Simple to use on site

Coupling under residual pressure

STAUFF is adding two nominal sizes to its QRC-FG series of flat-face screw-to-connect couplings: the ‘Small coupling’ – DN 6 for low volumetric flows and tight installation spaces, such as those found inside construction machinery, and the ‘Large coupling” – DN 51 for use at sea, in mining, and in special heavy-duty applications.



With demolition excavators, the multi-sectional booms become shorter during operation as the demolition progresses.
Image: gabort-stock.adobe.com



Taking into account users' needs when developing hydraulic line components reinforces the manufacturer's brand at the same time. The easier a component is to use in practice, the less frequently installation errors will occur, and the more regularly maintenance and repair work will be carried out. The benefit of this is efficient, reliable operation with minimal downtimes and, overall, longer machine service lives, even in extreme site conditions. The QRC-FG coupling series is a special example of this approach by the Stauff Development and Technology Centre.

At the request of the user

The QRC-FG coupling for the safe connection of hoses in the hydraulic systems is the further development of a previous series, which has been successfully marketed for over a decade, and the basic concept of which has been retained. It is a flat-face screw-to-connect coupling, a quick-release coupling with a screw thread and smooth faces, all sizes of which are de-signed to handle high burst and operating pressures, strong vibrations, and pressure peaks. One of the key differences in this further development: both sides of the QRC-FG can be coupled under pressure, while only the male tip side of the previous series could be connected up to a maximum of 250 bar. Svenja Küch, Product Manager for Quick-release Couplings at Stauff Germany, explains: "The QRC-FG series was developed in response to the request from end-users to undertake maintenance and modification work under residual pressure as well." The revised development also focussed on higher flow rates and lower coupling forces. Nominal sizes of DN 10 to DN 25 were





Both sides of the QRC-FG can be coupled under pressure, while only the male tip side of the previous series could be connected up to a maximum of 250 bar. *Image: Stauff*

launched in 2022. A nominal size of DN 6 will soon be available to provide the solution for low volumetric flow rates and especially tight installation spaces. Among other applications, sizes DN 6 to DN 25 are used in sectional excavator booms, as well as in many other mobile machines. A QRC-FG coupling with a nominal size of DN 51 was developed in response to demand from the oil and gas industry and international OEMs in the construction and mining machinery sector.



„Quick-release couplings also act as safety valves to stop the uncontrolled loss of oil during hose changes, modifications or maintenance, preventing hydraulic oil from being released into the environment."

Svenja Küch, Product Manager for Quick-release Couplings at Stauff Germany
Image: Stauff

Connection, modification and maintenance during ongoing operation

Couplings on hoses and components that carry oil represent sensitive points in the hydraulic power transmission system. On the one hand, they must be absolutely tight and leak-free, but they also need to be capable of being easily coupled and uncoupled. In demolition excavators, for example, the multi-sectional booms, which enable the machine to work at significant heights and give it a wide working range, become shorter during operation as the demolition progresses. Simple and safe handling is crucial here. Svenja Küch: "Quick-release couplings also act as safety valves to stop the uncontrolled loss of oil during hose changes, modifications or maintenance, preventing hydraulic oil from being released into the environment." Only when the male tip and female body are tightly connected to each other do the two valves open. The smooth faces of the 'flat-face' concept also minimise drip losses, preventing dirt particles or air from entering the hydraulic system – a further contribution to the ease of maintenance of mobile machinery used in dirty environments. Crucial for the operators of mobile machinery outdoors: if the increase in the ambient temperature raises the residual pressure on both sides when the machine is stationary, no oil leakage can occur during coupling or uncoupling.

Screw-to-connect or push-to-connect?

Compared to push-to-connect couplings, screw-to-connect couplings offer a larger contact surface between the male tip and the female body. This results in a more uniform distribu-tion of the forces that occur and improved resistance to the traditional loads on hydraulic systems in construction and agricultural machinery, such as vibrations and pressure peaks. A disadvantage of push-to-connect couplings: recurring vibrations and pressure surges can cause "brinelling", that is deformation in the groove of the male tip. Depending on how serious the deformation is, the female body and male tip can then no longer be uncoupled and need to be replaced. Screw-to-connect couplings are not subject to this, due to the even distribution of force in the connecting thread.

