LANXESS at NPE 2006

Hybrid Assembly Points – an Alternative to Spot Welding

Excellent Potential in Plastics-Metal Composite Technology

LANXESS Corporation
Contact: Terri Fitzpatrick
Head of Communications - NAFTA
111 RIDC Park West Drive
Pittsburgh, PA 15275-1112

Phone: 412-809-1516
Fax: 412-809-3603
terri.fitzpatrick@lanxess.com

Chicago, IL – June 19, 2006 – An established method of joining pieces of sheet metal together in the automotive industry is by spot welding. Trials carried out by LANXESS have now shown that injecting punched steel with polyamide can be a more effective and more economical jointing technique. "In tensile fatigue tests carried out on specimens of steel and our Durethan® BKV 30 polyamide 6, which is 30 percent glass fiber reinforced, we proved that the resultant hybrid assembly points had higher resistance to sustained loads than comparable welded points," explains Ulrich Dajek, an expert from the Semi-Crystalline Products business unit.

He sees excellent prospects in the automotive segment for this method of assembling structural parts using plastics-metal composite technology (hybrid technique). "Here, the spot welding of the metal before the injection molding becomes superfluous, leading to greater economy and productivity," says Dajek. Potential applications are, for example, hybrid front ends and roof frames which are made from several pieces of steel joined to one another. Apart from that, other welded metal connections, such as those that join the A and B posts to the sill, could be replaced. LANXESS is also considering this jointing technique in plans involving the production of car doors, tailgates and engine hoods using hybrid technology.

To produce hybrid assembly points – also known as "in-mold assembly points" – various sized holes are first punched with collars in two or more pieces of metal. The metal sheets are then placed in the injection molding tool so that the collars of adjacent pieces fit into each other. The collars and holes are then provided with a frictional “rivet head” of thermoplastic by injection molding. If a tensile load is applied, the main forces are held by the collars, which are inside each other. The injected rivet heads or buttons distribute the load and prevent the pieces of metal from sliding apart. "One advantage of this construction is that far narrower tolerances can be achieved than with spot welding. After all, the injection mold serves as a precision assembly gauge," says Dajek.

The tensile fatigue tests were performed at a frequency of 60 Hz at various load levels in a temperature range from –30 to +90°C until the specimens failed. Up to two million load cycles were applied. "With hybrid in-mold assembly points based on our glass-fiber polyamide 6, larger numbers of load cycles were achieved. They resisted the dynamic load longer than comparable welded points. One of the reasons is the greater strength of the plastic button compared with the relatively brittle metal weld," explains Dajek. The damping behavior of the hybrid assembly points is also better. Adjacent points also share the load, resulting in delayed failure. Metal weld points in isolation, on the other hand, fail. The result is that, on overloading, neighboring weld points give way in a kind of chain reaction (zipper effect).

LANXESS Corporation
Contact: Terri Fitzpatrick
Head of Communications - NAFTA
111 RIDC Park West Drive
Pittsburgh, PA 15275-1112

Phone: 412-809-1516
Fax: 412-809-3603
terri.fitzpatrick@lanxess.com

About LANXESS

The LANXESS-Group manufactures high-quality products in the areas of chemicals, synthetic rubber and plastics. The companies' portfolio comprises basic and fine chemicals, color pigments, plastics, fibers, synthetic rubber and rubber chemicals, leather, textile processing chemicals, paper chemicals, material protection products and water treatment products.

LANXESS Corporation was formed when the Bayer Group combined most of its chemical businesses and large segments of its polymer activities. The company began operating as a legal entity in the United States on July 1, 2004. LANXESS Corporation is a member of the German LANXESS-Group that was spun-off from Bayer in January 2005.

Information for editors:
All our news releases can be found on our home page at www.lanxess.com under the "Press" button. Visual material can also be downloaded from there.