

DIN EN 18191:2026-10 (E)

Industrial valves - Additional requirements for metallic valves for hydrogen application

Contents

Page

European foreword	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
4 General	11
5 Hydrogen service (damage mechanisms)	11
5.1 Metallic materials	11
5.2 Non-metallic materials	11
6 General information on material selection for each hydrogen service (damage mechanism)	12
6.1 Hydrogen in low temperature applications	12
6.2 Hydrogen environmental embrittlement (HEE)	12
6.2.1 General	12
6.2.2 Ferritic steels except austenitic ferritic stainless steels	12
6.2.3 Austenitic stainless steels	13
6.2.4 Austenitic-ferritic steels	13
6.2.5 Aluminium and aluminium alloys	13
6.2.6 Cast irons	13
6.2.7 Steel casting	13
6.2.8 Copper and its alloys	13
6.2.9 Nickel, nickel alloys, titanium and titanium alloys	14
6.2.10 Zirconium	14
6.2.11 Other metallic materials	14
6.3 High temperature hydrogen attack (HTHA)	14
6.4 Hydrogen service with cyclic loads (fatigue)	16
6.4.1 General requirements	16
6.4.2 Fatigue in combination with the other hydrogen services (damage mechanisms)	16
6.5 Non metallic materials	17
7 Additional specifications	17
7.1 Design	17
7.1.1 General	17
7.1.2 Design temperature	17
7.1.3 Hydrogen partial pressure	17
7.1.4 Tightness aspects	17
7.2 Materials	18
7.2.1 General	18
7.2.2 Metallic and non metallic materials	19
7.2.3 Delivery conditions of finished valve components	20
7.3 Manufacture	20
7.3.1 Welding	20
7.3.2 Welding consumables	21
7.3.3 Cold forming	21

7.3.4	Strain hardening	21
7.3.5	Hardness of welds	21
7.3.6	Mechanical properties of welds	21
7.4	Final assessment	21
7.5	Marking	21
Annex A (informative) Harmonized European industrial valve product standards		22
Annex B (informative) Materials for components of metallic industrial valves intended to be used in hydrogen applications		23
Annex C (normative) Tightness and additional testing		54
Bibliography		62