

NORSOK STANDARD

SUBSEA PIPELINES

Y-001
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Please note that whilst every effort has been made to ensure the accuracy of the NORSOK standards neither OLF nor TBL or any of their members will assume liability for any use thereof.

CONTENTS

FOREWORD	2
INTRODUCTION	2
1 1 SCOPE	3
2 2 NORMATIVE REFERENCES	3
3 3 DEFINITIONS AND ABBREVIATIONS	3
3.1 3.1 Definitions	3
3.2 3.2 Abbreviations	4
4 4 ADDITIONAL REQUIREMENTS	4
4.1 4.1 General	4
4.2 4.2 Certification	4
4.3 4.3 Project Data, Safety Philosophy and Design	4
4.4 4.4 Loads	5
4.5 4.5 Strength and stability	5
4.6 4.6 Linepipe	5
4.7 4.7 Pipeline Components, Equipment and Structural Items	5
4.8 4.8 Corrosion Protection	5
4.9 4.9 Installation	5
4.10 4.10 Operation and Maintenance	5
4.11 4.11 Condition assessment/re-qualification	5

FOREWORD

NORSOK (The competitive standing of the Norwegian offshore sector) is the industry initiative to add value, reduce cost and lead-time and remove unnecessary activities in offshore field developments and operations.

The NORSOK standards are developed by the Norwegian petroleum industry as a part of the NORSOK initiative and are jointly issued by OLF (The Norwegian Oil Industry Association) and TBL (Federation of Norwegian Engineering Industries). NORSOK standards are administered by NTS (Norwegian Technology Standards Institution).

The purpose of this industry standard is to replace the individual oil company specifications for use in existing and future petroleum industry developments, subject to the individual company's review and application.

The NORSOK standards make extensive references to international standards. Where relevant, the contents of this standard will be used to provide input to the international standardisation process. Subject to implementation into international standards, this NORSOK standard will be withdrawn.

INTRODUCTION

The national and international oil and gas industry has for many years referred to and used the DNV Rules for Submarine Pipeline Systems, 1981, as a recognised industry standard. DNV has recently, in co-operation with the industry, updated and re-issued these as DNV Rules for Submarine Pipeline Systems, 1996.

ISO/TC67 is currently working on a new international standard for pipelines referred to as ISO 13623 " Pipeline Transportation Systems for the Petroleum and Natural Gas Industries". This standard is currently at Committee Draft stage, and it is expected to be complete for publication late in 1998 to early 1999. Other ISO standards related to this subject are also under development in ISO/TC67.

Until these ISO standards are agreed and issued, the NORSOK workgroup has chosen to maintain the reference to the DNV Pipeline Rules, with some additional requirements stipulated by this NORSOK standard.

Note: The reference to the DNV Pipeline Rules does not imply any requirement for certification or third party verification as stated in the Rules. Wherever the term "agreement", "acceptance", "consideration" etc. appear in the DNV Rules they shall be taken to mean agreement, acceptance or consideration by the Operator/Purchaser. Likewise, any statement as "to be submitted to DNV" shall be taken to mean "to be submitted to Operator/Purchaser".

1 SCOPE

This NORSOK standard applies to subsea pipeline systems used in the petroleum and natural gas industries, and includes provisions for the design, fabrication, installation, testing, commissioning, operation and re-qualification mainly by references to other main pipeline standards and rules. For risers, only steel risers connected to a fixed structure are covered by this standard.

The standard is applicable to linepipe in carbon manganese (C-Mn) steel, ferritic austenitic (duplex) steel, stainless steel, other corrosion resistant alloys, clad steel and non-ferrous metallic materials.

2 NORMATIVE REFERENCES

The following standards include provisions, which, through reference in this text, constitute provisions of this NORSOK standard. Latest issue of the references shall be used unless otherwise agreed. Other recognised standards may be used provided it can be shown that they meet or exceed the requirements of the standards referenced below.

