DNV·GL

Certificate No:
TAS0000183

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Windlass

with type designation(s)
1-AV-12.5K2, 1-AV-14K2, 1-AV-16K2, 1-AV-17.5K2, 2-AV-17.5K2, 1-AV-19K2, 1-AV-20.5K2, 2-AV-20.5K2, 1-AV-22K2, 2-AV-22K2, 1-AV-24K2, 2-AV-24K2, 1-AV-26K2, 1-AV-28K2, 1-AV-30K2, 1-AV-34K2, 2-AS-30K3

Issued to
MB Hydraulikk AS
MJOSUNDET, Norway

is found to comply with
DNV GL rules for classification – Ships
DNV GL rules for classification – High speed and light craft

Application :

The anchor winches are approved for the following breaking strengths of chains selected: AV-12.5K2 approved for 92kN / AV-14K2 approved for 116kN / AV-16K2 approved for 150kN / AV-17.5K2 approved for 179kN / AV-19K2 approved for 211kN / AV-20.5K2 approved for 244kN / AV-22K2 approved for 280kN / AV-24K2 approved for 332kN / AV-26K2 approved for 389kN / AV-28K2 approved for 449kN / AV-30K2 approved for 514kN (to be used with locking mechanism) / AV-34K2 approved for 655kN / AS-30K3 approved for 735kN (to be used with external chain stopper)

These are limited to use for anchorage depth down to 82.5 m when it is DNVGL-RU-SHIP application.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2018-01-15**
This Certificate is valid until **2023-01-14**.
DNV GL local station: **Kristiansund N**

Approval Engineer: **Chi Wan Bang**

for **DNV GL**

Aldo Matteucci
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.

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Product description

Hydraulic driven anchor windlasses with wire rope drums (AV) or cable lifter (AS) according to the following information.

Type No.	Type designation*	Breaking load of chain	Chain**	Steel Wire Rope***
1	1-AV-12.5K2 HSLC	92 kN	12.5m Ø12.5mm K2	130m Ø12mm (same for fibre rope****)
2	1-AV-12.5K2 SHIP	92 kN	12.5m Ø12.5mm K2	130m Ø12mm (same for fibre rope****)
3	1-AV-14K2 HSLC	116 kN	12.5m Ø14mm K2	130m Ø12mm (same for fibre rope****)
4	1-AV-14K2 SHIP	116 kN	12.5m Ø14mm K2	130m Ø12mm (same for fibre rope****)
5	1-AV-16K2 HSLC	150 kN	12.5m Ø16mm K2	190m Ø14mm
6	1-AV-16K2 SHIP	150 kN	12.5m Ø16mm K2	190m Ø14mm
7	1-AV-17.5K2 HSLC	179 kN	12.5m Ø17.5mm K2	220m Ø16mm or 200m Ø18mm
8	1-AV-17.5K2 SHIP	179 kN	12.5m Ø17.5mm K2	220m Ø16mm or 200m Ø18mm
9	1-AV-17.5K2-KN HSLC	179 kN	12.5m Ø17,5mm K2	220m Ø16mm or 200m Ø18mm
10	2-AV-17.5K2-KN HSLC	179 kN	2 x 12.5m Ø17,5mm K2	2x220m Ø16mm or 2x200m Ø18mm
11	1-AV-19K2 HSLC	211 kN	12.5m Ø19mm K2	220m Ø19mm
12	1-AV-19K2 SHIP	211 kN	12.5m Ø19mm K2	220m Ø19mm
13	1-AV-20.5K2 HSLC	244 kN	12.5m Ø20,5mm K2	220m Ø19mm
14	1-AV-20.5K2 SHIP	244 kN	12.5m Ø20,5mm K2	250m Ø22mm
15	2-AV-20.5K2-KN SHIP	244 kN	2 x 12.5m Ø20,5mm K2	2 x 250m Ø22mm
16	1-AV-22K2 HSLC	244 kN	12.5m Ø22mm K2	250m Ø22mm
17	1-AV-22K2 SHIP	244 kN	12.5m Ø22mm K2	250m Ø22mm
18	2-AV-22K2-KN HSLC	244 kN	2 x 12.5m Ø22mm K2	2 x 250m Ø22mm
19	2-AV-22K2-KN SHIP	244 kN	2 x 12.5m Ø22mm K2	2 x 250m Ø22mm
20	1-AV-24K2 HSLC	332 kN	12,5m Ø24mm K2	250m Ø22mm
21	1-AV-24K2 SHIP	332 kN	12,5m Ø24mm K2	250m Ø22mm
22	2-AV-24K2-KN HSLC	332 kN	2 x 12.5m Ø24mm K2	2 x 250m Ø22mm
23	2-AV-24K2-KN SHIP	332 kN	2 x 12.5m Ø24mm K2	2 x 250m Ø22mm
24	1-AV-26K2 HSLC	389 kN	12.5m Ø26mm K2	215m Ø30mm
25	1-AV-26K2 SHIP	389 kN	12.5m Ø26mm K2	215m Ø30mm
26	1-AV-28K2 HSLC	449 kN	12.5m Ø28mm K2	215m Ø30mm
27	1-AV-28K2 SHIP	449 kN	12.5m Ø28mm K2	215m Ø30mm
28	1-AV-30K2 HSLC	514 kN	12.5m Ø30mm K2	215m Ø30mm
29	1-AV-30K2 SHIP	514 kN	12.5m Ø30mm K2	215m Ø30mm
30	1-AV-34K2 HSLC	655 kN	12.5m Ø34mm K2	310m Ø34mm
31	1-AV-34K2 SHIP	655 kN	12.5m Ø34mm K2	310m Ø34mm
32	2-AS-30K3-KN SHIP	735 kN	Ø30 K3	N/A

*each type is allowed to have the following configuration on the original winch, and both configurations can also be used together.

