

**TYPE APPROVAL CERTIFICATE****This is to certify:****That the Flexible Hoses of Metallic Material with permanently fitted couplings**

with type designation(s)

**SZ 32/40/797/975/897/FB, SZ 32/40/500/M2A32, SZ 40/40/790/M2A40**

Issued to

**HKS GmbH industrieller Hersteller von Kompensatoren und  
Schläuchen  
Rostock, Germany**

is found to comply with

**DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems****DNV GL class programme DNVGL-CP-0183 – Type approval – Flexible hoses****Application :****Products approved by this certificate are accepted for installation on all vessels classed by  
DNV GL.**

<b>Type:</b>	<b>Temperature range:</b>	<b>Max. working press.:</b>	<b>Sizes:</b>
<b>SZ 32/40/797/975/897/FB</b>	<b>0°C up to 100°C</b>	<b>30 bar</b>	<b>DN32, DN40</b>
<b>SZ 32/40/500/M2A32</b>	<b>0°C up to 100°C</b>	<b>30 bar</b>	<b>DN32, DN40</b>
<b>SZ 40/40/790/M2A40</b>	<b>0°C up to 100°C</b>	<b>30 bar</b>	<b>DN40</b>

Issued at **Hamburg** on **2017-06-13**This Certificate is valid until **2022-06-12**.DNV GL local station: **Rostock**Approval Engineer: **Hagen Markus**for **DNV GL**

Digitally Signed By: Drews, Olaf

Location: DNVGL Hamburg

Signing Date: 2017-06-14

**Olaf Drews**  
**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.



Job Id: **262.1-025870-1**  
Certificate No: **TAP00000XS**

## Product description

Type	Description	Drawing
SZ32/40/975/FB SZ40/40/797FB SZ40/40/897/FB	Double braided metallic hose assembly with a centre piece 90° elbow and flange connection	SZ32/40/975/FB, 2001-01-03 SZ40/40/897/FB, 2001-01-03 SZ40/40/797/FB, 2001-01-03
SZ32/40/500/M2A32 SZ40/40/790/M2A40	Double braided straight metallic hose assembly with pipe union end connection and weld joint	SZ32/40/500/M2A32, 2001-01-02 SZ40/40/790/M2A40, 2001-01-02

## Materials

Type	Hose	Wire braids	Hose end fitting
SZ32/40/797/975/897/FB	1.4541	1.4306	S235JR or P250GH
SZ32/40/500/M2A32			1.0460
SZ40/40/790/M2A40			1.0460

## Requirements according to pipe classes

### Material certificates

Refer to:

- DNVGL Rule Pt.4, Ch.6, Sec.1 – Table 1 (pipe classes)
- DNVGL Rule Pt.4, Ch.6, Sec.2 – Table 3 (material certificates acc. to pipe classes)
- DNVGL Rule Pt.2 Ch.1, Sec.2 (Approval of manufacturers)

### Welding

Refer to:

- DNVGL Rule Pt.4, Ch.6, Sec.10, 1 Welding

## Application/Limitation

The metallic hose assemblies of type "SZ" are type approved for application in starting air lines of combustion engines and further piping systems of pipe class I, II and III, not subject to high pressure impulses.

### Pressure range PN

0bar up to 30bar

For service temperature above 50°C the pressure reduction factors specified in the manufacturer catalogue are to be observed.

### Temperature range

0°C up to + 100°C

## Material selection – corrosion resistance

### Sea water application

For selection of the material of media wetted parts, inside and outside of the hose assembly, the corrosion resistance and high temperature stability is to be observed,

The traditional stainless steels, including type 321, 316 or 316L, should not be considered suitable for use in seawater systems in general.

Certain stainless steels with higher contents of chromium, molybdenum and nitrogen have improved resistance to localised corrosion. These include high molybdenum austenitic steels and ferritic-austenitic (duplex) steels. Even these steels cannot be considered immune to attack under all situations; avoidance of stagnant sea water conditions and removal of welding oxides are some of the important factors to the successful use.

For application in sea water systems stainless steel grades with a minimum pitting resistance equivalent number (PREN) of 30 shall be used.

Material certificate shall include appropriate confirmation tests per ASTM A262, Practice E, Copper - Copper Sulphate - Sulphuric Acid Test or to another recognised standard.

Refer to DNVGL Rules Part 2 Section 3 – Corrosion testing.

### Installation on board ship

Hose assemblies shall be

- limited to a quantity and length necessary to provide for relative movement between fixed and flexibly mounted items of machinery / equipment or systems. (Ref. to MSC.1/Circ.1321).
- fitted in places where they are always accessible.
- as short in length as practicable, but should not, in general exceed 1.5m in length. Exceptions are subject to case by case approval.

For installation, the manufacturer's instructions are to be observed.

Means shall be provided to isolate flexible hose assemblies used in systems for fuel oil, lubricating oil, sea-water cooling and compressed air.

### Production place hose assemblies

<b>Germany</b>	<b>DNVGL Station</b>
HKS GmbH Schonenfahrerstr. 1 18057 Rostock	Rostock
<b>Manufacturer Certificate (AOM)</b> Welding Shop approval WF 1510006 HH, Rev.0	

### Production testing

Each batch of metallic hose assemblies is subject to a hydraulic pressure test according to purchase order but at least to 1.5 times the PN. Appropriate test report (TR) is to be issued by the manufacturer. In case of orders according to legacy GL Rules, a DNV GL-product certificate is to be issued.

Material certificates are to be provided for the pre-materials such as metal sheets (corrugated hose) and round bars (hose end fittings) as specified in the Rules Pt.4, Ch. 6 Piping system – Section 2 Materials – Table 3 Material certificates.

## Type Approval documentation

### Drawings

SZ 32/40/975/FB, SZ 32/40/897/FB, SZ 32/40/797FB, SZ 40/40/975/FB, SZ 40/40/897/FB, SZ 40/40/797FB,

K 000.00655 and K 000.00.201

### Test reports

No. ar76245913\_02 from TÜV SÜD Automotive dated 2012-02-10

Manufacturers Pressure test record from a burst test witnessed by DNV dated 13.04.2012, 13.01.17

## Tests carried out

Bending test, leakage test, U-bend test, vibration test, burst pressure test, elongation test.

## Marking of product

For traceability to this type approval the hoses are to be marked with:

Component	Reference	Example
Flange	"Tagebuchnummer", Month, DNVGL Stamp, Year	xxxxx, 06VL17
Hose	"Sachnummer", "Bestellnummer"	xxxxx, xxxxxx

## Periodical assessment

For retention of the type approval certificate periodical assessments shall be carried out at production places by DNVGL surveyor.

The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered.

Main scope of the assessment:

- verification of the production and quality control system
- review of quality control documentation of recent deliveries
- review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application
- verification of the product marking

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

## End of certificate