Ecopaint Gluing

GLUING IN FINAL ASSEMBLY
Ecopaint Gluing –
GLUING IN FINAL ASSEMBLY

Ecopaint Gluing – The Dürr product family for automated gluing in the final assembly of vehicle production. Highly viscous materials are used to permanently bond parts and components of different characteristics. The innovative product range of the Dürr Ecopaint Gluing systems is based on the ECO EFFICIENCY concept. This includes all aspects of efficiency Dürr is using to support the production process of its clients and sustainably reduces the unit costs – maintaining highest quality. The ECO EFFICIENCY concept improves the economic efficiency and guarantees highest quality and environmental compatibility.

4 advantages at a glance

Reduction of unit costs
Automated processes for installation and glue application reduce the cycle time and unit costs. Simultaneously, error rates and post-treatment costs are decreased.

Maximum quality
Application systems of the Ecopaint Gluing product range ensure an optimum, reproducible process control and thus a constant quality of the gluing application. All decisive parameters for safety-relevant gluing are documented to 100 %.

Highest sustainability
The advance of lightweight and multi material construction comes with new requirements for safety and convenience of automobiles and a simultaneous effort to reduce production and operating costs. The innovative solutions of the Ecopaint Gluing series put the savings potential right into the production cycle.

Reduction of the exposure of the worker
Automated solutions reduce the physical exposure when handling components and avoid the direct contact with hazardous materials.

» Gluing tower: section with cloth cleaning and applicator
Dürr’s Ecopaint Gluing series offers modular systems for every application in the final assembly.

**Window gluing**

Today gluing is the default joining technology for windows. Glued window panels improve the stability of the entire body and increase comfort and safety. Here, glue is applied on the windows as a triangular bead and these are then inserted into the window section of the body.

**Gluing of roof module**

Automobiles with a modular design meet the requirements of individual customers and the objective of the manufacturers to lower costs. Here, the modular design ensures a flexibility of the manufacturing processes. To keep the assembly expenditure as small as possible, preassembled components, for instance roof modules, are glued to the body with PUR glue. This way, it is possible to integrate module variants into the assembly process easily and without changes in the layout of the assembly line.

**Gluing in roof reinforcement dampings**

Roof reinforcement dampings have a noise-reducing effect and increase comfort; at the same time they contribute to safety with their reinforcing function. For the gluing with the body, glue is applied in the shape of round and triangular beads.

**Multi-material constructions**

Multi-material constructions are becoming much more common, for example the use of CFRP components. Here, different moisture or heat curing glues are used: from 1K (polyurethane) to 2K (epoxide resin).
Dürr offers custom solutions for the various requirements of automobile manufacturers for economic gluing cells that fulfill different demands for quantity, operating material costs and quality. These include automated and partially automated solutions as well as robot-guided and stationary application systems.

**Glue application at the robot – Mobile applicator, stationary component**

The robot-guided glue application comes frequently in combination with the manual installation of the components. In this concept, the glue is applied via automation on a stationary component which guarantees a high quality of the gluing bead.

**Benefits**

» low investment costs  
» compact construction with small footprint  
» flexible construction of gluing cell allows for processing of different window sizes in same cell  
» modular extension with e.g. integration of automated feeder systems  
» component buffer  
» very short cycle times due to optimized cell layout with short processing times
Glue application at the tower – Stationary applicator, mobile component

The concept of glue application on a component in motion is frequently used when the installation is carried out automatically with a robot. Here, the applicator is mounted stationary to the gluing tower.

For the glue application, the robot moves the component past the applicator and then the component is inserted into the corresponding body section. A guidance system guides the robot.

Benefits

» high quality guaranteed by automated glue application
» reproducible window installation process
» reduced work expenditure
» increased production
» permanently monitored systems

Glue and primer application at the robot

The primer or activator application allows the production of durable glued connections due to an optimum surface pretreatment With the EcoGun N and/or S applicators, it is possible to clean surfaces, to apply thin primer coats or to activate pre-primed window panels (robot-guided or stationary). Alternatively, pretreatments like atmospheric pressure processes can be used.

For the application procedure of the primer, three application methods are available: spray, paintbrush or felt application.