-K : mechanically free coupling between the drum and drive

-N : warping head

** the length of chain cable shall be according to DNVGL-RU-SHIP Pt.3 Ch.11 Sec.1 [5.1.7] or DNVGL-RU-HSLC Pt.3 Ch.5 Sec.3 [5.1.5].

*** the breaking strength of the used wire rope shall be according to DNVGL-RU-SHIP Pt.3 Ch.11 Sec.1 [5.1.7] or DNVGL-RU-HSLC Pt.3 Ch.5 Sec.3 [5.1.4].
**** synthetic fibre rope may be used instead of stud link chain cable when it is DNVGL-RU-HSLC application only.

Application/Limitation

- All winches are limited to use for anchorage depth down to 82.5 m when it is DNVGL-RU-SHIP application. For anchorage depth deeper than 82.5m, a case-by-case approval with increased capacities shall be applied according to DNVGL-RU-SHIP Pt.3 Ch.11 Sec.1 [6.3.1]
- Chain and wire rope are not parts of the winch supplier's delivery, and these shall be according to anchoring arrangement approved for each installation.
- Different chain grades K1, K2 and K3 and wire ropes from the above mentioned chain/rope can be acceptable as long as the maximum breaking strength specified for each type is not exceeded and the ratio between the drum and wire is found acceptable by the manufacturer.
- All anchor winches except AV-30K2 and AS-30K3 shall withstand a static pull equal to 80% of the minimum breaking strength on the band brake alone and no chain stopper is required.
- AV-30K2 has the locking mechanism as the functionality of a chain stopper which withstand 80% of the minimum breaking strength and no chain stopper is required. The band brake shall withstand a static pull equal to 45% of the minimum breaking strength.
- AS-30K3 shall withstand a static pull equal to 45% of the minimum breaking strength on the band brake alone. An external chain stopper is required
- The band brake shall always be applied first to control drop speed according to MB Hydraulikk AS's instruction manual/recommendation. According to this the lock for the locking mechanism is not to be engaged at speed.
- Hydraulic motors/systems related parts, gears and warping heads are not covered by this type approval.
- The required output lifting power capacities shall be delivered with a range of different gearing ratios and hydraulic motors by considering each vessel's hydraulic system. It is the manufacturer's responsibility to ensure the required lifting power and speed, and to be verified by testing of each winch.
- All anchor winches are fitted with a manually operated bypass valve for the hydraulic motor enabling drop of anchor (hydraulically operated couplings capable of being disengaged manually) under all conditions including the dead ship condition(fairlure of the power drive). This is to be tested onboard as a part of the anchoring test according to MB Hydraulikk AS's instruction manual/recommendation.
- Steel and aluminium components should be isolated from one another due to risk of corrosion.
- Load carrying bolts are to be pre-stressed and secured according to a procedure acceptable to the surveyor.
- The connection and support of the anchor windlasses to the ship's structure are not included in this approval and to be covered by separate approvals.
- If installed on DNV GL vessels, a DNV GL product certificate is to be issued for each product and the following will apply:
  - Materials are to be delivered with required material certificates in accordance with DNVGL-RU-SHIP Pt.3 Ch.1 Sec.3 [3.1] Table 2 or DNVGL-RU-HSLC Pt.3 Ch.5 Sec.1 [1.4] Table 3.
  - The manufacturer is required to have a DNV GL surveyor witness all important production and tests as required.
  - Non-destructive testing is to be carried out to the attending surveyor's satisfaction.
  - Welding procedures and welders shall be qualified in accordance with the requirements of DNV GL.
  - Hydraulic systems shall comply with the requirements from the aforementioned Rules.

Type Approval documentation

Tests carried out

complete shop test verification with the required chain MBL was carried out for each winch as follows:

- Report from "Full Scale Test" at sea of 1-AV-12,5K2, carried out 2013-05-13.
- Test Report with No.1870, Winch 1-AV-14K2, carried out 2013-08-19.
- Test Report with No.1748, Winch 1-AV-16K2, carried out 2012-11-01.
- Test Report with No.1121, Winch 1-AV-17.5K2, carried out 2006-10-30.
- Test Report with No.2069, Winch 1-AV-17.5K2-KN, carried out 2014-11-13.
- Test Report with No.2037, Winch 1-AV-20.5K2, carried out 2014-09-17.
- Test Report with No.2255, Winch 1-AV-24K2, carried out 2016-03-04.
- Test Report with No.1392, Winch 2-AV-24K2-KN, carried out 2009-06-18.
- Test Report with No. 919, Winch 1-AV-30K2, carried out 2003-06-26.
- Test Report with No.2428, Winch 1-AV-34K2, carried out 2017-10-26.
- Test Report with No. 946, Winch 2-AS-30K3-KN, carried out 2009-06-18.

Each windlass shall be shop tested and on-board tests after installation in DNVGL-RU-SHIP Pt.3 Ch.11 Sec.1 [6.6] or DNVGL-RU-HSLC Pt.3 Ch.5 Sec.1 [6.3].

Marking of product

Each windlass shall be marked with manufacturer's name or trademark and type number identification. When it is DNVGL-RU-SHIP application, it shall be marked according to Pt.3 Ch.11 Sec.1 [6.7].

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.

END OF CERTIFICATE