

DuPont Provides Lightweight Bonding Solutions for Aston Martin's First-ever Luxury SUV



Photo courtesy Aston Martin

Project

The introduction of the DBX marks a milestone in the 107-year history of Aston Martin because it's the luxury car manufacturer's first venture outside the traditional sports car look. To build an SUV with the performance and handling worthy of the Aston Martin name, their engineers relied on DuPont lightweight bonding solutions.

Powered by a 4.0-litre V8 engine that goes 0-62 mph in 4.5 seconds, the new DBX body is manufactured with a fully-bonded aluminum structure supported by DuPont expertise and solutions. As with all Aston Martin cars, BETAMATE™ and BETASEAL™ adhesives were critical for creating a body structure for the DBX that's bonded not just for strength and toughness but ultra-lightweight too.

Challenges

For over 25 years, DuPont has supplied Aston Martin with structural adhesive solutions, however, the DBX posed new challenges.

Bonding dissimilar materials

The design of the DBX required bonding of a broad range of materials including electro-coated aluminum and steel; anodized aluminum extrusions, castings, and sheet; carbon fiber and glass-fiber-reinforced composites as well as glass bonding applications.

Curing at the speed of production

Excellent processability was critical for the production of the DBX. Customized BETAMATE™ and BETASEAL™ adhesive solutions needed to meet a wide range of open- and cure-time requirements to ensure manufacturing efficiency.

A need for training and education

Production of the DBX takes place at an all-new production and technology center in Wales (UK) where Aston Martin converted three former military super hangars into a state-of-the-art manufacturing facility. DuPont experts needed to work closely with Aston Martin engineers to reinforce their understanding of how BETAMATE™ and BETASEAL™ adhesives work with new robotic application equipment. DuPont also supported the training and education of operators working with the materials for the first time.

Solution

Thanks to the strong and long-standing technical relationship and trust between the two companies—along with DuPont's proven ability to formulate the right adhesive solutions to meet Aston Martin's needs—the DBX is a structural and elastic bonding success story.

The DBX contains an impressive total of 23 kg of DuPont lightweight bonding solutions of which 15 kg is structural bonding alone! This is equivalent to 277 meters of applied adhesives. BETAMATE™ and BETASEAL™ are key to the DBX's body stiffness and high-performance driving experience.

In terms of application, including open- and cure-time requirements, DuPont's technology made it easy for Aston Martin to implement the BETAMATE™ and BETASEAL™ adhesives at their new plant. Continuous bond lines also contribute to durability, crashworthiness, as well as dampening vehicle vibration for a quieter ride.

In addition to structural bonding solutions with robust adherence to different substrates, DuPont provided education and training to ensure high performance, manufacturing efficiency, and the quality of fit and finish.

DuPont solutions applied for DBX strength, toughness, and lightweighting

- **BETAMATE™ 4600F** - a crash-durable structural adhesive applied by robot to bond four types of aluminum for the DBX body (anodized extrusion, sheet, casting, and powder-coated casting aluminum)

- **BETAMATE™ 2810 MV SET** - elastic adhesive applied manually to bond and seal SMC to aluminum

- **BETASEAL™ 1949-1F** - elastic adhesive applied robotically to bond glass on front, rear, and side of the DBX as well as the panoramic roof

- **BETAMATE™ 2810 LV PLUS** - elastic adhesive originally designed for Aston Martin; robotically applied to the DBX to bond SMC to three types of aluminum to reinforce the door opening

BETAMATE™ and BETASEAL™ for Superior Performance

Two of the most sought-after DuPont products for automotive bonding and sealing are BETAMATE™ and BETASEAL™ because they have a proven track record of exceptional performance.

BETAMATE™ one- and two-component epoxy structural adhesives provide high-performance bonding to steel, aluminum, and other materials to enhance stiffness, NVH, crash, and durability performance. They replace welds and mechanical fasteners to help improve durability while reducing weight and manufacturing cost. BETAMATE™ products are ideal for use in closures (doors, hoods, trunks, and liftgates) as well as body structure and chassis (underbody, pillars, and roof) applications.

BETAMATE™ structural adhesives can be used with:

- steel and high-strength steel (HSS)
- aluminum closures
- cast aluminum to profile bonding
- composite body-in-white parts integration
- magnesium suspension struts
- aluminum chassis/powertrain components
- aluminum or composite roof bonding
- bonded seat structures

BETASEAL™ adhesives are used worldwide for structural bonding and sealing of stationary glass in passenger vehicles, trucks, buses, rail coaches, and off-road vehicles. The superior performance of these systems helps vehicles meet globally mandated safety requirements for barrier, rollover, and roof crush regulations. Applied robotically or manually from standard or custom pumping equipment, BETASEAL™ is most often used for:

- windscreens
- backlites
- quarter glass
- modular roof assemblies
- sunroof assemblies
- glass hardware
- door glass
- mixed-material bonding

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Form No. 001-20464-HMC1120