

Venting Condensing Appliances with Polypropylene Pipe: Part 1



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Over the last 10–15 years, installing high efficiency gas-fired condensing appliances has become quite common in residential and light-commercial applications. The industry has been moving towards higher efficiency products and utility companies have and will continue to offer rebate incentives to their customers to adopt this technology.

Question: *What makes these appliances more efficient than the boilers and furnaces that are being replaced?*

Answer: *They intentionally condense the flue products that are created during the combustion process.*

When a gas boiler or furnace is

firing, the flame that is produced through the process called “combustion” passes through the heat exchanger. The other side of the heat exchanger is either air (if a furnace) or water (if a boiler), which absorbs this heat through conduction. The flue gases, which are the result of this combustion, are then vented out of the appliance through the vent piping (B-vent or a chimney), out of the building and into the atmosphere. The flue gases are hot enough that they remain in their gaseous state until they exit the building. It is this temperature of the flue gases that impacts the stated efficiency of the appliance.

As energy prices have become more of a factor all over the world,

the heating industry has been looking for higher efficiency-rated appliances that will allow the consumer to *get more bang for their buck*. The manufacturers modified the design of their heat exchangers so that they could condense the hot flue gases that normally would pass through the vent system and out to the atmosphere. By condensing the gases (changing the flue products from a gas to a liquid), latent heat is released, which increases the efficiency of the appliances up to an additional 10%! When these flue products turn back to condensate (a liquid), the liquid is very acidic and corrosive, which is why most appliance manufacturers have chosen stainless steel as the material to use when designing and building their heat exchangers.

Venting materials

Not all of the flue gases will condense while in contact with the heat exchanger and will enter into the venting system. The industry quickly learned that the traditional vent materials (B-vent, masonry and clay chimneys) could not withstand the acidic nature of the condensate. Manufacturers then started looking for other materials to use that would withstand the corrosive condensate. Stainless steel vent pipe was an obvious choice, but also quite expensive. Plastic pipe was the other option that the industry selected as an alternative to handle the acidic condensate. The plastics included pipes made of polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC) and polypropylene (thermoplastic polymer, PP). They are all classified as plastic pipe but each one has its own characteristics based upon its chemical makeup.

North American appliance manufacturers immediately adopted

PVC, CPVC and stainless steel as their suggested vent pipe materials for their condensing products. PVC became the more popular vent pipe material of choice because it was the least expensive and readily available. In addition, every wholesaler in the plumbing and heating business had it in their inventory. Besides, plumbers were already accustomed to using it for most of their plumbing jobs.

Europe decided to go in a different direction. They chose polypropylene for their venting material to handle the flue gases for condensing boiler installations. One big difference to point out is that the polypropylene vent pipe was manufactured for one purpose—to vent the flue gases from these condensing appliances. The manufacturers engineered the vent pipe to be assembled as a complete venting system—from the appliance all the way to the termination. The manufacturers in Europe never considered using the other plastic piping (PVC or CPVC) to vent the condensing flue gases.

As European boiler manufacturers gained market share in the North-east, and the condensing boiler market developed due to rising energy costs and rebate incentives offered by the utilities for higher efficiency appliances, polypropylene manufacturers decided to enter the North American market. Realizing that most contractors and wholesalers didn’t know who or what polypropylene piping was, the manufacturers needed to establish some credibility with their product. They approached Underwriter’s Laboratories (UL) and asked to test their highest venting standard in the U.S. UL1738 is considered to be the most stringent safety testing standard in the U.S.

In our next issue, we will discuss how this polypropylene venting system actually works, the benefits of using this type of venting system and answer some of the frequently asked questions about why gaskets (instead of glue) are used to seal each joint.

If you have any questions or comments, e-mail gcarey@fiainc.com, call 800-423-7187 or follow me at [@Ask_GCarey](https://twitter.com/Ask_GCarey) on Twitter. **ICM**