

Gassco Technical Requirement for Offshore Crossings

Specification: AM-790

Author: Harald Martinsen
Verifier: Per-Atle Strømme
Approver: Inghild Storesund

Classification: Open
Revision: 5.0
Valid from: 18.07.2019 13:06:03
Replaces:

Location: Pipelines
Validity area: Transport Network
Owner: AM-TN

This document has been electronically approved, hence it contains no signature(s).

History log:

Rev. no.	Date	Author	Verifier	Approver
02-05	18.07.2019	Harald Martinsen	Per-Atle Strømme	Inghild Storesund
01	21.07.2015	HMA	LOE	KKK
00	04.12.2014	ABR	LOE	KKK

Revision log:

Rev. no.	Date	Description of revised issues
02-05	18.07.2019	Updated document with several changes to the text including document references, new TCC e-mail address. Changed document classification and content type.
01	21.07.2015	Changed format, new responsible author.

Table of contents

Table of contents.....	iii
1. Objective	1
2. Validity and scope	1
3. Definitions.....	1
4. Responsibility	1
5. Technical Requirements	2
5.1. General requirements.....	2
5.2. Pipeline Protection Design	2
5.3. Pre-Lay / as-found requirements	3
5.3.1. Pipeline Condition at Crossing Point.....	3
5.3.2. Pipeline Crossing Design	3
5.3.3. Pre-Lay Intervention.....	3
5.3.4. Pipeline Crossing Operations.....	3
5.4. Post-lay Intervention.....	4
5.5. As-Built Documentation	4
6. Notifications	5
7. References	6

1. Objective

The objective of this document is to specify the minimum technical requirements for any third party crossing of pipelines operated by Gassco AS. The technical requirements described in this document shall be the basis for the requirements given in the specific crossing agreements between the parties.

2. Validity and scope

The scope of this document is to summarise technical requirements for any activity in relation to a pipeline crossing operation, including the following;

- Pre-Lay / as found requirements
- Installation requirements
- Post-Lay requirements
- As-built / as-left documentation

3. Definitions

Gassco AS	Affected Pipeline Operator
Crossing Party	The Operator of any third party pipeline or cable or any other party crossing pipelines operated by Gassco

4. Responsibility

Gassco's Vice President Transport Network is the owner of this document and responsible for updates and revisions.

5. Technical Requirements

5.1. General requirements

The purpose of the requirements is to specify details to provide sufficient safeguards for the affected pipelines by minimising the risk imposed by the crossing party.

It is the responsibility of the crossing party to plan, design and perform the crossing in order to minimise the risk imposed to the pipeline. Specific requirements may vary from case to case. Deviations from technical requirements in this document shall always be subject to Gassco approval.

In general, the following requirements are given for a 3. party crossing.

- Pre-survey / as-found survey including relevant documentation of pipeline to be performed by Crossing Party
- The vertical separation between the pipeline and the crossing party facility shall as a minimum be 0.3 metres throughout the lifetime of the pipeline. If the separation layer is prepared by a gravel berm, the minimum separation layer thickness is 0,5 metres. The proposed intervention method is subject to Gassco review
- Any trenching of the crossing product in the vicinity of the pipeline shall be carried out by means of easily controllable equipment. No heavy uncontrollable equipment, anchors or other heavy equipment shall be used for this purpose within a distance of 100m from the pipeline
- Crossing of the pipeline shall take place at an angle as close to 90° as possible taking local conditions into account. This direction shall be kept on each side until the crossing party facility is at a safe distance from the pipeline, preferably 500m or as mutually agreed dependant on the situation.

5.2. Pipeline Protection Design

The crossing party shall prepare and present the proposed crossing design to Gassco for review. The crossing design shall be based on the known local restrictions and environmental conditions and shall meet all requirements to protect the pipeline. The protection design may consist of concrete mattresses on top of the pipeline, gravel berms or other separation methods.

Minimum requirement for design of gravel berms will typically be;

- Sufficient length and width of support to meet requirement of vertical separation
- Maximum side slopes; 1:2
- The length and height of the support shall be calculated based upon pipeline outer diameter, burial status, and the vertical separation and installation tolerances.

High voltage power cables may introduce current to the pipeline cathodic protection system if the cable and the crossing are not designed to prevent this. The crossing party

will be responsible for providing documentation showing the pipeline is protected against introduced induction current.

5.3. Pre-Lay / as-found requirements

5.3.1. Pipeline Condition at Crossing Point

The proposed crossing location shall be assessed with respect to pipeline lay comfort, burial condition, spans, susceptibility for upheaval buckling, pipeline features, external conditions etc. Upon request, Gassco can supply pipeline condition details to the 3rd party. It is however the 3rd party's responsibility to check and verify the pipeline condition in form of a pre-lay / as-found survey of the pipeline and the surrounding area.

Gassco will based on existing data verify the proposed crossing location.

