System1738™ FLUE GAS VENTING

The New Standard in Life Safety

MEETING STANDARDS

Homeowners are exposed to the possibility of a life safety hazard every day, and their safety is in your hands. Historically, the plumbing and HVAC industry has not nationally regulated the use of plumbing pipes and accessories used for thermoplastic Flue Gas Venting (FGV) installations. Currently, the use of plumbing Schedule 40 Solid Wall or Foam Core Drain, Waste, and Vent (DWV) pipe and fittings are allowed if they are referenced as options in the appliance installation instructions. These systems do not meet the UL 1738 safety standard for venting one of the most dangerous and silent killers: carbon monoxide. Take the time to read this article, familiarize yourself with the safety facts, and help families in your community remain safe.

The Code Change and Better Venting Option

The use of plastic venting systems on gas fired water heaters, furnaces and boilers has undergone a significant change. The NFPA 54-18 and IFGC-18 Fuel Gas Codes now recognizes the UL 1738 venting standard across the United States.

Flue Gas Venting (FGV) systems are used to safely remove lethal combustion gases, namely carbon monoxide, generated by gas burning appliances from homes and businesses to the outdoors. Because venting systems provide this essential safety feature, they must be built, installed and maintained to the appropriate standard for this specialized function. The UL 1738[1] standard consists of stringent requirements for nonmetallic venting systems intended for venting categories II and IV Gas Burning Appliances. IPEX has engineered a piping system that meets this rigorous FGV standard – System 1738®.

The safety concern today is in the use of plumbing drain, waste, and vent (DWV) products in FGV applications. These products were never intended to be used in FGV applications, but they have been chosen because they are often the least expensive materials available. Several manufacturers of these products have stated time and again that these products are not suitable for FGV. These products do not meet the key performance requirements nor most of the material requirements of UL 1738. Simply put, Plumbing DWV products are not designed to meet the life safety standards of FGV applications.

System 1738® Physical Properties and Conformity to UL 1738

This chart reflects only a selection from the list of conditioning and test requirements in UL 1738.

UL 1738 Section Reference	Description	System 1738
Section 40 Conditioning for Physical Properties Test	• Elevated temperature conditioning	✓
	• Light and water conditioning	✓
	• Condensate conditioning	✓
Section 42 Polymeric Material - Physical Properties Test	• Tensile strength	✓
	• Impact	✓
	• Pipe deflection, resistance & stiffness	✓
	• Flammability	✓

ASTM Standards vs. UL 1738

Currently, the use of thermoplastic plumbing products are referenced in the ANSI Z21 appliance standards as being suitable materials in FGV applications; provided that, they comply with specific ASTM standards and are certified by the appliance manufacturer as an approved option for venting. However, these ASTM Standards are for fluid handling applications only. For example, ASTM D1785-15 is a standard for pressure rated Schedule 40, 80, and 120 PVC pipe intended for use with distribution of pressurized liquids only. In fact, the 2015 standard states: "This standard specifies dimensional, performance and test requirements for plumbing and fluid handling applications only. It does not include provisions for the use of these products for venting of combustion gases. UL 1738 is a standard that does include specific testing and marking requirements for flue gas venting products, including PVC." ASTM D1785-15 Standard reference.

Plumbing Product Standard vs. FGV Installation

Standards	Description	ABS Foamcore	ABS	PVC Foamcore	PVC	PVC DWV	System 1738®
ASTM D1785	Schedule 40, 80 and 120 PVC, Pressure Rated for Water				✗		
ASTM D2665	PVC Drain Waste Vent (DWV) Pipe & Fittings					✗	
ASTM F891	PVC Pipe with a Cellular Core for Non Pressure			✗			
ASTM D2241	PVC Pressure Rated Pipe - SDR Series				✗		
ASTM D2661	ABS Schedule 40 Pipe and Fittings		✗				
ASTM F628	ABS DWV Schedule 40 Pipe with a Cellular Core	✗					
UL 1738	Vent Systems for Gas-Burning Appliances Categories II and IV						✓

✗ Not Recommended or warranted in a FGV installation | ✓ Recommended and warranted in a FGV installation
(ASTM Standards are for liquid handling applications only)

UL 1738 Standard Requirements

For peace of mind, choose UL 1738 certified products that include specific testing and marking requirements for FGV applications. To be certified to this standard, System 1738 underwent extensive material and system performance testing to meet appliance venting requirements.

In addition, part of the certification process included formal approval of all installation instructions and special marking and labeling requirements for pipe, fittings, and cement.

System 1738 pipe, fittings and cement have been certified as a system. It is important to note that different manufacturers have different joint systems and or cements. UL 1738 stipulates: Do NOT mix pipe, fittings or joining methods from different manufacturers. DO NOT use other IPEX products not listed in the System1738 brochure. This will result in unsafe conditions and will void certification and warranty.

Meeting the UL 1738 standard ensures that System 1738 is suitable and safe for FGV applications intended to vent categories II and IV Gas Burning Appliances.

