

ISO 14692-2:2017-08 (E)

Petroleum and natural gas industries - Glass-reinforced plastics (GRP) piping - Part 2: Qualification and manufacture

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	1
3	Terms, definitions, symbols and abbreviated terms	2
4	Manufacturer's declarations	2
4.1	Procedure	2
4.2	Long term regression testing	4
4.3	Gradient, Gxx	5
4.4	MPRxx	5
4.5	Partial factors	5
4.5.1	Partial factor for design lifetime, A0	5
4.5.2	Partial factor for chemical degradation, A2	5
4.5.3	Partial factor for cyclic loading, A3	6
4.6	Long term envelope data points	6
4.7	Dimensions	6
4.8	Baseline values	6
4.9	Flexibility factors and SIFs	7
4.10	Production processes and jointing instructions	7
5	Qualification programme	7
5.1	General	7
5.2	Scaling rules	9
5.3	Product qualification	10
5.3.1	Validation of long term envelopes	10
5.3.2	Density	10
5.3.3	Thermal expansion coefficient	10
5.3.4	Qualification procedure for external pressure	10
5.4	Elastic properties	10
5.4.1	General	10
5.4.2	Axial tensile modulus, Ea	12
5.4.3	Hoop tensile modulus, Eh, and minor Poisson's ratio, ah	12
5.4.4	Major Poisson's ratio, ha	12
5.4.5	Circumferential bending modulus, Ehb	13
5.5	Optional qualification requirements	13
5.5.1	Electrical conductivity	13
5.5.2	Potable water certification	13
5.5.3	Impact resistance	13
5.5.4	Qualification procedure for fire performance	13
5.5.5	Low temperature performance	13
6	Requalification	14
7	Quality programme for manufacture	15
7.1	General requirements	15
7.2	Quality control tests	16

7.2.1	General	16
7.2.2	Mill hydrostatic test for pipes	16
7.2.3	Mill hydrostatic test for spoolpieces	17
7.2.4	Degree of cure	17
7.2.5	Barcol hardness	17
7.2.6	Glass content	18
7.2.7	Visual inspection	18
7.2.8	Key component dimensions	18
7.2.9	Retest	19
7.2.9 7.2.9	
Retest	19
7.3	Optional quality control tests	20
7.3.1	Electrical conductivity per length	20
7.3.2	Fire performance	21
7.3.3	Residual styrene monomer content	21
7.3.4	Additional quality control tests	21
8	Component marking	22
9	Handling, storage and transportation	22
10	Documentation	22
10.1	General	22
10.2	Enquiry and purchase order documentation	22
10.3	Qualification documentation	22
10.3.1	General	22
10.3.2	Qualification reports	22
10.3.3	Potable water approval certificates	23
10.4	Production quality control documentation	23
10.4.1	General	23
10.4.2	Manufacturing procedure	23
10.4.3	Raw material certificates	23
10.4.4	Production quality control reports	23
10.5	Installation documentation	23
Annex A (normative)	Gradients and temperature limits	24
Annex B (normative)	Long term envelope data points	29
Annex C (normative)	Survival tests	34
Annex D (normative)	Scaling rules	39
Annex E (normative)	Representative products	50
Annex F (normative)	Flange qualification	53
Annex G (normative)	Major Poisson's ratio	56
Annex H (normative)	Fire endurance testing	59
Annex I (normative)	Alternate material qualification	68
Annex J (normative)	Visual inspection	74
Annex K (informative)	Example of qualification summary form	78
Bibliography	80