



An Acument™ Global Technologies Company

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Fact Sheet Backgrounder

Avdel Designs Hydra™ 2000 Workstation To Assemble New

Lear Pro-Tec™ PLuS Self-Aligning Head Restraint System

Booth 1820 Assembly Technology Expo 2008

Avdel® Hydra™ Workstations

Avdel Hydra workstations simultaneously apply Avdel Speed Fastening® systems, breakstem fasteners and threaded inserts in high-volume production environments. When components are positioned at the Hydra workstation, hydraulic placing heads quickly install Avdel fasteners.

At the end of each cycle, a new round of fasteners is indexed to nosepieces for synchronous, repeatable assembly. Fastener heads double as fixturing points and can be moved and angled to adjust to distance, height and fastener pitch requirements. Hydra systems are the only workstations that offer custom configured assembly solutions in three fastening forms: Avdel Speed Fastening systems, breakstem fasteners and threaded inserts.

Hydra's Lear Head Restraint Application

A custom-designed Hydra workstation simultaneously applies two Avdel Stavex® all-steel breakstem rivets in assembly of Lear ProTec™ P LuS Self-Aligning Active Head Restraint Systems at the Lear automotive seating plant in Roscommon, Mich. Lear selected this application over a threaded fastener and weld nut process that did not offer the repeatability of the Hydra system.

The Hydra process joins three parts: the head restraint harp frame and two small, stamped steel brackets with plastic bushings. The brackets are key components in a mechanism that pivots the headrest up and forward in a rear impact crash. The plastic bushings prevent noise and rattle during vehicle operation.

When the harp arrives at the Hydra station, the operator sets it into a holding fixture, inserts Stavex rivets into a pair of placing heads, and sets a bracket with a bushing over each rivet. The placing heads move horizontally, simultaneously inserting rivets and brackets into holes in the harp and then extracting the stems. Placing heads immediately revert to home position. The entire process takes about 22 seconds, and the result is a harp assembly that prevents noise and rattle and allows instant protection in response to a rear impact collision.

Foolproof Process Controls

Avdel designed foolproof process controls for ProTec P LuS harp restraint assembly. The only system of its type in the world, its sophisticated sensor technology monitors and balances force and distance of rivet application strokes to ensure correct and consistent settings. If a hole is too large, if a bracket is missing, or if the part isn't quite correct, the system senses these problems and will not cycle. No rivets will be inserted. If all process parameters fall within predetermined limits, the application is date and time stamped, and can be archived for future reference. The monitoring process is displayed at eye level during system operation.

The Hydra workstation began production in January 2008, operating flawlessly since then, setting rivets for ProTec PLuS Systems for installation in Cadillac CTS front seats. Avdel provided the following engineering support during two-year design, testing and validation leading up to actual assembly:

- Designed semi-automatic Hydra workstation
- Designed support for proper joint configuration
- Redesigned Hydra 2000 placing heads to accept process monitoring
- Produced samples for test unit builds
- Provided on-site technical support and training at Roscommon plant
- Managed overall program and customer interface

Avdel Stavex Breakstem Rivets

The Hydra workstation at the Lear Roscommon plant applies Avdel Stavex all-steel breakstem rivets. With a unique crimp design that provides a wide grip range, they feature a smooth bubble formation on the backside of the application. High shear and tensile strength and consistent clamp loads ensure strong, vibration resistant joints while eliminating the need for several grip fasteners.

Stavex rivets fill irregular, oversized, slotted, and misaligned holes, providing increased strength and vibration resistance. The enlarged bulbing tail makes them ideal for thin sheet materials. Stavex rivets applied to ProTec PLuS harp steel tubing are 3/16" in diameter and about 5/8" long.

Pro-Tec PLuS Active Head Restraint

The patented, all-mechanical ProTec PLuS active head restraint becomes standard on many 2009 U. S. cars in response to Federal Motor Vehicle Safety Standard (FMVS 202a). Issued in 2006, the regulation dictates that all vehicles produced after September 1, 2008, for the U. S. market must have front seats equipped with head restraints that meet stringent requirements for reduction of whiplash injuries. The new head restraints are required on rear seats of all cars sold in the U. S. beginning September 1, 2010. ProTec PLuS also meets requirements of the Insurance Institute for Highway Safety and the European New Car Assessment Programme.

In rear impact collisions, the driver's pelvis, lumbar and shoulders are forced violently back into the seat. This sudden action deploys a mechanism in ProTec PLuS to pivot it instantly up and forward to capture and cushion the occupant's head as it rotates and thrusts backward. This lightning quick response significantly reduces the force and movement of the occupant's neck and is expected to lead to substantial declines in whiplash injuries sustained by American drivers each year. Following a crash, the device resets itself in seconds.

About Lear and Avdel North America

Lear Corporation is one of the world's largest suppliers of automotive seating systems, electrical distribution systems, and electronic products. The company's world-class products are designed, engineered and manufactured by a diverse team of more than 90,000 employees at 236 locations in 33 countries. Lear headquarters is in Southfield, Mich., and Lear is traded on the New York Stock Exchange under the LEA symbol. Further information about Lear is available at www.lear.com.

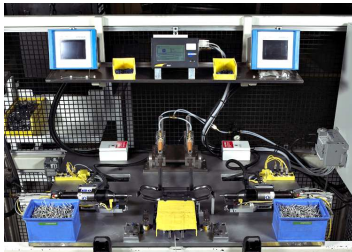
Avdel North America is headquartered in Sterling Heights, Mich., outside Detroit, with a production center in Stanfield, N. C., and a distribution center in Rexdale, Ontario. Avdel has been a leader in blind fastening systems and associated installation tools for more than 70 years. Principal products include breakstem fasteners, lockbolts, speed fasteners, threaded inserts, sealing plugs, and assembly tools and workstations. Avdel is an Acument Global Technologies company. For more information go to www.avdel-global.com.

Note To Editors: Low-res photos of Pro-Tec PLuS harp assembly at the Lear plant in Roscommon, Mich., are displayed on the following two pages. For 300 dpi versions, go to the newsroom at www.avdel-global.com. Click on *Press Releases* and then click on the first item that appears: *Assembly Technology Expo Press Kit*.

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- (1) Avdel and Lear engineers examine harp assembled in ProTec Plus head restraint.



- (2) Placing heads move horizontally, simultaneously inserting rivets into the seat restraint harp frame. Foolproof process controls ensure correct and consistent settings.



- (3) Applications take about 22 seconds for harp assemblies that provide instant protection in response to rear impact collisions.



- (4) Avdel Stavex rivets used in the Lear head restraint system are 3/16" in diameter and about 5/8" long. The application is shown in the background.

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- (5) With a unique crimp design that provides a wide grip range, Avdel Stavex breakstem rivets feature a smooth bubble design on their back side.



- (6) Brackets are key components in a mechanism that pivots upward and forward in rear impact crashes. Avdel Stavex breakstem rivets are applied in two holes where the blue bushing is shown.



- (7) Lear ProtTec PluS head restraint harp frame shown here with Avdel Stavex breakstem rivets applied.



- (8) Custom-designed Avdel® Hydra™ workstation applies Avdel Stavex® rivets in assembly of Lear ProTec™ PluS Self-Aligning Active Head Restraint Systems.