Section	System Performance Test Requirements	UL 1738	Section	Material Conditioning & Test Requirements	UL 1738
19	Temperature Structure	✓	40.2	Elevated Temperature Conditioning	✓
22.4	Joint Load	✓	40.3	Light and Water Conditioning	✓
28	Vent Sag	✓	40.4	Condensate Conditioning	✓
29	Puncture	✓	42.2	Tensile	✓
35	Joint Tightness	✓	42.3	Impact	✓
37	Low Temperature Handling	✓	42.5	Flammability	✓
42.4	Crush Resistance and Stiffness	✓	43.1	Heat Deflection Temperature	✓

This chart reflects only a selection from the list of UL 1738 conditioning and test requirements.

✓ System 1738® meets all requirements listed above

Q&A

Why Specify UL 1738?

Saving Lives

FGV is a life safety application and UL 1738 is a specific standard that qualifies the use of metallic or nonmetallic products specifically manufactured for FGV applications.

System 1738 is the first engineered PVC system that fully meets the UL 1738 standard including material requirements, system performance, and installation requirements.

In Massachusetts, the Town of Danvers prohibits the use of DWV products for FGV applications. This is a result of reported instances of plumbing DWV piping systems failing in the field. It has therefore been determined, that the use of these plumbing DWV piping systems for FGV applications is no longer a safe practice. Only UL 1738 listed products for FGV applications are now acceptable.

The following note is issued by the Town of Danvers with every gas permit for boilers, furnaces and water heaters.

a. Standard schedule 40 PVC is NOT permitted for use as a material to vent products of combustion for furnaces, boilers and water heaters (see ASTM D-1785 requirements prohibiting this usage).

b. UL 1738 (listed) venting material (i.e. Polypropylene, CPVC and PVC Schedule 40) is acceptable.

Norman St. Hilaire, Jr., Plumbing and Gas Inspector for the Town of Danvers states, "Using UL 1738 certified venting products is key, it's important to use a Flue Gas Venting system approved for the application, it's all about peace of mind for the contractor and the customer."

The use of correct building materials for any job is essential; for a Flue Gas Venting installation it mitigates risk as it is a matter of life or death. It is particularly important that the appropriate FGV piping system be used to ensure poisonous gases such as carbon monoxide is properly exhausted.

In Canada, the gas code adopted the ULC S636 standard for nonmetallic FGV systems, and IPEX responded with System 636®, a venting system that meets the material requirements, performance standards, installation and safety requirements of ULC S636. The code adaption of ULC S636 certification was prompted by the Canadian safety authorities due to identified failures in a number of existing plastic flue gas venting systems. This code change has made a positive impact on the safety of flue gas venting in Canadian homes and businesses. Since 2007, inspectors have been able to confidently verify, in nonmetallic systems, that the critical standards for life safety and installation have been met.

When FGV products are used that don't meet the code, the results can be deadly.

The US Environmental Protection Agency (EPA) website states: "Carbon monoxide (CO) can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues. At extremely high levels, CO can cause death."[2] Failed venting of gases from burning fossil fuels can result in raised levels of CO and tragedy.

In the years from 1999 to 2010, unintentional carbon monoxide poisoning caused 5,149 deaths in the United States. That's an average of 430 deaths per year.[3] Poor venting may contribute to these statics. For added peace of mind, when it comes to the safety of families and workers, it makes sense to use a FGV piping system that meets and is certified to the UL 1738 safety standard.

System 1738® meets the Safety Standard

Shouldn't the product that is installed in your community meet the standard?

Available Product Support & Training

IPEX offers detailed installation instructions, training on proper solvent welding, and onsite assistance to ensure the integrity of your next FGV system and its safety features.

Contact IPEX for details. system1738.com | ipexna.com | 800.463.9572

[1] **Standard UL 1738**

3.4 CATEGORY II APPLIANCE – An appliance that operates with a non-positive vent static pressure and with a flue loss less than 17 percent in accordance with the Standard for Gas-Fired Central

Furnaces (except Direct-Vent Central Furnaces), ANSI Z21.47.

3.5 CATEGORY III APPLIANCE – An appliance that operates with a positive vent static pressure and with a flue loss not less than 17 percent in accordance with the Standard for Gas-Fired Central

Furnaces (except Direct-Vent Central Furnaces), ANSI Z21.47.

3.6 CATEGORY IV APPLIANCE – An appliance that operates with a positive vent static pressure and with a flue loss less than 17 percent in accordance with the Standard for Gas-Fired Central Furnaces (except Direct-Vent Central Furnaces), ANSI Z21.47.

[2] **US Environmental Protection Agency website, Carbon monoxide (CO) can cause harmful health effects.**
Available at http://www3.epa.gov/airquality/carbonmonoxide/health.html

[3] **National Vital Statistics System. Mortality public use data files, 1999–2010.**
Available at http://www.cdc.gov/nchs/data_access/vitalstatsonline.htm

IPEX
by aliaxis

system1738.com | ipexna.com | 800.463.9572