

3 NEEDLE VALVE GAUGE TEST PROCEDURES

RP (RELIEF VALVE TEST) (Notify Identify Inspect Observe)

1. In this order 4, 3, 2, 1 **open** TC's to **flush** and **leave open**, Then **close** TC's in this order 1, 2, 3, 4.
 2. **(If needed)** Install appropriate fittings on TC's.
 3. **Attach** low side hose to TC 3, **attach** high side hose to TC 2.
 4. **Open** TC 3; **open** bypass valve one turn, and then **open** low side bleed valve to remove air from low side of gauge and **leave open**.
 5. **Open** TC 2; **open** high side bleed valve to remove air from high side of gauge and **leave open**.
 6. **Close** in this order: SOV 2, high side bleed valve, low side bleed valve and last close the bypass valve. **(Observe and record the apparent reading, must be 5 psi or more to continue)**
 7. **Open** the high side bleed valve 1 turn and **leave open**, then **open** the low side bleed valve no more than ¼ turn, when gage reading starts to drop **observe** the relief valve for discharge. When relief valve starts to drip **record this reading** as the relief valve opening point. **(Relief must open at 2 psi or more to pass)**
 8. Close low side bleed valve. **(#2 CHECK VALVE TEST)**
 9. **Attach** the bypass hose to the bypass valve and **open** the bypass valve to remove air from the hose.
 10. **Close** the bypass valve and **connect** bypass hose to TC 4, and then open TC 4
 11. **Reestablish** the zone, **loosen** the low side hose connection from TC 3, allowing water to flow from TC, and then **tighten** the connection.
 12. **Open** bypass valve one turn, if gage reading does not drop to the relief valve opening point **record** the second check as closed tight.
- (#1 CHECK VALVE TEST)**
13. **Reestablish** the zone, **loosen** the low side hose connection from TC 3, allowing water to flow from TC, and then **tighten** the connection. When gage settles **record this reading** as the differential pressure across check valve #1. **(Reading must be 5 psi or more, and above the relief opening point to pass)**
 14. **Close** TC's, remove equipment and fittings. Slowly **open** SOV 2.

SVB (CHECK VALVE TEST) (Notify Identify Inspect Observe)

1. **Remove** the air inlet canopy, **flush** TC and vent valve.
 2. **(If needed)** Install appropriate fitting on TC.
 3. **Open** the bypass valve on the gauge, **leave open** for the remainder of the test.
 4. **Attach** bleed valve tool and high side hose to TC 1, then **open** TC 1.
 5. **Open** high side bleed valve to remove the air from hose and gauge, then **close** high side bleed valve.
 6. **Close** SOV 2, **lift** gage to proper elevation and **maintain** gage at this level for the remainder of the test then **close** SOV 1.
 7. Slowly **open** and **remove** vent valve screw. When gage reading settles **record this reading** as the check valve holding point. **Watch** the air inlet to see if it opens before the check valve holding point, if the air inlet opens first then also record air inlet opening point). **(Must be 1psi or more to pass)**
- (AIR INLET TEST)**
8. **Maintain** gage at proper elevation.
 9. Slowly **open** high side bleed valve and **watch** both the needle on gage and the air inlet. When air inlet opens **record this reading** as the air inlet value. **(Must be 1psi or more to pass)**
 10. **Remove** the high side hose and bleed tool from TC1 to **drain** all the water from the body of the assembly. **(Observe and record that the air inlet opened all the way)**
 11. **Close** TC **install** and **close** vent valve screw, **remove** equipment and fitting.
 12. **Open** SOV 1, and then slowly **open** SOV 2. **Replace** canopy.

DC (#1 CHECK VALVE TEST) (Notify Identify Inspect Observe)

