

2nd ANSI Public Review of B109.5 Standard (New)

The draft B109.5 Standard underwent 1st ANSI Public Review from August 18 – October 2, 2023. During that public review period, AGA received various comments that resulted in substantive changes to the standard draft. Those changes, excerpted below, are open for 2nd Public Review.

Document Title:
B109.5, Self-Operated Diaphragm-Type Natural Gas Service Regulators
 For Nominal Pipe Size up to and including 2 inches (50 mm) and inlet pressures up to 125 psig (861.8 kPa) with outlet pressure of 20 psig (138 kPa) or less not covered in ANSI B109.4

#: Red-Line Change											
1	Section 4.3.4	<p>The diaphragm shall withstand a differential pressure of 5 PSIG or at least two times the maximum set pressure, whichever is greater, without leakage or rupture.</p>									
2	Section 5.3.2 External Leakage	<p>The leakage shall not exceed the requirements set forth below when the regulator is subjected to a back pressure of 5 PSIG or 1.5 times the maximum set point pressure, whichever is greater, through the regulator outlet with the vent and body inlet connection blocked.</p>									
3	Section 5.3.5 (c)	<p>Ensure that the lock-up pressure is no greater than 3 inches w.c. (0.75 kPa) above the original set pressure for set points of 14 inches w.c. or less (3.48 kPa). For set points greater than 14 inches w.c. (3.48 kPa) and equal or less than 10 psig (69 kPa), lock-up pressure shall not be greater than 115% of set point. For set points greater than 10 psig (69 kPa), lock-up pressure shall not be greater than 110% of set point. See Section 5.3.3.</p>									
4	Section 5.3.8 Relief Set Point	<p>TABLE VI</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 5px;">Set Point</th> <th style="text-align: left; padding: 5px;">IRV – Start-to-Discharge Range (Over Set-Point)</th> <th style="text-align: left; padding: 5px;">Minimum IRV Reseat Above Lock-Up</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Set ≤ 14 inches w. c. gauge (3.48 kPa gauge)</td> <td style="padding: 5px;">6 – 14 12 inches w.c. (1.49 – 3.48 kPa gauge)</td> <td style="padding: 5px;">2 inches w. c (0.49 kPa gauge)</td> </tr> <tr> <td style="padding: 5px;">14 inches w. c. gauge (3.48 kPa gauge) < Set < 1 psig</td> <td style="padding: 5px;">7 – 21 inches w.c. (1.74 – 5.22 kPa gauge)</td> <td style="padding: 5px;">2 inches w. c. (0.49 kPa gauge)</td> </tr> </tbody> </table>	Set Point	IRV – Start-to-Discharge Range (Over Set-Point)	Minimum IRV Reseat Above Lock-Up	Set ≤ 14 inches w. c. gauge (3.48 kPa gauge)	6 – 14 12 inches w.c. (1.49 – 3.48 kPa gauge)	2 inches w. c (0.49 kPa gauge)	14 inches w. c. gauge (3.48 kPa gauge) < Set < 1 psig	7 – 21 inches w.c. (1.74 – 5.22 kPa gauge)	2 inches w. c. (0.49 kPa gauge)
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	1 psig (6.89 kPa gauge) ≤ Set ≤ 2 psig (13.8 kPa gauge)	2.0 psig max (13.8 kPa gauge)	0.1 psig (0.68 kPa gauge)	
	2 psig (13.8 kPa gauge) < Set ≤ 20 <u>10</u> psig (138 <u>69</u> kPa gauge)	3.0 psig max (20.68 kPa gauge)	10% of gauge setpoint pressure	
	<u>10 psig (69 kPa gauge) < Set ≤ 15 psig (103 kPa gauge)</u>	<u>3.0 psig max (27.58 kPa gauge)</u>	<u>5% of gauge setpoint pressure</u>	
	<u>15 psig (103 kPa gauge) < Set ≤ 20 psig (138 kPa gauge)</u>	<u>4.0 psig max (27.58 kPa gauge)</u>	<u>5% of gauge setpoint pressure</u>	
5	<p>Section 5.4.1 External Leakage</p> <p>The leakage shall not exceed the requirements set forth below when the slam shut is subjected to a back pressure of 5 psig (34.5kPa) above the regulator setpoint <u>or 1.5 times the maximum set point pressure, whichever is greater</u>, through the outlet with the vent and body inlet connection blocked or plugged. Leaks to the atmosphere may be detected, by water immersion or other acceptable means of measuring stated leakage rate. When using the immersion method, submerge the complete slam shut under water [at a depth not greater than two inches (5.1 cm)] and watch for a continuous stream of bubbles. There shall be no stream of bubbles greater than one bubble per second, regardless of the size of the bubbles. The leakage rate from the slam shut shall not exceed 200 cc/hr. The leak test should last for a minimum of 60 seconds.</p>			
6	<p>Section 5.4.3 Slam Shut Set Point</p> <p>a) For OPSO setting, starting at lock-up pressure...</p> <p><u>b) For this test the initial pressure setting value shall be for regulator with built-in slam-shut according to Section 5.3.3 or equivalent means for stand-alone slam-shut.</u></p> <p>c) While flowing at 50% of the regulator’s rated capacity...</p>			
7	<p>Section 5.4.4 Endurance Test</p> <p>A slam shut shall withstand 150 cycles of opening and closing of the valve under the following test method:</p> <p>a) Set the slam shut as described in Section 5-5-3 <u>5.3.3</u>, “Set Point.”</p> <p>b) The cycle test shall include 75 cycles at room temperature, 50 cycles at the lowest temperature in the specified range and 25 cycles at the highest temperature in the specified range. With the product stabilized, the product temperature shall be within 2 degrees F of the test temperature.</p>			

