

# DIN EN ISO 21922:2023-09 (E)

## Refrigerating systems and heat pumps - Valves - Requirements, testing and marking (ISO 21922:2021)

---

<b>Contents</b>		<b>Page</b>
	European foreword .....	4
	Annex ZA (informative) .....	5
	Foreword .....	6
	Introduction .....	7
<b>1</b>	<b>Scope</b> .....	<b>8</b>
<b>2</b>	<b>Normative references</b> .....	<b>8</b>
<b>3</b>	<b>Terms and definitions</b> .....	<b>8</b>
<b>4</b>	<b>List of symbols</b> .....	<b>11</b>
<b>5</b>	<b>General requirements</b> .....	<b>13</b>
	5.1 Installation and operation .....	13
	5.2 Components under pressure .....	13
	5.3 Excessive mechanical stress .....	14
	5.4 Tightness .....	14
	5.5 Functioning of hand-operated valves .....	14
	5.6 Functioning of actuator-operated valves .....	14
<b>6</b>	<b>Materials</b> .....	<b>14</b>
	6.1 General .....	14
	6.1.1 Using metallic materials .....	14
	6.1.2 Using non-metallic materials .....	14
	6.2 Requirements for materials to be used for pressure bearing parts .....	15
	6.3 Compatibility of connections .....	15
	6.4 Ductility .....	15
	6.5 Ageing .....	15
	6.6 Castings .....	15
	6.7 Forged and welded components .....	15
	6.8 Nuts, bolts and screws .....	15
	6.9 Spindles .....	16
	6.10 Glass materials .....	16
	6.11 Requirements for documentation .....	16
	6.12 Impact energy <i>KV</i> measurement on sub-sized specimens .....	17
<b>7</b>	<b>Design</b> .....	<b>17</b>
	7.1 General .....	17
	7.2 Maximum allowable pressure .....	18
<b>9</b>	7.3 Valve and valve assembly strength design .....	<b>18</b>
	7.4 Bodies and bonnets .....	19
	7.5 Nuts, bolts, screws, fasteners and seals .....	19
	7.6 Seat tightness .....	19
	9.4 7.6.1 General .....	19
	7.6.2 Seat tightness: type test .....	20
	7.7 Screwed spindles and shafts .....	21
	7.8 Design of glands .....	21
	7.9 Valve seats .....	22
	7.10 Caps .....	22
	7.11 Hand operated valves .....	23
	7.12 Corrosion protection .....	23
<b>8</b>	<b>Appropriate manufacturing procedures</b> .....	<b>23</b>

<b>9</b>	<b>Production testing</b> .....	<b>24</b>
9.1	Strength pressure testing .....	24
9.2	Tightness testing .....	24
9.3	Seat sealing capacity .....	25
9.4	Caps .....	25
<b>10</b>	<b>Marking and additional information</b> .....	<b>25</b>
10.1	General .....	25
10.2	Marking .....	26
10.3	Example how to mark the allowable limits of pressure and temperature .....	26
10.4	Hand-operated regulating valves .....	26
10.5	Caps .....	26
<b>11</b>	<b>Documentation</b> .....	<b>27</b>
11.1	General .....	27
11.2	Documentation for valves .....	27
11.3	Additional documentation for valve assemblies .....	27
<b>Annex A</b>	<b>(normative) Procedure for the design of a valve by calculation</b> .....	<b>28</b>
<b>Annex B</b>	<b>(normative) Experimental design method for valves</b> .....	<b>31</b>
<b>Annex C</b>	<b>(normative) Determination of the allowable pressure at the maximum operating temperature</b> .....	<b>35</b>
<b>Annex D</b>	<b>(normative) Determination of the allowable pressure at minimum operating temperature — Requirements to avoid brittle fracture</b> .....	<b>36</b>
<b>Annex E</b>	<b>(informative) Compilation of material characteristics of frequently used materials</b> .....	<b>47</b>
<b>Annex F</b>	<b>(informative) Justification of the individual methods</b> .....	<b>67</b>
<b>Annex G</b>	<b>(normative) Pressure strength verification of valve assemblies</b> .....	<b>73</b>
<b>Annex H</b>	<b>(normative) Determination of category for valves</b> .....	<b>74</b>
<b>Annex I</b>	<b>(informative) DN system</b> .....	<b>79</b>
<b>Annex J</b>	<b>(normative) Additional requirements — Sight glasses and indicators</b> .....	<b>82</b>
<b>Annex K</b>	<b>(normative) Compatibility screening test</b> .....	<b>85</b>
<b>Annex L</b>	<b>(informative) Stress corrosion cracking</b> .....	<b>89</b>
<b>Annex M</b>	<b>(normative) Method for sizing the operating element of hand-operated valves</b> .....	<b>92</b>
<b>Bibliography</b>	.....	<b>94</b>