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**NATIONAL STANDARD OF THE  
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**GB/T 29165.3-2023**

Replacing GB/T 29165.3-2015

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**Petroleum and natural gas industries - Glass-reinforced plastics  
(GRP) piping - Part 3: System design**

石油天然气工业 玻璃纤维增强塑料管 第3部分：系统设计  
(English Translation)

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## Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents" Drafting:

This document is Part 3 of GB/T 29165 "Glass fiber reinforced plastic pipes for the oil and gas industry": GB/T 29165 has been the following sections were published:

- Part 1: Vocabulary, symbols, applications and materials;
- Part 2: Assessment and Manufacturing;
- Part 3: System Design;
- Part 4: Assembly, installation and operation:

This document replaces GB/T 29165.3-2015 "Glass fiber reinforced plastic pipes for the oil and gas industry - Part 3: System design count": Compared with GB/T 29165.3-2015, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

a) The contents of Chapter 5 "System Layout Requirements" have been changed, and contents such as joint selection, electrostatic discharge control and electrochemical corrosion have been deleted:

(See Chapter 4, Chapter 5 of the:2015 edition);

b) The content of Chapter 6 "Hydraulic Design" has been changed, and content such as hydraulic transient simulation analysis and vacuum circuit breaker have been added (see Chapter 5 Chapter, Chapter 6 of the:2015 edition);

c) The content of Chapter 7 "Structural Design" has been changed, and the overview, manufacturer's pressure level, rated pressure, and factored rated pressure have been deleted:

force, system design pressure, load requirements, allowable displacement, rated stress and factorized stress, etc.; and the calculation requirements for load generation Contents such as the determination of force limit values and failure envelopes have been optimized and modified (see Chapter 6, Chapter 7 of the:2015 edition);

d) Changed the content of Chapter 8 "Stress Analysis" and deleted external pressure/vacuum, thermal load, stress generated by internal pressure, and pipe support the content such as the stress generated has been added to the pipeline stress analysis software, flexibility factors, pressure enhancement factors, pipeline modeling, and allowable deflection:

Degree, allowable pressure, external pressure, longitudinal pressure expansion, etc: (see Chapter 7, Chapter 8 of the:2015 edition);

e) Added the method for determining the pipe stiffness in the calculation of the estimated vertical deflection of the pipe (see 7.7:2);

f) Added the deflection lag coefficient, vertical soil load on the pipeline, and dynamic load on the pipeline in the calculation of the estimated vertical deflection of the pipeline:

Determination method of Dedin coefficient and composite soil constraint modulus (see 7.7:2);

g) Added the method of determining the shape coefficient in the comprehensive calculation of hoop stress (see 7.8);

h) The content of Chapter 11 "Installation and Operating Party Files" has been changed and the requirements for inspection planning have been deleted (see Chapter 9,:2015 version Chapter 11);

i) Added Appendix A "Cyclic Service Sub-item Coefficient A3" (see Appendix A);

j) Added the method for determining the cyclic long-term strength coefficient  $f_c$  (see A:2);

k) Appendix D "Deflection Analysis Guide" is deleted (see Appendix D of the:2015 version);

l) Appendix E "Calculation of Support Stress for Large Diameter Liquid-Filled Pipelines" has been deleted (see Appendix E of the:2015 edition):

This document is equivalent to ISO 14692-3:2017 "Glass fiber reinforced plastic pipes for the oil and gas industry - Part 3: System design count":

Due to a typographical error in an ISO standard, the following minimal editorial changes have been made to this document:

a) The reference chapter or article number in the process box in Figure 1 of ISO 14692.3:2017 is incorrectly marked: In boxes 1 to 7, this document is divided into Don't change it to "See Chapter 4" "See Chapter 5" "See Part 2 Chapter 4" "See Chapter 6" "See Chapter 7" "See 7.7 and 7:8" "See 7.9 and 7:10" "See Chapter 8":

- b) The indexing number description of symbols X and Y in Figure 2 of ISO 14692.3:2017 is not given, this document will supplement it, X---cycle times and Y---cycle loading ratio:
- c) The first "Note 4" in Table 1 of ISO 14692.3:2017 is incorrect, and this document is modified to "Note 3":
- d) The reference standard number of DNVRP0501 in ISO 14692.3:20175:4:2 is incorrect, and this document is modified to DNVRPO501: ginseng Corresponding modifications will be made in the literature review:
- e) No explanation is given for index numbers 3 and 4 in Figure 3 of ISO 14692.3:2017: This document is supplemented by 3---Hoop stress ( $\sigma_{\theta}$ ) and 4---Longitudinal stress ( $\sigma_{\parallel}$ ):
- f) The symbol " $\epsilon_{p,avg}$ " in ISO 14692.3:20177:11 is incorrect, this document is modified to " $\epsilon_{ap,avg}$ ":
- g) The reference number of B:2:2 in ISO 14692.3:2017B:5 is incorrect, and this document is modified to B:2:3:

Please note that some content in this document may be subject to patents: The publisher of this document assumes no responsibility for identifying patents:

## Introduction

Glass fiber reinforced plastic pipe is a composite made of glass fiber reinforced unsaturated polyester, epoxy resin and phenolic resin as matrix materials:

Plastic pipes are widely used in the oil and gas industry: In order to standardize the design, manufacturing, evaluation and operation of glass fiber reinforced plastic pipes line, and formulated a series of technical documents for glass fiber reinforced plastic pipes for the oil and gas industry: GB/T 29165 "Oil and natural gas industrial glass Fiber Reinforced Plastic Pipes" aims to provide the oil and gas industry with basic terminology, materials, evaluation, and evaluation of glass fiber reinforced plastic pipes recognized by all parties:

Standards for manufacture, design, assembly, installation and operation: According to the characteristics of each stage of the full service cycle of glass fiber reinforced plastic pipes, such as application and Materials, evaluation and manufacturing, system design, assembly, installation and operation are planned to be composed of four parts:

---Part 1: Vocabulary, symbols, applications and materials: The purpose is to provide information on basic terminology and notation for the remaining three parts, and to Application scope and materials are specified and required:

---Part 2: Assessment and Manufacturing: The purpose is to provide quality for the design, assembly and compliance of glass fiber reinforced plastic (GRP) systems: