konstruktions praxis

2023 1

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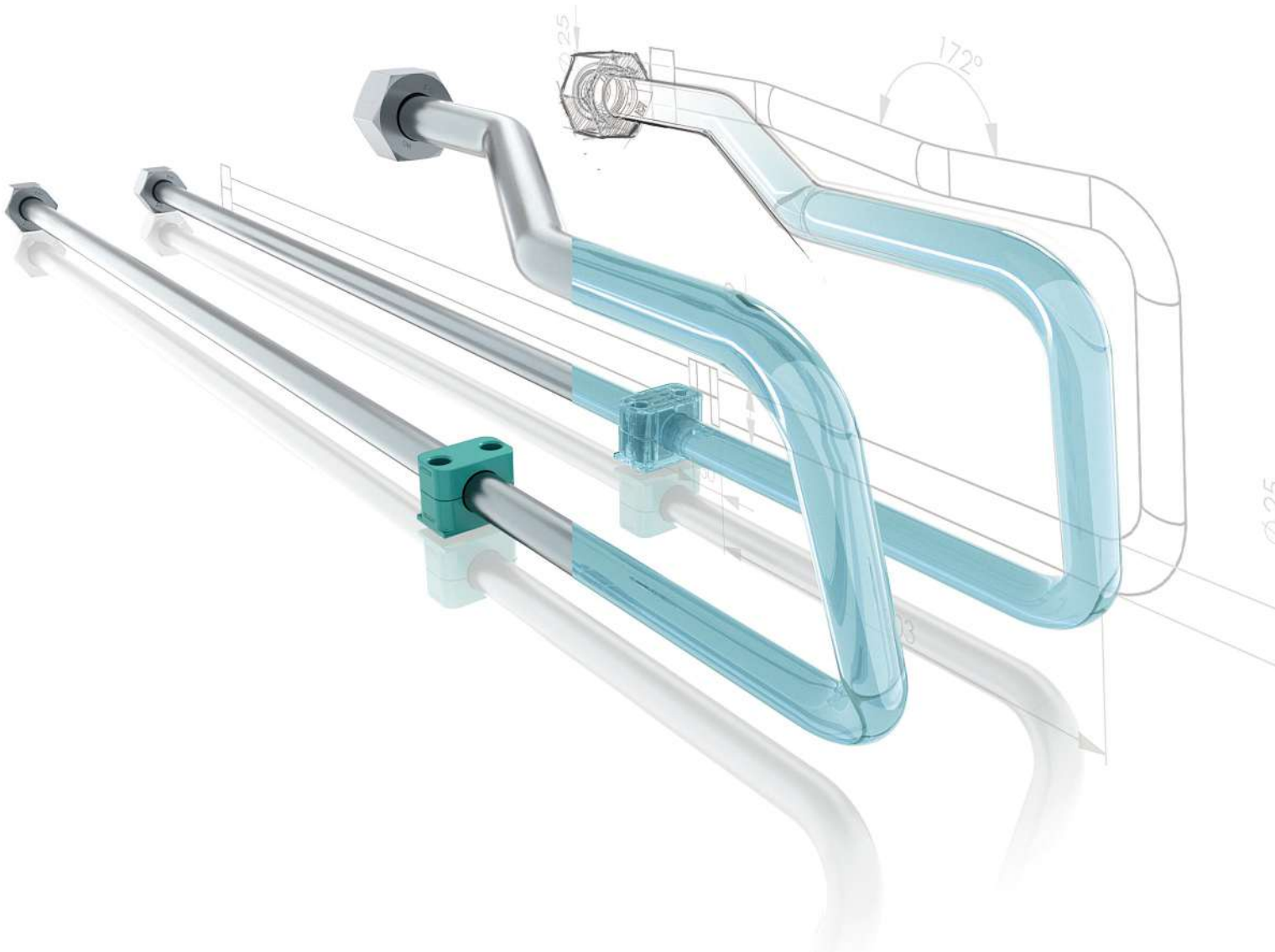


