, have opted for FASTplant® for smaller production series: Audi has been assembling the R8 sports car with the system at Neckarsulm (Germany) since 2006 and at Chennai (India) several different BMW models have been produced very flexibly on a CKD assembly line there since 2007. The first mass production chassis line – incorporating 80 FASTplant® modules and including 58 scissor action hangers with infinitely adjustable height regulation – was built by GM at San Luis Potosi (Mexico). This American manufacturer has been producing 100,000 vehicles per year there since 2009.

The FASTplant® system, which is based on a simple modular principle and allows pre-fabricated and tested modules to be combined freely to form assembly lines, is proving increasingly convincing in other industrial branches too. A motor cycle manufacturer is currently having new concept FASTplant® utilities modules

installed so that work stations are uniformly equipped. This system user is introducing FASTplant® on a worldwide basis and is capitalizing on the system's strength – simplicity of production capacity adaptation – around the globe. FASTplant® is not affected by roof load restrictions so simple, low cost building concepts can be implemented irrespective of the size and weight of the product involved. A newly developed heavy duty module has made it possible to transfer FASTplant® technology to aircraft production. Two assembly lines, incorporating 130 modules and with a total length of more than 1.2 km, went into operation for Lockheed Martin at Fort Worth (USA) in March 2010. For the first time in aircraft manufacture wings are being assembled in pulse production there. The wings can even be turned on their own axis so that special assembly processes can be carried out.

The diversity of these FASTplant® projects shows just how vital it is for system users to be able to modify manufacturing lines easily and to adapt production quickly and optimally to suit changing market situations.

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### **Dürr Somac – Safe filling systems for new refrigerant R1234yf**

As from 1.1.2011 refrigerant R134a, which is damaging to the environment, will be prohibited for use in new car models throughout Europe. In itself this will have little effect on air conditioning systems in the vehicles. But for special filling systems in final assembly it will mean a need to handle the flammability of replacement refrigerant R1234yf. Dürr Somac has developed such filling system solutions with standards of safety that can be relied upon.

The reason for turning away from R134a is its very high Global Warming Potential (GWP) value of 1,400. This refrigerant, which has been in use until now, is thus classed as a greenhouse gas. As small quantities of refrigerant do escape from vehicle air conditioning

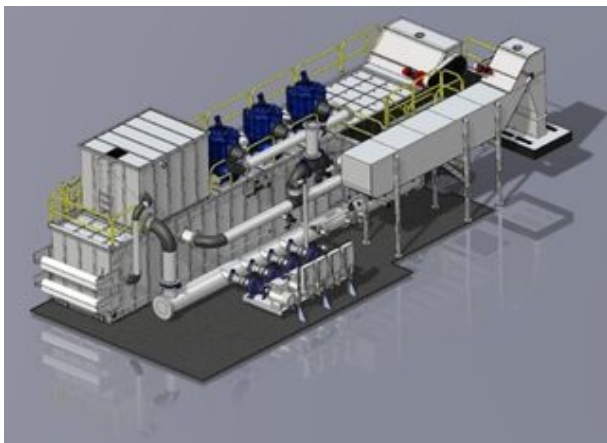
systems – a leakage of a maximum of 40 grams per year is permissible – R134a adds to global warming. A European Union Directive has therefore brought in a ban on the use of R134a for all new car models as from 2011. By 2017 the substance is to be eradicated from vehicle air conditioning systems completely. It will be replaced by R1234yf which, although it has almost the same thermodynamic properties as R134a, has a GWP value of only 4. However, R1234yf is classed as an EU R12 hazardous substance and thus as extremely flammable meaning that all filling equipment must meet high standards of safety.

For utilization of R1234yf in filling systems Dürr Somac, working in cooperation with the TÜV Rheinland Group, has developed an integrated safety concept, which eliminates risks even in cases of malfunction. Alongside reliable components, additional sealing materials in all threaded connections and an associated ventilation system ensure that explosive mixes cannot occur. Even greater safety is provided as a result of the continuous, automatic seal tightness testing of selected sections of the filling system during operation. Individual sections can also be shut-off and drained separately, in the event of faults or for maintenance purposes. High safety standards also apply to the interface with the vehicle, i.e. the actual fill point for the air conditioning system in the car. To ensure that R1234yf does not run out here a pneumatically clamping filling adapter is used. Any excess volume of refrigerant remaining is also sucked out on completion of the filling process.

The new filling systems are available either as mobile *Compact* units, or as *ProLine* line models; both can be integrated easily into existing assembly lines.

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**Eastwards – Dürr Ecoclean expands its filtration business in Europe**

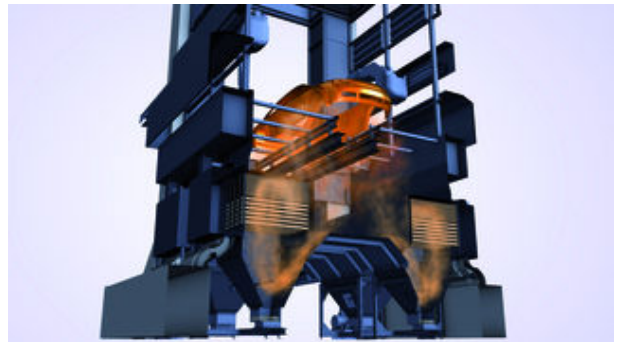
Dürr Ecoclean successfully pushes the strategic expansion of its filtration business. The company supplies GM's new engine plant in Tashkent, Uzbekistan, with central filtration systems including turnkey equipment

With the brand names „H. R. Black“ and „Henry Filters“ Dürr Ecoclean has been North Americas leading supplier for the conditioning and treatment of coolants and other industrial liquids for many years now. Based on this experience, Dürr Ecoclean has now started to develop the European filtration markets. GM's major order marks a milestone on this way. The project in Tashkent includes five central filtration systems for the cylinderhead and block production lines. The filter technology is based on media vac filters with pre-separators and automatic back flush filters. The filtration systems have a volume between 20 and 100 m³ and a screen size of 10 to 25 m².

