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**Erdöl- und Erdgasindustrie –  
Glasfaserverstärkte Kunststoff-Rohrleitungen (GFK) –  
Teil 1: Begriffe, Symbole, Anwendungen und Werkstoffe  
(ISO 14692-1:2002);  
Englische Fassung EN ISO 14692-1:2002**

Petroleum and natural gas industries –  
Glass-reinforced plastics (GRP) piping –  
Part 1: Vocabulary, symbols, applications and materials (ISO 14692-1:2002);  
English version EN ISO 14692-1:2002

Industries du pétrole et du gaz naturel –  
Canalisations en plastique renforcé de verre (PRV) –  
Partie 1: Vocabulaire, symboles, applications et matériaux (ISO 14692-1:2002);  
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## **Nationales Vorwort**

Diese Europäische Norm wurde vom Technischen Komitee CEN/TC 12 „Materialien, Ausrüstungen und Offshore-Bauwerke für die Erdöl-, petrochemische- und Erdgasindustrie“ (Sekretariat: Frankreich) erstellt. Es handelt sich dabei um die unveränderte Übernahme von ISO 14692-1:2002, erarbeitet vom ISO/TC 67 „Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries“, Subkomitee SC 6 „Processing equipment and systems“ (Sekretariat: Frankreich), zu welchem die nationale Zuarbeit beim NAM im DIN liegt.

Diese Europäische Norm enthält unter Berücksichtigung des DIN-Präsidialbeschlusses 13/1983 nur die englische Originalfassung der ISO-Norm.

English version

Petroleum and natural gas industries – Glass-reinforced plastics  
(GRP) piping – Part 1: Vocabulary, symbols, applications and  
materials (ISO 14692-1:2002)

Industries du pétrole et du gaz naturel – Canalisations en  
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symboles, applications et matériaux (ISO 14692-1:2002)

Erdöl- und Erdgasindustrie – Glasfaserverstärkte  
Kunststoff-Rohrleitungen (GFK) – Teil 1: Begriffe, Symbole;  
Anwendungen und Werkstoffe (ISO 14692-1:2002)

This European Standard was approved by CEN on 2 December 2002.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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## Foreword

This document (EN ISO 14692-1:2002) has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum and natural gas industries" in collaboration with Technical Committee CEN/TC 12 "Materials, equipment and offshore structures for petroleum and natural gas industries", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2003, and conflicting national standards shall be withdrawn at the latest by June 2003.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## Endorsement notice

The text of ISO 14692-1:2002 has been approved by CEN as EN ISO 14692-1:2002 without any modifications.

## Introduction

ISO 14692 (all parts) for the use of glass-reinforced plastics (GRP) piping in oil and natural gas industries is based on the document *Specifications and recommended practice for the use of GRP piping offshore* published by the United Kingdom Offshore Operators Association (UKOOA) in 1994. The objective of ISO 14692 (all parts) is to provide the oil and gas industry, and the supporting engineering and manufacturing industry, with mutually agreed specifications and recommended practices for the design, purchase, manufacturing, qualification testing, handling, storage, installation, commissioning and operation of GRP piping systems.

ISO 14692-2, ISO 14692-3 and ISO 14692-4 follow the individual phases in the life cycle of a GRP piping system, i.e. from design through manufacture to operation. Each part is therefore aimed at the relevant parties involved in that particular phase. It is primarily intended for offshore applications on both fixed and floating topsides facilities, but it may also be used as guidance for the specification, manufacture, testing and installation of GRP piping systems in other similar applications found onshore, e.g. produced-water and firewater systems.

