

# SPECIAL-PURPOSE PART MOBILE MACHINERY

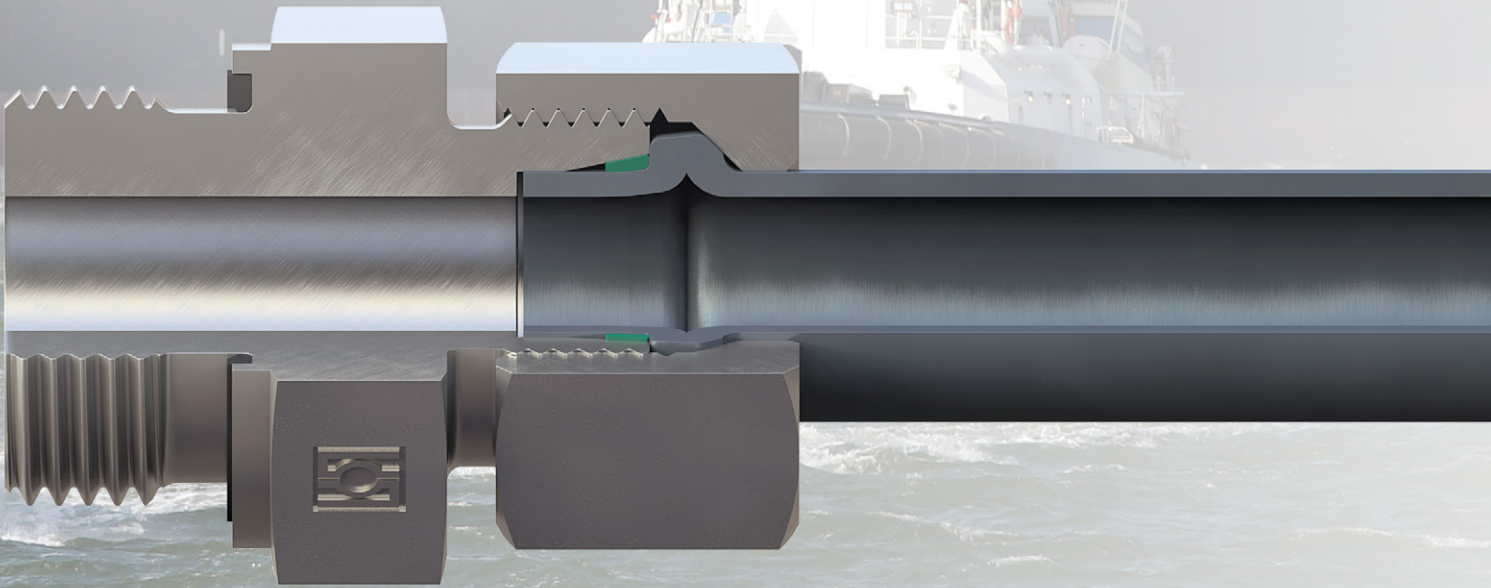


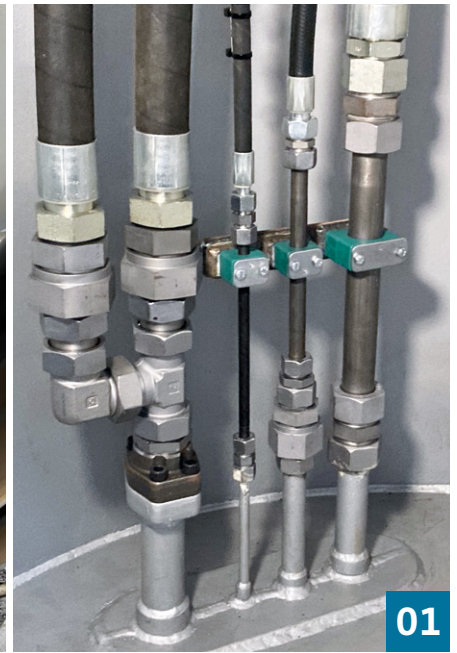
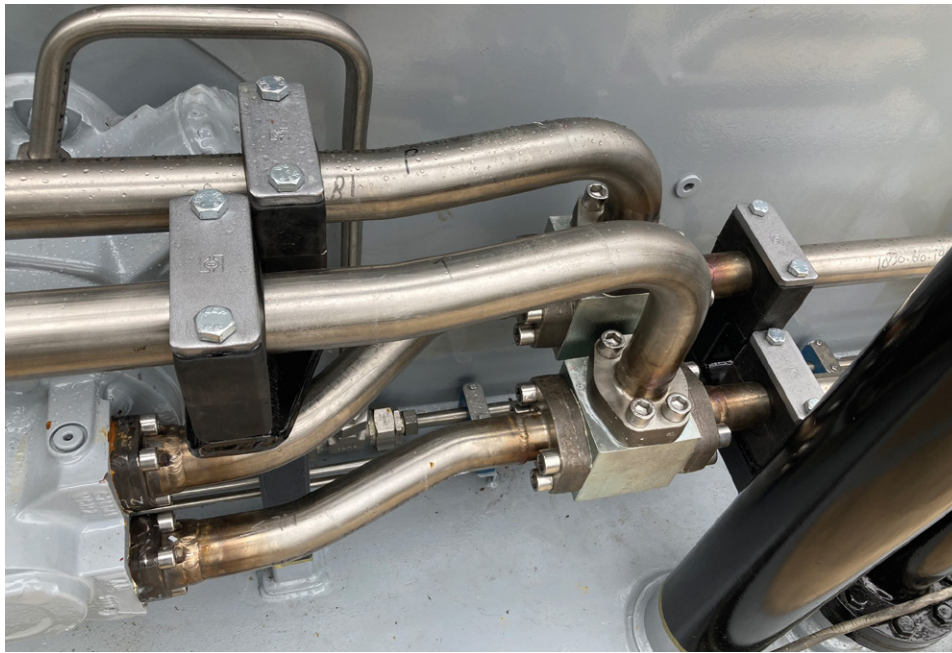
HYDRAULIC LINES IN SHIPBUILDING

