AS ISO 14692.1:2022
ISO 14692-1:2017

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Petroleum and natural gas industries — Glass-reinforced plastics (GRP) piping

Part 1: V

AS ISO 14692.1:2022

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Australian Industry Group
Australian Organisation for Quality
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ISO 14692-1:2017

Petroleum and natural gas industries — Glass-reinforced plastics (GRP) piping

and materials

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Preface

This Standard was prepared by the Standards Australia Committee ME-092, Materials, equipment, structures and related services for petroleum, petrochemical and natural gas industries.

The objective of this document is to specify the following —

(a) application;

(b) pressure rating methodology;

(c) classification of products according to application, type of joint and resin matrix; and

(d) limitations to the materials of construction and dimensions of glass-reinforced plastics (GRP) piping systems.

This document also lists the terms, definitions and symbols used, and provides guidance in the use and interpretation of, AS ISO 14692.2:2022, AS ISO 14692.3:2022 and AS ISO 14692.4:2022.

AS ISO 14692 (all parts) is applicable to glass-reinforced plastics (GRP) piping systems that —

(i) utilize [This is a preview. Click here to purchase the full publication.] ture change and fluid hydrodynamic forces; and

(ii) have a trapezoidal shape for its design envelope.

This document is identical with, and has been reproduced from, ISO 14692-1:2017, *Petroleum and natural gas industries — Glass-reinforced plastics (GRP) piping — Part 1: Vocabulary, symbols, applications and materials*.

As this document has been reproduced from an International document, a full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

Contents

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade n s not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 6, *Processing equipment and systems*.

This second edition cancels and replaces the first edition (ISO 14692-1:2002), which has been technically revised.

A list of all parts of ISO 14692 can be found on the ISO website.

Introduction

0.1 General

The objective of ISO 14692 (all parts) is to provide the oil and gas industry, as well as the supporting engineering and manufacturing industry, with mutually agreed specifications and recommended practices for the purchase, qualification, manufacturing, design, handling, storage, installation, commissioning and operation of GRP piping systems.

This document, provides guidance in the use and interpretation of the other parts of ISO 14692. This document contains the following annexes:

— Annex A (informative) explaining the principle;

— Annex B (informative) providing guidance on scope limitations;

— Annex C (normative) containing the enquiry sheet;

— Annex D (normative) providing wall thickness definitions;

— [illegible]

— Annex F (informative) containing a worked example.

0.2 Basic steps in use of ISO 14692 (all parts)

Figure 1 identifies the eight basic steps involved in the use of ISO 14692 (all parts) that are further explained below.

Step 1: The bid process. The principal completes an enquiry sheet (see Annex C) that defines the design pressures and temperatures of the piping system as well as the application, required pipe sizes and required components (bends, tees, reducers, flanges, etc.). The principal also verifies that the scope of the application is within the limits of ISO 14692 (all parts) (see Annex B). The principal and manufacturer also comes to an agreement on the value of the estimated value of the part factor $f_{3,est}$ (see Annex E).

In some cases, the manufacturer can wish to offer a product that 1) meets or exceeds the requirements in the enquiry sheet and 2) has already been manufactured, qualified and inspected per ISO 14692-2. In this case, Steps 2 through 4 would not need to be repeated.

Step 2: Manufacturer's data. Recognizing that long-term regression testing can easily take two or more years to complete, the manufacturer will most likely have already selected target values for MPR_{xx}, the long-term envelope(s) and the minimum reinforced wall thicknesses. The manufacturer determines the appropriate gradient and $rd_{1\ 000,xx}$ can then be calculated to suit the survival test duration. Additional basic data such as pipe sizes, wall thicknesses, SIFs, production processes and jointing instructions are also provided.

Step 3: Qualification process. The manufacturer conducts survival tests to qualify the pressure and temperature. If applicable, the manufacturer also qualifies fire performance and electrical conductivity properties. Elastic properties, potable water certification, impact and low temperature performance are also addressed in this step. Just as in Step 2, the manufacturer can have already completed part or all of the qualification process prior to Step 1.

