



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **M-12358**

This is to certify that the
Hydraulic Rudder Actuator for Steering Gear

with type designation(s)
7080 and 7085

Manufactured by
KOBELT MANUFACTURING CO.LTD.
SURREY BRITISH COLUMBIA, Canada

is found to comply with
Det Norske Veritas' Rules for Classification of Ships/High Speed and Light Craft

Application
May be used as steering cylinder on ships and HSLC

This Certificate is valid until **2016-12-31**.

Issued at **Høvik** on **2013-08-07**

DNV local station: **Vancouver**

Approval Engineer: **Adel Samieizafarghandi**

for **Det Norske Veritas AS**



Digitally Signed By: **Marveng, Marianne Spæren**

Location: **DNV Høvik, Norway**

Signing Date: **2013-08-07**

Marianne Spæren Marveng
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.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



Certificate No.: M-12358
 File No.: 703.11
 Job Id.: 262.1-006778-2

Product description

Both models: Balanced or unbalanced hydraulic cylinders made from:
 Brass tube (C33500, Wieland-Z10) - cold drawn seamless brass tubing minimum yield strength 300 N/mm2, tensile strength: 450 N/mm2. Stainless steel piston rod (SS303).

Bolted with tie rods.

Spherical bearings in each end with a trunnion cap in the tube end.

End Covers, rod ends etc – die cast brass. Material to be manufactured to comply with specification C87800. Manufacturer's acceptance criteria to be accepted by DNV.

Application/Limitation

May be used for steering gear applications on ships and HSLC.

Sizes:

Type	Tube inner diameter (inches)	Rod diameter (inches)	Max. stroke (inches)	Working pressure/ Design pressure
7080	3"	1.25"	7.5", 12", 16"	69 bar/86 bar
7085	3.5"	1.5"	7.5", 12", 16"	69 bar/86 bar

Type Approval documentation

Drawings:

Type 7080:

- 7080 steering cylinder w/specifications
- D-7080 rev. A, 7080 Steering cylinder, dated 25/0920/03,
- B-7080-0001 rev. A End cap dated 06/1993,
- C-7080-0002 Trunnion foot dated 14/8/1989
- C-7080-0003 rev. A, Trunnion end cap dated 06/1993
- B-7080-0004 Rod End, dated 23/12/2000
- A-7080-0004B Rod ball dated 06/1992
- B-7080-0005 Trunnion cap dated 15/9/1989
- A-7080-0006 rev A Tube dated 05/1991
- B-7080-0007 rev. C Shaft guide dated 5/2007
- B-7080-0008 rev. C Piston (balanced cyl.) dated 8/1989
- A-7080-0009 rev. A Shaft balanced cyli dated 1/1989
- A-7080-0010 rev. B Retaining washer dated 03/1991
- A-7080-0012 Pin dated 08/1989
- A-7080-0014 rev. A Tie rod dated 8/1983
- B-7080-0107 rev. C Rear end cap (unbalanced cylinder) dated 6/2007
- B-7080-0108 rev. B Piston (unbalances cyl) dated 1/1989
- A-7080-0109 rev. A Shaft for 7080 unbalanced cylinder dated 2/1989
- A7040-00111 rev. A Bleeder screw dated 22/10/2000
- D-7080-CALCUL dated 16/01/2008
- Model 7080 Parts list without date
- Specification "Seamless round brass tubing for cylinder barrels" from Wieland-Werke AG

Type 7085:

- 7085 Cylinder (balanced) dated 06/08/2002
- 7085 Cylinder (unbalanced) dated 06/08/2002
- C-7085-0001 Foot dated 22/07/1998
- B-7085-0002M rev. A Swivel dated 22/07/1998
- C-7085-0003M rev. A End cap swivel end dated 11/03/2005
- C-7085-0004M Rod end dated 29/07/1998
- B-7085-0006M rev. A End cap dated 11/03/2005
- B-7085-0015 rev. B Main shaft guide dated 31/01/2003
- A-7085-0016 Seal retainer dated 03/06/1998



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- B-7085-0018 rev. A Main tube dated 12/03/2004
- B-7085-0021 rev. C Main piston Balanc. Cyl. Dated 15/09/2000
- B-7085-0022 rev D Main piston rod balanced cyl dated 09/11/2007
- A-7085-0028 rev A Hex. Shoulder bolt (short) dated 09/05/2007
- A-7085-0029 Hex shoulder bolt (long) dated 01/06/1998
- A-7085-0031 Main piston pin dated 12/08/1998
- A-7085-0033 rev. A Main tie rod dated 23/03/2004
- B-7085-0038 rev B Rear end cap dated 21/10/2003
- B-7085-0121 rev B Main piston unbal. Cyl. Dated 15/09/2000
- B-7085-0122 rev. C Main piston rod unbalanced cyl. Dated 07/12/2006
- D-7085 CALCUL. Unbalanced steering cylinder (for calculation) dated 16/01/2008
- Model 7085 Parts list without date

Marking of product

For traceability to this Type Approval Certificate the products are at least to be marked:

- Manufacturers name or trade mark.
- Type designation.

Certificate Retention Survey

Each cylinder being marketed/ sold as "Type Approved by Det Norske Veritas" is to be certified by Det Norske Veritas' Surveyor as outlined in Standard for Certification No. 2.9 Type approval Program no.5-778.93 "Hydraulic Cylinders".

A product certificate endorsed or issued by the DNV Surveyor is to accompany each cylinder/delivery. The cylinder is to be hydraulically pressure tested as follows:

Design pressure, bar	Test pressure, bar
86	129

The test pressure is to be applied to both sides of the piston in sequence.

The materials for the cylinder tube, the piston rod and end connections are at least to be delivered with material work's certificate (= 3.1B material certificate according to EN 10204 or equivalent) unless otherwise required by the different Rules or by the purchaser. For cylinder intended for steering gear or for steering of water jet units NV material certificates are required for the same parts

END OF CERTIFICATE