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A CAUTION ON DUAL-FLUSH CONVERSION DEVICES FOR TANK-TYPE, GRAVITY-FED TOILETS

During the past year, numerous water efficiency professionals, water provider organizations, and consumers have been approached by various vendors, entrepreneurs, and inventors about dual-flush conversion devices for tank type toilets. Recommending or subsidizing such untested products is being questioned.

There are many of these products being promoted throughout North America, most of which provide the ability to convert a 1.6-gallon (6.0-litre), 3.5-gallon (13-litre), 5-gallon (19-litre) or more fixture from a single-flush, tank-type gravity toilet to a dual-flush toilet. All promise water savings by giving the consumer a “choice” between a full flush for solids and a reduced flush (usually one-half the volume of a full flush) for liquids only. In some cases, astronomical water savings are quoted by the vendors, hoping to convince the unwary of their benefits.

While the goal of reducing water use in the home is admirable, there is no independent evidence that such savings do or will occur as a result of retrofitting the toilet with these devices. No independent field studies of actual “real world” installations have been conducted (although one such study is about to commence) and the significant concerns over the efficacy of the devices remains. Three primary reasons for this are...

(1) The removal and replacement of an original equipment manufacturer’s (OEM) flush valve with an after-market product changes the full flush characteristics of the toilet fixture. The delivery of the right amount of water to the bowl at a certain rate is critical to the full removal of all solid and liquid waste from the fixture. This is especially true of 1.6-gallon and 1.28-gallon toilets where the hydraulic characteristics (profile) are finely tuned to achieve the maximum “force” of the water delivered through the flush valve. Changing that profile can adversely affect flush performance, leading to double flushing by the user, thereby increasing water use. In a perfect scenario, a dual-flush retrofit flush valve should be flush performance tested with each of the gravity-fed toilets into which it is to be installed to assure the purchaser or end-user that performance will not be sacrificed. That has not occurred.

(2) Similarly, the reduced flush is particularly vulnerable to unsatisfactory performance from a retrofit product, because a complete exchange of water in the bowl is expected by the user. There is no assurance that the after-market product will, in fact, remove all of the waste. That is, if it visually appears to the user that the reduced flush has not removed all of the liquid waste, the toilet will be flushed a second or third time.

(3) Most of the flush valves are adjustable and allow the user to increase the flush volume well above the originally rated volume of the fixture, thereby negating much of the expected “savings”.

Currently, there are two primary U.S. national standards that apply to after-market dual-flush devices:

For retrofit into 3.5-gallon (13-litre) and greater toilets: ASME A112.19.10

For retrofit into 1.6-gallon (6-litre) toilets: IAPMO PS 50-2008

Compliance with ASME A112.19.2 – Vitreous China Plumbing Fixtures and ASME A112.19.5 – Trim for Water Closet Bowl, Tanks, and Urinals, is incorporated by reference and cover additional requirements beyond those in the two primary standards.



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Other factors to be considered by those installing, recommending, or subsidizing these retrofit products are:

- (1) Replacement of the OEM flush valve with an after-market product will likely void any remaining manufacturer warranty on the toilet fixture.
- (2) In most cases (but not all), installation requires that the homeowner/user turn off the water supply to the toilet, empty the toilet tank and disassemble it from the bowl, remove the OEM flush valve and replace it with the after-market product, reassemble the fixture and adjust the new valve to manufacturer's instructions. Some homeowners may require a plumber or handyman for this installation.

In conclusion, the purchase, endorsement, or subsidy of these after-market devices should be approached with much caution. We do not recommend the devices for 1.6-gallon (6.0-litre) toilet fixtures where hydraulic performance is critical. If an individual or agency wishes to proceed, however, they should: (1) insist upon full certification to the two primary standards listed above; (2) require that the product be non-adjustable to water consumption levels above that originally certified for the toilet into which the device is to be installed; and (3) insist that the manufacturer provide independently developed third-party evidence that the products as used in a "real world" setting actually demonstrate real water saving. Such studies should provide statistically reliable results and, thus, should be conducted on multiple installations.

Finally, it is our opinion that the water savings potential and cost-effectiveness of these retrofit devices is doubtful, even with meeting the requirements noted above. At such time as a conversion device meets the standard, is independently tested and demonstrates that it will not adversely affect the flush performance of the toilet, we will report that information.

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