

Daily endurance test:
Clays, silts, sands,
and loams, as well
as the stones they
contain, represent a
continuous challenge
to plowshares

Tough and strong

Originally founded as a blacksmith's workshop, the **Lemken** family business has been producing high-quality agricultural machinery since 1780. Today, the company based on the Lower Rhine is one of the leading international manufacturers of agricultural machinery, with 30 subsidiaries worldwide. Its most important products include plows, which are manufactured using boron-alloyed wear-resistant steels from thyssenkrupp Steel. Brand new in use: **TBL® 45**.

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H

ardly any tool has influenced the development of agriculture over the past centuries as much as the plow. Today, it is both a curse and a blessing. On the one hand, it loosens and turns over the topsoil, thus increasing the oxygen supply and promoting the decomposition of organic matter. On the other hand, plowing increases soil erosion and water evaporation. "The plow is regaining importance as an alternative to phytosanitary treatments. It continues to be the tool of choice for many farmers, particularly for controlling treatment-resistant weeds," explains Ingo Fricke, a materials technology specialist at Lemken.

The company, whose products are immediately recognizable by their characteristic blue paintwork, specializes in the development of innovative solutions for profitable agricultural

machinery. Lemken exports machines with a working width between one and 36 meters to 55 countries worldwide – with great success. In 2022, sales broke through the €500 million barrier for the first time in the company's history.

Every application is a new test

One decisive factor in boosting demand is the special quality of Lemken machines. This is put to the test every day when they used in the various soil types. Clays, silts, sands, and loams, as well as the stones they contain, represent an ongoing challenge to plowshares in practical use.

For this reason, Lemken leaves nothing to chance when it comes to the materials used. The product of choice: Steel. For more than 25 years – and except for brief interruptions – the manufacturer from Alpen in the Lower Rhine region has been sourcing its input stock from

Successful development partnership (from top):
Lena Ruf from thyssenkrupp Steel together with Ingo Fricke and Arne Maas from Lemken.

thyssenkrupp Steel. Hardenable boron steels in particular play a major role in the production of agricultural machinery. From this starting point, further heat treatments and finishing measures are carried out at Lemken in order to be able to offer its demanding clientele precisely those properties that are required in arable farming. It's about two things in particular: "We need maximum hardness after quenching and tempering to ensure that the parts subject to wear perform as well as possible in all soil conditions. The considerable toughness of the material is equally important, so that the component does not break even under peak loads," says Arne Maas, a strategic purchasing employee at Lemken.

Close development partnership

In thyssenkrupp Steel, Lemken has a partner at its side who can supply highly specific steel grades for the special tasks the machines must perform, and who also provides active support in the development of new products. The latest example is the fine-grained boron-alloyed tempered steel, TBL® 45. This is the result of an intensive development partnership that enables completely new qualities in wearing parts at economical costs. The background to this was Lemken's desire to critically examine its own choice of materials. This involved testing different steels for their final hardness and expected service life under the aspect of wear stress on the parts to be manufactured with them during soil cultivation.

Lemken machines require highly specific steel grades in their application. thyssenkrupp Steel supports the development. The latest example: the boron-alloyed wear-resistant steel, TBL® 45.



Various materials performed well in the demanding tests – including field trials in the truest sense of the word. But only the TBL® 45 grade proved convincing on several levels. On the one hand, with its special hardness of at least 57 Rockwell (HRC – an internationally used unit of measurement for the hardness of technical materials) after quenching and tempering. On the other hand, its price, which is essential not only for Lemken but also for the agricultural technology manufacturer's customers. In addition, the hardenable boron steel simplifies processes at Lemken because the number of steps in the finishing process is lower than for other materials.

The effort was worth it

The overall package of various advantages ultimately led to the decision to use TBL® 45 from thyssenkrupp Steel in Lemken plows in the future. A well-considered decision, in the run-up to which both project partners invested a lot of time and effort for interdisciplinary cooperation. Ingo Fricke: "The product development process, the construction of the prototypes, the work on the validation test rigs, the production of a pilot series – we spared no efforts with thyssenkrupp's help, and in the end achieved the best possible result."

Web

More information about TBL® can be found here:
www.thyssenkrupp-steel.com/en/tbl

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