

3 NEEDLE VALVE GAUGE TEST PROCEDURES

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

1. Open TC's to flush and **leave open**, in this order # 4, #3, #2, #1. Then close TC's in this order #1, #2, #3, #4. **(Open and close TC #2 slowly so relief does not dump)**
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. (Open high side bleed valve slowly so relief valve does not dump)**
6. Close in this order: SOV #2, high side bleed valve, low side bleed valve and then bypass valve. **(Observe and record the apparent reading)**
7. Open the high side bleed valve 1 turn. 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 greater 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 greater, 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, (maintain gage at this level for the remainder of the test)**, 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 air inlet opens then also record air inlet opening point). **(Must be 1psi or greater 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 greater to pass)**
10. Remove the high side hose and bleed tool from TC#1. **Drain all water from the body of assembly. (Observe and record that the air inlet opens all the way)**
11. Close TC and insert and close vent valve screw, remove equipment and fitting.
12. Open SOV #1, and then slowly open SOV #2.
13. Replace canopy.

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

1. Flush TC's #1, #2, #3, #4 in 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, and then close high side bleed valve.
7. Open TC #3 and fill the sight tube, 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 greater to pass)**
10. Close TC's 2 and 3 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 and fill sight tube, 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 greater 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.
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.
7. 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 greater to pass)**
8. Remove the high side hose and bleed tool from TC#2. **Drain all water from the body of assembly. (Observe and record that the air inlet opens all the way)**
9. Close the high side bleed valve then close TC #2.
10. Open SOV #1 to re-pressurize the assembly.

(CHECK VALVE TEST)

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

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

1. Flush TC's #1, #2, #3, #4 in 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, and then close high side bleed valve.
7. Open TC #3 and fill the sight tube, 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 greater to pass)**
10. Close TC's 2 and 3 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 and fill sight tube, 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 greater 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.
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.
7. 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 greater to pass)**
8. Remove the high side hose and bleed tool from TC#2. **Drain all water from the body of assembly. (Observe and record that the air inlet opens all the way)**
9. Close the high side bleed valve then close TC #2.
10. Open SOV #1 to re-pressurize the assembly.

(CHECK VALVE TEST)

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

3 NEEDLE VALVE GAUGE TEST PROCEDURES

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

1. Open TC's to flush and **leave open**, in this order # 4, #3, #2, #1. Then close TC's in this order #1, #2, #3, #4. **(Open and close TC #2 slowly so relief does not dump)**
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. (Open high side bleed valve slowly so relief valve does not dump)**
6. Close in this order: SOV #2, high side bleed valve, low side bleed valve and then bypass valve. **(Observe and record the apparent reading)**
7. Open the high side bleed valve 1 turn. 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 greater 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 greater, 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, (maintain gage at this level for the remainder of the test)**, 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 air inlet opens then also record air inlet opening point). **(Must be 1psi or greater 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 greater to pass)**
10. Remove the high side hose and bleed tool from TC#1. **Drain all water from the body of assembly. (Observe and record that the air inlet opens all the way)**
11. Close TC and insert and close vent valve screw, remove equipment and fitting.
12. Open SOV #1, and then slowly open SOV #2.
13. Replace canopy.