Straightforward installation process

With larger nominal sizes, it is beneficial for users that manual application of force can be reduced by the use of assembly tools – simple, commercially available hook spanners. A further point in favour of screw connections: the installation process is clearly defined. On the QRC-FG, a coloured O-ring at the bottom of the thread provides additional safety. Only when it can no longer be seen has the screw process been done correctly. Svenja Küch: "We receive very positive feedback from the users on site about this installation aid." Users also appreciate the colour coding. The male tip and female body can be marked with coloured rings to reliably rule out confusion of the lines during connection. Svenja Küch and her colleagues at the Stauff Development and Technology Centre have learnt that some OEMs are using the QRC-FG for applications where a screw-to-connect coupling

is not mandatory. “Manufacturers are interested in minimising the potential for errors in the application. After all, their reputation depends on how reliable their machines are in everyday use.”

Zinc/nickel finish surface in the test laboratory

The QRC-FG coupling series is coated with the special Stauff zinc/nickel finish for steel components, which offers particularly good corrosion protection compared to the competition. Extensive test series in the salt spray chamber (DIN EN ISO 9227) demonstrated a resistance to rust of over 720, at the same time minimising the formation of white rust. The coating is environmentally-friendly – free of Cr6 – and complies with the latest directives, including REACH, RoHS and ELV. Its high level of ductility reduces wear even in tough conditions. The zinc/nickel finish is used on a wide range of Stauff steel products, such as clamps, tube connectors, valves, and test couplings. Stauff recently invested in another state-of-the-art measuring instrument in order to retain quality at a constantly high level. The new equipment provides for even more accurate and efficient testing. The X-ray-based measurement checks both zinc/nickel layers and other galvanic coatings. Stauff is elevating its quality assurance to a new level with the introduction of this technology.

Hydraulic and other supply lines

Alongside hydraulics, electrics are playing an increasingly important role with mobile machinery. Electric excavators, cranes, telescopic loaders and other machines are equipped with sensors and actuators for automatic functions and preventative maintenance. Last but not least, more and more OEMs are developing electric-powered construction machinery. The Stauff product range offers various solutions for the secure fastening and routing of the electrical cables, including plastic clamps with special elastomer inserts for cables or cable protection hoses. The latter can be reliably fixed with a special type CHC clamp body version for the fastening of thermoplastic corrugated hoses – also known as corrugated hose clamps or corrugated tube clamps. Stauff MultiLine clamps represent a useful alternative when installation space, fitting work, metallic components and thus weight are to be saved when routing supply lines, such as electric cables, pneumatic and low-pressure lines. MultiLine clamps are also available for tube and hose lines in large hydraulic excavators, road construction machines, tunnel boring machines, open-cast mining equipment, or material handling excavators. Stauff MLC clamps are available for two, three, four or six tube or hose lines with identical or different diameters.

Stauff at Bauma 2025: Hall A4, stand 212

Behind the scenes: Stauff manufacturing

A coupling is a complex component and its assembly is a complicated process. A male tip consists of up to 30 individual components. While many assembly processes are highly automated at Stauff, the small sizes of the QRC-FG coupling are manually assembled. Camera technology is used to check correct assembly. For instance, on the QRC-FG with nominal size DN 6, barely bigger than a matchstick, it is hard to see with the naked eye whether the particularly small seal has been fitted correctly around it. In the Stauff production plant, every single product undergoes multiple tests during and after assembly: as the male tip has two valves, the rear valve is first pre-assembled including a leak test. Depending on demand, the pre-assemblies are either used directly for final assembly or are initially stored. Incidentally, the label with the Stauff logo and lettering is only applied once the product has passed its leak test – clear proof for the user that the product supplied has passed Stauff’s exacting quality tests.



Alongside hydraulics, electrics are playing an increasingly important role with mobile machinery *Image: EdVal-stock.adobe.com*



In recent years, Stauff has expanded its product range to include clamps for electrical and other supply lines. The CHC clamp was developed to fasten thermoplastic corrugated hoses. *Image: Stauff*