

# TYPE APPROVAL CERTIFICATE

Certificate no.:  
**TAP00001CA**  
Revision No:  
**2**

## This is to certify:

that the **Pipe Couplings, Bite and Compression Type**

with type designation(s)

**Walpro, WalproX, WalformPlus, WalformPlus-M**

issued to

**Danfoss Power Solutions II GmbH**  
**Troisdorf, Nordrhein-Westfalen, Germany**

is found to comply with

**DNV rules for classification – Ships Pt.4 Ch.6 Piping systems**

**DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021**

**DNV class programme DNV-CP-0185 – Type approval – Mechanical joints**

## Application:

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

**Type:**

**Walpro, WalproX**

**WalformPlus, WalformPlus-M**

**Temperature range:**

**up to 400°C**

**up to 400°C**

**Max. working press.:**

**up to 800 bar**

**up to 800bar**

**Sizes:**

**6mm up to 42mm.**

**6mm up to 42mm**

Issued at **Hamburg** on **2025-08-06**

This Certificate is valid until **2030-08-05**.

DNV local unit: **Essen**

Approval Engineer: **Hagen Markus**



for **DNV**

This document has been digitally signed and will therefore not have handwritten signature

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

## Product description

### Walpro, WalproX

The Walpro (carbon steel) and WalproX (stainless steel) tube fitting system consists of a nut of type M and two edges cutting ring of type P-R.

### Walform

The WalformPlus and WalformPlus-M are positive tube fitting systems consisting of a mechanically reshaped tube end, Waltech nut and fitting, as well as the Waltech Walform seal for WalformPlus.

Surface protection of components, refer to Danfoss Power Solution GmbH, Danfoss Waltech tube fitting systems catalogue "AF403661682130en-000103".

Tube end forming machines of types M-WF385X, M-WF385X/BO (MEG-WF2/BO), as well as other machine types manufactured by Danfoss Waltech shall be used for tube end forming.

### Tube fittings

Tube fittings acc. to DIN 2353 and DIN EN ISO 8434-1 and Danfoss Waltech specification.

### Scope of type approval

This type approval includes tube fittings, accessories, machines and tools as specified in Danfoss Power Solution GmbH; Danfoss Waltech tube fitting systems catalogue "AF403661682130en-000103", excluding:

- Banjo fittings, Swivel banjos, Double banjo fittings, Swivel elbow fittings
- Ball valves, Non-return valves, Shuttle valves, Non-return valve with male stud
- Compact diverter valve, Three-way valve
- Flange fittings, Welding nipple

### For the following pipe coupling types limitations are to be observed:

#### Bulkhead couplings

Bulkhead coupling types GSS and WSS are not approved through tank walls, watertight decks and bulkheads. For application through fire divisions a separate type approval is required.

Welded bulkhead coupling type ESS is approved through tank walls, watertight decks and bulkheads.

Through fire divisions the coupling and connected pipe is to be provided with the same insulation material as used for the divisions, with total insulation length of 450mm.

### Pipe connectors where pressure -tight joints are made on the threads are limited in the application as follows:

Pipe connector design	Range of application <sup>1</sup>	
..with tapered or parallel thread	not approved for toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur	
..with parallel thread	approved for pipe class III	up to outside diameter 60.3mm
..with tapered thread	approved for pipe class I	up to outside diameter 33.7mm
	approved for pipe class II, III	up to outside diameter 60.3mm

#### Note

<sup>1</sup> Refer to DNV RU SHIP Rules Pt.4 Ch.6 Piping system – Section 9 – 5.2.6.

### Overview of threaded pipe fitting with limitations

Type	Name
WES..RK/WES..MK/WES...NPT P-WEV..RK, P-WEV..MK, P-WEV..NPT	Male stud elbow
GES..RK/GES..MK/GES..NPT, P-GEV..RK/P-GEV..MK /P-GEV..NPT	Male stud coupling
EGESD....NPT	Stud standpipe adaptor

All other pipe fittings with thread connection not listed in the above table may be used without limitations.

