

or welding the components. This sandblasting operation, carried out on the customer's premises, occasioned prohibitive costs in terms of the competitiveness of this process compared with the conventional cold-stamping process.

As for boron-alloyed steel, this was developed during World War II for shipbuilding and was initially used for the construction of warship hulls. Following the invention of hot stamping, it was recognised as a steel well suited to this process thanks to its high yield strength and its ability to harden by rapid cooling, but was only used in the uncoated state.



Jean-Pierre Laurent

Jean-Pierre Laurent, Research Engineer at the Fos-sur-Mer Hot Products Research Centre, had the idea of using hot stamping for the forming of boron steels with an aluminium alloy coating

The right product at the right time

With Jean-Paul Hennechart, then metallurgy/quality manager of the Mouzon plant, Jean-Pierre Laurent and his colleagues discovered that, by pre-coating the boron steel with an aluminium alloy before stamping, the corrosion inherent in the hot stamping operation could be eliminated. Costly post-stamping processing operations were thus obviated, with a final product exhibiting optimal mechanical properties and geometry.

This seemingly simple idea in fact went entirely against the technical preconceptions of the time in the field of hot stamping, according to which no metallic coating could withstand the heating operation prior to forming. In addition, nothing made it possible to predict that this metallic coating could also withstand very rapid cooling in the stamping tool, without detaching from the component.

With the development of Usibor® 1500 AISi, the leap in the steel's mechanical strength was considerable: we moved from conventional cold-rolled steel strengths of 600 MPa (megapascal) to 1000 MPa at the very inception of Usibor®, then to 1500 and now to 2000 MPa. This increase in mechanical strength has made it possible to reduce the thickness of the sheet used for automotive structures and thus contribute to reducing the weight of the body-in-white and therefore CO₂ emissions.

The success of Usibor® 1500 AISi, in addition to the product's technical and economic performance, also owes much to the automotive manufacturers who focused on lightening vehicles in order to reduce their fuel consumption. PSA, Renault, Volkswagen, Audi and Fiat were the pioneering manufacturers pushing for the development and use of Usibor®.

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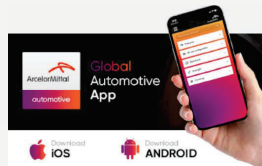
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In dark orange: applications of Usibor®

In fact, this new product required a substantial review of their manufacturing processes: they or their equipment manufacturers had to invest in new tools for hot stamping which required several years of development.

The first vehicles to incorporate Usibor® were the Peugeot 607 and the Citroën C5. Many other models have followed, driven by the product's excellent performance, and continue to use Usibor® in their structural components. Since its launch, Usibor® AISi's sales have grown exponentially and is now mainstream, reaching more than 2.5 million tonnes worldwide by the end of 2018, volumes that are expected to continue to increase in the future.

Usibor® 1500 AISi made its appearance as the right product at the right time thanks to the competence and commitment of good people who, not knowing that, according to specialists, this product was impossible to develop, developed it and put it onto an industrial footing in a period of 18 months.

Multi Part Integration®
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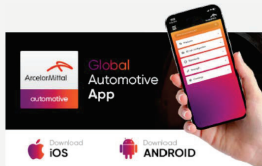
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