FLUIDTECHNIK

Präzise gebogene Rohre – nicht nur für hydraulische Anwendungen

ANTRIEBSTECHNIK

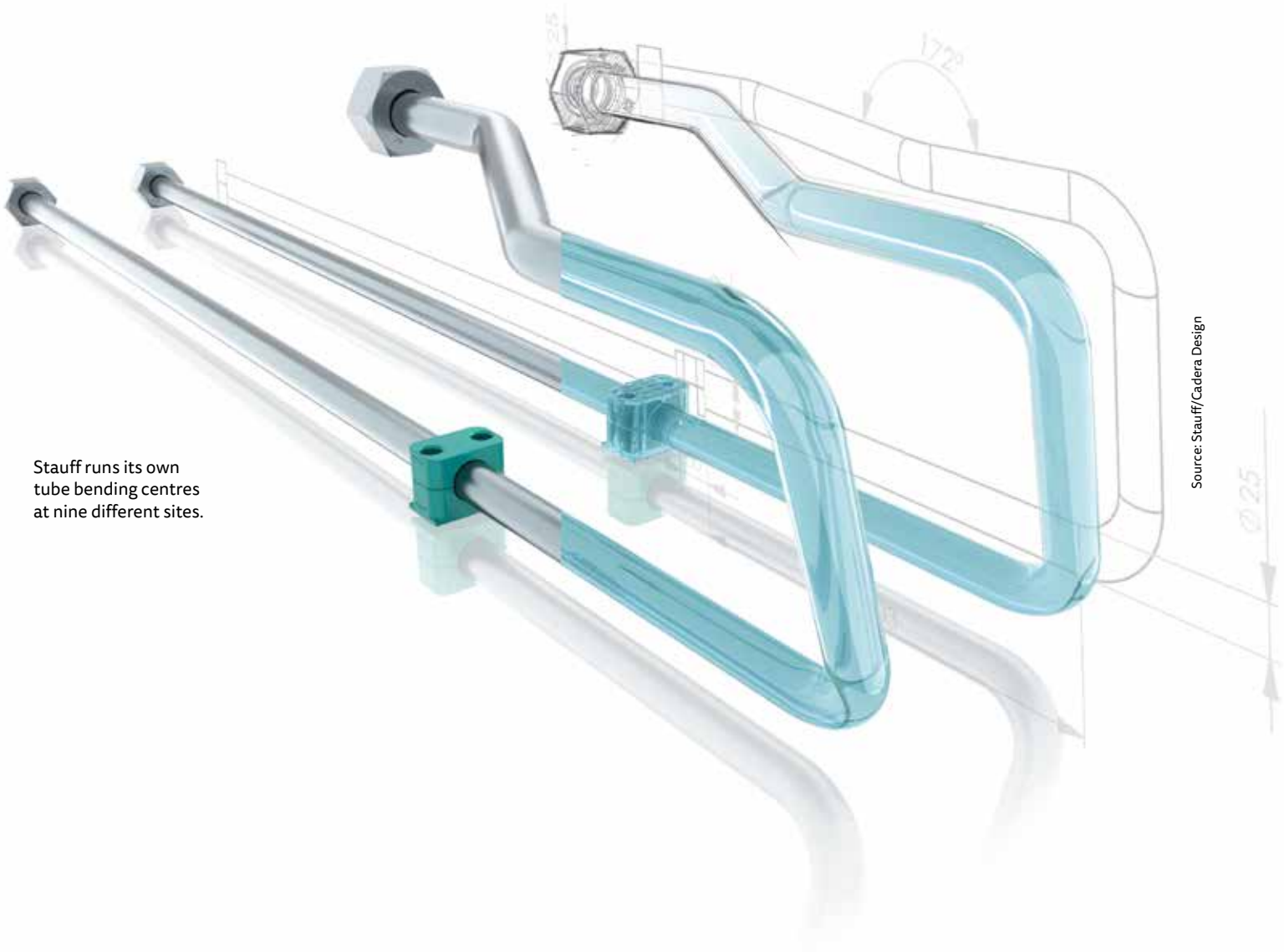
Wie sich die Reibung in Gleit- und Wälzlagern reduzieren lässt

VOGEL COMMUNICATIONS GROUP

TUBE BENDING CENTRE

More than "just" hydraulics

With its tube bending centres, Stauff offers fully fabricated line sections ready to install for the worldwide hydraulics market and applications in other areas.



Stauff runs its own tube bending centres at nine different sites.

Source: Stauff/Cadera Design

TITLE STORY

Source: Safescape

The Bortana EV was developed for the rough underground and overground environment in the mining industry. Stauff tubes are used for the coolant supply and for protecting electric cables.

Since introducing its own tube connector range Stauff Connect in 2015, Stauff has been a one-stop supplier for components of hydraulic line systems in the international market. All components in the Stauff Line are developed and manufactured in house, and manufacturers of mobile and stationary systems with hydraulic functions can also purchase fully fabricated line sections, ready for port-to-port installation, including the bent tubes.

Stauff has now set up tube bending centres at nine of its international sites, most recently in France in January 2023. In other countries, this service is provided by authorised Stauff Line system partners.

In 2021, Stauff entered into a strategic partnership with Unison Ltd, the leading manufacturer of fully electric tube bending machines. The agreements include an even more comprehensive global service from the British company, whose expertise Stauff has been relying on for many years when it comes to setting up and operating state-of-the-art tube bending centres. With this competence acquired at the source, so to speak, Stauff guarantees its customers implementation of anything from simple to complex customised three-dimensional tube structures. 17 Unison machines produce for Stauff worldwide every day.