## Materials

Component	Material designation and standards	
Profile ring P-R	Walpro	Carbon steel DIN 3859-1, Table 2 and Danfoss Waltech specification
	WalproX	Stainless steel 1.4571
Nut M Nut W-R	Walform	Carbon steel DIN 3859-1, Table 2 and Danfoss Waltech specification
		Stainless steel 1.4571
Nut M		Copper alloy CuNiFe1.6Mn
Pipe fittings	Walpro	Carbon steel DIN 3859-1, Table 2 and Danfoss Waltech specification
	WalproX	Stainless steel 1.4571
	Walform	Copper alloy CuNiFe1.6Mn
Soft seals	Walform	NBR, FPM, EPDM <sup>1</sup> Danfoss Waltech specification

## Tubes<sup>2,3</sup>

### Seamless cold drawn tubes

Stainless steel 1.4541, 1.4571	DIN EN 10216-5
	Condition delivery: CFA
Stainless steel 1.4404, 1.4435, 1.4301	EN ISO 1127, ASTM A269/A213
	Tolerances: ISO 1127 D4/T3 <sup>4</sup>
	Condition delivery: Dissolution annealed and deterrered

### Welded tubes

Carbon steel E235, E355	DIN EN 10305-4
	Condition delivery: +N
Copper alloy CuNiFe1,6Mn <sup>5</sup>	NES 780, Part 3
	Tolerances: DIN EN 10305-4
TUNGUM® <sup>5</sup>	CW700R
	Tolerances: DIN EN 10305-4

### Notes

- <sup>1</sup> EPDM soft seals are not suitable for piping systems containing hydrocarbon-based fluids.  
<sup>2</sup> For selection of tubes and detailed material designation refer to Danfoss Power Solution GmbH; Danfoss Waltech tube fitting systems catalogue "AF403661682130en-000103",  
<sup>3</sup> Minimum tube wall thickness acc. to DNV RU Ship Rules Pt.4 Ch.6 Piping systems, Section 9, 1.2 Wall thickness. Dimension tolerances acc. to DIN EN 10305-4 or tolerances ISO 1127D4/T3 see table above.  
 Regarding material certificates Section 2, Table 3 Material certificates are to be observed.  
<sup>4</sup> Applicable to pipes up to O.D. 20mm. Above O.D. 20mm tolerances acc. to DIN EN 10305-4 applies.  
<sup>5</sup> In combination with pipe couplings and nuts made of CuNiFe1,6Mn and WALPRO-X profile ring P-R.

### Application/Limitation

The Walpro, WalproX, WalformPlus and WalformPlus-M tube fitting systems are type approved for application in pipe class I, II and III piping systems.

Reference: DNV-RU-SHIP Pt. 4 Ch. 6 Piping system, Sec. 9, Table 8 - Compression couplings - Flared type.

Fire endurance test condition "30 min. wet". Flare fittings made of CuNiFe1.6Mn for connection of pipe made of CuNiFe and CW700R (TUNGUM®) are limited to piping systems with static load.