As a minimum, the pre-lay survey shall identify the following, at the minimum distance affected by the crossing operation;

- Pipeline lay comfort
- Burial of depth
- Freespan height and length
- Pipeline features
- Seabed features
- Pipeline longitudinal and transverse profiles relative to the seabed
- Any other observation of interest

The crossing party shall, if necessary adjust the crossing design based on the observations made during the pre-lay survey.

In case of laying operations with anchored lay-barges, the pre-lay surveys will have to cover the entire section of the pipeline to be crossed by the anchor chains including a pre-agreed safety distance.

5.3.2. Pipeline Crossing Design

Based upon the observations made by the Pre-lay surveys, the proposed crossing design may be updated to reflect the actual condition of the pipeline.

5.3.3. Pre-Lay Intervention

Required intervention shall take place prior to a pipeline crossing operation. The intervention work shall be in accordance with the crossing design as discussed above and may consist of gravel berms or concrete mattresses.

5.3.4. Pipeline Crossing Operations

The pipeline crossing operations shall be planned and executed to minimise the risk for the pipeline. Detailed procedures shall be made by the crossing party for Gassco review. The procedures shall as a minimum describe vessels position in the vicinity of the pipeline, safety distances for handling of subsea equipment, safety distance for pipeline loading, anchor handling, touchdown monitoring etc.

Use of trenching equipment (ploughing / jetting) needs to be approved by Gassco in the vicinity of the pipeline, and the following points needs to be taken into consideration;

- Ploughing and any subsea handling of the plough are restricted in a distance of the pipeline. The safety distance may be 500 metres either side or less if mutually agreed between the parties. Safe operation of the plough is required by securing it on deck while the ploughing vessel is transiting over the pipeline or by demonstrating that the risk of lifting over the pipeline is acceptable (e.g. by use of buoyancy elements).
- Jetting in the proximity of the pipeline (i.e. less than 50 meters) shall be approved by Gassco. The crossing party shall establish procedures covering all aspects of the operation.

In case of pipeline laying operations utilising anchored vessels, the minimum vertical separation distance between pipeline and crossing anchor chain shall be 50 metres, if possible to achieve at given water depth. In shallow water depths, surface buoy connections may be utilised to achieve sufficient separation. The crossing party shall document the operations including the safety aspects and the monitoring activities in the procedures presented for Gassco review.

5.4. Post-lay Intervention

Any post-lay intervention must be performed in a way to minimise the risk for the affected pipeline. Post-Lay intervention of the crossing point shall consist of rock installation, mattresses or similar.

5.5. As-Built Documentation

When relevant, each phase of the operation shall be documented by a survey. Survey reports shall be prepared for every offshore campaign.

After offshore completion, a final as-built / as-left survey shall be performed, and all resulting survey data shall be compiled into one brief survey report applicable for the 3rd party activity.

Reports and corresponding charts shall be issued to Gassco according to the proximity agreement requirements.

The content of the documentation shall be in accordance with procedures prepared by the 3rd party and shall provide full documentation of the status of the pipeline, including;

- Pipeline and crossing product lay comfort before and after crossing
- Burial depth
- Freespan height and length
- Pipeline features
- Seabed features
- Pipeline longitudinal and transverse profiles relative to the seabed
- Digital terrain model consisting of maximum 0,1 m grid cells from pre and post survey activities

- Any effect made by the 3 party to the affected area / section of the pipeline
- Any other observation of interest

All data shall be reported in:

- Horizontal Datum ED50, UTM zone 31 or 32 or as otherwise instructed by Gassco
- Vertical Datum MSL

6. Notifications

Gassco, Asset Management will appoint one single point of contact for all technical communication. The 3rd party shall on a regular basis provide updates regarding vessel schedules and other activities.

A pre-warning of operation shall be given approximately 4 weeks prior to any offshore operation.

Four days prior to any offshore activity, Gassco Bygnes Transport Control Centre (TCC) shall be notified as follows with a short description of the activity, location and schedule.

Daily progress report shall be issued to TCC and to the appointed Gassco single point of contact for technical information during, and restricted to operations inside the defined vicinity of the pipeline (Typically 500 metres).

Gassco Bygnes, TCC, attn. shift leader

Telephone +47 52 81 28 95

Fax + 47 52 81 29 47

Email tcc@tcc.gassco.no

In emergency situations, call TCC and company nominated contact person

Figure 1 TCC contact information

7. References

Number	Procedure number	Title
/1/	CORP-749	Management system manual
/2/	AM-788	Risk Based Methodology for Integrity Assessment of Gas Pipelines
/3/	DNVGL-ST-F101	DNVGL standard: Submarine pipeline systems, October 2017 edition
/4/	EN ISO 9000	Quality management systems. Fundamentals and vocabulary
/5/	ISO 12623	Petroleum and natural gas industries - Pipeline Transportation systems