

# SPECIAL-PURPOSE PART MOBILE MACHINERY



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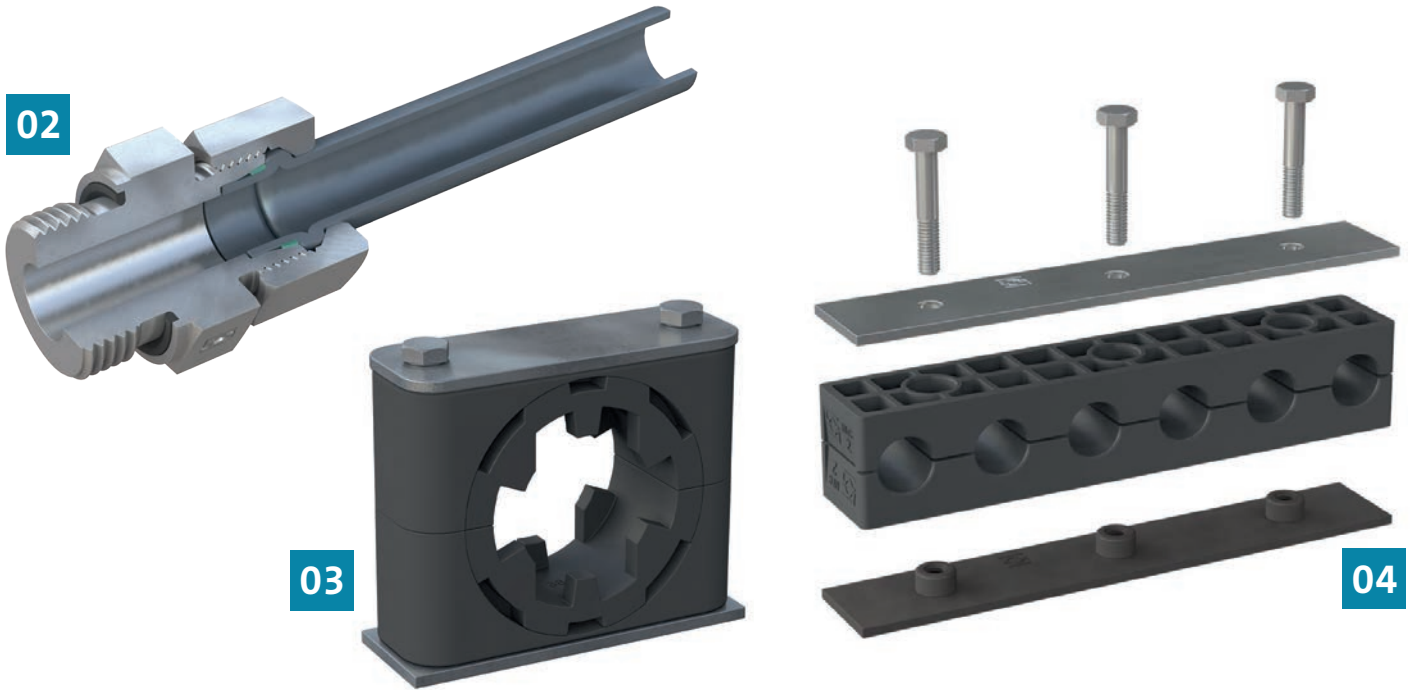
TUBE AND HOSE SOLUTIONS FROM  
A SINGLE SOURCE

## SAFE AND LEAK-FREE HYDRAULICS FOR REFUSE COLLECTION VEHICLES

In Germany, an estimated 15,000 to 18,000 refuse collection vehicles are operating every day even directly in town and city centres. In light of the burden caused by CO<sub>2</sub> emissions and noise emissions, manufacturers are always realising impressive new vehicle concepts. Stauff hydraulic line systems make an important contribution to their implementation.

**01** In Germany, up to 18,000 refuse collection vehicles have to carry out their work every day in town and city centres and residential areas





**02** The Form EVO tube connection system withstands strong vibrations and permanent pressure shocks

**03** The two-part elastomer insert of the NRC clamp dampens vibrations and absorbs noise

**04** MLC clamps can hold up to six lines with identical or different diameters and are suitable for use with tubes, hoses or cables

As more and more towns and cities are moving to keep high-polluting cars and vehicles out of town and city centres, refuse collection vehicles still have to operate right in the heart of residential areas and town and city centres. The vehicle industry is therefore right at the heart of the public debate about traffic in towns and cities and residential areas: The refuse collection vehicles should be low-emission or if possible emission-free and be able to navigate safely through car, bicycle and pedestrian traffic in partially confined road conditions. In addition, they should be low-noise whilst en route in or-

der to protect residents and in no way endanger the environment through escaping oil or even vehicle fires. Implementing this catalogue of requirements is an enormous challenge in light of vehicle dimensions alone: A standard rear loader refuse collection vehicle has a structure that weighs about seven tonnes and can hold eleven tonnes of waste. Around 40 metres of hydraulic tubes, 60 metres of hose lines and 100 metres of electric cables need to be compactly routed, connected leak-free and securely fastened in a vehicle.

