

In Massachusetts, the testing procedure for new or rough-in PVC Drain, Waste, and Vent (DWV) systems is strictly governed by the [Massachusetts Uniform State Plumbing Code \(248 CMR 10.04\)](#). The code requires either a **water (hydrostatic) test** or an **air test** to prove the system is completely watertight and airtight before closing up walls or floors.

Note: While 248 CMR allows air testing, most local inspectors and major pipe manufacturers heavily discourage or prohibit air testing on plastic PVC because compressed air can cause the plastic to violently shatter if a failure occurs. Always verify with your local municipality's inspector.

Method 1: The Water Test (Highly Recommended)

The system can be tested either in its entirety or section-by-section.

1. **Isolate the System:** Insert inflatable test balls or mechanical test plugs at the lowest point of the system (typically where the building drain exits to the sewer or septic line).
2. **Seal Openings:** Tightly cap or plug all fixture stub-outs, floor drains, and cleanout tees using mechanical plugs or test caps. Leave the highest opening (usually the roof vent stack) open.
3. **Fill with Water:** Introduce water slowly from the lowest point or an intermediate fixture box to push trapped air up and out of the stack. Fill the entire system to the point of overflow at the highest vent opening. If testing in sections, water must be filled to a minimum 10-foot head of water above the highest joint in that section.
4. **Hold Period:** Keep the system filled and completely static for a minimum of **15 minutes**.
5. **Inspection:** Conduct a thorough visual inspection of all glued solvent welds, joints, and fittings. The water level must not drop, and there must be no evidence of leakage.

Method 2: The Air Test

If executing an air test, you must use a dedicated testing apparatus equipped with a regulated compressor line and pressure gauge.

1. **Seal All Outlets:** Tightly seal every single entry, exit, and vent stack opening in the PVC system using test plugs.
2. **Pressurize:** Connect the air compressor apparatus to a convenient opening. Force air into the system until a uniform gauge pressure of **5 PSIG** is reached.
3. **Hold Period:** Disconnect or shut off the air supply source. The 5 PSIG pressure must be held completely without adding additional air for **at least 15 minutes**.
4. **Leak Detection:** Check the pressure gauge for drops. To locate micro-leaks, spray a water-and-dish-soap solution onto the PVC joints and look for inflating air bubbles.

Method 3: 5-Step Massachusetts Smoke Test Procedure

The code mandates that specific specialized equipment be utilized and that the system be placed under precise, low-level pressure.

1. **Prime the Traps:** Ensure that every plumbing fixture trap (P-trap) in the building is filled with water. This prevents the test smoke from backing up into the living spaces through normal fixture drains.
2. **Connect the Smoke Injector:** The licensed plumber must use specialized smoke injector equipment designed specifically to generate a heavy, continuous volume of thick smoke. The discharge hose from the machine is extended into a test cap or cleanout plug.
3. **Seal the Injection Point:** All voids and gaps encompassing the hose at the entry point must be completely sealed airtight using plumbing putty or an equivalent sealing compound.
4. **Charge and Pressurize the System:** Smoke is pumped through the DWV lines until the entire system (or the specific section under evaluation) is filled and charged with smoke. Once full, air pressure equivalent to a **1-inch water column (approx. 0.036 PSI)** must be applied and maintained.
5. **Inspect for Defects:** The plumber and the local municipal inspector visually examine the exposed lines. Any crack, failed solvent weld, unglued joint, or physical puncture will immediately reveal itself by discharging distinct plumes of smoke.

EMOND PLUMBING AND HEATING

DRAIN TESTING CHECKLISTS

PVC Sanitary Drain Air Testing Checklist

CRITICAL SAFETY WARNING: Testing PVC piping with compressed air carries an inherent risk of catastrophic brittle failure. PVC pipe can shatter into sharp fragments if it fails under air pressure. **Never exceed 5 PSI.** Ensure all personnel remain clear of the piping network during authorization and pressure loading phases. Use an approved, calibrated low-pressure gauge with an integrated pressure relief valve.

1. Code Regulations & Constraints

- **Pressure Target:** Establish and maintain a uniform pressure of exactly 5 pounds per square inch (PSI).
- **Duration:** The system must hold this pressure statically for a minimum of 15 consecutive minutes without adding air.
- **Gauge Requirements:** Use a 0-10 PSI max gauge (increments no larger than 0.1 PSI) so slight drops are readily visible.