Piping systems		Application/ Limitation
<b>Flammable fluids (flash point ≤ 60°C)</b>		
1	Cargo oil lines	Not approved for installation in pump rooms and open decks.
2	Crude oil washing lines	
3	Vent lines	Installation limited to on exposed open decks, as defined in SOLAS II-2/Reg. 9.2.3.3.2.2(10) and not used for fuel oil lines.
<b>Inert gas</b>		
4	Water seal effluent lines	Approved
5	Scrubber effluent lines	
6	Main lines	Not approved for installation in pump rooms and open decks.
7	Distribution lines	
<b>Flammable fluids (flash point &gt; 60 °C)</b>		
8	Cargo oil lines	Not approved in pump rooms and open decks.
9	Fuel oil line.	Approved. Not approved for installation in high pressure fuel injection systems of combustion engines.
10	Lubricating oil lines	Approved
11	Hydraulic oil	
12	Thermal oil	
<b>Seawater</b>		
13	Bilge lines	Not approved for installation in machinery spaces of category A.
14	Water filled fire extinguishing systems (e.g., fire main, sprinkler)	Approved
15	Non water filled fire extinguishing systems, e.g., foam, drencher systems	Installation limited to on exposed open decks, as defined in SOLAS II-2/Reg. 9.2.3.3.2.2(10) and not used for fuel oil lines.
16	Fire main (not permanently filled)	
17	Ballast systems	Approved
18	Cooling water systems	
19	Tank cleaning services	
20	Non-essential systems	
<b>Fresh water</b>		
21	Cooling water systems (ensuring main function)	Approved
22	Condensate return systems	
23	Non-essential piping systems, e.g. cooling water for air condition, sanitary, technical water systems	
<b>Sanitary/drains/scuppers</b>		
24	Deck drains (internal)	Approved for installation above bulkhead deck of passenger ships and freeboard deck of cargo ships.
25	Sanitary drains	Approved
26	Scuppers and discharge (overboard)	
<b>Sounding/vent</b>		
27	Water tanks/dry spaces	Approved
28	Oil tanks (flash point > 60 °C)	
<b>Miscellaneous</b>		
29	Starting/control air	Not approved in machinery spaces of category A.
30	Service air piping systems (non-essential), e.g., sounding system	Approved
31	Brine	Not approved. (lack of corrosion resistance)
32	CO <sub>2</sub> Systems (outside protected space)	Not approved
33	CO <sub>2</sub> Systems CO <sub>2</sub> system (inside protected space)	Approved.
34	Steam	Approved with FKM sealing.
35	Gases having an oxygen content exceeding 25%	Not approved

### Selection of materials

It shall be noted that the selection of the materials considers the applicable service condition with respect to type of media, flow velocity, media temperature and installation area of the piping system.

In particular, the resistance to corrosion, erosion, oxidation and other deterioration during projected service life are to be considered.

### Sea water application

The term sea water application includes piping systems conveying sea water and piping systems installed on the open deck.

The stainless-steel materials 1.4571 (AISI 316Ti), 1.4404(AISI 316L) or 1.4401(AISI 316) and CuNiFe1,6Mn for pipe fittings for connection of pipes made of CuNiFe or TUNGUM® are approved for sea water application.

Even the stainless-steel and CuNiFe grades specified above cannot be considered immune to attack under all situations, avoidance of stagnant seawater or high velocity conditions and removal of welding oxides after welding are some of the important factors to the successful use in piping systems for sea water and installation on open deck.

### References:

- DNV-RU-SHIP Rules Pt.4 Ch.6 Piping systems – Section 2 – Materials, Table 1 and DNV-OS-D101 Ch.2 – Sec. 2 – Materials
- DNV-CG-0288 Corrosion protection of ships.

### Sizes and pressure range<sup>1</sup> Walpro and Walpro-X

Walpro Carbon steel				Walpro-X Stainless steel				Walpro-X CuNiFe		Walpro-X, <u>TUNGUM®</u>	
L Series		S Series		L Series		S Series		Pipe O.D. mm	PN bar	Pipe O.D. mm	PN bar
Pipe O.D. mm	PN	Pipe O.D. mm	PN	Pipe O.D. mm	PN	Pipe O.D. mm	PN				
6-10	500 bar	6-10	800 bar	6-12	400 bar	6-16	630 bar	6-22	180 bar	6-38	330 bar
12-18	400 bar	12-16	630 bar	15-18	315 bar	20-30	400 bar	30	150 bar		
22-42	250 bar	20-38	420 bar	22-42	160 bar	38	315 bar				

### Notes

<sup>1</sup> Max. working pressure of the piping system depend on selected pipe material, pipe wall thickness and individual PN of selected tube fittings.

### WalformPlus-M (metallic seal)

Carbon steel				Stainless steel			
L Series		S Series		L Series		S Series	
Pipe O.D. mm	PN bar	Pipe O.D. mm	PN bar	Pipe O.D. mm	PN bar	Pipe O.D. mm	PN bar
8, 10	500	8, 10	800	8, 10, 12	400	8, 10, 12, 16	630
12, 15, 18	400	12-16	630	15, 18	315	20, 25, 30	400
22, 28, 35,42	250	20-38	420	22, 28, 35, 42	160	38	315