Optionally, Dürr offers the control of primer flow rate and application result. For the primer application, both a stationary solution at a primer tower and a robot solution are available.
Ecopaint Gluing – DOSING FOR ALL DEMANDS

EcoShot Meter – The correct dosing for all gluing processes

EcoShot Meter piston dosing systems are volume-controlled dosing systems and meet all requirements on the optimum dosing of highly viscous glues.

With the EcoShot Meter Single electrical driven dosing device, the material is dosed continuously and extremely accurately. The system is suited for almost all applications in the final assembly where a large amount of highly viscous glues must be applied with high accuracy. The dosing devices are dependent on project specific demands and available in multiple volume sizes. The outflow rate can be optimized for the specific application demands. For the dosing of the condensation curing glues on polyurethane basis that are frequently used in the final assembly, the dosing device has an optional connection for a blocking medium. The Dürr application control unit monitors all functions required for high quality glue dosing and is perfectly integrated into the specific cell concept. The dosing device has a modular design and is low-maintenance.

Benefits

» highest dosing accuracy
» suitable for highly viscous glues and high application pressures
» low-maintenance
<table>
<thead>
<tr>
<th>EcoShot Meter Single</th>
<th>EcoShot Meter Single</th>
<th>EcoShot Meter Single</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
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</table>

<table>
<thead>
<tr>
<th>Dosing volume</th>
<th>30 cm³</th>
<th>120 cm³</th>
<th>600 cm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application pressure</td>
<td>up to 200 bar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application tolerance</td>
<td>&lt; 1 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material volume flow</td>
<td>up to 4 cm³/sec</td>
<td>up to 30 cm³/sec</td>
<td>up to 80 cm³/sec</td>
</tr>
<tr>
<td>Material temperature</td>
<td>up to 80 °C, heated [optional up to 160 °C]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaction time</td>
<td>&lt; 150 ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examples of ranges of application</td>
<td>Glue application, 1K and 2K application, booster</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Material supply**

Barrel pumps convey highly viscous media directly from the original barrels to the dosing device. The material supply is available for different barrel sizes from 20 to 200 liters. Depending on the necessary conveying volume, individual or double pumps are used. All pumps can be heated. Temperatures can reach up to 160 °C depending on the glue. The robust pneumatic piston pumps work with a pressure transmission of 65:1. The follow-up plates used for pressing the material out of the barrel are matched to the glue with regard to material and geometry. The same applies for the pressure of the follow-up plates to the glue.

The pumps have a filling level and a “container empty” monitor, automatic disconnection and an automatic barrel changeover.

**EcoHeat – Conditioning of the material for stable application results**

The systematic preheating of the application materials prevents the process from being influenced by fluctuating material temperatures. This way, the material temperature remains constant in an optimal range for the application quality. Another benefit of preheating the glue is the low material pressure used to pump and dose. This prevents material shearing and damage to the equipment caused by high pressures and reduces energy consumption of the pump and dosing devices.

EcoHeat for electrical material heating works in the temperature range of up to 160 °C.
Ecopaint Gluing – APPLICATORS
FOR PERFECT QUALITY

EcoGun Gluing applicators allow the application of highly viscous glues with varying bead cross sections. The high pressure application heads are available both for the non-contact application of cylindrical beads and also for the contact application of beads with a defined cross section (triangular beads). In the contact application of triangular beads, component tolerances are compensated for by a pneumatic system. The compact design allows an easy application, even in hard to access components.

The applicators can be used for stationary applications as well as robot-guided applications.

To reduce the material quantity between needle valve and nozzle, the valves are integrated directly into the nozzle adaptor head. This safeguards an optimum quality at the bead beginning and end.

The applicator can be equipped with various EcoJet nozzles that are adapted specifically to the project. The nozzles are easy to exchange.

Optionally, an optical monitoring of the bead can be integrated. For this feature 1D up to 3D detection systems are available.