# LEAK-PROOF UNDER ADVERSE CONDITIONS

The Damen Shipyards Group’s work boats are known throughout the world for their excellent durability. To date, Damen has relied on welding for the connections in its complex hydraulic line systems at its Hardinxveld site in the Netherlands. However, now the shipyard has switched over to the Stauff Form Evo forming system. It is a matter of substantial corrosion protection, marked vibration resistance, and maximum tear-off resistance even under extreme conditions.

*Andreas Toporowsky, Product Manager Tube Connectors, STAUFF*





01

**W**ith 11,000 employees bringing in sales of some €2.5 billion, 6,000 ships built in just under 100 years, 35 shipyards and twenty other companies in twenty countries, the Damen Shipyards Group based in Gorinchem/Netherlands is a real force in European shipbuilding. And Damen's product range is just as impressive: It ranges from work boats and tugs (including the well-known "Shoalmaster" and "MultiCat" series) through to ferries, naval ships and mega yachts. All in all, the Damen Group built and delivered 143 ships in 2021. Another important business sector is ship conversion and modernisation.

Work is exceptionally varied at the Hardinxveld site where in 1927 the Jan and Riem Damen brothers founded the company as a small boat-builder's yard. Maintenance, repairs, conversions of ships and the construction of new ships up to 90 metres in length are undertaken here. The site manufactures components for other sites in addition to building 14 to 16 work boats every year. This work is undertaken by the Damen Shipyards Components business unit with some 100 employees working at Hardinxveld.

### TOP QUALITY EXTENDING INTO EVERY TUBE CONNECTION DETAIL

Damen ships are renowned for their extremely high durability and service life. This is seen in a host of details, including the tubing of the numerous lines which are needed for the various hydraulic applications on work boats, such as winches and cranes. Whilst other shipyards have relied on detachable connections for many years, Damen still preferred welded joints up to now. Marcel De Bruin, Piping Manager at Damen Piping at Hardinxveld, was an advocate of welding and sceptical about detachable tube

**01** Various products from the Stauff connection and fastening technology range are used at the Damen Shipyards Group's Hardinxveld site

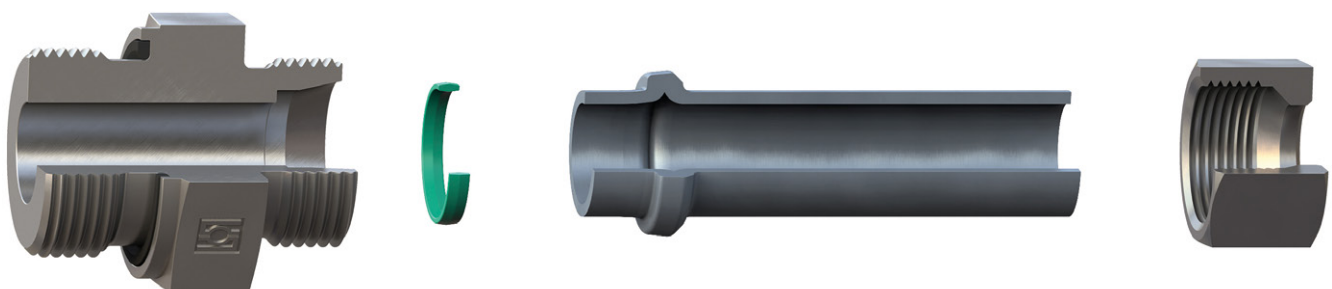
**02** The Stauff Viton® sealing ring is suitable for both steel and stainless steel tubes

