

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Battery (Accumulator)

with type designation(s)
VTX1 L & VTX1 M

Issued to

Alcad Ltd.
OSKARSHAMN, Sweden

is found to comply with
DNV GL rules for classification – Ships and offshore units
IEC 62259 (2003-10)
IEC 60623 (2001-09)
IEC 60092-305 (1980)

Application :

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

This Certificate is valid until **2017-06-30**.

Issued at **Høvik** on **2016-05-22**

DNV GL local station: **Stockholm**

Approval Engineer: **Nicolay Horn**

for **DNV GL**

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.

Job Id: **262.1-019211-2**
Certificate No: **TAE000010K**

Product description

Industrial pocket plate Ni-Cd batteries with the following type designations are covered by this certificate:

Type Designation	Rated Capacity C ₅ Ah
VTX1 L 15	15
VTX1 L 30	30
VTX1 L 47	47
VTX1 L 62	62
VTX1 L 75	75
VTX1 L 95	95
VTX1 L 110	110
VTX1 L 140	140
VTX1 L 185	185
VTX1 L 235	235
VTX1 L 280	280
VTX1 L 325	325
VTX1 L 375	375
VTX1 L 420	420
VTX1 L 470	470
VTX1 L 515	515
VTX1 L 560	560

Type Designation	Rated Capacity C ₅ Ah
VTX1 L 610	610
VTX1 L 650	650
VTX1 L 700	700
VTX1 L 750	750
VTX1 L 800	800
VTX1 L 840	840
VTX1 L 890	890
VTX1 L 940	940
VTX1 L 980	980
VTX1 L 1030	1030
VTX1 L 1120	1120
VTX1 L 1220	1220
VTX1 L 1300	1300
VTX1 L 1400	1400
VTX1 L 1500	1500
VTX1 L 1600	1600
VTX1 L 1700	1700

Type Designation	Rated Capacity C ₅ Ah
VTX1 M 8	8
VTX1 M 16	16
VTX1 M 24	24
VTX1 M 32	32
VTX1 M 40	40
VTX1 M 48	48
VTX1 M 65	65
VTX1 M 75	75
VTX1 M 100	100
VTX1 M 125	125
VTX1 M 150	150
VTX1 M 170	170
VTX1 M 195	195
VTX1 M 220	220
VTX1 M 245	245
VTX1 M 270	270
VTX1 M 295	295
VTX1 M 320	320
VTX1 M 345	345

Type Designation	Rated Capacity C ₅ Ah
VTX1 M 370	370
VTX1 M 395	395
VTX1 M 420	420
VTX1 M 445	445
VTX1 M 490	490
VTX1 M 540	540
VTX1 M 590	590
VTX1 M 640	640
VTX1 M 690	690
VTX1 M 740	740
VTX1 M 785	785
VTX1 M 835	835
VTX1 M 885	885
VTX1 M 935	935
VTX1 M 985	985
VTX1 M 1030	1030
VTX1 M 1130	1130
VTX1 M 1230	1230
VTX1 M 1330	1330

Application/Limitation

Industrial Nickel-Cadmium batteries for mobile and stationary applications and for use in ships and Offshore Units

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

Type Approval documentation

Tests 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 in IEC 62259: Manufacturers name, IEC 62259, type and manufacturing date.

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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 assessment 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