

Press Release



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Electric racing cars for the Formula Student competitions

Full throttle with flame-retardant polycarbonates

The racing team E.Stall Esslingen is driving smoothly with polycarbonate battery materials from Covestro

Electric vehicles not only prevent local emissions, they can also be fun. Founded in 2012, the E.Stall Esslingen is participating in various international events of Formula Student with an electrically powered racing car. One of the biggest events is the [Formula Student Germany](#), which takes place every year at Hockenheim Ring.

The design of the racing car's traction battery is demanding – it is one of the most important components for the course of the race: It determines whether the driver has enough power to beat the competition.

Since the 2018 racing season, [Covestro](#) has supported the E.Stall Esslingen team with flame-retardant materials for the construction of the battery. In its Leverkusen pilot plant, the plastics manufacturer extrudes sheets from the PC+ABS blend Bayblend® to produce frames and brackets for its battery modules. These modules are based on lithium-ion battery cells in the so-called pouch format.

Flame retardant materials for safe batteries

In the design department for the battery, the various disciplines of the students at Esslingen University of Applied Sciences complement each other – from electrical engineering to electronics and mechanical engineering. In addition, the Formula Student specifies certain design requirements for the students in its rules and regulations, among others with regard to safety in handling lithium ion cells. Apart from active monitoring and control of the battery, the Formula Student regulations explicitly require the use of flame-retardant materials in



accordance with the Underwriters Laboratories' flame-retardant standards according to category UL 94 V-0 in the General Technical Requirements.

"We are delighted that Covestro is supporting us again in the 2019 season with polycarbonate blend sheets, which we can process easily," explains Raphael Raff, who is currently in charge of the high-voltage sub-project at E.Stall Esslingen. Compared with the previous year, a PC+ABS blend with around 10 percent lower density and high mechanical, electrical and thermal properties was selected for the racing team together with the Bayblend® product experts from Covestro in order to remove even more weight from the racing car's battery.

Products for large automotive series

For mass production, designers are looking for materials that meet the strict requirements of car manufacturers in vehicle operation but which are also easy to process. Compared to semi-crystalline materials, amorphous plastics such as polycarbonates have the advantage that they are virtually shrinkage-free in the injection molding process and have very low water absorption. This facilitates being able to design thin-walled, distortion-free components. Also polycarbonates can be provided very well with flame protection. The Covestro product portfolio includes a large selection of flame-retardant materials that meet the standards of the Underwriters Laboratories of category UL 94 V-0.

Covestro continues to develop its portfolio for battery applications. For cell holders to hold cylindrical battery cells, pouch cell frames, battery housings and similar applications, the focus is on both unfilled ([Bayblend® FR3010](#), [Bayblend® FR3040](#)) and mineral-filled ([Bayblend® FR3020](#), [Bayblend® FR3021](#)), along with glass-fiber-reinforced Bayblend® FR3060 EV) flame retardant Bayblend® products. Covestro also offers thermally conductive polycarbonate grades of the Makrolon® TC product family that can contribute to battery thermal management.

About Covestro:

With 2018 sales of EUR 14.6 billion, Covestro is among the world's largest polymer companies. Business activities are focused on the manufacture of high-tech polymer materials and the development of innovative solutions for products used in many areas of daily life. The main segments served are the automotive, construction, wood processing and furniture, and electrical and electronics industries. Other sectors include sports and leisure, cosmetics, health and the chemical industry itself. Covestro has 30 production sites worldwide and employs approximately 16,800 people (calculated as full-time equivalents) at the end of 2018.



About E.Stall Esslingen:

In 2012, E.Stall was founded as an electric racing team and has since then existed parallel to the Esslingen racing team, which has participated in Formula Student with in-house developed combustion vehicles since 2006. Following an initial prototype, the first all-electric racing car from Esslingen University was launched in 2013.

In the 2018/19 season the E.Stall team produced its second four-wheel drive vehicle and will take part in the summer events in Spain ([FS Spain](#)) and Italy ([FSAE Italy](#)). The entire team would like to thank its bronze sponsor Covestro for the successful cooperation. As one of our supporters, Covestro made it possible for us to participate in Formula Student and to have these great experiences.

This press release is available for download from the Covestro press server at www.covestro.com. Photos are available there for download as well. Please acknowledge the source of any pictures used.

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