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 customers 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, failure rates and re-work 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 critical parameters are recorded and settable in the control system.

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.
Integrated process efficiency for every application task

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 car 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 car 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 modules, for instance glass roofs, are glued to the car body with polyurethane (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 car 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 PUR 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 is frequently combined with the manual installation of the components. The glue is applied to a stationary work piece using robotic and dosing automation. The work piece is then manually mounted on the vehicle. A constantly high quality standard is ensured.

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
» Work piece buffer
» very short cycle times due to optimized cell layout with short processing times
Glue application tower –
Stationary applicator, moving component

The concept of glue application on a component in motion is frequently used when the assembly of the work piece 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 car body section. A measuring system guides the robot.

Benefits:

» high quality guaranteed by automated glue application
» reproducible window assembly 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.

To add further process repeatability, Durr can offer the option of primer flow control. For the primer application, both a stationary solution at a primer tower and a robot solution are available.

» Stationary glue tower applies glue to moving component
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, which meet the accuracy and repeatability requirements necessary for optimum application of high viscosity 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 flow rate can be optimized for the specific application demands. For the dosing of the condensation curing glues on PUR 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
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, single 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 aligned 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 integrated sensors monitoring the filling level and the container empty status. Empty barrels will automatically be disconnected. To ensure continuous material flow, the supply is automatically switched from the empty to the full barrel.

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 by a pneumatically balanced axis. The compact design allows an easy application, even for components where complex work piece geometry restricts applicator accessibility.

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 beginning and end of the bead.

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 vision 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>Round bead</td>
<td></td>
<td>Triangular bead</td>
<td>Triangular bead</td>
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<tr>
<td>Max. operating temperature</td>
<td>80 °C (optional 160 °C)</td>
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<tr>
<td>Max. flow volume</td>
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<td>50 cm³/sec</td>
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<td>Max. material pressure</td>
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<td>Heating</td>
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<td>yes, gear ratio 16:1</td>
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<tr>
<td>Z compensation</td>
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<td>+/- 15 mm</td>
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<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 tissue

The EcoGun Cleaner is suitable for all nozzle geometries. Both mobile and stationary solutions are available.

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

As part of the gluing process, vacuum sucking grippers, equipped with a vision system handle the window and roof modules. An automatic adaptation of the suction device position ensures low-deformation handling of the component and guarantees that the component is installed without distortion. Alternatively, the gripper can be designed to “deform” the component into a defined installation geometry to achieve the optimum assembly 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 be equipped with a measurement system, that allows for window assembly following the “best fit method”.

» Nozzle cleaning with tissue

» Centering table for various window geometries
VISIONSYSTEM: OPTIMIZED AUTOMATIC INSTALLATION ("BEST FIT")

For the assembly, the component (e.g., windows) is first of all positioned in front of the body section. A 3D optical measuring system measures the body section to determine the assembly position. Via robot and gripper, the component is inserted automatically into the car body section, whereby the vision system "guides the robot". After that, the gripper releases the window and its position in the car body is measured once again to ensure the exact position and thus the quality of the window assembly. 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 gap will be documented.
Ecopaint Testcenter Gluing

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

The Testcenter 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 – we integrate for you using our own products
Dürr – Leading in Production Efficiency

Five divisions, one goal: Maximum production efficiency for our clients

» Paint and Assembly Systems: Paint shops and final assembly for the automotive industry
» Application Technology: Robot and application technology for painting, gluing and sealing
» Measuring and Process Systems: Balancing, cleaning and surface technology and testing, filling and assembly machines
» Clean Technology Systems: Air purification systems, energy efficiency technologies
» Wood Processing Systems: Machinery for woodworking industry