

## 5 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, and loosely attach bypass hose to TC #4.
4. Open TC #3, then open low side bleed valve and **leave open**.
5. Open TC #2, then open high side bleed valve 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, then low side bleed valve. (**Observe and record the apparent reading**)
7. Open the high side control valve 1 turn. (**Leave open for the remainder of the test**) then open the low side control 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 control valve.

#### (#2 CHECK VALVE TEST)

9. Open bypass control valve; bleed air from bypass hose; close the bypass control valve
10. Tighten bypass hose to TC #4 and then open TC #4.
11. Open low side bleed valve to reestablish the zone, then close low side bleed valve.
12. Open bypass control valve one turn, if gage reading does not drop to the relief valve opening point **record** that the second check is closed tight.

#### (#1 CHECK VALVE TEST)

13. Open low side bleed valve to reestablish the zone, then close low side bleed valve. 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.

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

1. Flush TC's #1, #2, #3, and #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 TC #2, then open the high side bleed valve to remove air from gage and hose, then close high side bleed valve.
6. Open TC #3 and fill the sight tube, then close TC #3.
7. Close SOV #2, **lift the gage to proper elevation**, and then close SOV #1.
8. 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**)
9. Close TC's 2 and 3 then open SOV #1 to re-pressurize the assembly.

#### (#2 CHECK VALVE TEST)

10. Move sight tube from TC #3 to TC #4.
11. Move bleed valve tool and high side hose from TC #2 to TC #3.
12. Open TC #3, then open the high side bleed valve to remove air from gage and hose, then close high side bleed valve.
13. Open TC #4 and fill sight tube, then close TC #4.
14. **Lift gage up to proper elevation**, then close SOV #1.
15. 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**)
16. Close all TC's remove equipment and fittings.
17. Open SOV #1, and then slowly open SOV #2.

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

1. Remove the air inlet canopy, flush TC and vent valve, in any order.
2. (**If needed**) Install appropriate fitting on TC.
3. Attach bleed valve tool and high side hose to TC #1, then open TC #1.
4. Open high side bleed valve to remove the air from hose and gauge, then close high side bleed valve.
5. Close SOV #2, **lift gage to proper elevation, (maintain gage at this level for the remainder of the test)**, close SOV #1.
6. 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)

7. Maintain gage at proper elevation.
8. 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**)
9. 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)**
10. Close TC and insert and close vent valve screw, remove equipment and fitting.
11. Open SOV #1, and then slowly open SOV #2.
12. Replace canopy.

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

1. Remove the air inlet canopy and flush TC's #1 and #2, in any order.
2. (**If needed**) Install appropriate fittings on TC's.
3. Attach bleed valve tool and high side hose to TC #2, then open TC #2.
4. Open high side bleed valve to remove the air from hose and gauge, then close high side bleed valve.
5. 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 greater to pass**)
- 7 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)**
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. Open TC#1.
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 greater 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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1. Remove the air inlet canopy, flush TC and vent valve, in any order.
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3. Attach bleed valve tool and high side hose to TC #1, then open TC #1.
4. Open high side bleed valve to remove the air from hose and gauge, then close high side bleed valve.
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1. Remove the air inlet canopy and flush TC's #1 and #2, in any order.
2. **(If needed)** Install appropriate fittings on TC's.
3. Attach bleed valve tool and high side hose to TC #2, then open TC #2.
4. Open high side bleed valve to remove the air from hose and gauge, then close high side bleed valve.
5. 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 greater to pass)**
7. 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)**
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. Open TC#1.
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 greater 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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**(Open high side bleed valve slowly so relief valve does not dump)**
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9. Open bypass control valve; bleed air from bypass hose; close the bypass control valve
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3. Attach sight tube to TC #3.
4. Install bleed valve tool and high side hose to TC #2.
5. Open TC #2, then open the high side bleed valve to remove air from gage and hose, then close high side bleed valve.
6. Open TC #3 and fill the sight tube, then close TC #3.
7. Close SOV #2, **lift the gage to proper elevation**, and then close SOV #1.
8. 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)**
9. Close TC's 2 and 3 then open SOV #1 to re-pressurize the assembly.  
**(#2 CHECK VALVE TEST)**
10. Move sight tube from TC #3 to TC #4.
11. Move bleed valve tool and high side hose from TC #2 to TC #3.
12. Open TC #3, then open the high side bleed valve to remove air from gage and hose, then close high side bleed valve.
13. Open TC #4 and fill sight tube, then close TC #4.
14. **Lift gage up to proper elevation**, then close SOV #1.
15. 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)**
16. Close all TC's remove equipment and fittings.
17. Open SOV #1, and then slowly open SOV #2.