

# TYPE APPROVAL CERTIFICATE

**This is to certify:**

**That the Hydraulic Cylinders**

with type designation(s)  
**6525-305, 6530-350, 8032-350, 9032-305, 9032-350**

Issued to  
**Sleipner Motor AS**  
**FREDRIKSTAD, Norway**

is found to comply with  
**DNV GL rules for classification – Ships Pt.4 Ch.10 Steering gear**  
**DNV GL rules for classification – High speed and light craft**  
**DNV GL standard DNVGL-ST-0194 – Hydraulic cylinders**

**Application :**

**Products approved by this certificate are accepted for installation on vessels classed by DNV GL.**

Type	Max. working press. (push)	Max. working press. (pull)	Cylinder sizes
<b>6525-305</b>	<b>70</b>	<b>70</b>	<b>see certificate</b>
<b>6530-350</b>	<b>90</b>	<b>90</b>	<b>see certificate</b>
<b>8032-350</b>	<b>85</b>	<b>85</b>	<b>see certificate</b>
<b>9032-305</b>	<b>85</b>	<b>85</b>	<b>see certificate</b>
<b>9032-350</b>	<b>70</b>	<b>70</b>	<b>see certificate</b>

This Certificate is valid until **2025-07-08**.

Issued at **Høvik** on **2020-07-09**

DNV GL local station: **Fredrikstad**

Approval Engineer: **Renata Rossi**



for **DNV GL**  
 Digitally Signed By: Ragavendhra Rao, Vishnumurthi  
 Location: DNV GL Høvik, Norway  
 on behalf of

**Zeinab Sharifi**  
**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: **262.1-017071-3**  
 Certificate No: **TAP000009C**  
 Revision No: **1**

## Product description

Five types of the hydraulic cylinders for steering and reversing of water jet units.

Dimensional Data:

Type	Part number designation	Cylinder outside Diameter (mm)	Cylinder Inside Diameter (mm)	Rod Diameter (mm)	Maximum stroke (mm)
6525-305	6525-xxx-7-xx	75	65	25	305
6530-350	6530-xxx-9-xx	75	65	30	350
8032-350	8032-xxx-9-xx	90	80	32	350
9032-305	9032-xxx-9-xx	100	90	32	305
9032-350	9032-xxx-7-xx	100	90	32	350

Materials:

Type	Cylinder tube	Piston Rod	Piston	End eye	End cover	Stuffing box
6525-305, 6530-350 and 9032-350	E355+SR (EN10305-1)	1.4418+QT900 (EN10088-3)	S355J2+N (EN10025-2)	1.0501 C35N (EN10083-2)/ 1.4460 (EN10083-2)	1.4418+QT900 (EN 10088-3)	1.4418+QT900 (EN10088-3))
8032-350 and 9032-305	E355+SR (EN10305-1)	1.4418+QT900 (EN10088-3)	S355J2+N (EN10025-2)	1.0503 C45V (EN10083-2)/ 1.4460 (EN10083-2)	1.4418+QT900 (EN 10088-3)	1.4418+QT900 (EN10088-3)

## Application/ Limitation

The cylinders are approved for:  
 Steering Gear and Water Jet Steering on Ships and High Speed Light Craft classed by DNV GL.

Type	Maximum working Pressure (push/pull) (bar)	Design Pressure (push/pull) (bar)
6525-305	70	87.5
6530-350	90	112.5
8032-350	85	107
9032-305	85	107
9032-350	70	87.5

Design Temperature for all types : -20°C / 80°C

The cylinder tube material E355+SR EN10305-1 shall be ordered with a special minimum guaranteed elongation properties above 12%.

## Type Approval documentation

Type approved Drawings:

02-01-120-123 dated 2013-10-23, Ed. 1    02-01-130-111 dated 2014-03-28, Ed. A  
 02-01-120-126 dated 2014-06-12, Ed. 1    02-01-130-135 dated 2013-03-27, Ed. A  
 02-01-120-111 dated 2014-03-28, Ed. A    02-01-130-110 dated 2014-03-28, Ed. A  
 02-01-120-118 dated 2013-08-27, Ed. B    02-01-130-121 dated 2013-03-28, Ed. A  
 02-01-120-130 dated 2014-09-17, Ed. A    02-01-120-113 dated 2014-03-28, Ed. A

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02-01-120-127 dated 2013-08-28, Ed. 1	02-01-140-131 dated 2014-03-27, Ed. A
02-01-120-113 dated 2014-03-28, Ed. A	02-01-140-132 dated 2014-03-27, Ed. A
02-01-120-112 dated 2014-03-28, Ed. A	02-01-140-137 dated 2014-03-27, Ed. A
02-01-120-122 dated 2014-03-28, Ed. A	02-01-140-130 dated 2014-03-27, Ed. A
02-01-120-115 dated 2014-03-28, Ed. A	02-01-140-138 dated 2013-08-30, Ed. 1
02-01-120-106 dated 2014-03-28, Ed. A	02-01-140-139 dated 2014-06-12, Ed. 1
02-01-120-114 dated 2014-03-28, Ed. A	02-01-140-135 dated 2014-03-27, Ed. A
02-01-120- dated 2014-03-28, Ed. A	02-01-140-136 dated 2014-03-27, Ed. A
02-01-130-112 dated 2013-10-23, Ed. 1	02-01-140-134 dated 2014-03-27, Ed. A
02-01-130-113 dated 2014-06-12, Ed. 1	02-01-140-133 dated 2014-03-27, Ed. 1
02-01-140-124 dated 2014-01-08, Ed. A	02-01-150-109 dated 2014-06-12, Ed. 1
02-01-150-108 dated 2014-06-12, Ed. 1	02-01-140-120 dated 2014-07-10, Ed. B
02-01-150-103 dated 2013-08-30, Ed. 1	02-01-150-104 dated 2013-10-23, Ed. 1
02-01-140-128 dated 2013-10-17, Ed. A	02-01-140-125 dated 2014-01-08, Ed. A
02-01-150-101 dated 2013-10-17, Ed. B	02-01-140- dated 2013-10-17, Ed. B
02-01-150-102 dated 2013-10-17, Ed. B	02-01-140-127 dated 2014-01-08, Ed. C
02-01-140-129 dated 2013-10-17, Ed. B	02-01-140-126 dated 2014-01-08, Ed. C
	02-01-140-114 dated 2013-10-17, Ed. A

### **Production test and Certification**

Each cylinder is to be hydraulically pressure tested to 1.5 times of the design pressure and be delivered with a DNV GL product certificate. The test pressure is to be applied on both sides of the piston in sequence. Testing are to be in accordance with to DNVGL standard ST-0194 - Hydraulic Cylinders in presence of DNV GL surveyor.

The cylinder tube and piston rod shall be delivered with VL material certificate. The end covers, end eyes and pistons shall be delivered with W material certificate. Approval of manufacturer is required for VL and W material certificates.

### **Marking of product**

Hydraulic cylinders shall be permanently marked in order to enable unique traceability to a product certificate or a type approval certificate. The marking shall at least consist of the following:

- manufacturers name or trade mark
- type designation
- DNV GL product certificate number, if applicable
- charge number for the materials used in the cylinder tube and the piston rod.

### **Periodical assessment**

For retention of the Type Approval, a DNV GL surveyor shall perform periodical assessment after two years (+/-90 days) and after 3.5 years (+/-90 days) to verify that the conditions for the approval are complied with. Reference is made to DNVGL-CP-0338.