

ENGINEERING  
TOMORROW

*Danfoss*

# Danfoss WalringPlus®

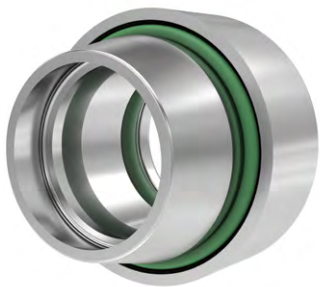
## Soft Seal Cutting Ring





# Easy assembly and leak-free connections, optimized for thin wall tubing

The Danfoss WalringPlus tube fitting features a two-edge cutting ring with additional soft sealing for both possible leak paths. Specifically optimized for thin wall tubing, it's designed to enable easy, repeatable assembly and to prevent the possible causes of leaks for dependable in-application performance.



## Eliminates the risk of leaks

To prevent leakages that can create costly equipment damage and downtime, WalringPlus is designed to address their common root causes. While already featuring optimum metal-to-metal sealing, WalringPlus also boasts additional soft sealing for both possible leak paths to eliminate the risk of leakage in even

## Easy and safe to (re)assemble

Correct assembly is crucial to tube fitting performance. WalringPlus is designed to prevent excessive or insufficient tightening, with a clear block-stop-function providing a tangible torque increase when the operator reaches the end of assembly. The unique internal design of WalringPlus also requires a significantly lower force to pull the ring over the tube, while the O-ring groove position allows for frequent reassembly without damaging the soft seal.

## Optimized for thin wall tubing

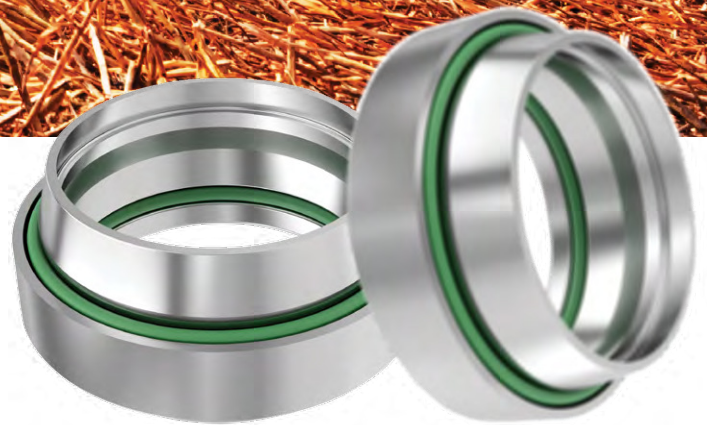
With the ability to reduce system size, weight, and cost, higher strength thin wall tubing is increasingly popular for hydraulic applications. Due to its optimized cutting edge geometry, block-stop-assembly function, and soft sealing, WalringPlus enables safe assembly for very thin wall tubing without the need to insert additional sleeves.





# WalringPlus design benefits

WalringPlus is designed to make assembly easier, faster, and safer. Its enhanced design enables to drastically reduce the risk of in application failures caused by incorrect assembly, even when undertaken by inexperienced operators.



## WalringPlus applications

Hydraulic tube connections in agriculture, construction, commercial vehicles, discrete manufacturing, and railways.

## WalringPlus features

- Steel cutting ring with Viton O-rings
- For tube sizes 6 to 42 mm
- Two soft seals for both possible leak paths
- Suited for wide range of steel and stainless steel tube materials
- Supports dry assembly with steel components
- Working pressure up to 500 bar (L-series) and 800 bar (S-series)
- High burst pressure exceeding 4:1 safety factor
- ISO8434-1 compliant
- Automated assembly with Danfoss proprietary M-R7 machine

## Simplified assembly

- Operators can clearly 'feel' when assembly is complete thanks to a block-stop-assembly function, which also means no torque or distance measurement is required.
- Block assembly design considerably reduces the required torque and tightening turns, enabling faster assembly and greater operator comfort.
- Some cutting rings with inner soft seals can be difficult and slower to assemble due to friction between the inner O-ring and the tube's outer surface. The unique inner design of WalringPlus means a significantly lower force is needed to pull the cutting ring over the tube – enabling easier assembly and a reduced risk of damage to the soft seal.
- Where many tube fitting systems require time-consuming and messy lubrication for all components, this is not necessary for Waltech™ components in carbon steel. This dry assembly process makes tube fitting assembly easier, faster, and cleaner.
- The O-ring groove design of WalringPlus enables an improved stress curve in the material, which increases its mechanical resistance compared to other soft seal cutting rings on the market. This eliminates the risk of the cutting ring cracking during assembly.
- With the bulk of material in front of the first cutting edge, WalringPlus allows for visible control over assembly to reduce the risk of leaks.
- By automating the process of cutting ring assembly and tube forming, Danfoss bespoke Waltech M-R7 machine reduces the assembly time and effort required for WalringPlus, as well as the risk of leaks.