A new design for mining vehicles

An unusual application illustrates the wide range of tasks where bent tubes from the Stauff tube bending centres can be used. In the Bortana EV, an underground electric vehicle, this concerns the coolant supply for the powerful battery pack and safe routing of electric cables.

Even the background story of this vehicle is exciting: The Australian company Safescape specialises in equipping mining plants with safety products such as special ladders, covers or edge protection structures. Like many mining suppliers, the experts at Safescape were not happy with the diesel vehicles typically used in this environment: Even robust off-road vehicles reach an average service life of just one and a half years in the extreme conditions of a mine. This is due to the high mechanical strain, heat and moisture, which lead to extreme corrosion. The greatest challenge for Safescape, however, was to replace the combustion engine.

Beau McKenna, Marketing Manager at Safescape, explains: "The great number of moving parts susceptible to corrosion in a diesel engine are the cause for many vehicle failures underground. We also wanted to eliminate the particle emissions and heat generation from the combustion engine in order to make the working conditions for personnel safer underground."

An electric drive seemed the obvious choice.

Beau McKenna says: "An electric motor is the ideal drive. It has fewer moving parts, requires little maintenance, generates little heat and produces no emissions. Range is not an issue because the vehicle is used only in the mine. In addition to this, the entire drive can be easily protected against the typical strains of the mining environment such as dust, impact, vibrations, and moisture containing acid and salt." The base vehicle is a Marruá, an off-road commercial vehicle developed in Brazil for military use. "The so-called 'wild bull' is an extremely robust vehicle. It has a high payload and the manufacturing quality is very good,

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State Manager
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FACT

After ten test vehicles went through rigorous testing during practical use in various Australian mines, the Bortana EV has now gone into standard production.

Source: Stauff

View of the Stauff line production in Unanderra/Australia: high-quality precision machinery at work

Source: Stauff

The tubes bent to individual customer requirements are ready to install.

as is the corrosion protection for the body and components. All body components are galvanized and the chassis is fully sealed – ideal prerequisites for a long service life underground," confirms Beau McKenna.

Stainless steel tubes

The objective was to design and implement every detail at this high level. Safescape were accordingly very discerning when selecting their service providers. The engineers were impressed by the expertise of Stauff Corporation Pty Ltd. in Melbourne. Stauff received the order for ready-to-install, three-dimensionally bent 19 mm tubes with machined ends, for conveying the coolant to the powerful battery packs.

Safescape also ordered fully fabricated 28 mm tubes for routing the electric cables.

Stauff initially manufactured several trial tube sets made of stainless steel that were up to 1.85 mm long and had multiple three-dimensional bends. These tubes are produced at the Australian Stauff headquarters in Unanderra.

The 3D design data from Safescape can be imported directly into the Stauff software for the bending stations and the delivered assemblies meet all requirements. Stauff clamps are used for installing the tubes. After ten test vehicles went through rigorous testing in various Australian mines, the Bortana EV has now gone into standard production: While the current "entry level" produces ten vehicles per month, the planned production volume is 100 vehicles per month. The business relationship between Safescape and Stauff is a successful one. The employees at the tube bending centre in Unanderra are ready for more orders.

Clamps for supply lines

In the Bortana EV, electric cables are guided through tubes to protect them against the extreme conditions of the mining environment. In other areas of application with less extreme conditions, more and more line builders rely on Stauff clamps for direct guiding and fastening of supply lines such as electric cables, pneumatic hoses and low-pressure hoses.

The new Multi-Line clamp type MLC was presented at the two trade fairs Bauma and Innotrans in 2022: These clamps are designed to hold two, three, four or six lines with identical or different diameters and are therefore ideal for easy and secure fastening of different line types.

In contrast to standard DIN clamps, which can only be used to attach up to two lines with the same diameter, these clamps result in a significantly lower number of individual parts required for installation. Variants for six lines, for example, require only three screws, while all others need only two. Using fewer components also shortens the installation time while reducing the required installation space. *(häu)*

INFO

Custom fabricated tubes

From component manufacturer to service provider: The companies in the Stauff Group and their authorised system partners follow this principle to offer machine and plant engineering companies the following services for the processing of tubes, in particular for (but not limited to) mobile and industrial hydraulics:

- machine controlled and monitored bending of seamless precision tubes made from standard steel (Zistaplex, Zista Seal, galvanised, phosphated, untreated), stainless steel, copper and various special materials in all common metric tube diameters and wall thicknesses, up to six metres long,
- machine controlled and monitored assembly of cutting rings and union nuts,
- tube end forming with Stauff Form and other common
- systems,
- inductive soldering, Cu hard soldering as well as WIG, MIG and MAG for welding non-positive connections,
- testing in line with standards or customer specifications,
- cleaning of lines to achieve specific cleanliness levels and specifications as well as
- sealing and protecting the tube ends and other connections.