

DuoBond® is ready for production New composite material provides stable drives

Winkelmann MSR Technology and Hoesch Hohenlimburg – two specialists who have researched and developed DuoBond® in successful teamwork. The innovation, which has now reached production maturity, is a modern steel composite material that fulfills the highest expectations and makes the gearboxes in modern vehicles more resilient.

Flow formed disc brackets for sophisticated powertrains are a specialty of WMT and potential field of application for the brand new steel composite, DuoBond® from Hoesch Hohenlimburg.

The newly developed DuoBond® steel-composite material sees metalworkers Winkelmann MSR Technology (WMT) improve the speed and torque of modern vehicles. "We currently have component prototypes with the new material combination in the testing phase with our customers," said Christian Brinkmann, Head of Sales and the Drive Elements Project. The previous development stages were negotiated successfully – in cooperation with Hoesch Hohenlimburg.

"ThyssenKrupp Steel Europe has been our material supplier and development partner for more than 20 years. And the new DuoBond® is our joint project." The work has paid dividends: The new development with boron-alloyed tempering and high strength chromium steel was a 2012 Steel Innovation Award prize winner.

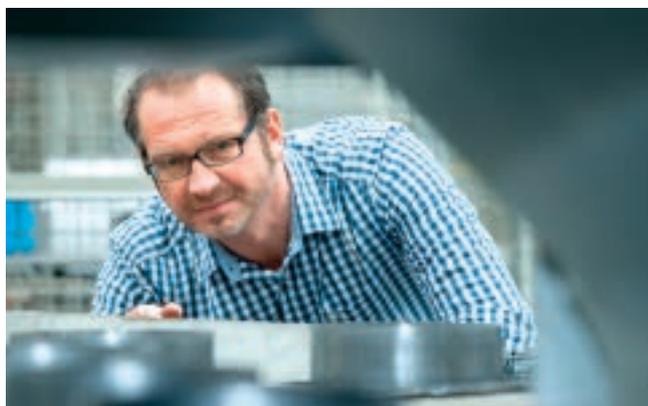
The specialty of the company, based in Ahlen: a broad spectrum of forming technologies, in particular flow forming. Customers come from all over the world. "And of course from Germany, an important purchaser country," adds Brinkmann. WMT supplies components and assemblies made of steel, stainless steel, aluminum and titanium for the high-tech industries automotive, aviation and aerospace engineering, and plant construction. For example, it manufactures high-precision plate carriers with internal gears for gearboxes in premium sports vehicles. In passenger aircraft, hydraulic cylinders are installed in the chassis and other cylinders even find their way into space – for example, in the Ariane launcher rocket. These and other products from Westphalia – mainly rotationally symmetrical hollow components – are distinguished by high precision and complexity. And this is where WMT's specialty, flow forming, comes into its own. The company is the global market leader here across all industries. CEO Martin Michelswirth explains: "This forming process allows us to produce complex shapes with very thin walls and high material utilization – while at the same time achieving increases in strength due to cold work hardening."

The company is the manufacturer of the Winkelmann Group and its high-tech unit at

the same time. Michelswirth: "Our R&D activities typically lead to small production runs by WMT. Then they are used in the manufacturing activities of other subsidiaries, for example, Winkelmann Powertrain Components, which supplies all German car manufacturers with high volumes." The group, which has its headquarters in Ahlen, stands for more than 100 years of experience in metal processing and expertise in various forming technologies. Today, the hidden champion has more than 2,500 employees worldwide, generating a turnover in 2012 of some 450 million euros with 18 independent business units, seven production and distribution companies, eight distribution companies, a steeltrading company, and two joint ventures in China. The group is organized in three divisions: automotive, heating and water, and drive technology. The latter is especially the focus of WMT for automobile manufacturing of highly specified small to medium-sized series.

The brand new DuoBond®, which was created in cooperation with Hoesch Hohenlimburg, is a development with potential for large scale production. "But first of all, it's all about use in our plate carriers with internal gearing for vehicle transmissions," says Brinkmann looking back: "The starting point for this development was the modern requirements of vehicle manufacturers, who are downsizing engine capacities with a view to future emissions regulations and reducing CO₂ emissions." This means higher speeds and torques – and it puts even more load on the transmission components. This requires

"DuoBond®, developed in cooperation with Hoesch Hohenlimburg, is ready for production of precision parts by WMT – primarily for use in automobile manufacturing," says Christian Brinkmann, WMT's Head of Sales and the Drive Elements Project.



adjustments to components and hence changes on the materials side. "For our plate carriers this means improving wear resistance due to the higher torques where the gear tooth system meshes," he says.

WMT then had the following idea and implemented it with Hoesch Hohenlimburg. "On the tooth flanks, the locations of highest stress and thus with the highest susceptibility to wear, the new composite material provides a highly wear-resistant layer," explains Norbert Schönborn, Technical Customer Advisor with Hoesch Hohenlimburg. For this application, DuoBond® combines boron-alloyed tempering steel as a standard constructional steel with high-strength chrome-alloyed high-carbon steel in the areas with extreme load exposure. The two are inextricably bonded at Hoesch Hohenlimburg during hot rolling. Schönborn: "The points with the highest loads achieve strengths of up to 1,300 megapascals. Other steel grades in multiple layers are feasible." Another advantage of joint development: "DuoBond® makes heat treatment, which is often required in flow forming, unnecessary. This saves processes and ultimately costs. Producing larger quantities and thus increasing the degree of automation in production, makes the composite more attractive," adds Schönborn. Despite the current successes, Schönborn and Brinkmann are modest: "Now we have to wait and see what WMT's customers think of the new material development. The material is production-ready in any case."

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