Diagnosing and Curing Sewer or Septic Odors Caused by Building Drains

- How to diagnose septic or sewer odors coming from building drain piping
- How to prevent or cure sewer gas odors from septic systems, building plumbing, & other causes
- Sewer gas smell diagnosis - plumbing checklist
- Septic gas smell diagnosis - septic system checklist

This page describes how to diagnose, find, and cure odors in buildings caused by leaks or other defects in the building drains or sewer line - leaks that make sewage smells or sewer gas smells or "gas odors" in buildings with a focus on homes with a private onsite septic tank but including tips for owners whose home is connected to a sewer system as well. What makes the smell in sewer gas? Sewer gases are more than an obnoxious odor.

Because sewer gas contains methane gas (CH₄) there is a risk of an explosion hazard or even fatal asphyxiation. Sewer gases also probably contain hydrogen sulfide gas (H₂S) In addition some writers opine that there are possible health hazards from sewer gas exposure, such as a bacterial infection of the sinuses (which can occur due to any sinus irritation).

Depending on the sewer gas source and other factors such as humidity and building and weather conditions, mold spores may also be present in sewer gases. We discuss plumbing vents as sources of sewer gas odors separately at Plumbing Vent Defects. We discuss plumbing fixtures, such as loose toilets, as sources of sewer gas odors separately at PLUMBING FIXTURE TRAPS. Also see CLOGGED DRAIN DIAGNOSIS & REPAIR, Drain Noises (gurgling drains means bad vent piping or clogged drains).

Citation of this article by reference to this website and brief quotation for the sole purpose of review are permitted. Use of this information at other websites, in books or pamphlets for sale is reserved to the author. Technical review by industry experts has been performed and is ongoing - reviewers welcomed and are listed at References.

© Copyright 2011 InspectAPedia.com, All Rights Reserved. Information Accuracy & Bias Pledge is at below-left. Use page top links to major topics or use links at the left of each page to navigate within topics and documents at this website. Green links show where you are in a document series or at this website.
Check for a cap left off of a sewer line cleanout:

Our client is pointing out an open sewer line in the basement of a home she was purchasing. The cap had been left off of a cleanout port where main waste line exited the building.

We suspected more trouble than just an open drain cleanout permitting sewer gases to leak into the basement. Because this "work" appeared to have just been performed, right before our property inspection, we wondered if someone had been asked to attempt to clear a blocked connection between the building sewer line and the community sewer (or private septic system).

Inspect the building drains and gas lines for leaks: Plumbing drains and traps may smell regardless, as they are usually a reservoir for organic debris.

Remember that a building drain can be leaking inside of a wall or ceiling cavity without showing up as a wet spot or mold.

But if you notice a sewer gas smell particularly at one or more plumbing drains, the fixture may not be properly vented.

If the plumbing fixture or drain "gurgles" or makes funny noises when it is draining, or if you hear gurgling noises at some fixtures, say a sink or tub when nearby fixtures are draining, we would certainly suspect that the fixture is not well vented or may not be vented at all.

If you suspect that odors are due to a problem with the building drains but you cannot find a drain line leak or an open drain cleanout cover, take a look at CLOGGED DRAIN DIAGNOSIS & REPAIR.

The sewer gas odor may be coming not from a wet building drain (discussed just above) but from the dry or vent portion of a building's drain-waste-vent system. We discuss plumbing vents as sources of sewer gas odors separately at Plumbing Vent Defects.

Other Sources of Sulphur Odors & Sewer Gas Smells in Buildings may Include Chinese Drywall

CHINESE DRYWALL HAZARDS discusses Chinese drywall odors, sulphur smells, and corrosive outgassing hazards in buildings. Major costs to remove this product, repair or replace electrical wiring, plumbing, and HVAC components may be involved, and there may be immediate safety hazards due to damaged smoke detectors or carbon monoxide detectors in buildings where Chinese drywall outgassing has caused damage.
Plumbing Vent System Problem Detection & Repair - Drain Noises, Gas Smells & Septic Tank Odors

- How to inspect the plumbing vent system to find leaks and sewer gas or septic gas odor sources
- How to prevent or cure sewer gas odors from septic systems, building plumbing, & other causes
- Sewer gas smell Septic gas smell diagnosis - plumbing checklist

Our site offers impartial, unbiased advice without conflicts of interest. We will block advertisements which we discover or readers inform us are associated with bad business practices, false-advertising, or junk science. Our contact info is at InspectAPedia.com/Contact.htm.