Besides the Filtration systems and Assembly the scope of supply includes also the turnkey installations and hook-up of the machining centres. For this purpose Dürr Ecoclean is supported by the group company Dürr Systems which brings in the know-how for Assembly and Installation technology. The project is scheduled to be finished at the end of this year.

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**Green Paintshop: Dürr in charge of construction at Chery plant in Dalian**

As general contractor, Dürr is building a new environmentally friendly paint shop for Chery Automobile Co. Ltd., a Chinese automobile manufacturer. At its facility in Dalian, China, in the heart of a very popular tourist area, not only is quality of the utmost importance but ecological aspects are as well. Using the latest technologies, Dürr can meet the high requirements for sustainability in the painting process. The contract, issued by Chery in the second quarter of 2010, has a volume of more than € 60 million.

Dürr is responsible for the construction of the entire paint

shop, including the application technology. In terms of saving resources and energy, the use of the *EcoDryScrubber* is highlighted. This innovative and already proven method for dry separation of overspray reduces energy consumption by up to 60% when compared to conventional spray booths. Air re-circulation is primarily responsible for this, since it eliminates the need for water and detackifier chemicals in the paint booth. A filtration quality of nearly 100 percent is achieved and the saturated binding material – a waste product in conventional processes – can be reused untreated.

The *Ecopaint* RoDip rotational dip process that is used in the basecoat area also helps to save resources through optimized immersion and retrieval phases and correspondingly low carryover. Furthermore, RoDip guarantees maximum coating quality.

For exterior painting, 32 robots of type *EcoR6* with *EcoBell2* atomizers are used, while the interior painting is done manually. Water-based paint is used for both the primer and the basecoat areas. Underbody protection is done by four Dürr *EcoRS* robots. Also included in the scope of delivery for the application technology are two cleaning installations *Ecopaint* Clean, which are used to remove any dust adhering to the body prior to topcoat painting.

Chery plans to paint premium vehicles in its new plant. Therefore the focus is on quality and environmental aspects. Here as well, the *EcoDryScrubber* makes a significant contribution. With an air re-circulation component of up to 95%, the temperature and humidity in the painting process are easily kept stable. The small amount of conditioned fresh air makes the process practically climate independent – at any location in the world. This is just another example that Dürr, with its components from the Green Paintshop is the ideal partner for Chery's requirements.

Starting December 2011, working in a two shift operation, 200,000 vehicles a year will receive their brilliant outfits – in a production line with high quality equipment and intelligent process control.

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**FIAT GAC: Major new contract for Dürr in China**

Dürr is the general contractor in building a new paint shop in the southern Chinese city of Changsha. The client for this order is GAC Fiat, a joint venture of the Italian Fiat Group with the local automobile manufacturer Guangzhou Automobile Group. Crucial for receiving this contract was certainly Dürr's repeated proven turnkey experience in China.

The contract includes the construction of the complete paint shop: from pre-treatment and dip coating to underbody protection, and from primer to basecoat and topcoat. It also includes conveyor systems and equipment for the workspaces. In addition to drying ovens, the equipment for media production and supply as well as the factory ventilation are included the scope of services from Dürr.

16 Dürr type *EcoRP* L033 painting robots provide fully automatic exterior painting. Interior painting is to take place at manual workplaces that will also be delivered by Dürr along with the entire paint supply system. Dürr is equipping the UBS line with a robot station with two *EcoRS* 16 robots and the application technology for automatic underbody protection. Seam sealing is done manually – here as well, Dürr will provide material supply.

With this contract Dürr benefits from its international presence with a local workforce in China of around 700 employees. These are linked with Dürr's other affiliates by a uniform IT environment with Dürr's own project management software. With the contract from GAC Fiat, project teams in Germany and Italy will work together with the Chinese colleagues.

The plant in Changsha works with water-based paints for the primer and base coat and will go into operation by the summer of 2012.

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**Personalisation**

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Dürr is a mechanical and plant engineering group that holds leading positions in the world market in its areas of operation. It generates a good 80% of its sales in business with the automotive industry. It furthermore supplies the aircraft, machinery, chemical, and pharmaceutical industries with innovative production and environmental technology. The Dürr Group operates in the market with two divisions. The Paint and Assembly Systems division supplies production and painting technology, especially for car bodies. Machinery and systems from the Measuring and Process Systems division are used in engine and transmission manufacturing and in final vehicle assembly, among other areas. Dürr has 48 business locations in 21 countries worldwide. The Group achieved sales of € 1.1 billion with approximately 5,700 employees in 2009.

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