- *Part 1: Vocabulary, symbols applications and materials.* It defines terms and symbols, and identifies the applications that ISO 14692 (all parts) is intended to cover, together with anticipated end users. It also defines limits on the material used for the construction of components and describes the pressure terminology used throughout ISO 14692 (all parts). Main users are envisaged to include all parties in the life cycle of a typical GRP piping system. ISO 14692-1 should be used in conjunction with the part of specific relevance.
- *Part 2: Qualification and manufacture.* Its objective is to enable the purchase of GRP components with known and consistent properties from any source. Main users of the document are envisaged to be the principal and the manufacturer, certifying authorities and government agencies.
- *Part 3: System design.* Its objective is to ensure that piping systems, when designed using the components qualified in ISO 14692-2, meet the specified performance requirements. Main users of the document are envisaged to be the principal, design contractors, suppliers contracted to do the design, certifying authorities and government agencies.
- *Part 4: Fabrication, installation and operation.* Its objective is to ensure that installed piping systems meet the specified performance requirements throughout their operational life. Main users of the document are envisaged to be the principal, fabrication/installation contractors, repair and maintenance contractors, certifying authorities and government agencies.

## 1 Scope

This part of ISO 14692 gives the terms, definitions and symbols used in the specification, manufacture, testing and installation of glass-reinforced plastics (GRP) piping installations associated with offshore applications on both fixed and floating topsides facilities for oil and gas industry production and processing. It also describes the philosophy and provides guidance on the range of suitable applications for such piping, and defines limitations to the materials of construction for these applications.

It is intended to be used in conjunction with the other parts of ISO 14692.

This part of ISO 14692 also describes the pressure terminology used in ISO 14692 (all parts).

## 2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 2.1 General terms

#### 2.1.1

##### **authority having jurisdiction**

third-party organization required to be satisfied with the standard of engineering proficiency and safety of a project

EXAMPLE A classification society, verification body or government regulatory body.

#### 2.1.2

##### **contractor**

party which carries out all or part of the design, engineering, procurement, construction and commissioning for a project or operation of a facility

NOTE The **principal** (2.1.9) may undertake all or part of the duties of the contractor.

#### 2.1.3

##### **designer**

party which carries out all or part of the design for a project or facility

#### 2.1.4

##### **installer**

party which carries out all or part of the construction and commissioning of composite pipe installations and installation work for a project

#### 2.1.5

##### **installation inspector**

person able to perform satisfactory and independent inspection of composite pipe installations and installation work

#### 2.1.6

##### **installation supervisor**

tradesman able to perform practical supervision of the installation and joining of composite pipes

#### 2.1.7

##### **manufacturer**

party which manufactures or supplies equipment to perform the duties specified by the contractor

#### 2.1.8

##### **operator**

party which assumes ultimate responsibility for the operation and maintenance of the piping system

NOTE The operator may or may not be the same as the principal or principal's agent

### 2.1.9

#### **principal**

party that initiates the project and ultimately pays for its design and construction

NOTE The principal generally specifies the technical requirements and is ultimately responsible for ensuring that safety and all other issues are addressed. The principal may also include an agent or consultant, authorized to act for the principal.

### 2.1.10

#### **site**

location where piping system is installed

## 2.2 Technical terms

### 2.2.1

#### **accelerator**

substance which, when mixed with a catalyst or a resin, will speed up the chemical reaction between catalyst and resin

### 2.2.2

#### **active fire protection**

method of extinguishing fire by application of substances such as halon, water, CO<sub>2</sub>, foam, etc.

### 2.2.3

#### **adhesive joint**

#### **adhesive bond**

bonded joint

glued joint

socket joint

rigid type of joint between two components made using an adhesive

NOTE Generally consists of a slightly conical (tapered) bell end and a machined (cylindrical or tapered) spigot end.

### 2.2.4

#### **anisotropic**

exhibiting different properties when tested along axes in different directions

### 2.2.5

#### **carbon fibre**

fibre produced by the pyrolysis of organic precursor fibres, such as rayon, polyacrylonitrile or pitch, in an inert environment

### 2.2.6

#### **cavitation**

formation of pockets of vapour in a liquid that suddenly collapse, causing very high localized pressures which can lead to serious erosion of boundary surfaces

### 2.2.7

#### **chemical-resistant glass**

glass fibre or synthetic veil having a specific chemical resistance against acids

NOTE Such glass is used primarily as a reinforcement for the resin-rich internal liner of GRP pipe

### 2.2.8

#### **collapse pressure**

external pressure differential which causes buckling collapse of a component

### 2.2.9

#### **component variant**

individual component

**2.2.10****composite**

reinforcing fibres laid up in a resin matrix

**2.2.11****composite pipe**

pipe manufactured using fibre-reinforced thermoset plastics

NOTE Thermoplastic resins are excluded from ISO 14692 (all parts).