# WalringPlus For thin-walled tubes to reduce weight and fuel use

WalringPlus offers superior tube fitting capabilities ideal for a wide range of hydraulic applications. While there are other soft-seal cutting ring systems on the market, our innovative two-edge design with two additional O-rings, as well as the integration of the O-ring in the cutting ring to avoid separate assembly of the seal, offers improved leakage prevention.

## High performance

- WalringPlus ensures excellent in-application performance by combining a robust, leak-free design with high impulse and vibration resistance.
- To eliminate the risk of leaks, WalringPlus features both optimum metal-to-metal sealing and additional soft sealing on both possible leak paths—the cutting ring cone and the cutting ring inner area.
- Soft seals prevent leaks if the tube or stud are slightly scratched, stop 'sweating' if the fluid temperature fluctuates in application, and maintain the connection if the retention force is reduced in thin wall tubing.
- Due to its optimized cutting edge geometry, block-stop-assembly function, and soft sealing, WalringPlus enables safe assembly for very thin wall tubing—without the usual need to insert additional sleeves that increase costs and reduce flow rates.
- Block assembly design enables repeated assembly without sacrificing system performance.
- With two cutting edges sharing the holding force equally, WalringPlus has greater resistance to high dynamic loads.
- Optimized cutting edge angles fill the cutting edge chambers with material, enabling the greatest contact area for improved vibration resistance.
- Manufactured from FKM (Viton), the soft seals in WalringPlus are resistant to high in application temperatures.

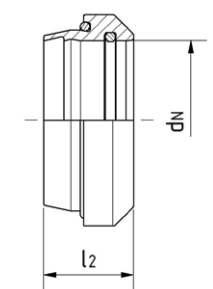
## Ready for safety-critical applications

- WalringPlus is designed to ensure safety in critical applications and to minimize the risk of a catastrophic failure.
- The optimized cut-in design of WalringPlus offers the highest possible burst pressures—exceeding a 4:1 safety factor on working pressures up to 500 bar (L-series fittings) and 800 bar (S-series fittings).
- Spotting insufficient assembly in cutting rings with additional soft sealing can be difficult, as no leaks may appear. To prevent this issue, WalringPlus is designed so that only a safely assembled cutting ring will show a proper seal, enabling the risk of failure due to low assembly torque to be identified before the cutting ring is pulled from the tube.
- WalringPlus enables safe connections even after repeated assembly, with the outer soft seal of the cutting ring positioned to allow reassembly without risking damage.



