Certificate No:
**TAP00002NB**

# TYPE APPROVAL CERTIFICATE

## This is to certify:

**That the Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings**

with type designation(s)
**HW-2SC-GH781**

Issued to
**Tubes International Sp. z o.o.**
**Poznan**, **Poland**

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 are accepted for installation on all vessels, offshore-plants classed by DNV according to above mentioned Rules.**

| | |
|---|---|
| **Temperature range:** | **-40°C up to +126°C** |
| **Max. working press.:** | **up to 448 bar** |
| **Sizes:** | **DN6 up to DN51** |

Issued at **Hamburg** on **2024-08-12**
This Certificate is valid until **2029-08-11**.
DNV local unit: **Gdansk CMC**

Approval Engineer: **Hagen Markus**

for **DNV**

**Sven Klinger**
**Head of Section**

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 300,000 USD.

## Product description

Synthetic rubber inner tube, two wire braid reinforcement and synthetic rubber cover.
Hose design standards SAE 100R16 Type S, EN 857 2SC, ISO 11237-1 Type 2SC
Fire resistant acc. to ISO 15540:2016.

**Materials:**

Reinforcement: 2-wire steel braid
Inner tube: Synthetic rubber Synthetic rubber
Cover: Synthetic rubber DURA-TUFF

## Size and pressure range:

**Hoses EN 857 2SC, Type GH781 DURA-TUFF, non-skived**

| Tubes International Hose Type | DN | Hose I.D. | | Hose O.D. max | | Maximum working pressure | |
|---|---|---|---|---|---|---|---|
| | | mm | inch | mm | inch | [bar] | psi |
| HW-2SC-GH781-4 | 6 | 6.4 | 0.25 | 13.5 | 0.53 | 448 | 6500 |
| HW-2SC-GH781-5 | 8 | 7.9 | 0.31 | 14.5 | 0.57 | 350 | 5100 |
| HW-2SC-GH781-6 | 10 | 9.7 | 0.38 | 16.9 | 0.67 | 400 | 5800 |
| HW-2SC-GH781-8 | 12 | 12.7 | 0.50 | 20.4 | 0.80 | 345 | 5000 |
| HW-2SC-GH781-10 | 16 | 15.9 | 0.63 | 23.0 | 0.91 | 276 | 4000 |
| HW-2SC-GH781-12 | 19 | 19.1 | 0.75 | 26.7 | 1.05 | 241 | 3500 |
| HW-2SC-GH781-16 | 25 | 25.4 | 1.00 | 34.9 | 1.37 | 207 | 3000 |
| HW-2SC-GH781-20 | 31 | 31.8 | 1.25 | 42.4 | 1.67 | 172 | 2500 |
| HW-2SC-GH781-24 | 38 | 38.1 | 1.50 | 48.9 | 1.93 | 138 | 2000 |
| HW-2SC-GH781-32 | 51 | 50.8 | 2.00 | 65.5 | 2.58 | 110 | 1600 |

Reference drawing: 2SC Hydraulic hose - PT-DNV-2SC, Rev.0 2023-03-08

## Hose end fittings

Reference: Tubes EN catalogue 2017

| DN | Hose Ferrule | | Hose fitting | |
|---|---|---|---|---|
| | Carbon steel[1,3] | Stainless steel[2,4] | Carbon steel[1,3] | Stainless steel[2,4] |
| 6 | TI-ZF12T-04-CN | TI-ZF12T-04-SS | TI-ZMW121-16-04-CN | TI-ZMW121-16-04-SS |
| 10 | TI-ZF12T-06-CN | TI-ZF12T-06-SS | TI-ZMW121-22-06-CN | TI-ZMW121-18-06-SS |
| 13 | TI-ZF12T-08-CN | TI-ZF12T-08-SS | TI-ZMW121-22-08-CN | TI-ZMW121-22-08-SS |
| 16 | TI-ZF12T-10-CN | TI-ZF12T-10-SS | TI-ZMW121-22-10-CN | TI-ZMW121-26-10-SS |
| 19 | TI-ZF12T-12-CN | TI-ZF12T-12-SS | TI-ZMW121-22-12-CN | TI-ZBW110-12-12-SS |
| 25 | TI-ZF12T-16-CN | TI-ZF12T-16-SS | TI-ZMW121-22-16-CN | TI-ZBW110-16-16-SS |
| 32 | TI-ZF12T-20-CN | TI-ZF12T-20-SS | TI-ZMW121-22-20-CN | TI-ZBZ110-20-20-SS |
| 38 | TI-ZF12T-24-CN | TI-ZF12T-24-SS | TI-ZMW121-22-24-CN | TI-ZBZ110-24-24-SS |
| 51 | TI-ZF12T-32-CN | TI-ZF12T-32-SS | TI-ZMW121-22-32-CN | TI-ZBZ110-32-32-SS |