This page describes how to examine the building’s plumbing vent system piping and connections in order to diagnose, find, and cure odors in buildings including septic or sewage or sewer gas smells or plumbing drain and fixture noises that may appear indoors or outside. Here we list common causes of plumbing problems related to improper plumbing vents.

We describe how to track down and correct these "gas odors" in buildings with a focus on homes with a private onsite septic tank but including tips for owners whose home is connected to a sewer system as well. What makes the smell in sewer gas? Sewer gases are more than an obnoxious odor. What causes that gurgling noise in a sink, tub or shower drain, and why do some fixtures "gurgle" when a toilet is flushed nearby? Here are the answers. Our page top sketch of a plumbing stack vent and other sketches included below are provided courtesy of Carson Dunlop.

At PLUMBING DRAIN VENTS we explain the basics of proper plumbing vent piping and how errors cause trap siphonage, odors, and noises. We discuss how to diagnose and cure drain sounds (gurgling, bubbling, smells, and poor drainage) at PLUMBING DRAIN NOISE DIAGNOSIS (gurgling drains means bad vent piping or clogged drains)

Other advice about controlling plumbing noises in buildings is at SOUND CONTROL for PLUMBING. More details about plumbing drain line venting can be found at PLUMBING VENT DEFINITIONS & TYPES, also PLUMBING VENT DEFECTS & NOISES and at CLOGGED DRAIN DIAGNOSIS & REPAIR. We discuss plumbing fixtures, such as loose toilets, as sources of sewer gas odors separately at PLUMBING FIXTURE TRAPS.

© Copyright 2011 InspectAPedia.com, All Rights Reserved. Information Accuracy & Bias Pledge is at below-left. Use page top links to major topics or use links at the left of each page to navigate within topics and documents at this website. Green links show where you are in a document series or at this website.

Plumbing Vent Piping Defects May Cause Drain Noises or May Release Dangerous Sewer Gas Odors Indoors
Plumbing drain or sewer gas odors: If you smell sewer gases in your building conditions could be dangerous (risking a methane gas explosion) or unsanitary. Also see Remedies for Sewer Odors and see ODORS & SMELLS DIAGNOSIS & CURE for advice on finding the source of smells or odors in buildings.

Because sewer gas contains methane gas (CH4) there is a risk of an explosion hazard or even fatal asphyxiation. Sewer gases also probably contain hydrogen sulfide gas (H2S) In addition some writers opine that there are possible health hazards from sewer gas exposure, such as a bacterial infection of the sinuses (which can occur due to any sinus irritation).

Depending on the sewer gas source and other factors such as humidity and building and weather conditions, mold spores may also be present in sewer gases. Also see Wet Weather or Cold Weather Septic Odors or Sewage Odor Diagnosis & Repair Guide for additional odor tracing and cure advice for odors occurring during wet or cold weather.

Plumbing drain or fixture noises: Other advice about controlling plumbing noises in buildings is at DRAIN NOISES and at SOUND CONTROL for PLUMBING.

**Missing, inadequate, or improperly installed drain-waste-vent (DWV) piping** in the building: sometimes a building drain system has inadequate or missing plumbing vents. We list a variety of plumbing vent defects in this article. Our first photo (below left) below shows our client observing a very questionable plumbing vent on a new house. The vent is so far from vertical that we wondered if it had been connected to anything inside, and even if it was, we took this detail to suggest work by someone who lacked proper training - so we were alert for other plumbing defects in the building.

Plumbing vents outside but by a window or door: Just as is shown in the second photograph (above right), plumbing vents which terminate outside but right next to an upper story window permit sewer gas entered the room when the window is open.
**Plumbing vents which have been accidentally closed off or blocked:** some plumbing vents include a screen which can slide down, closing off the vent and causing sewer gas backups in the building. We've also found plumbing vents blocked by wasp nests, birds, and once even a frog. Our photos above show how we simply raised the screen back up to open an old sheet-metal vent.

**Leaking plumbing vent system piping:** check that all of the pipe connections in the building's plumbing vent system have been properly made and sealed. Particularly with plastic piping it's possible for an installer to push vent pipe sections together while forgetting the glue.

![Image of a 2010 InspectAPedia.com photo showing a plumber raising a screen to open a vent](© 2010 InspectAPedia.com)

**Our plumbing vent stack leak** photographs above and just below show a hidden plumbing vent leak in a building wall cavity - exposed by drywall removal during an odor investigation, courtesy of reader Cheryl Lidawer, show what happens when plumbing vent pipe connections are not properly made. In this case the installer coated the pvc vent pipes with primer but not glue, then assembled them.

