waterless urinals

what are they?

They're urinals that use no water to flush away urine. They're becoming more common in public buildings such as offices, stadiums, bars, hotels etc. They can also be installed domestically, although this is less common.

In a flush urinal, the U bend of continually-replenished water prevents smells from the sewer getting into the room. Water also cleans the fitting after use. So, these two objectives must be achieved by the waterless urinal technology.

Basic urinal

There are some off-grid applications where a basic urinal with no trap can be installed at a campsite or an allotment (see picture). This unit has a vent flue that gets the odours out of the room. Urine is taken away via a drain pipe.

Retrofit cartridges

Flush urinals can be retrofitted and made waterless by inserting a cartridge / some sort of one-way valve that allows urine to pass though and then closes to keep out smells. This type of product can be attractive in the short term as the installation does not require the urinals to be changed. Some have active enzymes that claim to remove smells from the urine, and some include a strong-smelling urinal cake (those little blue deodorising blocks) to mask any urine smell that lingers.

Complete waterless urinals

These are full waterless urinal fittings with a proprietary trap that has been designed for it. There are many brands of waterless urinal in this category, such as: Uridan; Urimat; Waterless; Falcon; Armitage Shanks; Duravit.

Unisex models

There are also unisex waterless urinals available, that utilise the same kind of traps, but are used sitting down.

A HepVO valve is a self-sealing waste valve - the easiest way to convert a flush urinal to a waterless one (apart from no trap at all). It may be too flimsy for a heavily-used urinal.

Shed installation of the vented Biolan Urinal in Cornwall. No trap – the urine is just led away to the ground or to a straw-bale / sawdust pile to create compost. Good for alltoments / gardens.

what are the benefits?

Given that 90% of public toilet usage is for urination, and that many urinals could be getting no use, but still flushing every 15 minutes, there's an opportunity to save large amounts of water. According to Wikipedia and manufacturers' own estimates, a waterless urinal can save 100,000 litres per urinal per year.

Drinking water is an expensive thing to produce – it requires lots of infrastructure to harvest, treat, and deliver it. It seems enormously wasteful to use it to flush away urine. There's massive potential for waterless urinals, especially in drier countries. Germany is in the lead when it comes to installing waterless urinals – as is often the case with sustainable tech.

Urine can be used as a fertiliser; it contains much more nitrogen by volume than faeces (around 90% of the nitrogen we excrete is in urine). Urine could replace chemical fertilizers in feeding the world's population (although carbon-rich material would have to be added as well to provide structure and to aid decomposition), instead of being treated as a problem.

If looked after properly, waterless urinals smell less than flush urinals, because calcium in water reacts with uric acid in the urine to produce more limescale than with water alone. The limescale then absorbs more urine, which encourages bacterial growth and can cause smells.

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Uridan and Falcon models.

what can I do?

Basic urinal: more polite than doing it outside, if there are other people around. In most circumstances the urine is allowed to soak into the soil nearby, but it could also go onto a strawbale, or a pit with sawdust etc. to produce compost.

Retrofit cartridges: needs a trap to be fitted below the urinal. Pipes downstream should be replaced of jetted to make sure they're clean. This will prevent struvite, a mineral deposit that causes kidney stones and can cause blockages in pipes. Refer to manufacturers' installation instructions. Consider the ongoing costs of the cartridges, plus how long they last. Talk to the manufacturer / retailer. Also, you need to check your urinal(s) to make sure the shape sheds urine, as it was designed to be flushed, plus whether the cartridge creates pockets of standing urine as the urinal and cartridge weren't designed for each other.

Ask your plumbers' merchant for a self-sealing waste valve. Some one-way valve / flap types of cartridge might be a bit too delicate for urine, and they might not kill the smell. Also, urine isn't water. In high concentrations, it becomes sticky. If there are moving parts, they may seize up. Factor in hair, chewing gum, cigarette butts and other things that can end up in urinals, especially in public spaces, and make sure the urinal and trap will still work. This isn't such a problem in a domestic installation, and maybe not if the toilet is outdoors. As a last resort, if it's a retrofit, you can always turn the flush back on. Another problem with retrofit is that you have to clean the fitting every day. Off-the-shelf waterless urinals have their own system for cleaning.

Complete waterless urinals: same potential problems as above. Some models use floats / seals, so chewing gum, hair etc. may cause them to remain partially open causing odours. In engineering, it's preferable to remove moving parts, so Uridan deserve an honourable mention as there are no moving parts in their trap and no plastic in trap replacement. Clean the urinal each day to keep them odour free. Usually there's a proprietary liquid, the cost of which needs to be factored into the running cost of the system.

Unisex models: sit-down model - the urinal can't accept toilet paper, so you may need signage to ensure the unit isn't clogged with paper. Unlike the male counterpart, which requires no adjustment in user behaviour, the unisex urinal does require some instruction – e.g. where to put the paper, plus that the unit can't accept any solid waste so maybe best used in offices and other locations where users can become used to the technology.

Urine as fertiliser: urine contains nitrogen, phosporous and potassium, which boost plant growth. But if the urinal is used by anyone on medication, chemicals will be introduced into the soil. Usually the volume will be so tiny as to be insignificant but if someone was on chemotherapy for example, who used the urinal regularly, there could be downstream impact. In the right circumstances, you can pee on a straw-bale to eventually produce compost. Urine contains lots of nitrogen, straw contains lots of carbon, so it's perfect for producing good compost. Put the bale in an out-of-the-way place. It won't smell because the bacteria will have a 'balanced diet' of carbon and nitrogen, so won't have to give off ammonia (a way of removing excess nitrogen). You could also collect urine in a container with a funnel, and tip it onto your compost heap when full. This will benefit the heap, especially if it has a lot of carbon-rich material like dry leaves, twigs, straw or hay.

resources

- lowimpact.org/waterless-urinals for more info, videos, links & books, including:
- Carol Steinfeld, *Liquid Gold*
- Sally Magnusson, *Life of Pee*
- bit.ly/31B80gn – *Wired* article
- bit.ly/2vdjIBP – urine as fertiliser
- bit.ly/2urCsgL – report on waterless urinals