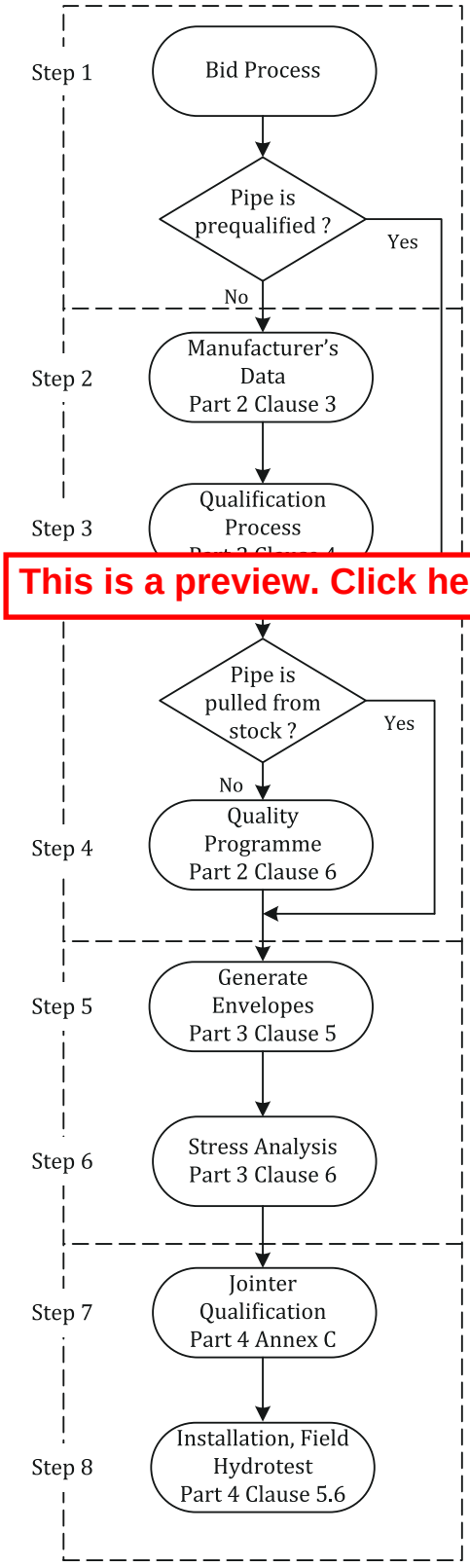
Step 4: Quality programme. The basic requirements for the manufacturer's quality management system are defined.

Step 5: Generate envelopes. This is the first major step in ISO 14692-3. Partial factors and part factors are identified and combinations of these factors are determined. Formulae are then provided to calculate the design envelope(s).

Step 6: Stress analysis. The flexibility factors and SIFs to be used in the stress analysis are identified. The allowable values for vertical deflection, stresses and buckling are also defined. An analytical formula for external pressure is provided.

Step 7: Bonder training and assessment. This is the first major step in ISO 14692-4 where the bonder training and assessment process is defined.

Step 8: Installation, field hydrotest. This is the last major step where installation issues are addressed.



Concepts

Enquiry sheet (Part 1 AnnexD)
Estimated f_3 (Part 1 Annex F)
Scope limits (Part 1 Annex C)
A_0, A_2, A_3, MPR_{xx} (Part 1, 3.1 and 3.2; Part 2, 3.3 and 3.4)

Pipe, fittings and joints that have already been qualified per ISO 14692-2 would not need to repeat steps 2 and 3. Manufacturer would select a product with an MPR_{xx} to meet the requirements in the Entquiry sheet

Long term envelopes (Part 2, 3.5 and AnnexD)
Gradients and $rd_{1000,xx}$ (Part 2, 3.2 and Annexes B and C)
$D_{r,min,}$ $t_{r,min,}$ *SIFs* (Part 2, 3.6, 3.8)
Production processes and jointing instructions (Part 2, 3.9)

Scaling rules (Part 2, 4.2)
Product qualification (Part 2, 4.3)

Pipe, fittings and joints that have already been inspected per ISO 14692-2 would not need to repeat step 4

Mill hydrostatic test, degree of cure, glass content, visual inspection and key component dimensions (Part 2, 6.1 and 6.2)

Combinations of partial factors and the f_2 part factor (Part 3, 5.1 thru 5.3)
Generate design envelope(s) (Part 3, 5.4)

Flexibility factors and *SIFs* (Part 3, 6.3 thru 6.5 and Annex A)
Allowable deflections and stresses (Part 3, 6.7 and 6.8)
External pressure/vacuum rating (Part 3, 6.9)

Based on manufacturer's jointing procedures
Theoretical and pratical exam terms (Part 4, Annex C)
Jointer qualification on representative joint types and sizes (Part 4, Annex C)

System design output (Part 3, Clause 8)
Field hydrotest (Part 4, 5.6)
Manufacturer's jointing instructions (Part 2, 3.9)
Installation instructions (Part 4, 5.5)
Jointer certificates (Part 4, Annex C)

Figure 1 — Guidance on the use of ISO 14692 (all parts)