After lots of detective work and difficulties tracking down sewer gas odors in this home, the owners found multiple sewer gas leaks including the one shown in the two photos above, inside of the building wall cavity. The defective vent piping and sewer gas leaks were discovered by pressure-testing the plumbing drain-waste-vent system.

![Image of a 2010 InspectAPedia.com photo showing a plumbing vent leak in a building wall cavity](© 2010 InspectAPedia.com)

Troubles and mistaken sewer gas odor-sources along the way to finding this plumbing vent sewer gas leak problem included

- **a red-tagged gas-fired heating furnace** (people thought the odor was due to the heating system - an apparent mistake since odors persisted when the heating system was not running)
Suspecting odors traveling through heating air ducts - was sewer gas or LP gas leaking into the duct work?

suspicions of a chimney problem - was there back-drafting into the gas fired heater?, and finally

visual discovery of open plumbing vents in the building attic (photo above left - that gray pipe stub at center of the photo ends with a saw cut and you can see staining on nearby wall surfaces), and more

Confusion about odor and plumbing error responsibility among multiple contractors.

Clues surrounding this problem included visual evidence of inexperienced or untrained workers such as the extensive use of mixed PVC/ABS plastic vent and drain piping in an older home. While modern glues can secure PVC to ABS plastic, in older homes, before such adhesives were available, a mix of black ABS and white PVC drain waste vent piping often meant leaks due to incompatible glues. Don't assume mixed plastic piping is properly secured.

When you find evidence of un-trained workers having been part of the construction team, remember to be alert for other improper or even unsafe conditions such as this unsafe electrical wiring found in the same building attic as the chopped off plumbing vent pipe.

- Because a plumbing vent is passing only sewer gas, not liquid waste that causes a drain not to function, no one notices that it's leaking into the building until there is an odor complaint, the pipe falls apart (which may never happen), or there is a sewer gas explosion.

An experienced plumber may spot a loose vent piping correction quickly, especially in an attic or basement. It helps if you've already traced the sewer gas smell to its strongest location.

- Pressure test the vent piping or drain piping systems: It is also possible to perform a pressure test of the vent piping system or the drain piping system - a procedure which will diagnose for sure whether or not the plumbing vent system is leaking sewer gas. A plumber installs seals at appropriate locations and pressurizes the piping to check for leaks. [Thanks to J.V. for this detail.] In the Lidawer sewer gas odor diagnosis case described just above, pressure testing the plumbing system disclosed un-glued drain-waste-vent piping joints.

Missing plumbing vents: I've seen systems with no vents at all - which often leads to sewer gases reentering the building through sink and shower traps.

Plumbing vents which are too short in their above-roof projection can be blocked by snow and ice in freezing climates.
• **Plumbing vents which are blocked by ice** freezing inside the vent line: in freezing weather if a lot of water vapor is passing up the vent line, for example from long steamy showers or perhaps from a hot water fixture left running or leaking into the drain system, frost can form in the vent piping where it passes through a cold attic and outside. When the frost becomes heavy enough it can block the plumbing vent system completely.

In freezing climates, check that a plumbing vent is not being blocked by frost or by snow-cover. Waste line sounds heard in piping or at plumbing fixtures, such as "drain gurgling" or "glub glub" sounds, or similar noises may indicate defective or clogged plumbing. We discuss how to diagnose and cure drain sounds at Plumbing Drain Noises, and we discuss diagnosing sewer gas odors in cold weather further at Diagnosing Sewer Odors.

• Remedies for sewer gas odors are discussed at Remedies for Sewer Odors. Also see Wet Weather or Cold Weather Septic Odors or Sewage Odor Diagnosis & Repair Guide

**Transite pipe plumbing vents** - an cement-asbestos material, can become delaminated and clogged with age, blocking the plumbing vent system. See Transite Pipes, Chimneys & Flues [Photograph courtesy of Roger Hankey].

**Plumbing vents terminating indoors**: We sometimes find plumbing vents which terminated in the house attic rather than being vented outside.

The plumber didn't want to cut the hole in the roof, perhaps because she didn't have the proper tools, ladder, or roof vent flashing at hand.
We've also found plumbing vent lines that had been cut indoors where a fixture was removed or moved, leaving an open vent line that should have been capped or sealed.

Check for blocked building plumbing vents such as a vent blocked by an insect nest, birds nest, or even a dead animal. Incidentally, a dead animal anywhere in a building might be mistaken for a sewer gas smell as the animal decays. Live animals can block a plumbing vent too.

We found a live frog in one building plumbing vent, right at the rooftop, as shown in this photo!

In freezing climates, check that a plumbing vent is not being blocked by frost or by snow-cover. See Cold Weather Septic Odors or Sewage Odor Diagnosis.