

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Pipeline Isolation Plugs**

with type designation(s)
3" to 48" Tecno Plugs and 3" to 48" BISEP plugs

Issued to

STATS House
ABERDEEN, United Kingdom

is found to comply with

DNVGL-ST-F101 Submarine pipeline systems

DNVGL-RP-F113 Pipeline subsea repair

2010 ASME Boiler and Pressure Vessel Code VIII Div. 2 Rules for Construction of Pressure Vessels

DNVGL-SE-0499 Certification of Pipeline Components

Application :

For use as isolation plug for carbon steel pipelines for water, oil and/or 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.

Type Approval cover the isolation plugs in set condition.

Issued at **Høvik** on **2018-08-14**

This Certificate is valid until **2023-11-01**.

for **DNV GL**

DNV GL local station: **Aberdeen**

Approval Engineer: **Dag Øyvind Askheim**

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Anne Britt Høydal
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.



Certificate history

Certificate number	Description	Issue Date
P-15082	Original DNV GL Type Approval Certificate	2014-11-01
TAP00001FW	Renewal, and updated to include AISI 4140 18/22 Rc. material	2018-07-18

Product description

Product	Application	Product designation
Tecno Plug	Carbon steel pipeline with nominal outer diameter sizes 3" to 48"	Pipeline Isolation Plug
Branch Installed Self-Energised Plug (BISEP)	Carbon steel pipeline with nominal outer diameter sizes 3" to 48"	Pipeline Isolation Plug

3" to 48" Tecno Plugs and 3" to 48" BISEP plugs is found to comply with DNV GL's current understanding and interpretation of the ASME Boiler and Pressure Vessel Code (2013), Section VIII division 2.

The Tecno Plug, is designed to provide pressure isolation of piping and pipeline systems, for maintenance, repair or pressure testing operations. The tool actuation system uses the pressure differential across the tool to maintain the lock and seal mechanisms independent of the tool control system, ensuring fail-safe operation. The lock mechanism is provided by seregated wedge segments gripping into the pipe wall. As a contingency function in the event that the hydraulic control system is compromised, the tool locking mechanism will unset when differential pressure is equalised.

The Tecno Plug is supplied with a dual seal configuration. A through port is provided to provide a pressure release of the hydraulic pressure. This connection also provides an inter-plug monitor. The dual seal tool with annulus vent, provides a dual seal and-bleed isolation, with both seals capable of holding the full isolation pressure. The annulus is monitored during operation by both control modules in order to verify this function.

The BISEP is designed to provide a dual seal and bleed isolation, deployed through a single full bore branch or hot tap penetration, for this application a mechanical clamp is the preferred option. The BISEP Head which houses the primary and secondary seals is deployed from a pressure competent launcher through a slab valve and rotated towards the upstream flow of pressure to be isolated.

The twin seals that form part of the head provide a dual seal and bleed. The bleed is from an intermediate annular space between the two seals. The seals are activated in the same way as the Tecno Plug seals, self energised by pipeline pressure. Pressure differential acting across the head of the tool maintains seal pressure against the pipewall creating a fail-safe isolation, independent of the hydraulic system. The ejection load resistance is provided by the tool's deployment system housed in the launcher.

Design Data

The design have been assessed based on the following data

Parameter	Unit	Tecno- and the BISEP plug
Size range	-	3" to 48" outer diameter pipeline (API 5L specification)
Test pressure	barg	1.5 x design pressure
Design pressure	barg	≤350 (project specific)
Design temperature	°C	-40 to +150 (Project specific)
Hydraulic pressure to set	barg	≤350
Hydraulic pressure to un-set	barg	≤100
Pipeline material	-	API 5L grades X52 – X65

Job Id: **262.1-018533-2**
Certificate No: **TAP00001FW**

Fluid service	-	Water, seawater, Hydrocarbon oil and / or gas, including H ₂ S.
Sour service	-	Compliant with ISO 15156

Media to be transported

Hydrocarbons (i.e. Oil and / or gas) including H₂S, and water. All materials exposed to pipeline fluid are compliant with ISO 15156.

Application/Limitation

This Type Approval 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 reduces the risk of these failures to occur.

This Certificate only relates to the isolation plugs in hydraulic set condition and in self energized set condition. The performance related to pigging, setting, un-setting and retrieval is not covered by this certificate.

A Tecno plug consist typically of plug module(s), pigging modules and a control system. The modules are connected by ball joint connections. The control system includes all electrical and hydraulic components needed to control the plug modules and provide communication through the pipeline wall.

The maximum packer radial extrusion gap in combination with operating temperature, design pressure, main seal design and isolation time of each plug shall for each plugging operation be documented by STATS Group in the design documentation. This should be based on STATS Group documented experience, and subject for approval by DNV GL. The calculation of the maximum extrusion gap shall include possible effects from unsymmetrical plug locking and pipe expansion.