	<p>c) Slowly increase the downstream pressure until the slam shut trips. When the cycles at a given temperature are complete check for set point and seat leakage in accordance with Section 5.5.3 <u>5.3.3</u>, "Set Point," and Section 5.5.2 <u>5.4.2</u>, "Seat Leakage test," not to exceed the setpoint deviation for designated accuracy group in Table IX.</p> <p>d) After 150 cycles of operation, the slam shut shall be checked for set point and seat leakage in accordance with Section 5.5.3 <u>5.3.3</u>, "Set Point," and Section 5.5.2 <u>5.4.2</u>, "Seat Leakage test," not to exceed the setpoint deviation in Table IX.</p>
<p>8</p>	<p>Section 5.4.5 Shell Pressure Test</p> <p>Each slam shut type shall be tested to establish that it is able to withstand an internal pressure in excess of that which it may be subjected to in actual service. A pressure test shall be performed on all slam shut pressure retaining shells to a minimum pressure of 10 <u>20</u> psig or at 1.5 times the Maximum Allowable Operating Pressure (MAOP), whichever is greater, for cast steel, cast aluminum and wrought aluminum shells, and at 2.0 times MAOP for cast and ductile iron shells. (Reference Section VIII, ASME Boiler and Pressure Vessel Code and FCI/ANSI 79-1.)</p>
<p>9</p>	<p>Section 5.6.1 (d)</p> <p>Ensure that the lock-up pressure is no greater than 3 inches w.c. (0.75 kPa) above the original set pressure for set points of 14 inches w.c. or less (3.48 kPa). For set points greater than 14 inches w.c. (3.48 kPa) <u>and equal or less 10 psig (69 kPa gauge)</u>, lock-up pressure shall not be greater than 115% of set point. <u>For set points greater than 10 psig (69 kPa gauge), lock-up pressure shall not be greater than 110% of set point,</u> See Section 5.3.3.</p>
<p>10</p>	<p>Section 5.6.3 Integral monitor seat leakage test</p> <p>The internal <u>integral</u> monitor should have a shut off classification of FCI/ANSI 70-3 Class VIII.</p>