### WalformPlus (with captive seal)

Carbon steel				Stainless steel			
L Series		S Series		L Series		S Series	
Pipe O.D. mm	PN bar	Pipe O.D. mm	PN bar	Pipe O.D. mm	PN bar	Pipe O.D. mm	PN bar
6, 8, 10	500	6, 8, 10	800 bar	6, 8, 10, 12	400	6, 8, 10, 12, 16	630
12, 15, 18	400	12, 16	630 bar	15, 18	315	20, 25, 30	400
22, 28, 35, 42	250	20, 25, 30, 38	420 bar	22, 28, 35, 42	250	38	330

### WalformPlus-M CuNiFe 70/30, Tungum

Pipe O.D. mm	Pipe wall thickness mm	PN
12	2.5	276 bar
16	3.0	
20	3.5	
30	4.0/5.0	
38	5.0/6.5	

### Temperature range<sup>2</sup>

The temperature range for the fittings are limited by the selected soft seal material and/or fitting material.

Metallic materials	
Carbon steel	-20°C <sup>1</sup> to +120°C
Stainless steel	-55°C to + 400°C
CuNiFe, Tungum	-55°C to + 200°C

Rubber materials	
NBR	-35°C to +100°C
FPM	-25°C to +200°C
EPDM	-45°C to +150°C

#### Notes

<sup>1</sup> Lowest medium temperature -20°C and lowest environmental temperature -40°C. Refer to DIN 3859-1.

<sup>2</sup> For service temperatures above 120°C (Carbon steel) and above 50°C (Stainless steel) the pressure reductions factors specified in Danfoss Waltech tube fitting systems catalogue "AF403661682130en-000103" are to be observed.

### Temperature range examples

Stainless steel pipe fitting with NBR sealing	- 35°C up to +100°C
CuNiFe pipe fitting with FPM sealing	- 25°C up to +200°C

### Assembling and Installation

For the assembling and installation, the instructions specified in Danfoss Power Solution GmbH; Danfoss Waltech tube fitting systems catalogue "AF403661682130en-000103", are to be observed.

This certificate is valid for pipe connections using pipe couplings and tube end forming machines manufactured by Danfoss Power Solution GmbH.

### Type Approval documentation

**TAP00001CA, Rev. 2**

#### Work scope:

Standard renewal. In addition, deleting of the WALRING system and merge with TAP000019R, Rev.4

#### Documents:

DNV Assessment reports

Holder of Certificate Danfoss Power Solutions II GmbH, Troisdorf dated 2024.11.22

Production site DANFOSS, spol. s.r.o., Areal ZTS a.s.c 924, 018 41 Dubnica and Vahom, 2025.01.27  
 Slovak Republic

DNV Management System Certificate ISO 9001:2025, Site certificate No.: 278231-2018-AQ-DEN-DANAK-CC32

#### Test reports

##### Burst pressure tests on selected sizes and types

Test laboratory Danfoss Power Solutions II GmbH Test centre Troisdorf, Germany, dated 15.05.2025.

Report number: Doc00068761

Flare fitting TAP00001UO: 12L (stst), 18L (stst), 20S(stst)




WalformPlus / M: 10L(stst), 16S (cst), 38S(stst), WalproX Pro: 12L(stst), 20S(stst)

### Tests carried out

DNV CP-0185

Repeated Assembly Test, Tightness Test, Burst Pressure Test, Pull-out Test, Vacuum Test, Combined Impulse and Vibration Test, fire resistance test according to ISO 19921/22 (wet condition).

### Marking of product

Component	Marking	Example
Fitting body	Danfoss sign, material <sup>1</sup> , supplier code.	 , 13
Cutting ring Walpro	Danfoss unique outer profile	
Nut	Danfoss sign, size, series	 , 30 S
Captive seal	Colour	NBR: black EPDM: purple FPM: green

Note

<sup>1</sup> Carbon steel components without material marking. Stainless steel components marked with „71“ or „1.4571“

### Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment to verify that the conditions for the Type Approval are complied with. Refer to the Class Programme DNV-CP-0338, Section 4.

In addition, burst pressure testing on selected sizes to be carried out during renewal of the certificate.

To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>

### Manufactured by:

- DANFOSS Power Solutions II GmbH, Troisdorf, Germany
- DANFOSS, spol. S.r.o. Dubnica, Slovak Republic

### End of certificate