Certificate No:
TAD00001EG

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Flare Boom

with type designation(s)
Schlumberger UBM-EB (85 ft.) and UBM-DB (60 ft.)

Issued to
Etudes et Productions Schlumberger
CLAMART, Hauts de Seine, France

is found to comply with
DNVGL-OS-E101 – Drilling facilities, Edition January 2018

Application :

The flare boom is used during well test operations to hold the burner(s) at a distance from the rig.

Issued at **Høvik** on **2021-07-09**
This Certificate is valid until **2026-07-08**.
DNV local station: **Paris Verification**

Approval Engineer: **Peder Andreas Vasset**

for **DNV**

Per Esvall
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.

Manufactured by
Chaudronnerie Bauloise
Rue Andre Raimbault
45130 Baule, France

Responsibility
The holder of Certificate takes the responsibility that both design and production are in compliance with Rules, Standards and / or Regulations listed in this Type Approval Certificate.

Product description
Schlumberger U-boom, Type UBM-EB (85ft) and UBM-DB (60ft).
For use in both warm and cold climate.
For use on semi-submersibles, drillships and jack-ups (where within dynamic limitations).

Application/Limitation
60 feet and 85 feet booms for installation with the different types of burners:

- Evergreen burner
  - Monojet burner 331 lbs (150kg)
  - 12 jets burner 2646 lbs (1200kg)
- Green-dragon burner
  - 3 heads burner 1565 lbs (710kg)
  - 4 heads burner 1874 lbs (850kg)
- Production burner.

Maximum total weights for standard configuration 85ft/60ft booms are 9100/6300kg respectively.

Minimum design temperature: -20ºC.

Operating limitations:

Load Case (as per DNV OS-E-101)		Operating Mode	Dynamic Vertical Accelerations	Horizontal Accelerations	Ice Thickness (cm)	Number of operators	Lateral Wind Speed
1 (a)	Operational Load Case	Deployed	1.4 g	0.02 g	0	0	44.44 m/s (160 km/h)
1 (b)	Operational Load Case	Deployed	1.4 g	0.02 g	1	3	15.3 m/s (55 km/h)
1 (c)	Temporary Load Case – Wind and Ice	Stowed sideward at 90 deg.	1.4 g	0.02 g	2	0	51.5 m/s (184 km/h)
1 (d)	Temporary Load Case - Earthquake	Deployed	1.12 g	0.24 g	1	3	20 m/s (72 km/h)
2 (a)	Accidental Load Case-Combination Loading - Evergreen	Deployed	1.4 g	0.35 g	0	0	51.5 m/s (184 km/h)
3	Fatigue	Deployed	1.0g±.4g	0.02 g	1	3	15.3 m/s (55 km/h)
4	Heeling	Deployed	1.608 g	0.56 g	0	0	15.3 m/s (55 km/h)
5	Transit*	N/A		N/A			N/A
6	Survival				Same as Accidental		

*Loading in Transit case is not applicable since boom is supported on rest.

Recommendations given in document EP586875 AB shall be followed during well testing in order to make sure the thermal loads will not compromise the boom and guy lines' strength.

Type Approval documentation

Tests to be carried out
Flare boom shall be tested with an overload of 25% related to the required weight of burner and spreader. The overload test shall demonstrate that the boom is capable of carrying out motions such as slewing, hoisting etc. as relevant. Ref. DNVGL-OS-E101 Ch.2 Sec.8 [3.4.10].

Marking of product

Each unit should as a minimum be marked with:

- Name of manufacturer
- Part number / type
- Unique serial number

Other conditions / comments

- Platforms, rails, otherwise are presumed to be in accordance with relevant Governmental Regulations / Guidance Notes etc.
- Grade of materials to be as stated on drawings/calculations received and delivered with relevant material certificates (3.1 or equivalent) according to the applicable rules/regulations.
- Charpy values to be in accordance with DNVGL-OS-E101 Ch.2 Sec.2 [2.6] and the applied design codes (e.g. ASTM A333).
- Non-destructive examination (NDE) shall be according to Quality control plans (ref.: 100711853/AC and 102098641/AB) and DNVGL-OS-E101 Ch.2 Sec.8 [3.1].
- ASTM A325/490 bolts used for connecting boom segments, and other load-carrying bolts, shall be delivered with relevant inspection certificates (3.1 or equivalent). The bolts shall be pre-stressed according to an approved procedure.
- Relevant ILO forms to be delivered for wire ropes, blocks, sheaves etc., documenting sufficient capacity (SWL) and safety factor.
- The following min. vertical distances above the boom foot apply for the wire rope attachments (m):

	60 ft. boom	85 ft. boom
Semi-submersible	9.9 m	9.9 m

- The support and fitting of rotating base / turntable as well as wire rope arrangement / attachment to the rig structure are presumed approved separately for each installation (as applicable, ref. governing rules on specific installation).
- The flare burners shall be located at a safe distance from the unit, this distance shall be justified by means of heat intensity calculations, ref. DNVGL-OS-E101 Ch.2 Sec.7 [8.2].

DNV Product certification

If a DNV Product Certificate is to be issued for a flare boom covered by this TA (where such is requested), a DNV Survyeor shall be contacted prior to start of manufacturing.

Periodical assessment

For retention of the type Approval, DNV Surveyor shall perform a survey – every second year and before the expiry date of this certificate. This is to verify that the conditions for the type approval are complied with, ref. DNVGL-CP-0338, DNVGL Type approval scheme.

This certificate replaces previously issued Type Approval Certificate D-6231.

END OF CERTIFICATE