1. To flush **open** and **close** all 4 TC's. (any order)
 2. **(If needed)** Install appropriate fittings on TC's.
 3. **Attach** sight tube to TC 3.
 4. **Install** bleed valve tool and high side hose to TC 2.
 5. **Open** the bypass valve on the gauge, **leave open** for the remainder of the test.
 6. **Open** TC 2, then **open** the high side bleed valve to remove air from gage and hose, then **close** high side bleed valve.
 7. **Open** TC 3 to fill the sight tube, and then **close** TC 3.
 8. **Close** SOV 2, **lift** the gage to proper elevation, and then **close** SOV 1.
 9. Slowly **open** TC 3, when water stops running from the sight tube **record this reading** as the #1 check valve value. **(Must be 1psi or more to pass)**
 10. **Close** TC's 2 and 3 and then **open** SOV 1 to re-pressurize the assembly.
- (#2 CHECK VALVE TEST)**
11. **Move** sight tube from TC 3 to TC 4.
 12. **Move** bleed valve tool and high side hose from TC 2 to TC 3.
 13. **Open** TC 3, then **open** the high side bleed valve to remove air from gage and hose, then **close** high side bleed valve.
 14. **Open** TC 4 to fill sight tube, and then **close** TC 4.
 15. **Lift** gage up to proper elevation, then **close** SOV 1.
 16. Slowly **open** TC 4, when water stops running from the sight tube **record this reading** as the #2 check valve value. **(Must be 1psi or more to pass)**
 17. **Close** all TC's **remove** equipment and fittings.
 18. **Open** SOV 1, and then slowly **open** SOV 2.

PVB (AIR INLET TEST) (Notify Identify Inspect Observe)

1. **Remove** the air inlet canopy and **flush** TC's 1 and 2, (any order)
 2. **(If needed)** Install appropriate fittings on TC's.
 3. **Attach** bleed valve tool and high side hose to TC 2.
 4. **Open** the bypass valve on the gauge, **leave open** for the remainder of the test
 5. **Open** TC 2, then **open** high side bleed valve to remove the air from hose and gauge, then **close** high side bleed valve.
 6. **Close** SOV 2; **lift** gage to proper elevation, then **close** SOV 1.
 6. Slowly **open** high side bleed valve and **watch** both the needle on gage and the air inlet. When air inlet opens **record this reading** as the air inlet value. **(Must be 1psi or more to pass)**
 - 7 **Remove** the high side hose and bleed tool from TC2 to **drain** all the water from the body of assembly. **(Observe and record that the air inlet opened all the way)**
 8. **Close** the high side bleed valve then **close** TC 2.
 9. **Open** SOV 1 to re-pressurize the assembly.
- (CHECK VALVE TEST)**
10. **Attach** bleed valve tool and high side hose to TC 1 then **open** TC1.
 11. **Open** high side bleed valve to remove the air from hose and gauge, then **close** high side bleed valve.
 12. **Lift** gage to proper elevation then **close** SOV 1.
 13. Slowly **open** TC 2. When water stops flowing from TC 2, **record this reading** as the check valve value. **(Must be 1psi or more to pass)**
 14. **Close** TC's, **remove** equipment and fittings.
 15. **Open** SOV 1, and then slowly **open** SOV 2.
 16. **Replace** canopy.

3 NEEDLE VALVE GAUGE TEST PROCEDURES

DC (#1 CHECK VALVE TEST) (Notify Identify Inspect Observe)

1. To flush **open** and **close** all 4 TC's. (any order)
2. (If needed) Install appropriate fittings on TC's.
3. **Attach** sight tube to TC 3.
4. **Install** bleed valve tool and high side hose to TC 2.
5. **Open** the bypass valve on the gauge, **leave open** for the remainder of the test.
6. **Open** TC 2, then **open** the high side bleed valve to remove air from gage and hose, then **close** high side bleed valve.
7. **Open** TC 3 to fill the sight tube, and then **close** TC 3.
8. **Close** SOV 2, **lift** the gage to proper elevation, and then **close** SOV 1.
9. Slowly **open** TC 3, when water stops running from the sight tube **record this reading** as the #1 check valve value. **(Must be 1psi or more to pass)**
10. **Close** TC's 2 and 3 and then **open** SOV 1 to re-pressurize the assembly.

(#2 CHECK VALVE TEST)

11. **Move** sight tube from TC 3 to TC 4.
12. **Move** bleed valve tool and high side hose from TC 2 to TC 3.
13. **Open** TC 3, then **open** the high side bleed valve to remove air from gage and hose, then **close** high side bleed valve.
14. **Open** TC 4 to fill sight tube, and then **close** TC 4.
15. **Lift** gage up to proper elevation, then **close** SOV 1.
16. Slowly **open** TC 4, when water stops running from the sight tube **record this reading** as the #2 check valve value. **(Must be 1psi or more to pass)**
17. **Close** all TC's **remove** equipment and fittings.
18. **Open** SOV 1, and then slowly **open** SOV 2.