**2.2.12****chopped strand mat****CSM**

reinforcement structure in which short lengths of glass fibre tows, held together by an emulsion or powder binding agent, are dispersed in random directions within a single plane

**2.2.13****cure**

change irreversibly the properties of a thermosetting resin by chemical reaction

NOTE 1 Examples of such chemical reaction are condensation, ring closure and addition.

NOTE 2 Cure may be accomplished by the addition of a cross-linking agent, with or without heat and pressure.

**2.2.14****cure cycle**

time/temperature/pressure cycle used to cure a thermosetting resin system

**2.2.15****curing agent**

catalytic or reactive agent that, when added to a resin, causes polymerization

NOTE Also called hardener, for epoxies.

**2.2.16****delamination**

separation of two adjacent plies or layers of material in a laminate resulting from lack of adhesion

NOTE May occur either locally or covering a wide area.

**2.2.17****design external pressure**

maximum positive external pressure differential, i.e. external minus internal pressure, intended to be experienced by a component during its service life

**2.2.18****design pressure**

maximum positive internal pressure differential, i.e. internal minus external pressure, intended to be experienced by a component during its service life

**2.2.19****design temperature**

for each design condition, maximum fluid temperature that can be reached during service

**2.2.20****differential scanning calorimetry****DSC**

method for determining the glass transition temperature of a polymer

**2.2.21**

**dynamic mechanical thermal analysis**

**DMTA**

method for determining the glass transition temperature of a polymer or **FRP** (2.2.33) component

**2.2.22**

**earth**, verb, GB

**ground**, verb, US

provide electrical contact with earth

**2.2.23**

**E-glass**

glass fibre normally used to reinforce **GRP** (2.2.48) pipes, consisting mainly of  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$  and  $\text{MgO}$

**2.2.24**

**elastomeric bell-and-spigot seal lock joint**

rubber seal lock joint

rubber sealed key lock joint

joint connection made up of a spigot end and a socket end with "O" or lip-sealing rings

**2.2.25**

**electrically conductive**

**conductive**

having a volume resistivity equal to or lower than  $10^4 \Omega \cdot \text{m}$

**2.2.26**

**electrostatic dissipative**

**conductive**

having a volume resistivity higher than  $10^4 \Omega \cdot \text{m}$  but lower than  $10^9 \Omega \cdot \text{m}$  or a surface resistivity less than  $10^{10} \Omega$  measured at ambient temperature and 50 % relative humidity

**2.2.27**

**environmental stress cracking**

**ESC**

formation of cracks in a polymer or composite caused by exposure to a chemical or environment under stress

**2.2.28**

**epoxide**

**epoxy**

compound containing at least two epoxy or oxirane rings

NOTE 1 Chemically, an epoxy ring is a three-membered ring containing two carbon atoms and one oxygen atom.

NOTE 2 The most widely used epoxy resin is termed DGEBA (diglycidyl ether of bisphenol A). Epoxy resins are always used in conjunction with curing agents or hardeners, i.e. substances that react with the epoxy rings, producing hydroxyl groups and other products, and linking the originally linear molecules into a rigid three-dimensional network.

**2.2.29**

**factored qualified pressure**

pressure to be used in determining the safe operating envelope of the GRP pipe or piping system

NOTE Factored qualified pressure is based on the qualified pressure and takes account of specific service conditions that could not be considered in the qualification programme, e.g. temperatures other than 65 °C and the effect of exposure to chemical environments other than water.

**2.2.30**

**factored stress**

hoop stress based on the **factored qualified pressure** (2.2.29)

**2.2.31**

**failure**

loss of structural integrity and/or transmission of fluid through the wall of a component or a joint