ISO 21922:2021-08 (E)

Refrigerating systems and heat pumps - Valves - Requirements, testing and marking

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 List of symbols **4**

5 General requirements **6**
5.1 Installation and operation 6
5.2 Components under pressure 6
5.3 Excessive mechanical stress 7
5.4 Tightness 7
5.5 Functioning of hand-operated valves 7
5.6 Functioning of actuator-operated valves 7

6 Materials **7**
6.1 General 7
6.1.1 Using metallic materials 7
6.1.2 Using non-metallic materials 7
6.2 Requirements for materials to be used for pressure bearing parts 8
6.3 Compatibility of connections 8
6.4 Ductility 8
6.5 Ageing 8
6.6 Castings 8
6.7 Forged and welded components 8
6.8 Nuts, bolts and screws 8
6.9 Spindles 9
6.10 Glass materials 9
6.11 Requirements for documentation 9
6.12 Impact energy ***KV*** measurement on sub-sized specimens 10

7 Design **10**
7.1 General 10
7.2 Maximum allowable pressure 11
7.3 Valve and valve assembly strength design 11
7.4 Bodies and bonnets 12
7.5 Nuts, bolts, screws, fasteners and seals 12
7.6 Seat tightness 12
7.6.1 General 12
7.6.2 Seat tightness: type test 13
7.7 Screwed spindles and shafts 14
7.8 Design of glands 14
7.9 Valve seats 15
7.10 Caps 15
7.11 Hand operated valves 16
7.12 Corrosion protection 16

8 Appropriate manufacturing procedures **16**

9 Production testing **17**

9.1 Strength pressure testing 17
9.2 Tightness testing 17
9.3 Seat sealing capacity 18
9.4 Caps 18

10 Marking and additional information 18
10.1 General 18
10.2 Marking 19
10.3 Example how to mark the allowable limits of pressure and temperature 19
10.4 Hand-operated regulating valves 19
10.5 Caps 19

11 Documentation 20
11.1 General 20
11.2 Documentation for valves 20
11.3 Additional documentation for valve assemblies 20

Annex A (normative) **Procedure for the design of a valve by calculation 21**

Annex B (normative) **Experimental design method for valves 24**

Annex C (normative) **Determination of the allowable pressure at the maximum operating temperature 28**

Annex D (normative) **Determination of the allowable pressure at minimum operating temperature — Requirements to avoid brittle fracture 29**

Annex E (informative) **Compilation of material characteristics of frequently used materials 40**

Annex F (informative) **Justification of the individual methods 60**

Annex G (normative) **Pressure strength verification of valve assemblies 66**

Annex H (normative) **Determination of category for valves 67**

Annex I (informative) ***DN* system 72**

Annex J (normative) **Additional requirements — Sight glasses and indicators 75**

Annex K (normative) **Compatibility screening test 78**

Annex L (informative) **Stress corrosion cracking 82**

Annex M (normative) **Method for sizing the operating element of hand-operated valves 85**

Bibliography 87