# Technical details

Series	PN bar (psi)	Tube outer diameter dN	Model	Art.no.	Model	$l_2$	Art.no.	Typ	Art.no.
			systemnut (cutting ring + nut)	cutting ring		nut			
L	500 (7252)	6	W-R-PLUS-M 6 L VI A2GS	WAL628467	W-R-PLUS 6 L/S VI	8.7	WAL628211	M 6 L A4GS	WAL039842
		8	W-R-PLUS-M 8 L VI A2GS	WAL628468	W-R-PLUS 8 L/S VI	8.7	WAL628212	M 8 L A4GS	WAL039843
		10	W-R-PLUS-M 10 L VI A2GS	WAL628469	W-R-PLUS 10 L/S VI	9.3	WAL628213	M 10 L A4GS	WAL039844
	400 (5801)	12	W-R-PLUS-M 12 L VI A2GS	WAL628470	W-R-PLUS 12 L/S VI	9.4	WAL628214	M 12 L A4GS	WAL039845
		15	W-R-PLUS-M 15 L VI A2GS	WAL628471	W-R-PLUS 15 L VI	9.6	WAL628215	M 15 L A4GS	WAL039846
		18	W-R-PLUS-M 18 L VI A2GS	WAL628472	W-R-PLUS 18 L VI	10.1	WAL628216	M 18 L A4GS	WAL039847
	250 (3626)	22	W-R-PLUS-M 22 L VI A2GS	WAL628473	W-R-PLUS 22 L VI	11.4	WAL628217	M 22 L A4GS	WAL039848
		28	W-R-PLUS-M 28 L VI A2GS	WAL628474	W-R-PLUS 28 L VI	11.4	WAL628218	M 28 L A4GS	WAL039849
		35	W-R-PLUS-M 35 L VI A2GS	WAL628475	W-R-PLUS 35 L VI	13.3	WAL628219	M 35 L A4GS	WAL039850
		42	W-R-PLUS-M 42 L VI A2GS	WAL628476	W-R-PLUS 42 L VI	13.1	WAL628220	M 42 L A4GS	WAL039851
S	800 (11603)	6	W-R-PLUS-M 6 S VI A2GS	WAL628477	W-R-PLUS 6 L/S VI	8.7	WAL628211	M 6 S A4GS	WAL039852
		8	W-R-PLUS-M 8 S VI A2GS	WAL628478	W-R-PLUS 8 L/S VI	8.7	WAL628212	M 8 S A4GS	WAL039853
		10	W-R-PLUS-M 10 S VI A2GS	WAL628479	W-R-PLUS 10 L/S VI	9.3	WAL628213	M 10 S A4GS	WAL039854
	630 (9137)	12	W-R-PLUS-M 12 S VI A2GS	WAL628480	W-R-PLUS 12 L/S VI	9.4	WAL628214	M 12 S A4GS	WAL039855
		16	W-R-PLUS-M 16 S VI A2GS	WAL628481	W-R-PLUS 16 S VI	9.9	WAL628225	M 16 S A4GS	WAL039857
		20	W-R-PLUS-M 20 S VI A2GS	WAL628482	W-R-PLUS 20 S VI	12.8	WAL628226	M 20 S A4GS	WAL039858
	420 (6091)	25	W-R-PLUS-M 25 S VI A2GS	WAL628483	W-R-PLUS 25 S VI	12.5	WAL628227	M 25 S A4GS	WAL039859
		30	W-R-PLUS-M 30 S VI A2GS	WAL628484	W-R-PLUS 30 S VI	13.1	WAL628228	M 30 S A4GS	WAL039860
		38	W-R-PLUS-M 38 S VI A2GS	WAL628485	W-R-PLUS 38 S VI	13.9	WAL628229	M 38 S A4GS	WAL039861



Information: components are available from stock - systemnuts are combined when ordered

## High performance assembly machines

To further reduce the assembly time and effort required and help ensure optimum performance, we've also developed our own Waltech machines to automate the process of cutting ring assembly and tube forming.

- Our innovative M-R7 machine is designed for final assembly of our Walpro® and WalingPlus systems. It offers optimized performance and installation advantages, resulting in a short tightening movement and reduced force required at the final stage of the service assembly.
- Our reliable M-WF385Xplus machine is designed for the most demanding applications, enabling tube forming for the Walform® system in steel and stainless steel (1.4571). It enables additional sealing, easy machine assembly, and robust performance.

### M-R7 features and benefits

- Final assembly of Walpro and WalingPlus tube fittings from 6-42 mm
- Fast cycle times allow efficient and economical production
- Able to process extremely tight bent tubes and short straight tube ends
- Automatic pressure point detection and way control ensures accurate and reliable assembly
- RFID-technology for tool detection and setting of process values
- Optimized error detection with self-programmed limits based on statistical process control
- Unmissable error messages that require acknowledgment
- Automatic assembly by pushing the tube through the tool
- Export assembly parameters via a USB port for integration into quality systems

**A Safety light curtain**  
Stops the assembly process in the event of an interruption

**B Tank breather filter / Oil filler neck**

**C Emergency stop button**

**D Main switch**  
Switch on/off



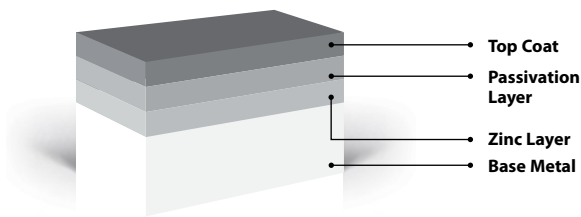
**E Tool holder / Assembly area**



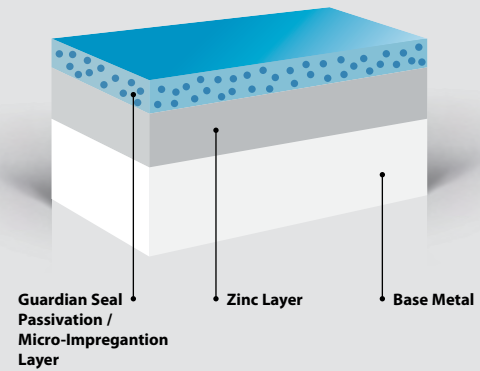
# Guardian Seal plating

Guardian Seal is our exceptional, zinc-based surface treatment applied by electroplating. It guarantees excellent, durable protection from corrosion and meets DIN EN ISO 9227 standards—while also being easy to assemble, and better for health and the environment.