The corrosive environment shall be evaluated for each operation, and the recommendation to avoid risk for hydrogen embrittlement in parts subject to tension stresses, shall be included in the operational procedures when applicable.

Type Approval Tests

Product Name / Identification	Reference
30" Tecno plug test procedure and report	STATS document: TP 0007-002 rev. CA
DNV witness report	DNV Job no. PP081826
24" BISEP plug test procedure and report	STATS Document: A0007-001, rev. Z1
DNV witness report	DNV Job no. PP081826

Production Site Name: STATS UK Ltd.	Address: STATS House, Toft Hills way, Midmill Industrial Estate, Kintore, AB51 0QC Aberdeen, UK.
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Inspection of manufacturing and testing of prototype(s) has been carried out by DNV GL Aberdeen, reference is given to DNV GL Site Visit Reports 9-13/9 2013 and 22-25/6 and 13/9-2013, DNV GL job no. PP081826, dated 2013, covering above referenced tests.

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Type Approval documentation

Drawing/ Document No.	Rev.	Doc. Date	Title	For Info/ Approved	VerCom date
TST_DD 005	Z5	30.06.2014	Material Selection for Type Approved Tecno Plugs™ and BISEPs	A	4/9-14
TST_DD 009	A5	26.06.2014	Material Selection - TST Design Document AISI 8630MOD	A	3/9-14
TST_DD 010	A5	26.06.2014	Material Selection - TST Design Document A182 F22MOD	A	3/9-14
MT 004	2	19.07.2014	MPI procedure - OS_F101	A	1/10-14
UT 004	4	16.09.2014	UT procedure - OS-F101 NDT	A	9/10-14
WPS WP.026	AA	21.11.2013	Welding procedure specification (WPS)	A	19/9-14
PQR WPS026	-	21.10.2013	Procedure Qualification Record (PQR)	A	19/9-14
DP-11003	6	2014-April	Tecno Plug Design Premise	FI	
CAA-33-1000-0001	1	07.05.2012	30" TecnoPlug 680mm OD	A	10/5-12
TST_DD 003	Z1	14.03.2012	Tecno Plug™ Lock Report	FI	
TST_DD 004	Z1	14.03.2012	Seal Design Development	FI	
CAA-33-1000-0001	9	13.08.2010	GA - 30" Tecno Plug tool	FI	
CAA 33 1000 0001	1	28.05.2012	Design Package 30" Tecno Plug	A	10/5-12
CAA-33-1000-0001	1	17.03.2013	Strain gauge comparison	FI	
CAA 30 0001 0006	0	27.10.2010	GA - 24" TECNO PLUG	FI	
CAA 36 0001 0002	0	06.06.2007	GA - 36" TECNO PLUG	FI	
CAA 17 0001 0001	1	29.03.2011	GA - 3" HTPI	FI	
CAA 21 0001 0001	1	08.02.2008	GA - 6" Isolation Plug	FI	
DP-11002	6	2014-April	BISEP Plug Design Premise	FI	
CAN-30-0000-0004	7	29.05.2012	Design package 24" BISEP #600	A	29/6-12
CAN-30-0000-0004	7	21.10.2010	24" BISEP #600 GA	FI	
HS-2138-004	1		Schematic Layout For Operation Of The 18" & 24" Slab Valve & BISEP Tools	FI	
CAN-19-0001-0006	1	19.10.2009	GA - 4" BISEP 150#	FI	
QCP-J03129-001	1	18.03.2013	Quality control plan - 36" + 48" REMOTE TECNO PLUG AND IWTT - BEACHFIELD	FI	
FMECA_DD021	A6	24.09.2014	30" Tecno Plug™ FMECA	A	8/9-14
FMECA_DD022	A5	25.09.2014	24" BISEP™ FMECA	A	3/10-14
TST_DD006	Z5	21.12.2017	TST Design and Purchasing 4140 18/22 RC	A	5/7-2018

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Documentation

Documentation for each plug size that shall be available at the manufacturer:

Conditions

- Before re-use of any plug, sufficient service, inspection & re-tests to prove full functionality shall be performed and documented.

Marking of product

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

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.

Periodical Assessment to be performed after two (2) years and after three and a half (3.5) years (Certificate Retention) and at renewal after five (5) years (Certificate Renewal).

The main elements of the Periodical Assessment are to:

- Ensure that **Type Approval documentation** is available.
- Review design, materials, production process, and performance with respect to possible changes, in order to ensure compliance with **Type Approval documentation** and/or referenced material specifications.
- Ensure traceability between manufacturer's product marking and the DNV GL Type Approval Certificate.

END OF CERTIFICATE