Manufacturers need to pay a lot of attention to the hydraulic line system, while the trend in mechanical engineering is to concentrate on one's own core competencies and hand over responsibility for non-specialist areas to companies with the appropriate expertise.

Stauff, the manufacturer of all the hydraulic line system components developed and produced in-house, offers a concept for this: The „Stauff Line“ product line includes the complete range of line, connecting and fastening components including bent tubes, and looks after customers from the initial idea to the implementation of hydraulic line systems. This includes delivery models tailored to the manufacturer's complex processes.

Assemblies have also proved useful as they reduce the workload and complexity on site, but also increase safety. After all, most leaks come from installation errors.

In line with the international Stauff Group's slogan „Connect with Stauff“, the company focuses strongly on engineering expertise and expressly invites OEM designers and project managers to work even more closely with them. Several well-known international manufacturers of refuse collection vehicles already appreciate collaborating with Stauff Engineering at its headquarters in Werdohl (Germany), especially as delivery and support is guaranteed by the Stauff Group's international branches.

### TUBE CONNECTION SYSTEM FOR GUARANTEED LEAK-FREE OPERATION

The most important hydraulically driven functions of a refuse collection vehicle include the side or rear lifters, which are used to lift and tilt refuse bins or containers, as well as the refuse presses inside the collection container. This is where the Stauff

### „PAY PER USE“ FOR FORMING SYSTEMS

Stauff recommends using its Stauff Form Evo forming system to connect tubes exposed to strong vibrations, as is the case in many mobile applications. The forming machine is the core of this particularly robust tube connection. Several usage models are provided for OEMs with initially low or hard-to-calculate order volumes: They have the option of paying a fee per forming operation (Pay Per Use) or a one-off flat-rate weekly rent.

**05** The Stauff Form EVO machine shapes the tube end so that a positive connection is created during fitting with a conventional fitting body and a union nut



hydraulic experts come in. Stauff Engineering recommends the strongest tube connection system Stauff Form EVO in view of the strong vibrations and permanent pressure shocks experienced. The lift is operated up to 1000 times in a 8-hour shift in a residential area, with most of the vibrations occurring when the bins are knocked out.

The principle: the Stauff Form EVO machine is used to reshape the tube end so that a so-called positive connection is created during fitting with a conventional fitting body and a union nut. The only conceivable leakage path is additionally secured with a Viton seal.

Unlike a forming system, a cutting ring connection is produced when a metal ring with two edges cuts – as the name already indicates – into the tube surface when a union nut is tightened. This incision into the material limits the vibration resistance. The forming system, on the other hand, has a higher tear-out strength, which adds to safety under extreme conditions – strong pressure surges and vibrations as experienced in the refuse collection vehicles. Manufacturers are increasingly relying on the explicit recommendations of the Stauff experts to prevent fires or traces of oil caused by leaking oil.

## CLAMPS REDUCE VIBRATIONS AND NOISE

Stauff recommends the use of NRC clamps (noise reduction clamps) to reduce the noise level in the hydraulic line systems of the refuse collection vehicles. These special clamps, which are used to attach tubes, for example, to the machine housing, have a specially shaped two-piece elastomer insert, which is integrated into the polypropylene or polyamide clamp body. It decouples the tube from the surrounding construction, minimising the transmission of vibrations in both directions, and noticeably reducing the noise level.

NRC clamps are compatible with standard steel and stainless steel fastening accessories. This means that the accessories do not need to be replaced when converting to NRC clamps in production.

The contribution of these clamps to reducing noise seems rather insignificant in view of the often heavy and large vehicles

with internal combustion engines. But on the one hand, with 40 metres of hydraulic tubes and 60 metres of hose lines, we are talking about a rough estimate of up to 100 fasteners. On the other hand, waste disposal companies are increasingly converting their fleets to electric or hybrid-powered vehicles, so that every decibel that can be saved becomes even more important. Small, manoeuvrable vehicles have long been used in the narrow streets of old towns, pedestrian zones or car parks.

## COMPACTLY AND SECURELY FASTENING LINES

While Twin Series standard clamps are capable of securing a maximum of two lines per clamp body, Stauff MLC clamps (multi-line clamps) have been designed to hold up to six lines with identical or different diameters. This is of particular interest for use in refuse collection vehicles: MLC clamps are suitable for use with tubes, hoses or cables. As mentioned above, the electrical „nerve system“ of a standard refuse collection vehicle can be up to 100 metres long. Tubes and hoses are often routed in parallel. Considerably less installation space or fastening surface is needed to secure the same number of cables using MLC clamps. One example to illustrate this: The total length of a clamp for six size 3 cables is only 216 mm. Six DIN Standard Series clamps arranged side by side require 300 mm. The number of components required is also lower, not just the number of clamps required. There are also fewer other components needed to securely fasten hydraulic lines: cover plates and weld plates, rail nuts, safety locking plates, stacking bolts, other adapters and other accessories. The fewer components that need to be attached, screwed and welded, the shorter the installation time and the lower the risk of installation errors. With the Stauff Multi-Line clamps, up to six lines with different outside diameters can be secured on request.

Images: Aufmacher: Zoeller; image 01: Jan Kliment – stock.adobe.com; others Stauff

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