

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Gears

with type designation(s)
SLW / SCW / SMW series

Issued to

Dana Brevini Power - Transmission S.p.A.
Reggio Emilia, Italy

is found to comply with

DNV GL standard DNVGL-ST-0378 – Standard for offshore and platform lifting appliances

DNV GL standard DNVGL-ST-0377 – Standard for shipboard lifting appliances

DNV GL standard DNVGL-ST-0358 – Certification of offshore gangways for personnel transfer

DNVGL-OS-E101 – Drilling plant, Edition July 2015

IMO SOLAS 1974 as amended and the LSA Code

Application :

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

Planetary gear units with failsafe brakes for hoist applications

Design Temperature, Td, according to above standard equals -20 degrees Celsius

Issued at **Høvik** on **2018-01-01**

This Certificate is valid until **2022-12-31**.

DNV GL local station: **Milan**

for **DNV GL**

Approval Engineer: **Sorina Thompson**

.....
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.



Product description

- SLW / SCW / SMW are planetary gear unit with 2, 3 or more stages and rotating housing.
- SCW implies the presence of the right angle unit at gearbox input (see TA certificate for right angle units).
- SMW implies the presence of the splitter box at gearbox input. The splitter box can be fitted for 2, 3 or more motors.
- The type approval of the whole unit is covered by the Type Approval of the single stages it is assembled of. Brakes are connected to input shaft and can be delivered with or without backstop device.

Application/Limitation

- Output speed is 15 rpm. If other output speed is required, the rating values are to be interpolated. These new values will be provided by Brevini Power Transmissions S.p.A. using their calculation program ISO BreCal2000.
- Load spectrum and classes of utilisation according to F.E.M. (1.001 3rd edition – Revised 1998.10.01) are defined below.
- Materials with 3.1B certificates are to be used when manufacturing load carrying parts. Traceability is assumed taken care of by the manufacturer's quality system.
- Upon final installation of gear unit to foundation/frame the fastening bolts are to be pre-stressed according to procedures acceptable to the attending surveyor. We have assumed that the load carrying bolts are of 8.8 quality or higher.
- Our gear calculations are based on that optimum hardening depths have been achieved according to recognised standards and manufacturer's experience. Material fatigue values based on 90% reliability of survival have been applied according to the requirements for lifting appliances in our rules. Load distribution factors as stated by the manufacturer (based on his experience) have been used and we have not considered these.
- The bearing lifetime for the gears has not been evaluated in this Type Approval. It is assumed that the manufacturer delivers bearings with sufficient capacity for the class of utilization they are intended for.

L1 (km = 0.1)

Load	Time
100 %	4 %
50 %	35 %
30 %	61 %

L2 (km = 0.2)

Load	Time
100 %	8 %
60 %	27 %
50 %	33 %
40 %	32 %

L3 (km = 0.4)

Load	Time
100 %	20 %
70 %	46 %
50 %	34 %

L4 (km = 0.8)

Load	Time
100 %	59 %
80 %	41 %

Classes of utilisation

Class	T1	T2	T3	T4	T5	T6	T7	T8
Hours	400	800	1600	3200	6300	12500	25000	50000

Output torque according to L1 [Nm]

Output torque according to L2 [Nm]

Output torque according to L3 [Nm]

Output torque according to L4 [Nm]

Brakes

Standard multidisc static brake design

Listed Static Torque values are the effective brake torque (with tolerance) for each configuration.

When a gearbox is delivered for an application according to Standard for Certification 2.22 – Lifting Appliances, the brake torque for the specific application shall be calculated taking into consideration the factor as given in Ch.2 Sec.5 B305.

Factor: 1,8 or dynamic factor if this exceeds 1.8 for the application.

