

Fabrication and installation of GRP piping systems

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Foreword

The NORSOK standards are developed by the Norwegian petroleum industry to ensure adequate safety, value adding and cost effectiveness for petroleum industry developments and operations. Furthermore, NORSOK standards are, as far as possible, intended to replace oil company specifications and serve as references in the authorities' regulations.

The NORSOK standards are normally based on recognised international standards, adding the provisions deemed necessary to fill the broad needs of the Norwegian petroleum industry. Where relevant, NORSOK standards will be used to provide the Norwegian industry input to the international standardisation process. Subject to development and publication of international standards, the relevant NORSOK standard will be withdrawn.

The NORSOK standards are developed according to the consensus principle generally applicable for most standards work and according to established procedures defined in NORSOK A-001.

The NORSOK standards are prepared and published with support by The Norwegian Oil Industry Association (OLF) and Federation of Norwegian Manufacturing Industries (TBL).

NORSOK standards are administered and published by Standards Norway.

Annex A and B are normative.

Introduction

This NORSOK standard replaces NORSOK M-630, MDS P-01, and NORSOK M-CR-621. This NORSOK standard is based upon ISO 14692 (all parts), but extended with sections on quality control and NDT including two annexes describing ultrasonic and radiography testing, respectively.

1 Scope

This NORSOK standard specifies additional and optional requirements to ISO 14692 (all parts). All components that form part of a GRP piping system (e.g. pipe, branches, bends, tees, flanges, and joints) are covered.

This NORSOK standard is directed towards piping systems in GRP materials used on offshore production platforms, but may also be used for similar onshore systems.

2 Normative and informative references

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

2.1 Normative references

ASTM D1599-99e1,	<i>Standard Test Method for Resistance to Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings</i>
EN 473	<i>Non-destructive testing – Qualification and certification of NDT personnel – General principles</i>
ISO 14692-1,	<i>Petroleum and natural gas industries – Glass-reinforced plastics (GRP) piping – Part 1: Vocabulary, symbols, applications and materials</i>
ISO 14692-2,	<i>Petroleum and natural gas industries – Glass-reinforced plastics (GRP) piping – Part 2: Qualification and manufacture</i>
ISO 14692-3,	<i>Petroleum and natural gas industries – Glass-reinforced plastics (GRP) piping – Part 3: System design</i>
ISO 14692-4,	<i>Petroleum and natural gas industries – Glass-reinforced plastics (GRP) piping – Part 4: Fabrication, installation and operation</i>
DIN 16965-2,	<i>Wound glass fibre reinforced polyester resin (UP-GF); pipes, Type B pipes, dimensions</i>
DIN 16966-1,	<i>Glass fibre reinforced polyester resin (UP-GF) pipe fittings and joint assemblies; fittings; general quality requirements and testing</i>
DIN 16966-2,	<i>Glass fibre reinforced polyester resin (UP-GF) pipe fittings and joints; Elbows, Dimensions</i>
DIN 16966-4,	<i>Glass fibre reinforced polyester resin (UP-GF) pipe fittings and joints; Tees, Nozzles, Dimensions</i>
DIN 16966-5,	<i>Glass fibre reinforced polyester resin (UP-GF) pipe fittings and joints; Reducers, Dimensions</i>
DIN 16966-6,	<i>Glass fibre reinforced polyester resin (UP-GF) pipe fittings and joint assemblies; collars, flanges, joint rings, dimensions</i>
DIN 16966-7,	<i>Pipe joints and their elements of glass fibre reinforced polyester resins – Part 7: Bushings, flanges, flanged and butt joints; general quality requirements and test methods</i>
DIN 16966-8,	<i>Glass fibre reinforced polyester resin (UP-GF) pipe fittings and joints; Laminated joints; Dimensions</i>
NTS-GRP-FJS/01,	<i>Certification of personnel for installation of composite pipes</i>
NTS-GRP-Insp/01,	<i>Certification of inspectors for installation of composite pipes</i>
KRV A 984/82-2,	<i>Kunststoffrohrverband (KRV); "GFK-Industrierohre".</i>

2.2 Informative references

NORSOK M-630,	<i>Material data sheets for piping</i>
NORSOK M-CR-621,	<i>GRP piping materials</i>

3 Terms, definitions and abbreviations

For the purposes of this NORSOK standard, the following terms, definitions and abbreviations apply.

3.1 Terms and definitions

3.1.1

shall

verbal form used to indicate requirements strictly to be followed in order to conform to this NORSOK standard and from which no deviation is permitted, unless accepted by all involved parties

3.1.2

should

verbal form used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required

3.1.3

may

verbal form used to indicate a course of action permissible within the limits of this NORSOK standard

3.1.4

can

verbal form used for statements of possibility and capability, whether material, physical or casual

3.2 Abbreviations

DN	nominal diameter
DSC	differential scanning calorimeter
DWSI	double wall single image
ECR	glass fibre grade with good chemical resistance in acidic environment
EX	classification of explosion hazards
GRE	glass-fibre reinforced epoxy
GRP	glass-fibre reinforced plastic
NDT	non-destructive testing
PE	pulse echo
PED	Pressure Equipment Directive
RT	radiographic testing

4 Pressure equipment directive (PED)

The manufacturer and the installation contractor shall satisfy the requirements given in European Pressure Equipment Directive (PED), when applicable.

NOTE The European implementation of ISO 14692 (all parts) is so far not a harmonised standard according to PED. In those applications where PED is governing, it is therefore necessary to apply the directive and to use a notified body to approve all stages in the process from design to installation.

5 Qualification and manufacture

Reference is made to ISO 14692-2.

Section 5 Materials of construction

The recommended materials of construction dependent of the fluid to be transported in piping systems are listed in Table 1. The final selection has to be agreed between the selected manufacturer and the Company.