# DET NORSKE VERITAS

## TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **P-14710**

This is to certify that the
**Hydraulic Cylinders**

with type designation(s)
**NH75**

Issued to
**Lind Jensens Maskinfabrik A/S**
**LEM, Denmark**

is found to comply with
**Det Norske Veritas' Rules for Classification of Ships**
**Det Norske Veritas' Offshore Standards**
**DNV Standard for Certification 2.9, 5-778.93 Approval of hydraulic cylinders**

Application
**Hydraulic cylinders for ordinary use, not for steering gear or where a mechanical lock inside the cylinder is required by the Rules**

| | |
|---|---|
| **Max work press. push** | **250 bar** |
| **Max work press. pull** | **250 bar** |
| **Cylinder sizes** | **Cylinder tube inner diameter from 40 to 320 mm** |

This Certificate is valid until **2017-06-30**.

Issued at **Høvik** on **2013-12-20**

DNV local station: **Fredericia**

Approval Engineer: **Adel Samieizafarghandi**

for **Det Norske Veritas AS**

Digitally Signed By: Marianne Spaeren Marveng
Location: DNV Høvik, Norway
Signing Date: 2013-12-20

**Marianne Spæren Marveng**
**Head of Section**

## Product description

Hydraulic cylinder with the following designations (illustrative):

| 1 | 2 | 3 | 4 | 5 | 6 | | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NH 75- | X- | X- | X- | D/ | d | x | L- | X- | X- | X- | ( ) |

The top row in the table is the column number, which represents:

**1. SERIES:** Type
**2. DESIGN:** Design no.
**3. CYLINDER MOUNTING:**
- = Without end connections
S = Spherical bearing
S(C) = Spherical bearing composit
**4. TYPE:** D = Double acting
E1 = Single action, push
E2 = Single action, pull
**5. CYLINDER TUBE INNER DIAMETER:** See dimension tables on pages 3
**6. PISTON ROD DIAMETER:** See dimension tables on pages 3
**7. STROKE:** See dimension tables on pages 3
**8. EXTENTIONS**
No. **=** Length of extention sleeve on cylinder tube
No. in ( ) = Length of extention sleeve on piston rod
**9. PISTON ROD MOUNTING:**
S = Spherical bearing
S(C) = Spherical bearing composit
**10. PISTON ROD MATERIAL**
- = Carbon steel, 20MnV6
= SIS 2387
= AISI 630
= X4CrNiMo16-5-1 / 1.4418 according to EN 10088-3
= X5CrNiCuNb16-4 / 1.4542 according to EN 10088-3
**11. SPECIAL GASKETS**
TN = Teflon
TV = Teflon-viton

## Application/Limitation

Table 1. Dimension table.
Piston rod material 20MnV6. Design pressure 250 bar.

| Cylinder tube ID, mm | Piston rod diameter, mm | Max. stroke, mm |
|---|---|---|
| 50 | 25 | 248 |
| 50 | 32 | 408 |
| 63 | 30 | 294 |
| 63 | 40 | 520 |
| 80 | 40 | 421 |
| 80 | 50 | 650 |
| 100 | 50 | 505 |
| 100 | 65 | 834 |
| 125 | 65 | 705 |
| 125 | 80 | 1048 |
| 140 | 70 | 727 |
| 140 | 90 | 1160 |
| 160 | 80 | 838 |
| 160 | 100 | 1285 |
| 180 | 90 | 940 |
| 180 | 110 | 1370 |
| 200 | 100 | 1050 |

| Cylinder tube ID, mm | Piston rod diameter, mm | Max. stroke, mm |
|---|---|---|
| 200 | 125 | 1605 |
| 220 | 110 | 1130 |
| 220 | 140 | 1740 |
| 250 | 125 | 1330 |
| 250 | 160 | 2099 |
| 280 | 140 | 1495 |
| 280 | 180 | 2400 |
| 300 | 160 | 1840 |
| 300 | 200 | 2800 |
| 320 | 180 | 2125 |
| 320 | 220 | 3030 |

Table 2 Dimension table.
Piston rod material 20MnV6. Design pressure 170 bar.

| Cylinder tube ID, mm | Piston rod diameter, mm | Max. stroke, mm |
|---|---|---|
| 80 | 50 | 750 |

Table 3 Dimension table
Piston rod material 1.4418, Design pressure 250 bar

| Cylinder tube ID, mm | Piston rod diameter, mm | Max. stroke, mm |
|---|---|---|
| 40 | 25 | 65 |

This type approval does not cover the following use of the cylinders:
- Subsea applications
- Steering gear / water jet steering
- Cleating application where the Rules require a mechanical lock of cleats.

If the cylinders are going to be used for above mentioned applications, they are subject to case-by-case approval.

Materials for the pressure containing parts are to meet Charpy V-notch energy values of minimum 27 J at minimum design temperature.

The material for the cylinder tube, piston rod and end eyes are to be delivered with Works' Certificate (3.1 material certificates).

Each cylinder is to be hydraulically pressure tested to minimum 1.3 times the design pressure. The test pressure is to be applied to both sides of the piston head in sequence.

Each cylinder is to be certified by Det Norske Veritas' Surveyor as outlined in Certification Note 2.9 Program No. 5-778.93 "Approval of Hydraulic Cylinders". A product certificate endorsed or issued by the DNV Surveyor is to accompany each cylinder/delivery.

## Type Approval documentation

The type approval is based on the following documentation:
1 box (approx.LBH 40x30x20cm) with drawings and calculations.
Drawing no. 10000026615 rev. 00 dated 17.12.07

## Marking of product

For traceability to this type approval, each cylinder is to be marked with:

- Manufacturers name or trade mark LJM
- Type designation NH75

## Periodical assessment

For retention of the Type Approval a DNV Surveyor shall perform a survey every second year to verify that the conditions for the type approval are complied with and carry out product audits if regular certification of the products no longer is undertaken.

**END OF CERTIFICATE**