DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. E-9729
This Certificate consists of 5 pages

This is to certify that the

Battery (Accumulator)

with type designation(s)

NAL, NBL, NAM, NBM, NAH and NBH

Manufactured by

SAFT AB

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 60623 (2001 - 09)

Application

Industrial Nickel-Cadmium batteries for mobile and stationary application

Place and date
Høvik, 2009-09-15
for DET NORSKE VERITAS AS

Marit Laumann
Head of Section

Local Office
DNV Stockholm

This Certificate is valid until
2013-06-30

Nicolay Horn
Surveyor

Notice: 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.

Types of batteries for 3 different uses: Discharge over a long period (NAL and NBL); several hours, medium period (NAM and NBM); half hour to a few hours and short period with high currents (NAH and NBH); fraction of an hour. Dimension in accordance with section 3 in IEC 60623.

The number in the type name gives the discharge capacity in Ah according to manufacturer's data. Type: NAL, NBL, NAM, NBM, NAH and NBH.

NICA	
Type	Reference Drawing No.
NAL10	3104471
NAL15	3104472
NAL21	3104473
NAL30	3104474
NAL38	3104475
NAL45	3104476
NAL59	3104477
NAL70	3104478
NAL85	3104479
NAL105	3104480
NAL135	3104481
NAL170	3104482
NAL205	3104483
NAL220	3104484
NAL260	3104485
NAL310	3104486
NAL355	3104487
NBL7,5	3100447
NBL16	3100448
NBL30	3100449

NICA	
Type	Reference Drawing No.
NBL37	3100450
NBL45	3101257
NBL48	3100459
NBL59	3101592
NBL70	3100451
NBL90	3100460
NBL102	3100452
NBL131	3100461
NBL173	3100462
NBL214	3100463
NBL256	3100464
NBL304	3100465
NBL346	3100466
NBL387	3104467
NBL429	3100468
NBL470	3100469
NBL510	3100988
NBL600	3103112
NBL645	3100989
NBL770	3100990

NICA	
Type	Reference Drawing No.
NBL860	3100991
NBL1020	3100992
NBL1070	3100993
NBL1280	3100994
NBL1450	3103099
NBL1540	3103100
NAM9	3104488
NAM14	3104489
NAM22	3104490
NAM31	3104491
NAM39	3104492
NAM47	3104493
NAM55	3104494
NAM70	3104495
NAM90	3104496
NAM110	3104497
NAM130	3104498
NAM145	3104499
NAM165	3104500
NAM185	3104501

NAM215	3104502
NAM240	3104503
NAM285	3104504
NAM310	3104505
NAM335	3104506
NBM11	3100470
NBM15	3100471
NBM22	3100472
NBM30	3100473
NBM43	3100474
NBM56	3100477
NBM65	3100475
NBM84	3100478
NBM112	3100479
NBM138	3100480
NBM161	3100481
NBM184	3100482
NBM208	3100483
NBM231	3100484
NBM277	3100485
NBM300	3100486
NBM323	3100487
NBM346	3100488
NBM369	3100489
NBM392	3100490
NBM415	3100995
NBM438	3100996
NBM461	3100955
NBM505	3103113
NBM555	3100998
NBM625	3100999

NBM690	3101000
NBM740	3101001
NBM830	3101002
NBM920	3101003
NBM965	3103114
NBM1040	3101004
NBM1150	3101005
NBM1220	3103101
NBM1390	3103102
NAH9	3104507
NAH12	3104508
NAH17	3104509
NAH21	3104510
NAH25	3104511
NAH29	3104512
NAH34	3104513
NAH40	3104514
NAH50	3104515
NAH60	3104516
NAH70	3104517
NAH80	3104518
NAH90	3104519
NAH100	3104520
NAH110	3104521
NAH120	3104522
NAH130	3104523
NAH145	3104524
NAH155	3104525
NAH185	3104526
NAH210	3104527
NBH8,3	3100491

NBH12	3100492
NBH16	3100493
NBH19	3100494
NBH29	3100495
NBH39	3100496
NBH49	3100497
NBH59	3100498
NBH69	3102509
NBH79	3100499
NBH88	3102510
NBH98	3100500
NBH118	3102511
NBH137	3102512
NBH157	3101102
NBH177	3101103
NBH196	3101104
NBH236	3101105
NBH265	3101106
NBH294	3101107
NBH353	3101108
NBH393	3101109
NBH471	3101110
NBH491	3101111
NBH590	3101112
NBH640	3101011
NBH705	3101012
NBH765	3101013
NBH865	3103103
NBH920	3103104

Application/Limitation

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

Type approval documentation

Nickel-Cadmium Batteries, Block types, Brochure from NICA.

Nickel-Cadmium Batteries, Single cell types, Brochure from NICA.

SAFT Technical Report no. 522, issued 2003-09-18.

Mechanical test reports Ref. 94F20909 and 97F22153 (vibration tests), SP- Swedish National Testing and Research Institute.

Test carried out

Type tests in accordance with IEC 60623 (Fourth edition 2001 - 09)

item 4.2 - Discharge performance
- 4.2.1 - Discharge performance at 20°C
- 4.2.2 - Discharge performance at + 5°C
- 4.2.3 - Discharge performance at - 18°C
- 4.2.4 - High rate current test

item 4.3 - Charge retention

item 4.4 - Endurance
- 4.4.1 - Endurance in cycles
- 4.4.2 - Permanent charge endurance

item 4.5 - Charge acceptance at constant voltage

item 4.8 - Electrolyte retention
- 4.8.1 - Test procedure
- 4.8.2 - Acceptance criteria

item 4.9 - Storage

and Vibration test

Marking of product

The product to be marked in accordance with section 2 in IEC 60623: Manufacturers name, IEC 60623, type and manufacturing date.

Certificate retention survey

The scope of the retention/renewal survey 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.

Survey to be performed at least every second year.

END OF CERTIFICATE