

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Battery (Accumulator)**with type designation(s)
PV

Issued to

Alcad Ltd.
OSKARSHAMN, Sweden

is found to comply with

Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
IEC 60092-305 (1980)
IEC 62259 (2003-10)
IEC 60623 (2001-09)**Application :****Industrial Nickel-Cadmium batteries for mobile and stationary application.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**This Certificate is valid until **2018-12-31**.Issued at **Høvik** on **2015-10-06**for **DNV GL**DNV GL local station: **Stockholm**Approval Engineer: **Nicolay Horn**

Marit Laumann
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

Nickel-Cadmium accumulators / batteries type PV designed and tested in accordance with in IEC 62259 (2003-10).

Capacities according to manufacturer's data.

Type designation	Rated Capacity C ₅ Ah	Type designation	Rated Capacity C ₅ Ah
PV 50	45	PV 960	890
PV 100	95	PV 1015	940
PV 150	140	PV 1065	980
PV 200	185	PV 1115	1030
PV 250	235	PV 1170	1080
PV 305	280	PV 1215	1120
PV 355	325	PV 1270	1170
PV 405	375	PV 1320	1220
PV 455	420	PV 1370	1260
PV 505	470	PV 1420	1300
PV 555	515	PV 1470	1350
PV 610	560	PV 1520	1400
PV 660	610	PV 1570	1450
PV 710	650	PV 1620	1500
PV 760	700	PV 1670	1550
PV 810	750	PV 1720	1600
PV 860	800	PV 1775	1650
PV 910	840	PV 1830	1700

Application/Limitation

Installation and maintenance to be done in accordance with the Installation and Operating Instructions and/or the Technical Manual.

Type approval documentation

Test carried out

Type tests in accordance with IEC 62259 (2003 - 10)*:

- item 7.2.1 - Discharge performance at +20°C
- item 7.2.2 - Discharge performance at +5°C
- item 7.2.3 - Discharge performance at -18°C
- item 7.2.4 - High rate current test
- item 7.3 - Charge retention
- item 7.4.1 - Endurance in cycles
- item 7.4.2 - Permanent Charge endurance
- item 7.5 - Charge acceptance at constant voltage

item 7.7 - Vent operation

item 7.8 - Electrolyte retention

item 7.9 - Determination of gas recombination efficiency

item 7.10 - Storage

* The type tests performed are also in accordance with IEC 60623 4th edition (2001-09) item 4.2 to 4.9.

Vibration test.

Marking of product

The product to be marked in accordance with IEC 62259: Manufacturers name, IEC 62259, type and manufacturing date.

Periodical Assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the survey are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Assessment to be performed at least every second year.

END OF CERTIFICATE