The 11-15 µm zinc layer is passivated through a specialized process, resulting in an open-pored structure. Organic micro-particles are then impregnated into this structure in an optimized emersion process. Finally, the cross-linked polymerization of the top layer is completed via a unique curing procedure.



## Guardian Seal Plating



## Guardian Seal coating in salt spray test according to DIN EN ISO 9227



after 720 hours



after 1000 hours

### Key features

- Lower assembly and disassembly torque and reduced torque variance
- >360 hours resistance to white corrosion and >1000 hours to red corrosion
- Nickel and chromium-6 free
- Torque value is the same as Chromium-3
- High quality shiny silver appearance
- Resistant to commonly used hydraulic fluids
- Paintable with commercially available coatings

### Key benefits

- Guarantees excellent, durable corrosion protection
- Safer and easier assembly and disassembly
- No risk of nickel dust during assembly and handling
- No risk of contact allergies
- Wastewater from the plating process requires less treatment

# Our supporting services

Our Waltech series relies on the proven capabilities at our major manufacturing and distribution facility in Lohmar, Germany—where we produce all our Walpro, WalingPlus and Walform tube connector lines.

With in-house expertise spanning design, testing and production, we can deliver much greater lifecycle value to customers. We offer customers a wide range of support services—including high-end test capabilities, inspection, maintenance, repairs, backfitting, rentals and operator training.

## Testing to the extremes

- Our Waltech development and testing programs go to extremes to ensure exceptional performance. We have all the expertise and test equipment needed to validate new products and tubing materials in-house.
- We can design components for specific customer applications and test them in a simulated environment to ensure they offer the best possible solution.
- The Waltech development and testing programs were designed to ensure top-notch performance, as well as help our customers meet specific application needs. They include:
  - A combined pressure/impulse and reversed bending test
  - A tensile test to failure, with confirmation of the fitting's stripping resistance
  - A fire resistance test to DIN EN ISO 19921 with exposure to flame
  - Helium-vacuum leakage test for Waltech cutting ring systems
  - Shock and gas pressure tests for military and marine applications

## Training for success

- As well as increasing time and cost requirements, insufficient knowledge or a lack of training can cause errors in assembly, leakages, and even safety issues.
- We offer customers expert training for both our tube fitting systems and assembly machines.
- Training can be held at either our Lohmar facility or at customer locations.

## Troubleshooting any issues

- Our service team regularly checks both rented or purchased tools and machines at customer sites.
- Our engineering team can visit customers to understand their applications, measure performance, and optimize routing and connections to resolve issues.
- We have a large rental pool of machines available to support customer projects or offer replacements in case maintenance is needed.
- Our machine warranty can be extended up to three years and, if a rental machine breaks down, a substitute can be issued subject to the terms of the rental contract.
- We have various options available for the maintenance and backfitting of older assembly machines.





## Six reasons **to** **choose Waltech**

- Excellent performance: no leaks and high bending, impulse and corrosion resistance
- A complete solution for any tube fitting needs
- Manual assembly that's straightforward, safe and repeatable
- Machine assembly that's quicker, easier and can reduce errors
- In-house supporting services spanning application testing, maintenance, training and more
- Danfoss's global footprint, excellent application references and customer success stories

Go to [www.danfoss.com](http://www.danfoss.com) for further product information.

#### **Danfoss Power Solutions (US) Company**

2800 East 13th Street  
Ames, IA 50010, USA  
Phone: +1 515 239 6000

#### **Danfoss Power Solutions II GmbH**

Hauptstrasse 150  
53797 Lohmar, Germany  
Phone: +49 2246 1009101

#### **Danfoss Power Solutions ApS**

Nordborgvej 81  
DK-6430 Nordborg, Denmark  
Phone: +45 7488 2222

#### **Danfoss Power Solutions Trading (Shanghai) Co. Ltd.**

Building #22, No. 1000 Jin Hai Rd  
Jin Qiao, Pudong New District  
Shanghai, China 201206  
Phone: +86 21 3418 5200