

# DIN EN ISO 10524-2:2019-08 (E)

## Pressure regulators for use with medical gases - Part 2: Manifold and line pressure regulators (ISO 10524-2:2018)

---

<b>Contents</b>		<b>Page</b>
European foreword .....		4
Foreword .....		5
Introduction .....		6
<b>1</b>	<b>* Scope .....</b>	<b>7</b>
<b>2</b>	<b>Normative references .....</b>	<b>7</b>
<b>3</b>	<b>Terms and definitions .....</b>	<b>7</b>
<b>4</b>	<b>Nomenclature .....</b>	<b>10</b>
<b>5</b>	<b>General requirements .....</b>	<b>10</b>
<b>5.1</b>	<b>Safety .....</b>	<b>10</b>
<b>5.2</b>	<b>Usability .....</b>	<b>10</b>
<b>5.3</b>	<b>Alternative construction .....</b>	<b>10</b>
<b>5.4</b>	<b>Materials .....</b>	<b>11</b>
<b>6</b>	<b>Design requirements .....</b>	<b>12</b>
<b>6.1</b>	<b>General .....</b>	<b>12</b>
<b>6.2</b>	<b>PRESSURE GAUGES .....</b>	<b>12</b>
<b>6.3</b>	<b>Integrated digital gauges .....</b>	<b>12</b>
<b>6.4</b>	<b>Pressure-adjusting device .....</b>	<b>12</b>
<b>6.5</b>	<b>Filtration .....</b>	<b>13</b>
<b>6.6</b>	<b>Mechanical strength .....</b>	<b>13</b>
<b>6.6.1</b>	<b>Resistance of the high-pressure side .....</b>	<b>13</b>
<b>6.6.2</b>	<b>Resistance of the low-pressure side to pneumatic pressure .....</b>	<b>13</b>
<b>6.6.3</b>	<b>Resistance of the low pressure side to P1 .....</b>	<b>13</b>
<b>6.7</b>	<b>Endurance .....</b>	<b>13</b>
<b>6.8</b>	<b>MANIFOLD PRESSURE REGULATORS .....</b>	<b>14</b>
<b>6.8.1</b>	<b>* Inlet connector .....</b>	<b>14</b>
<b>6.8.2</b>	<b>Outlet connector .....</b>	<b>14</b>
<b>6.8.3</b>	<b>Leakage .....</b>	<b>14</b>
<b>6.8.4</b>	<b>Functional and FLOW CHARACTERISTICS .....</b>	<b>14</b>
<b>6.8.5</b>	<b>PRESSURE-RELIEF DEVICE .....</b>	<b>15</b>
<b>6.8.6</b>	<b>* Resistance to ignition .....</b>	<b>15</b>
<b>6.8.7</b>	<b>NOMINAL INLET PRESSURE .....</b>	<b>15</b>
<b>6.9</b>	<b>LINE PRESSURE REGULATORS .....</b>	<b>15</b>
<b>6.9.1</b>	<b>* Inlet connector .....</b>	<b>15</b>
<b>6.9.2</b>	<b>Outlet connector .....</b>	<b>15</b>
<b>6.9.3</b>	<b>Leakage .....</b>	<b>15</b>
<b>6.9.4</b>	<b>Outlet pressure variation limits .....</b>	<b>16</b>
<b>6.9.5</b>	<b>* Resistance to ignition of sealing materials and lubricants .....</b>	<b>16</b>
<b>6.9.6</b>	<b>NOMINAL INLET PRESSURE .....</b>	<b>16</b>
<b>7</b>	<b>Construction requirements .....</b>	<b>16</b>
<b>7.1</b>	<b>* Cleanliness .....</b>	<b>16</b>
<b>7.2</b>	<b>Lubricants .....</b>	<b>16</b>

<b>8</b>	<b>Test methods for type tests .....</b>	<b>17</b>
<b>8.1</b>	<b>General conditions .....</b>	<b>17</b>
<b>8.1.1</b>	<b>General .....</b>	<b>17</b>
<b>8.1.2</b>	<b>Ambient conditions .....</b>	<b>17</b>
<b>8.1.3</b>	<b>Test gas .....</b>	<b>17</b>
<b>8.1.4</b>	<b>Reference conditions .....</b>	<b>17</b>
<b>8.2</b>	<b>Test schedule .....</b>	<b>17</b>
<b>8.3</b>	<b>Test methods for MANIFOLD PRESSURE REGULATORS .....</b>	<b>19</b>
<b>8.3.1</b>	<b>Test equipment for functional and FLOW CHARACTERISTICS .....</b>	<b>19</b>
<b>8.3.2</b>	<b>Test method for determining STANDARD DISCHARGE, Q1 .....</b>	<b>19</b>
<b>8.3.3</b>	<b>Test method for determining the coefficient of pressure increase upon closure .....</b>	<b>20</b>
<b>8.3.4</b>	<b>Test method for determining the irregularity coefficient .....</b>	<b>21</b>
<b>8.3.5</b>	<b>Test method for PRESSURE-RELIEF DEVICE .....</b>	<b>23</b>
<b>8.3.6</b>	<b>Test methods for leakage .....</b>	<b>23</b>
<b>8.3.7</b>	<b>Test method for mechanical strength .....</b>	<b>24</b>
<b>8.3.8</b>	<b>Test method for resistance to ignition .....</b>	<b>24</b>
<b>8.4</b>	<b>Test method for LINE PRESSURE REGULATORS .....</b>	<b>25</b>
<b>8.4.1</b>	<b>Test method for measuring the variation of the outlet pressure .....</b>	<b>25</b>
<b>8.4.2</b>	<b>Test methods for leakage .....</b>	<b>25</b>
<b>8.4.3</b>	<b>Test method for mechanical strength .....</b>	<b>26</b>
<b>8.4.4</b>	<b>Test method for determination of the auto-ignition temperature of sealing materials and lubricants .....</b>	<b>26</b>
<b>8.5</b>	<b>Endurance test .....</b>	<b>28</b>
<b>8.6</b>	<b>Test method for durability of markings and colour coding .....</b>	<b>29</b>
<b>9</b>	<b>Marking, colour coding, and packaging .....</b>	<b>29</b>
<b>9.1</b>	<b>Marking .....</b>	<b>29</b>
<b>9.2</b>	<b>Colour coding .....</b>	<b>30</b>
<b>9.3</b>	<b>Packaging .....</b>	<b>30</b>
<b>10</b>	<b>Information to be supplied by the manufacturer .....</b>	<b>30</b>
	<b>Annex A (informative) Examples of PRESSURE REGULATORS .....</b>	<b>32</b>
	<b>Annex B (informative) Rationale .....</b>	<b>33</b>
	<b>Annex C (informative) Reported regional and national deviations of colour coding and nomenclature for medical gases .....</b>	<b>35</b>
	<b>Bibliography .....</b>	<b>37</b>