

Plastic PVC Gas Flue Pipes – How “Good” Are They?

Here is a detailed analysis of the use of plastic PVC and ABS pipes for gas venting, alongside the newer manufacturer and code requirements that have dramatically reshaped the industry.

The Origin of Plastic Venting in Heating

The introduction of high-efficiency, condensing gas appliances (Category IV furnaces, boilers, and water heaters) fundamentally changed how exhaust gases are vented. Unlike older appliances that sent incredibly hot exhaust up a metal chimney, high-efficiency units extract so much heat during combustion that the exhaust gas is relatively cool. However, this cooler exhaust produces condensation that is highly acidic and corrosive to standard galvanized metal.

To solve the corrosion problem, manufacturers and installers turned to readily available, inexpensive plastic drain, waste, and vent (DWV) plumbing pipes—specifically standard Schedule 40 PVC and ABS.



How "Good" Are Standard PVC and ABS Gas Flue Pipes?

The short answer is: **Standard plumbing-grade PVC and ABS are not good or inherently safe for flue gas venting.** While they successfully resist acidic corrosion, they were never engineered to carry toxic, heated combustion gases.

Using standard plumbing plastics for gas venting presents several severe safety and performance issues:

- **Temperature Vulnerabilities:** Standard DWV PVC is typically rated for a maximum fluid handling temperature of **140°F**, and ABS is rated for **160°F**. While a new, perfectly operating high-efficiency furnace might output exhaust within these limits, equipment degrades over time. If a water heater scales up or a furnace filter severely clogs, exhaust temperatures can easily spike to 160°F–200°F+.
- **Structural Failures:** Prolonged exposure to elevated exhaust temperatures causes standard plumbing PVC and ABS to soften, sag, and warp. Joints can pull apart, and the pipe itself can suffer from stress cracking or melting.
- **The Cellular Core Problem:** Many older installations utilized "foam core" or "cellular core" ABS and PVC. The heated exhaust gases can distort the inner wall of the pipe, eventually causing the pipe to rot from the inside out.
- **The Safety Threat:** When a flue pipe sags, condensate pools inside the pipe, potentially blocking the exhaust and causing the furnace to shut down. Worse, if the pipe cracks or a glued joint fails, odorless, lethal carbon monoxide (CO) gas is released directly into the living space.

Because of these inherent dangers, the piping industry explicitly states that ASTM-certified plumbing pipes are intended for *fluid handling only* and do not endorse their products for venting combustion gases.

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The Paradigm Shift: UL 1738 and ULC S636

Recognizing the dangers of using unrated plumbing pipes, safety organizations stepped in.

- In Canada, the **ULC S636** standard was adopted to regulate plastic gas venting.
- In the United States, the National Fuel Gas Code (NFPA 54 / IFGC) updated its language to recognize the **UL 1738** standard for venting Categories II and IV gas-burning appliances.

Under these modern codes, plastic vent pipes must undergo rigorous testing (handling extreme temperature spikes, UV light exposure, joint load tests, and impact resistance) that standard plumbing PVC cannot pass.

Newer Manufacturer & Code Requirements for Plastic Flue Pipes

Modern codes and appliance manufacturers have moved away from standard DWV plastics. If a system uses plastic venting today, it must adhere to strict new requirements.

1. The Phase-Out of ABS and Foam Core

- **Cellular Core Ban:** Cellular/foam core PVC and ABS are now universally prohibited for flue gas venting across modern codes.
- **The End of Field-Supplied ABS:** Standard ABS plumbing pipe is largely phased out for new flue installations. While some appliance manufacturers may include a specific, proprietary ABS component integral to the appliance collar, any field-supplied piping run through the house must be a certified vent material.

2. Mandatory Use of Certified Materials (Engineered Plastics)

Installers must now use engineered plastics specifically formulated for flue gases, categorized by their temperature resilience:

- **Engineered PVC (UL 1738 / ULC S636 Certified):** Specially formulated solid-wall PVC rated for flue gases up to **149°F**.
- **Engineered CPVC:** Formulated for higher heat resistance, suitable for flue gases up to **190°F**.
- **Polypropylene (PP):** Increasingly the industry standard (often mandatory in Europe and gaining immense traction in North America). PP is highly resistant to chemical corrosion and can withstand flue gas temperatures up to **230°F**.

3. "System" Certification and Zero Mixing

- **Complete System Mandate:** You can no longer buy pipe from one brand, fittings from another, and generic plumbing cement. Under UL 1738 and ULC S636, the pipe, fittings, and joining cements are tested and certified together as a **single system**.
- **No Mixing:** Mixing components or solvents from different manufacturers instantly voids the safety certification and violates building codes.

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4. Strict Labeling and Visual Identification

- Certified plastic flue pipes cannot look like standard plumbing pipes. They must feature distinct warning labels, dual continuous print lines (180 degrees apart) stating they are for "Gas Venting," and certification stickers on fittings. They are often manufactured in black or grey to distinguish them from white plumbing PVC.



5. Retrofit and Replacement Mandates

- In jurisdictions operating under standards like ULC S636, there are strict replacement laws. If a homeowner replaces an old high-efficiency water heater or furnace, the installer **cannot** connect the new appliance to the home's existing, uncertified ABS or plumbing-grade PVC venting.
- The entire existing uncertified plastic vent run must be ripped out and replaced with a certified UL 1738 / ULC S636 system. (Exceptions are only granted via strict variances if the vent is physically inaccessible, requiring extensive pressure testing of the hidden pipe).


Sources

 The Master Group

www.master.ca

Plastic: Myths, Realities and Responsibilities - The Master Group

CONDENSING APPLIANCES AND FLUE GAS TEMPERATURE. Unlike standard or mid-efficiency appliances, condensing appliances must cool the flue gas to recover the ...

 Technical Safety BC

www.technicalsaftybc.ca

Directive: Plastic venting | TSBC

This requirement was put in place several years ago due to the investigated failures in a number of existing plastic gas venting systems throughout Canada, ...

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