

TYPE APPROVAL CERTIFICATE

This is to certify:**That the mechanical connectors and couplings**with type designation(s)
LC series

Issued to

STATS UK Ltd
ABERDEENSHIRE, United Kingdomis found to comply with
DNV-OS-F101 Submarine Pipeline Systems (2013)
DNV-RP-F113 Pipeline Subsea Repair (2007)**and with DNV GL's current understanding and interpretation of the ASME BPVC.VIII.1-2015**
and ASME B31.3-2014.**Application :****The connectors and couplings approved by this certificate are accepted for installation on**
steel pipelines for utilities, oil and gas transport.
Conditions and limitations are given below and in reference documents.
Design to follow approved design documentation and test procedures given in the reference
documents.**Temperature range:** -40 to +300°C
Max. working press.: 51.1barg
Sizes: 2" to 36"This Certificate is valid until **2020-05-17**.Issued at **Høvik** on **2016-05-18**.DNV GL local station: **Aberdeen**for **DNV GL**Approval Engineer: **António Cartaxo**

Afzal Hussain
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

STATS mechanical connectors and couplings are designed for the maintenance and modification of petroleum production and process facilities where welded pipe joining options may be undesirable. The slipover design and mechanical locking assembly can enable a flanged connection (connector) or a pipe to pipe connection (coupling) to be installed on a straight pipe stub without the need for hot-work or specialised tools and equipment.

The connector and coupling components are compatible with a wide range of fluid types and flow conditions. Similarly, the coating applied to all connector and coupling component surfaces is intended to provide protection in a range of hostile operating environments.

Application/Limitation

This Type Approval (TA) certifies that the methodology of the presented design documentation meets the requirements given in specified codes as well as DNV GL's engineering judgement. This includes an assessment of possible failure modes, analysis and procedures, which reduce the risk of these failures to occur.

The coupling and connectors are applicable for use on carbon steel and low alloy steel pipelines. A separate assessment is needed if the couplings and connectors will be used with CRA pipelines.

The manufacturing of the couplings and connectors is not covered by this Type Approval. The parts involving a high level of forming, with fibre deformation greater than 5% due to the rolling/cold forming process (eg. plate used for the body) shall be stress-relieved.

The connectors and couplings are assessed as a non-reversible connector, or if reversibility is a capability but not a requirement.

The maximum installation depth of the connectors and couplings is limited to the maximum diver depth.

Appropriate surface preparation instructions shall be defined and assessed for each installation procedure, depending on the type of coating and size of the pipework. In general the pipeline coating shall be removed in the area of the host pipework and the pipe surface cleaned back to a bare metal finish.

Type Approval documentation

Documentation for each connector and coupling size that shall be available at the manufacturer:

- Design premise;
- Product description;
- Assembly drawing including parts list;
- Calculations;
- Material specifications;
- Pipeline exposure to the locking system loads;
- Inspection and test plan;
- Test reports containing compliance with test procedures.

The following documents were verified by DNV GL and all verification comments were closed:

- [1] 4" 150# and 300# LC Series Connector 4" Coupling, STATS Design Package No. IA 19 0001 0001-04, February 1st, 2016;
- [2] 12" 150# and 300# LC Series Connector 12" Coupling, STATS Design Package No. IA 24 0001 0001-03, February 1st, 2016;
- [3] 24" 150# and 300# LC Series Connector, STATS Design Package No. IA 30 0001 0002-03, February 1st, 2016;
- [4] Couplings and Connectors Material Specification, STATS Doc. No. R0014-MS-0014, Rev. B3, April 4th, 2016;
- [5] Connector and Coupling Testing, STATS Doc. no. TP-1706-001, Rev. B2, March 17th, 2016.

The following documents were issued for information:

- [6] Connectors and Couplings Design Premise, STATS Doc. No. DP11006, Rev. 04, November 2015;
- [7] Tecno Plug Lock Mark Indentations (12" tests), STATS Doc. no. TR0104, Rev. A2, March 10th, 2015;
- [8] Review of Material of Construction – STATS "Low Pressure" Pipe Coupling and Connectors, INTERTECH Rev. 1, November 11th, 2009.

The following main drawings were issued for information:

- [9] LC-02-4 4" #300 SCH'D 40 CONNECTOR PARTS LIST GA, STATS Drawing No. IA 19 0001 0003, rev 04, June 23rd, 2008;
- [10] LC-03-4 4" LC Series Coupling Parts List GA, STATS Drawing No. IB 19 0001 0001, Rev. 03, July 1st, 2008;
- [11] LC-01-12 12" #300 Sch'd 40 Connector Parts List GA, STATS Drawing No. IA 24 0001 0003, Rev. 03, March 6th, 2006;
- [12] LC-01-12 12" #300 Sch'd 80 Connector Parts List GA, STATS Drawing No. IA 24 0001 0004, Rev. 03, June 23rd, 2006;
- [13] LC-03-12 12" LC SERIES COUPLING PARTS LIST GA, STATS Drawing No. IB 24 0001 0001, Rev. 02, March 16th, 20016;
- [14] 24" LC Series Class 150 (Sch'd 40) Parts List General Assembly, STATS Drawing No. IA 30 0001 0002, Rev. 00, November 11th, 2007;
- [15] 24" LC Series Class 150# (Sch'd 80) Parts List General Assembly, STATS Drawing No. IA 30 0001 0003, Rev. 00, November 11th, 2007;
- [16] 24" LC SERIES 300# SCH'D 40 PARTS LIST GA, STATS Drawing No. IA 30 0001 0004, Rev. 00, November 26th, 2007;
- [17] 24" LC SERIES 300# SCH'D 80 PARTS LIST GA, STATS Drawing No. IA 30 0001 0005, Rev. 00, Nov. 27th, 2007.

Tests carried out

The following tests were carried out on 4" connectors, following the requirements given in ISO 21329:2004:

- Pressure/Bending Test;
- Torsion Test;
- Pressure Test to Failure;
- Bending Test to Failure;
- Tensile Test to Failure;
- Bending Fatigue Test.

All tests were witnessed by the local DNV GL office, Aberdeen. Reference [5] given above includes the tests procedures, the calibration certificates and the DNV visit reports.

Marking of product

For traceability to the Type Approval certificate, the final products are to be marked with:

- Manufacturers identification;
- Serial number/Partnumber.

Periodical assessment

Periodical assessments shall be successfully carried out bi-yearly and before expire date of this certificate, as condition for retention of the TA certificate, according to requirements given in DNVGL-CP-0338, Ed. Oct. 2015. The objective of the periodical assessment is to verify that the conditions for the TA have not been altered. When possible, this assessment may be harmonised with normal surveys for product certification and/or other surveys and audits carried out.

If there are any changes to the product design, the design documentation and/or the TA certificate, information about this and revised documentation shall be sent to DNV GL local office.

Job Id: **262.1-022516-1**
Certificate No: **TAP00000BE**

Product Certification

For future product certification, all production procedures and procedures qualification shall be issued for verification. The connectors and couplings shall be subjected to DNV GL witnessing during manufacturing and factory acceptance testing – when applicable – as well as check of the actual documentation corresponding to the type approved documentation, as listed above.

Certificate history

Date	Description
Mai. 18 th , 2016	First issue.