DNV·GL

Certificate No:
TAS00000JS

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Seats

with type designation(s)
Alutech 320, Alutech 325, Alutech 330, Alutech 340, Alutech 350, Alutech 420, Alutech 425, Alutech 430, Alutech 440, Alutech 450, Alutech 520, Alutech 525, Alutech 530, Alutech 540, Alutech 550, Alutech 620, Alutech 625, Alutech 630, Alutech 640, Alutech 650, OP10 360, OP10 600

Issued to
Alu Design & Services AS
Kristiansand S, Norway

is found to comply with
International Code of Safety for High-Speed Craft, 2000 - Annex 10

Application :

Pilot/Crew Seat for Design level 2: gcoll = 3 to 12g

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

This Certificate is valid until **2021-06-30**.

Issued at **Høvik** on **2016-07-01**

DNV GL local station: **Kristiansand S** for **DNV GL**

Approval Engineer: **Per Annar Sandaune**

Odd Arne Lyngstad
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

Pilot/Crew Seat placed on column-leg at base/rails fixed to the deck of the craft.

Type/model designation:
300 Series: "Alutech 320", "Alutech 325", "Alutech 330", "Alutech 340" & "Alutech 350"
400 Series: "Alutech 420", "Alutech 425", "Alutech 430", "Alutech 440" & "Alutech 450"
500 Series: "Alutech 520", "Alutech 525", "Alutech 530", "Alutech 540" & "Alutech 550"
600 Series: "Alutech 620", "Alutech 625", "Alutech 630", "Alutech 640" & "Alutech 650"
OP10 Series: "OP10 360", "OP10 600"
Basic construction consists of: Bottom/Back with upholstery, Column/Leg and deck-Base/Rails.
Basic materials are aluminium-profiles/plates and steel bolts/details.
Seat-upholstery consists of foams/fabrics composed of different types and quality.

Application/Limitation

Type approval covers *strength* and *mounting* of Seat according to '2000 HSC-Code':
- *Design level 2* as specified for *collision* acceleration/g_{coll} from 3 to 12g.

Seat is approved for the following conditions *relative* to the craft:
- *Forward* facing placed on 1 leg/pillar fixed to deck with belt.
  - All types/models up to 12g
- Seat placed on 1 leg/pillar fixed to deck or to rail/cassette with belt.
  - Alutech 320, 325, 330, 420, 425, 430,
  - 520, 525, 530, 620, 625 and 630: 12g
  - Alutech 340, 440, 540 and 640: 7.7g
  - Alutech 350, 450, 550 and 650: 7.2g*)
  - OP10 360 and OP10 600: 7.7g

*)Seat was tested at minimum height to 12g.

Seat is to be mounted to deck as tested (see documentation overleaf):
- Fixation by 6 off M10 bolts for Leg/Column, 18 off M6 bolts for rail-carriage and M6 bolts spaced 300mm (150mm in ends) for deck-Rails. Bolts are st.steel A4.

Deck structure of craft is *not* part of this approval.

Other mounting and g_{coll} may be accepted based on separate approval case by case.

Approval conditions

Type Approval is issued based on Program 3-499.50-1 in DNV's Certification Note 2.9.
The approval covers requirements to Seats in ch.4.4, ch.4.5 and Appendix 10 of the "International Code of Safety for High-Speed Craft, 2000", as referred in Pt.3 Ch.7 of DNV's: "Rules for Classification of High Speed, Light Craft and Naval Surface Craft" at date of issue.

The approval covers the *strength* of Seat and mounting with respect to *collision* only.
Note: Restricted use of combustible materials according to HSC-Code sec.7.4.3 is not part of this approval.

Any Seat/Lap-belts are assumed separately approved according to relevant standard.

Any changes which may influence the strength or safety of the Seat, shall be reported for evaluating the need for revision of the approval.

Any additional equipment may be accepted based on documentation and/or survey prior to installation, showing that strength/safety will not be influenced.