PVB (AIR INLET TEST) (Notify Identify Inspect Observe)

1. **Remove** the air inlet canopy and **flush** TC's 1 and 2, (any order)
2. (If needed) Install appropriate fittings on TC's.
3. **Attach** bleed valve tool and high side hose to TC 2.
4. **Open** the bypass valve on the gauge, **leave open** for the remainder of the test
5. **Open** TC 2, then **open** high side bleed valve to remove the air from hose and gauge, then **close** high side bleed valve.
6. **Close** SOV 2; **lift** gage to proper elevation, then **close** SOV 1.
6. Slowly **open** high side bleed valve and **watch** both the needle on gage and the air inlet. When air inlet opens **record this reading** as the air inlet value. **(Must be 1psi or more to pass)**
- 7 **Remove** the high side hose and bleed tool from TC2 to **drain** all the water from the body of assembly. **(Observe and record that the air inlet opened all the way)**
8. **Close** the high side bleed valve then **close** TC 2.
9. **Open** SOV 1 to re-pressurize the assembly.

(CHECK VALVE TEST)

10. **Attach** bleed valve tool and high side hose to TC 1 then **open** TC1.
11. **Open** high side bleed valve to remove the air from hose and gauge, then **close** high side bleed valve.
12. **Lift** gage to proper elevation then **close** SOV 1.
13. Slowly **open** TC 2. When water stops flowing from TC 2, **record this reading** as the check valve value. **(Must be 1psi or more to pass)**
14. **Close** TC's, **remove** equipment and fittings.
15. **Open** SOV 1, and then slowly **open** SOV 2.
16. **Replace** canopy.

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4. **Open** TC 3; **open** bypass valve one turn, and then **open** low side bleed valve to remove air from low side of gauge and **leave open**.
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6. **Close** in this order: SOV 2, high side bleed valve, low side bleed valve and last close the bypass valve. **(Observe and record the apparent reading, must be 5 psi or more to continue)**
7. **Open** the high side bleed valve 1 turn and **leave open**, then **open** the low side bleed valve no more than ¼ turn, when gage reading starts to drop **observe** the relief valve for discharge. When relief valve starts to drip **record this reading** as the relief valve opening point. **(Relief must open at 2 psi or more to pass)**
8. **Close** low side bleed valve. **(#2 CHECK VALVE TEST)**
9. **Attach** the bypass hose to the bypass valve and **open** the bypass valve to remove air from the hose.
10. **Close** the bypass valve and **connect** bypass hose to TC 4, and then open TC 4
11. **Reestablish** the zone, **loosen** the low side hose connection from TC 3, allowing water to flow from TC, and then **tighten** the connection.
12. **Open** bypass valve one turn, if gage reading does not drop to the relief valve opening point **record** the second check as closed tight.

(#1 CHECK VALVE TEST)

13. **Reestablish** the zone, **loosen** the low side hose connection from TC 3, allowing water to flow from TC, and then **tighten** the connection. When gage settles **record this reading** as the differential pressure across check valve #1. **(Reading must be 5 psi or more, and above the relief opening point to pass)**
14. **Close** TC's, remove equipment and fittings. Slowly **open** SOV 2.

SVB (CHECK VALVE TEST) (Notify Identify Inspect Observe)

1. **Remove** the air inlet canopy, **flush** TC and vent valve.
2. (If needed) Install appropriate fitting on TC.
3. **Open** the bypass valve on the gauge, **leave open** for the remainder of the test.
4. **Attach** bleed valve tool and high side hose to TC 1, then **open** TC 1.
5. **Open** high side bleed valve to remove the air from hose and gauge, then **close** high side bleed valve.
6. **Close** SOV 2, **lift** gage to proper elevation and **maintain** gage at this level for the remainder of the test then **close** SOV 1.
7. Slowly **open** and **remove** vent valve screw. When gage reading settles **record this reading** as the check valve holding point. **Watch** the air inlet to see if it opens before the check valve holding point, if the air inlet opens first then also record air inlet opening point). **(Must be 1psi or more to pass)**

(AIR INLET TEST)

8. **Maintain** gage at proper elevation.
9. Slowly **open** high side bleed valve and **watch** both the needle on gage and the air inlet. When air inlet opens **record this reading** as the air inlet value. **(Must be 1psi or more to pass)**
10. **Remove** the high side hose and bleed tool from TC1 to **drain** all the water from the body of the assembly. **(Observe and record that the air inlet opened all the way)**
11. **Close** TC install and **close** vent valve screw, **remove** equipment and fitting.
12. **Open** SOV 1, and then slowly **open** SOV 2. **Replace** canopy.