



APPLICATION INFORMATION

Headlight Manufacturing with Inline Plasma Treatment

Openair-Plasma® for pretreating headlight lenses and housings

Reliable bonding and tight sealing – these are the ultimate requirements for assembling headlight housings with polycarbonate cover. Over the years, leading headlight manufacturers have come to rely on Openair-Plasma® technology to satisfy these requirements with outstanding precision and at an affordable cost.

New full LED headlights with lower operating temperatures present an even greater challenge in terms of delivering excellent sealing characteristics.

Modern headlight housings, generally made from high-grade filled polypropylene (PP), are pretreated in the bonding grooves before adhesive is applied. The plasma jet's high degree of reactivity combined with low temperature output – cold plasma – means that any release agent from the injection molding process that may be left in the bonding grooves is safely removed without damaging the sensitive plastic or the mirrored reflector.

The plasma also introduces reactive functional groups into the surface (of the PP), providing the basis for reliable, long-term stable adhesive bonds. The treatment typically increases surface energy from <30 mN/m to >56 mN/m; an effect which, though essential, is not sufficient on its own. Increased surface energy of the plastic surface is reliably achieved with Openair-Plasma® treatment.

To achieve this dual combination, which is so vital to the treatment process, Plasmatreat provides an extensive range of nozzle head designs to suit the ever-increasing variety of headlight designs.



Gap-filling plasma treatment of headlight housing

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Innovations of “Next Generation Plasmatechnology“

- New Openair-Plasma® jets with processing window adapted to distance and pretreatment speed, maximum plasma density with low thermal load.
- Speed-regulated plasma density control for maximizing flexibility with customized headlight designs. If the robot movement is slowed down due to a complex gap geometry, the plasma nozzle readjusts with the generators and thus ensures a uniform application.
- Gap-filling treatment up to 15 x 15 mm cross-section to maximize sealant coverage (rotary systems).
- Spectral analysis of the light emitted by the plasma jet ensures full process control in compliance with automotive industry requirements.



- The new system design features a number of technical innovations including quick-release connections, highly flexible, robot-friendly nozzle feed lines, optimal EMC shielding, new, space-saving high voltage transformer, fully extensible feed lines.
- Newly developed, secondary-side measurement process to measure real-time plasma power using integrated high voltage measurements.



PCU Unit with plasma jet

New innovation on an approved technology – Openair-Plasma® for pretreatment of headlight lenses and housings

Polycarbonate headlight lenses need to be incredibly scratch- and impact-resistant to withstand stone chips at high speed. They also have to contend with extremes of temperature and driving rain. The sensitive components receive a final scratch-resistant coating, usually an acrylic-based paint, to protect them from mechanical wear. Further coatings may also be applied in the Aurora vacuum plasma system. Although conventional paint systems generally adhere very well to polycarbonate, it is advantageous to activate the lens with Openair-Plasma® before applying the paint. Plasma treatment with the new RD2005 rotary jets offers the following benefits:

- a) relieves material stress and eliminates the “rainbow effect” (spectral lines),
- b) ensures consistent paint coverage, uniform paint thickness, especially on sharp edges and
- c) substantially reduces reject rates arising from particle contamination, which exceeds 5% in some production process.



Plasmatreat provides a rental program which allows you to install a system in your own production line to conduct a proper evaluation of these benefits

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AIDE176_2022_03_03 Headlamp
Subject to technical changes and misprints.