Static Torque for the brake $\geq$ Factor * Nominal_Output_torque / i (gearbox overall ratio)

Brake – FL type (external version) Brake model	Static Torque [Nm]
FL620	239 ÷ 285
FL635	352 ÷ 401
FL635 (variant with 16 springs)	505 ÷ 575
FL250.4C / FLs250.4C / FL250.4C-RL	171 ÷ 191
FL250.6C / FLs250.6C / FL250.6C-RL	263 ÷ 293
FL250.8C / FLs250.8C / FL250.8C-RL	361 ÷ 400
FL350.6C / FLs350.6C / FL350.6C-RL	394 ÷ 440
FL350.8C / FLs350.8C / FL350.8C-RL	541 ÷ 600
FL450.6C / FLs450.6C / FL450.6C-RL	512 ÷ 568
FL450.8C / FLs450.8C / FL450.8C-RL	701 ÷ 774
FL650.10C / FLs650.10C / FL650.10C-RL	588 ÷ 696
FL650.12C / FLs650.12C / FL650.12C-RL	728 ÷ 856
FL650.14C / FLs650.14C / FL650.14C-RL	875 ÷ 1023
FL750.10C / FLs750.10C / FL750.10C-RL	767 ÷ 901
FL750.12C / FLs750.12C / FL750.12C-RL	947 ÷ 1106
FL750.14C / FLs750.14C / FL750.14C-RL	1137 ÷ 1321
FL960.8C / FLs960.8C / FL960.8C-RL	923 ÷ 1115
FL960.10C / FLs960.10C / FL960.10C-RL	1153 ÷ 1394
FL960.12C / FLs960.12C / FL960.12C-RL	1384 ÷ 1673
FL960.14C / FLs960.14C / FL960.14C-RL	1615 ÷ 1952
FL960.16C / FLs960.16C / FL960.16C-RL	1845 ÷ 2231
FL960.18C / FLs960.18C / FL960.18C-RL	2076 ÷ 2509
FL875.6C / FLs875.6C / FL875.6C-RL	1060 ÷ 1265
FL875.8C / FLs875.8C / FL875.8C-RL	1414 ÷ 1687
FL875.10C / FLs875.10C / FL875.10C-RL	1767 ÷ 2108
FL875.12C / FLs875.12C / FL875.12C-RL	2121 ÷ 2530
FL875.14C / FLs875.14C / FL875.14C-RL	2474 ÷ 2952
FL875.16C / FLs875.16C / FL875.16C-RL	2828 ÷ 3373
FL7,5.8C (30ext.spring)	1259 ÷ 1478
FL7,5.10C (30ext.spring)	1574 ÷ 1847
FL7,5.12C (30ext.spring)	1811 ÷ 2300
FL7,5.14C (30ext.spring)	2113 ÷ 2683
FLs7,5.14C (30ext.+15int.spring)	2403 ÷ 3130
FL7,5.18C (30ext.spring)	2717 ÷ 3450
FL7,5.18C (30ext.+30int.spring)	3546 ÷ 4455
FL7,5.18C/FLs7,5.18C(30ext.+15int.spring)	3090 ÷ 4024

Job Id: **262.1-013464-5**
Certificate No: **TAS00001BW**

FL7,5.20C/FLs7,5.20C (30ext.+30int.spring)

3839 ÷ 5089

Type Approval documentation

Drawings of sun wheels, planets, ring gears, planetary carriers, housing, brakes and shafts and calculations for all stages and brakes

Tests carried out

- Survey report GEN050321-1 for SLW4003 gearbox, witnessed by DNV Venice.
- For delivery according to DNVGL-ST-0377 and ST-0378, gear unit and winch or similar is to be function and load tested according to Section 13 and 14 of the Rules, respectively before a DNV GL product certificate can be issued
- For delivery according to SOLAS a functional test is to be carried out showing compliances with IMO Resolution MSC 81(70) "Testing Part II"

Marking of product

The product to be marked with manufacturer's name/trademark and type number identification.

Periodical assessment

For retention of the Type Approval, DNV GL surveyor shall perform a survey every second year and before expiry date of this certificate in order to verify that the conditions of the type approval are complied with.

END OF CERTIFICATE