**03** Marcel De Bruin (l), Piping Manager at Damen Piping, and Mark Kramer (r), JB Hydraulics Sales, are convinced about Stauff Form Evo

connections: "Of course welding is expensive, you need experienced specialists and it is less flexible when it comes to repairs or conversions. But a non-detachable, welded pipe connection practically lasts for ever."

### FROM WELDING TO DETACHABLE LINE CONNECTIONS

The fact that Damen Piping was nevertheless looking around for an alternative in 2018 had a lot to do with its need for greater flexibility and a higher work rate. It was also linked to the fact that highly reliable detachable connection systems were now available. Damen Piping turned to the Netherlands-based hydraulics specialist JB Hydraulics about which detachable system to use. JB had already supplied the Damen site in Hardinxveld with a variety of Stauff hydraulic components (pipe clamps, fittings, measuring equipment). It was therefore self-evident to the hydraulic experts at JB Hydraulics to propose the Stauff Form Evo forming system - all the more so as they had had positive experiences with it in other demanding applications.



02



03

## DECISION FOR STAUFF FORM EVO

The crucial argument for using Stauff Form Evo in safety-critical fields – including shipbuilding – has undoubtedly been its excellent tear strength, which offers considerable safety benefits under extreme conditions, such as strong pressure surges and vibrating loads. A further reason is its DNV accreditation.

In the Stauff forming system, a compact machine forms the end of the tube to be connected such that – when fitting “metal to metal” with a conventional fitting body and a union nut – it forms a positive-fit, sealed connection. The only possible leak path with Stauff Form Evo, the second Stauff forming system generation, is additionally secured by the special-purpose Stauff Viton® sealing ring. In the first generation, the sealing ring consisted of two materials, namely the metallic adapter ring and a fixed elastomeric seal. The Stauff Viton sealing ring has been used since 2020, and is considerably less expensive as it is made of only a single material. This cost saving is appreciable for OEMs, such as Damen Shipyards, which fabricate large numbers of hydraulic tube connections.

## CORROSION PROTECTION, TEMPERATURE RANGE, PRESSURE LEVEL: EVERYTHING JUST RIGHT

The decision-makers at Damen Shipyards were also impressed by the corrosion resistance of Stauff Form Evo, as all components are supplied as standard with a high-grade Stauff zinc/nickel coating. This coating provides reliable corrosion protection with over 1,200 hours of resistance to red rust or base metal corrosion in the salt spray test chamber (in accordance with DIN EN ISO 9227). The requirements defined in the VDMA standard sheet 24576 for tube connections are still exceeded for the highest K5 corrosion protection class even after transportation, processing and instal-

lation of the components. Damen considers the broad temperature range of -35 °C to +200 °C as an added bonus, as is the fact that Stauff Form Evo can be used within pressure ranges of up to 800 bar in the Heavy Series (with a four-fold safety factor).

## CONSIDERABLE SAVINGS IN TERMS OF COST AND TIME

Tube preparation workflows have been greatly simplified since the Hardinxveld tube experts switched over from welding to forming. Marcel De Bruine: “Previously we had to prepare, weld, clean, X-ray and possibly rework the tubes, and then zinc-plate or paint them. Personnel outlay, processing times and costs were high. We now simply measure the tube, saw it, and deburr it. It is then bent and formed and can be fitted immediately.”

Using the Stauff Form Evo machine in Hardinxveld, eight tubing experts prepare some 8,000 ready-to-install hydraulic tubes each year. This means that the machine is used for some 16,000 connecting operations with 8 to 42 mm diameter tubes – 95% of which are made of carbon steel and 5% stainless steel. This “mixed use” is yet another benefit of Stauff Form Evo. Mark Kramer, JB Hydraulics Sales: “The old Stauff Form system required different seals for carbon and stainless steel tubes. The Stauff Form Evo’s Viton sealing ring is suitable for both materials. The forming tools can also be used for the two materials. This saves time when it comes to changing tools.” The operators are highly satisfied with the system and are even planning ahead. Marcel de Bruin: “We are thinking about buying another Stauff Form Evo machine.”

Images: Stauff / Damen Group

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