DNV Pipeline Rules	Rules for Submarine Pipeline Systems, 1996 (excluding section 2, Certification)
NORSOK M-503	Cathodic Protection
NORSOK M-001	Materials selection
NORSOK S-001	Technical safety
NORSOK Z-001	Documentation for operation

Note: The reference to the DNV Pipeline Rules does not imply any requirement for certification or third party verification as stated in the Rules. Wherever the term “agreement”, “acceptance”, “consideration” etc. appear in the DNV Rules they shall be taken to mean agreement, acceptance or consideration by the Operator/Purchaser. Likewise, any statement as “to be submitted to DNV” shall be taken to mean “to be submitted to Operator/Purchaser”.

3 DEFINITIONS AND ABBREVIATIONS

3.1 Definitions

Operator	The party ultimately responsible for the pipeline system as installed and its intended use.
Shall	Shall is an absolute requirement which shall be followed strictly in order to conform to the standard.
Should	Should is a recommendation. Alternative solutions having the same functionality and quality are acceptable.
Standard	Any standard or rule referred.
Verification	Examination to confirm that an activity, a product or a service is in accordance with specified requirements.

3.2 Abbreviations

DFI	Design, Fabrication and Installation
DNV	Det Norske Veritas
ISO	International Organisation for Standardisation
NPD	Norwegian Petroleum Directorate
QRA	Quantitative Risk Analysis

4 ADDITIONAL REQUIREMENTS

Note: This standard identifies additional requirements or deviations to the DNV Pipeline Rules. The sequence in this clause is identical with the DNV Pipeline Rules table of contents.

4.1 General

No additional requirements.

4.2 Certification

This section in the DNV Pipeline Rules is excluded from the reference.

4.3 Project Data, Safety Philosophy and Design

4.3.1 Documentation

Documentation in accordance with detailed requirements in the DNV Pipeline Rules shall be sent to the Operator. The documentation required to ensure and to provide documentation for the safe operation of pipelines and risers shall be prepared and submitted to the Operator. Documentation and DFI resumé shall be in accordance with NORSOK Z-001.

The need for documentation shall be subject to consideration during the different phases of the activities.

4.3.2 Safety Philosophy

The technical safety assessment shall be in accordance with NORSOK S-001.

The systematic review prescribed in the DNV Pipeline Rules shall be performed as a Quantitative Risk Analysis (QRA)

Where experience is limited, e.g. for new design scenarios, or the design is suspected unnecessarily conservative:

- a) Relevant model tests may be used to establish capacities and load effects
- b) A probabilistic design may be allowed as an alternative to the basic design criteria. This, analysis, given that the basis is well documented, shall be performed by competent personnel and be in line with the DNV Pipeline Rules requirements.

Reliability based limit state design shall not be used to replace the requirement in Section 5 C200 for the maximum permissible hoop stress due to fluid pressure for the general route of offshore pipelines.

4.3.3 Layout

The surface of the submarine pipeline including field joints shall be designed and installed so as not to damage fishing gear.

4.4 Loads

Classification of earthquake shall be established based on its frequency of occurrence, where relevant.

4.5 Strength and stability

No additional requirements.

4.6 Linepipe

For material selection, reference is made to Norsok standard M-001 and the DNV Pipeline Rules.

4.7 Pipeline Components, Equipment and Structural Items

No additional requirements.

4.8 Corrosion Protection

Cathodic protection design shall be in accordance with Norsok M-503.

4.9 Installation

The additional requirements for pipeline installation methods introducing plastic deformation of DNV Pipeline Rules section 9, sub-section E may be substituted by previous relevant test data and analysis as applicable for the selected material and installation method to be used, with due regard to section 1, A400 of the Rules.

4.10 Operation and Maintenance

A program for condition control shall be established. This program shall take into consideration all deterioration effects such as temperature loads, pressure variations, composition of the transported commodity, environmental loads, etc.

Inspections shall be performed by means of methods most suitable at all times with emphasis given to the type of pipeline systems and its location.

The Operator shall ensure that the different condition reports have a uniform format. Condition reporting may be made electronically according to Operator's requirements.

4.11 Condition assessment/re-qualification

No additional requirements.