**Notes**

[1] EN 10277-3 / EN 10087 Zn-Ni coating
[2] 1.4404 (AISI 316L)
[3] VOSS zinc nickel index: PF 22 7000....(ferrule), VOSS NPS3 (Standard) 700…(fitting)
[4] DISCA stainless steel index: ZPF2212…(ferrule), Standard series 84….-SS (fitting)

## Hose assembly production places

- Tubes International Sp. z o. o.:
  Headquarter, Bystra 15A, 61-366 Poznań
  Gdańsk Branch, Elbląska 117, 80-718 Gdańsk

**Hose assembly instruction**

Tubes International INSTRUCTION IT-22-A “Assembly of fittings to rubber hydraulic hoses HW-2SC-GH781..”, Issue 1 25.08.2022.

## Application/Limitation

The hose assemblies of type HW-2SC are type approved for pressure application in the following piping systems according to liner and hose end fitting compatibility, corrosion resistance:

- Flammable media such as hydraulic oil, fuel oil, petroleum oil and lubricating oil[1]
- Sea water[1].
- Water and water-glycol based fluids
- Compressed air (pin pricked cover is required for applications above 17 bar).

**Note**

Piping system wet condition. Not approved for piping system with service condition dry/wet or dry.
Refer to DNV RU-SHIP Pt.4 Ch.6 Section 9 Table 9.

Flexible hoses are only to be used in short lengths (up to 1.5m) where it is necessary due to vibrations or flexible mounting of the machinery.
Reference: DNV-RU-SHIP Pt.4 Ch. 6 Section 9 – 4 Flexible hoses – 4.1 General

Hose assemblies with hose end fittings made of carbon steel intended to be used below -10°C shall be made of normalized steel.

Temperature range: -40°C up to +126°C

## Installation

For the following piping systems, hose assemblies are to be provided with means to shut off to avoid uncontrolled media release in case of hose rupture:
- compressed air, lubrication oil, fuel oil and petroleum base hydraulic oil

In general, hose assemblies
- shall be fitted at locations always accessible
- not to be used on boiler fronts
- are not permitted in permanently starting air lines of combustion engines

In addition, the manufacturer’s instructions are to be observed.

## Tests carried out

**Hose**

Type tests acc. to EN 857 Type 2SC
Elongation / Contraction test, Burst pressure test, Standard Impulse Test, cover adhesion test EN ISO 8033, Resistance against liquid ISO 1817, Cold Flexibility test, Abrasion test, Ozone resistance test EN ISO 7326

**Hose assembly HW-2SC-GH781-xx**

DNV CP-0183
- Impulse test acc. to ISO 6803, TP:133% of EN 857 WP, + 100°C, 200.000 cycles, Frequency 1,0Hz+-0,25
- Proof pressure and Burst test acc. to ISO 1402
- Fire resistance test acc. to ISO15540:2016, wet condition.

## Production testing

Hose assemblies shall be subjected to a pressure test at 1.5 times the maximum working pressure.
Appropriate Product declaration certificate (PD) to be issued.

**Guidance notes:**

Product declarations are also known as 'works certificates' or 'product certificates issued by the manufacturer'.

## Type Approval documentation

### Marking of hose assembly

Hose end fitting

| Type | Example |
|---|---|
| Manufacturer sign | Tubes International |
| Batch No<br>Manufacturing date: month / year | *22005572-1-1<br>02/22 |

Reference: Instruction IT-36 type C MARKING

### 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 every third size 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

**End of certificate**