Type Approval documentation

Seat/mounting is covered by the following main drawings/documents, references:
- Assembly: "Alutech 550": drwg.no. ALU 550-200, Rev-04.0 dated 06/08/12
"Alutech 540": drwg.no. ALU 540-200, Rev-03.0 dated 10/07/12
"Alutech 530": drwg.no. ALU 530-200, Rev-02.0 dated 10/07/12
"Alutech 525": drwg.no. ALU 525-200 Rev-01.0 dated 08/08/12.
"Alutech 520": drwg.no. ALU 520-200 Rev-03.0 dated 10/07/12.
"Alutech 450": drwg.no. ALU 450-200, Rev-02.0,
"Alutech 440": drwg.no. ALU 440-200, Rev-02.0,
"Alutech 430": drwg.no. ALU 430-200, Rev-02. all dated 10/07/12
"Alutech 425": drwg.no. ALU 425-200 Rev-01.0 dated 07/08/12.
"Alutech 420": drwg.no. ALU 420 Rev-02.0 dated 10/07/12.
"Alutech 300 Series": drwg.no. Alutech 300 Rev B.
"Alutech 350": drwg.no. Alutech 650 Rev 01.0.
"Alutech 600 Series": drwg.no. Alutech 600 Rev B.
"Alutech 650": drwg.no. Alutech 650 Rev 01.0.
"OP10 360": drwg.no. OP10-360-G_Ergonomics Rev 01.0
"OP10 360": drwg.no. OP10-600-G_Ergonomics Rev 06.0

- Bottom: drwg.no. DNV_rygg_feste, Rev-0-01, date 04/05/10.

- Back: drwg.no. ADS-A44, Rev-0-04, date 04/05/10.

- Leg/Column: "Søyle. 630-830mm": drwg.no ADS-A4, Rev-0-02,
"Søyle 730-930": drwg.no. ADS-A151, Rev-0-02,
"ADS-A29": drwg.no. ADS-A29, Rev-0-01,
"Søyle sving sammenstilling": drwg.no. ADS-A50, Rev-0-02. , all dated 04/05/10

- Rail: "Alutech 3200 series & Alutech 3400 series":
drwg.no. Alutech 3200-3400, Rev-01.0, dated 20/08/12,
"Alutech 3300 series & Alutech 3500 series":
drwg.no. Alutech 3300-3500_DNV, Rev-01.0, dated 20/08/12.

- Rail Fixation: drwg.no. ADS-A15, Rev-03, date 13/03/09, with further detail-drawings.

Materials used are specified/referred in drawings/documentation above.

Any Seat/Lap-belt is assumed separately approved according to relevant standard.

Tests carried out

Dynamic test according to '2000 HSC-Code' Annex 10 section 3 was undertaken by Autoliv, reference:
- Test no: T-09014923, dated 2009-04-06**) ***)
- Test no: T-10095353, dated 2011-01-04

Static test according to '2000 HSC-Code' Annex 10 section 2 was undertaken by
Alu Design & Services AS, reference:
- Test date 2007-04-25, as verified by DNV-Report KRS-08.4175, dated 2008-10-16.

Note: Fire test of combustible materials in accordance with HSC-Code sec. 7.4.3 is not part of this approval.

**) The seat in the test is refered to as Alutech 540, but has later changed name to Alutech 550.
Lower models listed in this certificate are considered covered by this test.
***) Neck flexion/extension has not been tested.

Marking of product

Seats are to be marked with type/model designation(s) and name of manufacturer.

Note: MED-marking (acc. to Maritime Equipment Directives 96/98/EC) does not apply for strength of Seats,
but applies to fire safety of combustible materials, which are not part of this approval.

Periodical assessment

Det Norske Veritas may perform Certification Retention Surveys at any time during the validity period of this certificate. The arrangement is to be in accordance with scopes described in item 2.6.4 of Certification Note 2.9.

END OF CERTIFICATE