2. On-Site Inspection & Testing Sequence

Phase & Check Item	Target Requirement / Verification Protocol	Status
1. Pre-Test Inspection Solvent Cure Time	Verify all PVC primer and cement joints have fully cured. Wait a minimum of 2 hours at temperatures above 60°F, or 4+ hours if below 40°F.	[] Pass [] N/A
2. Mechanical Bracing Hanger Spacing	Confirm horizontal lines are braced every 4 feet maximum. Secure vertical risers at each floor level to prevent shifting or blowout under pressure.	[] Pass [] N/A
3. System Isolation Plugs & Caps	Seal all fixture connections and stub-outs using expansion plugs or permanent test caps. Cleanouts must be threaded tight. Don not use makeshift seals.	[] Pass [] N/A
4. Pressurization 5 PSI Maximum	Connect a low-pressure air compressor. Introduce air slowly until the gauge reaches exactly 5 PSI. Disconnect or isolate the compressor source feed line.	[] Pass [] N/A
5. Thermal Stabilization Temperature Hold	Wait 5 minutes before starting the official clock. Compressed air changes temperature and drops pressure slightly as it expands into cold pipes.	[] Pass [] N/A
6. The Static Test 15-Minute Monitoring	Set a timer for 15 minutes. The gauge must show zero loss. If the needle drops, spray all fittings with a rich soap-and-water solution to detect bubbling.	[] Pass [] N/A

3. Field Authorization & Sign-Off

Project Name: _____

Test Date: _____

Plumbing Contractor: _____

License Number: _____

Inspector Signature: _____

Pass / Fail Result: [] PASS [] FAIL

* All tubs, condensate stacks and floor drains are part of this inspection

PVC Sanitary Drain Water Testing Checklist

1. Pre-Test Installation Verification

Verification Parameter	Requirement Details & Code Notes	Status
Solvent Cement Cure	PVC primer and cement must be completely cured. Wait at least 2 hours at 60°F+ before filling with water.	☐ Pass
Hanger & Support Spacing	Horizontal PVC lines (3"+ diameter) must be supported every 4 feet. Vertical stacks strapped at each floor.	☐ Pass
Fitting Orientation	Verify correct directional flow fittings: sanitary tees for vertical-to-horizontal transitions only.	☐ Pass
Protection Shields	Steel nail plates installed on all studs and plates where PVC passes within 1.25 inches of the edge.	☐ Pass

2. Hydrostatic Water Test Steps

Step Sequence	Action Item & Execution Details	Completed
1. Isolation & Plugs	Insert inflatable mechanical test balls into the main cleanout where the building drain exits. Inflate to rated PSI.	☐ Yes
2. Secondary Sealing	Cap all fixture rough-in stubs (sinks, toilets, tubs) using threaded test caps or solvent-welded knockouts.	☐ Yes
3. High-Point Filling	Fill the system slowly with water from the highest roof vent stack to allow trapped air to vent naturally.	☐ Yes
4. Head Pressure Target	Fill until water fills to the top of the roof stack, creating a minimum of 10 feet of water head pressure.	☐ Yes
5. Stabilization Period	Let water sit for 15 minutes to allow temperature stabilization and pipe expansion before official monitoring.	☐ Yes

3. Field Inspection & Official Sign-Off

Inspection Point	Defect Criteria & Success Benchmarks	Result
Water Level Hold	The water level at the top of the vent stack must remain completely static for a minimum duration of 15 minutes.	☐ No Drop
Joint Physical Review	Manually inspect every solvent-welded joint, closet flange, and trap arm for sweating, weeping, or active leaks.	☐ Dry
Underground Review	If a slab installation, verify no pooling water or wet mud along unburied under-slab PVC runs.	☐ Dry

Project Name: Plumber:

Test Date:

Inspector Signature:

License Number:

Pass / Fail Result: ☐ PASS ☐ FAIL

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EMOND PLUMBING AND HEATING

DRAIN TESTING CHECKLISTS

PVC Sanitary Drain SmokeTesting Checklist

A PVC sanitary drain smoke test uses non-toxic smoke and a blower to pressurize a building’s Drain-Waste-Vent (DWV) system, pinpointing hidden cracks, unglued joints, or sewer gas leaks.

1. Code Regulations & Constraints

- Notify authorities:** Call the local fire department and monitoring agencies to prevent false alarms.
- 2. Alert occupants:** Inform all building occupants of possible smoke and to stay out of the testing zone
- 3. Position crew:** Place at least one spotter inside the building and one on the roof.

2. On-Site Inspection & Testing Sequence

Phase & Check Item	Target Requirement / Verification Protocol	Status
1. Pre-Test Inspection Solvent Cure Time	Verify all PVC primer and cement joints have fully cured. Wait a minimum of 2 hours at temperatures above 60°F, or 4+ hours if below 40°F.	[] Pass [] N/A
2. Mechanical Bracing Hanger Spacing	Confirm horizontal lines are braced every 4 feet maximum. Secure vertical risers at each floor level to prevent shifting or blowout under pressure.	[] Pass [] N/A
3. System Isolation Plugs & Caps	Seal all fixture connections and stub-outs using expansion plugs or permanent test caps. Cleanouts must be threaded tight. Don not use makeshift seals.	[] Pass [] N/A
4. Pressurization 1" W.C. Maximum	Connect a high-capacity smoke blower. Introduce smoke slowly until the gauge reaches 1-inch water column.	[] Pass [] N/A
5. The Static Test 15-Minute Monitoring	Set a timer for 15 minutes. The gauge must show zero loss. If the needle drops, continue inspecting for leaks until resolved.	[] Pass [] N/A

3. Field Authorization & Sign-Off

Project Name: _____

Test Date: _____

Plumbing Contractor: _____

License Number: _____

Inspector Signature: _____

Pass / Fail Result: [] PASS [] FAIL

* All tubs, condensate stacks and floor drains are part of this inspection