<table>
<thead>
<tr>
<th></th>
<th>EcoGun F</th>
<th>EcoGun C (for 1K)</th>
<th>EcoGun C (for 2K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. operating temperature</td>
<td>80 °C (optional 160 °C)</td>
<td>80 °C</td>
<td>80 °C</td>
</tr>
<tr>
<td>Max. flow volume</td>
<td>50 cm³/sec</td>
<td>50 cm³/sec</td>
<td>50 cm³/sec</td>
</tr>
<tr>
<td>Max. material pressure</td>
<td>200 bar</td>
<td>300 bar</td>
<td>300 bar</td>
</tr>
<tr>
<td>Heating</td>
<td></td>
<td>optional</td>
<td></td>
</tr>
<tr>
<td>Rotary feedthrough</td>
<td>no</td>
<td>yes, gear ratio 16:1</td>
<td>yes, gear ratio 16:1</td>
</tr>
<tr>
<td>Z compensation</td>
<td>no</td>
<td>+/- 15 mm</td>
<td>+/- 15 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>3.5 kg</td>
<td>approx. 26.4 kg (without drive)</td>
<td>approx. 30 kg</td>
</tr>
</tbody>
</table>

Glue bead sensors (1D, 2D and 3D) optional for all applicators
EcoGun Cleaner – Fully automatic nozzle cleaning

To avoid the soiling of components and guarantee a correct bead geometry, the EcoGun Cleaner cleans the nozzle of the applicator as required. Depending on customer demands, three different systems are available:

» cleaning with compressed air
» cleaning with compression strap
» cleaning with cloth

The EcoGun Cleaner suitable for all nozzle geometries and can either be installed to the EcoJet nozzle in either a stationary or mobile fashion.

Gluing tower – Carrier of dosing device and applicator

The gluing tower is used for the application-specific arrangement of the dosing device and applicator in the gluing processes. The stiff design that is optimized with regard to vibrational energy and the short distance between dosing device and applicator ensure an exact application result. The gluing tower is designed to be integrated even in the most complex cell layouts. Good accessibility is ensured to allow for application of products with complex shapes. The gluing tower can be equipped with various nozzle cleaning systems depending on the customer’s requirements.

Centering table – Optimum alignment of components

Low-tension centering is used for the positioning and direction of the components, e. g. windows, before they are guided to the following primer or glue application in the robot-guided process. This is followed by a type recognition of the product. Sensors also check the function of the centering elements. The centering table is optionally available in a tiltable execution for the ergonomic inserting of components.

EcoGripper – Grippers for low-deformation handling of components

During the glue application and in the installation, vacuum sucking grippers with a vision system handle the windows and roof modules. An automatic adaptation of the suction device position allows the low-deformation handling of the component and in this way minimizes resilience after its installation. Alternatively, the gripper can be designed to “deform” the component into a defined installation geometry to achieve the optimum installation position of the component after release of the gripper. The standardized modules of the gripper are suited for the adaptation of various component sizes. The base frame of the gripper is welded. This ensures a perfect stiffness of the gripper structure even with heavy loads. The exchangeability of individual system sections, e. g. the vacuum suction, makes the EcoGripper especially easy to maintain. If required, the gripper can receive a vision system, that allows for window installation following the “best fit method”.

» Centering table for various window geometries
» Nozzle cleaning with paper tissue
For the installation, the component (e.g. windshield) is first of all positioned in front of the body section. A 3D image display system measures the body section to determine the installation position. Via robot and gripper, the component is inserted automatically into the body section, whereby the vision system “guides the robot”. After that, the gripper releases the window and its position in the body is measured once again to ensure the exact position and thus the quality of the window installation. Optionally, the vision system can also be used to measure the windows before gripping, which considerably reduces the requirements on the centering process before the installation. The installation clearance is documented.
The gluing cell in the Ecopaint Testcenter Gluing at the Dürr technology center for gluing material applications is available for component trials, product and process developments and the validation of new products.

The test center represents a complete glue and primer application in multiple cells. Tests with various glues and materials can be carried out.

The center is equipped with

» 6-axis robot
» gluing tower
» centering and delivery table
» window gripper
» dosing systems
» applicators for glue and primer application
» various nozzle cleaning systems
» material supply
» optical measuring and monitoring systems

Your competitive advantage with Dürr

» Reduction of unit costs
» Maximum quality
» Reduction of the exposure of the worker
» Everything from one supplier – integrator with its own products synchronized with each other
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 systems as well as assembly, 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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