BACKCHECK · BACKFLOW PREVENTION ASSEMBLY TESTER

The Ultimate Backflow Field Test Cheat Sheet

Tape this to the inside of your test kit lid.

1 Field Test Pass Criteria

Every criterion for all four testable assemblies. Three of these numbers live inside a single RP test and belong to different components, which is where most errors come from.

ASSEMBLY	COMPONENT	REQUIREMENT
RP / RPDA	Relief valve	Opens at 2.0 psid or higher
RP / RPDA	Check valve #1	Holds 5.0 psid or higher
RP / RPDA	Buffer	CV1 at least 3.0 psid above the relief point
RP / RPDA	Check valve #2	Tight against backpressure, 1.0 psid
DC / DCDA	Check valve #1	Holds 1.0 psid or higher, drip tight
DC / DCDA	Check valve #2	Holds 1.0 psid or higher, drip tight
DCDA / RPDA	Bypass meter	Registers flow on test cock 4
PVB	Air inlet	Opens at 1.0 psi or higher, opens fully
PVB	Check valve	Holds 1.0 psid or higher
SVB	Check valve	Holds 1.0 psid or higher
SVB	Air inlet	Opens at 1.0 psi or higher, opens fully

Source: USC Manual of Cross-Connection Control field test criteria; AWWA M14

2 Test Cock Positions

Where each test cock sits on a four cock assembly, and which pair straddles which check.

TEST COCK	POSITION	USED FOR
1	Upstream of the number 1 shut-off	Supply pressure
2	Between shut-off 1 and check 1	High side for check 1
3	Between the two checks	Low for check 1, high for check 2
4	Downstream of check 2	Low side for check 2, backpressure

Source: AWWA M14 Appendix B, UF-TREEO field procedures

3 Symptom to First Move

Worked in the order that costs the least. A leaking number one shut-off imitates almost every component failure on this list.

SYMPTOM	CHECK FIRST
Relief valve discharges continuously	Whether it stops when downstream demand stops
Relief valve drips intermittently	Whether a heater or check valve was fitted recently
Relief valve will not open	The number 1 shut-off for leakage
Check reads low but holds	Reset the gauge and read again
Gauge falls straight to zero	Hose positions and needle valves
Needle bounces	Air in the hoses and flow through the assembly
Downstream will not reach atmosphere	The number 2 shut-off and any second feed
Air inlet never opens	The number 1 shut-off for leakage
PVB spits in service	The height above the highest outlet
Readings drift between attempts	Whether the gauge moved

Source: Standard field troubleshooting practice

4 Installation Heights and Clearances

The dimensions checked on arrival, before the gauge comes out. Local code may be stricter.

ITEM	REQUIREMENT
Assembly above grade, minimum	12 in to the bottom of the body
Assembly above grade, maximum	About 30 in to the centre line
PVB above highest downstream outlet	At least 12 in
AVB above outlets	At least 6 in
RP relief discharge	Air gap to atmosphere, never direct
RP in a pit or vault	Not permitted where the port could flood
Air gap, clear of walls	2 x effective opening, minimum 1 in
Air gap, near a wall	3 x effective opening

Source: ASME A112.1.2 for the air gaps, and standard installation practice

5 Hydraulic Conversions

The figures a tester uses on site. The first two cover every gauge elevation and residual pressure question on the exam.

QUANTITY	VALUE
Feet of water per psi	2.31 ft
psi per foot of water	0.433 psi
Feet of water per inch of mercury	1.133 ft
Atmospheric pressure at sea level	14.7 psi
Atmospheric pressure as a water column	About 34 ft
Atmospheric pressure as mercury	About 29.9 in Hg
Gallons per cubic foot	7.48 gal
Weight of water per gallon	8.34 lb
Weight of water per cubic foot	62.4 lb
gpm to cubic feet per second	Divide by 448.83
Usual design velocity ceiling	About 8 ft/s

Source: Standard hydraulics

> **Close the bleeds high first and low last, every time. A failed test never restarts the clock: the assembly stays due until a retest passes.**

Doing this by hand on site?

- All four field test procedures, step by step, with the reason for each step
- RP, DC and vacuum breaker pass or fail, with the 3.0 psid buffer checked
- A test report log with due dates and a printed report for every test
- 576 tester practice questions, free in your browser, and it works offline once opened

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A study and field aid. Your water purveyor's own procedure, report form and criteria govern; check them before you rely on any figure here.