US Army Corps of Engineers

ENGINEERING AND CONSTRUCTION BULLETIN

No. 2006-7 R **Issuing Office: CECW-CE** **Issued: 09 Aug 2006**

Subject: The Army Standard for Urinals

Applicability: Directive

1. This ECB changes the implementation date provided in ECB 2006-7 from FY07 to FY10.

2. Point of contact for this ECB is Dan Casapulla, 202-761-4227.

for DONALD L. BASHAM, P.E.
Chief, Engineering and Construction
Directorate of Civil Works

US Army Corps of Engineers

ENGINEERING AND CONSTRUCTION BULLETIN

No. 2006-7 Issuing Office: CECW-CE Issued: 03 Jul 2006

Subject: The Army Standard for Urinals

Applicability: Directive

1. Reference:

- DAIM-ZA Memorandum for Record, undated, same subject as above (Encl. 1)
- DAIM-ZA Memorandum for Record, dated 05 April 2006, same subject as above (Encl. 2)
- ERDC/CERL TN-06-3, dated April 2006 (March 2005 update), titled Waterless Urinals A Technical Evaluation (Encl. 3)

2. The referenced DAIM-ZA memos require the use of non-water using urinals for FY07 and beyond MILCON projects or major repairs not yet solicited. In addition to changing the Army Installation Design Standard, both UFGS 220000 and UFGS 220400.0010 will be revised to add the following paragraph (provided here for your use) under Part 2 Products:

Non-Water Use Urinals

> Note: For FY07 and beyond MILCON projects, Army Installation Design Standard requires the use of non-water using urinals for new construction and major repairs.

ASME A112.19.2M, [white] [___] vitreous china, wall-mounted, wall outlet, non-water using, integral drain line connection, with sealed replaceable cartridge or integral liquid seal trap. Either type shall use a biodegradable liquid to provide the seal and maintain a sanitary and odor-free environment. Install with urinal rim 432 mm 17 inches above the floor. Provide ASME A112.6.1M concealed chair carriers. Installation, maintenance and testing shall be in accordance with the manufacturers' recommendations. Slope the sanitary sewer branch line for non-water use urinals a minimum of ¼ inch per foot. Drain lines that connect to the urinal outlet shall not be made of copper tube or pipe. For urinals that use a replaceable cartridge, provide four additional cartridges for each urinal installed along with any tools needed to remove/install the cartridge. Provide an additional quart of biodegradable liquid for each urinal installed. Manufacturer shall provide an operating manual and on-site training for the proper care and maintenance of the urinal.

3. When replacing existing flush-type urinals with non-water use urinals it is important to verify that the existing drain lines slope a minimum of ¼ inch per foot and that the interior of the drain lines are clear of any obstruction. The attached ERDC/CERL report provides additional information concerning retrofit installations.

4. Point of contact for this ECB is Dan Casapulla, 202-761-4227.

3 Encls

DONALD L. BASHAM, P.E.
Chief, Engineering and Construction
Directorate of Civil Works

DEPARTMENT OF THE ARMY
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON, DC 20310-0600

REPLY TO
ATTENTION OF

DAIM-ZA

MEMORANDUM FOR RECORD

SUBJECT: The Army Standards for Urinals

1. The Army Standard for non-water using urinals is hereby approved. This standard is effective immediately for FY07 and beyond MILCON projects or major repairs not yet solicited. Retrofits will replace urinals using more than 1 gpf if criteria in March 2005 technical evaluation are met.

2. The Army Installation Design Standard (IDS) entry in Chapter 3.1.3 will be changed to read "Urinals. Non-water using urinals are an Army Standard for new construction and major repairs. It is a best practice to replace existing urinals using more than 1gpf if retrofit criteria are met IAW Waterless Urinals, Technical Evaluation, March 2005."

3. The Army Facilities Standardization Subcommittee must approve any planned deviation from this standard prior to finalizing designs for construction or major renovation projects.

DONALD L. BASHAM, P.E.
Chief of Engineering and Construction
Army Facilities Standardization Subcommittee

PHILIP E. SAKOWITZ
Deputy Director
Installation Management Agency
Army Facilities Standardization Subcommittee

MARK A. LORING
Colonel, GS
Director, Facilities and Housing Directorate
Assistant Chief of Staff for Installation Management
Chairman
Army Facilities Standardization Subcommittee

Encl 1

DEPARTMENT OF THE ARMY
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600 ARMY PENTAGON
WASHINGTON, DC 20310-0600

REPLY TO
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DAIM-ZA

APR 0 5 2006

MEMORANDUM FOR RECORD

SUBJECT: The Army Standards for Urinals

1. The Army Standard for non-water using urinals is hereby approved. This standard is effective immediately for FY10 and beyond MILCON projects or major repairs not yet solicited. Retrofits will replace urinals using more than 1 gallon per flush if criteria in March 2005 technical evaluation are met.

2. The Army Installation Design Standard (IDS) entry in Chapter 3.15.2 will be added to read "Urinals. Non-water using urinals are an Army Standard for new construction and major repairs. It is a best practice to replace existing urinals using more than 1 gallon per flush if retrofit criteria are met in accordance with Waterless Urinals, Technical Evaluation, March 2005."

3. The Army Facilities Standardization Committee must approve any planned deviation from this standard prior to finalizing designs for construction or major renovation projects.

for J C Mew

DAVID W. BARNO
LTG, GS
Assistant Chief of Staff
for Installation Management

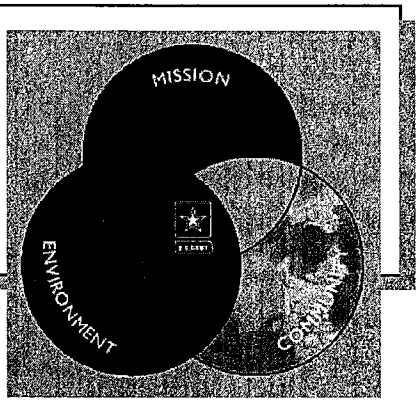
Encl. 2

US Army Corps of Engineers®
Engineer Research and Development Center

Waterless Urinals

A Technical Evaluation

Annette L. Stumpf



Basic Technology

The Energy Policy Act of 1992 mandated the use of "low flush" urinals (which use no more than 1 gallon of water per flush) to conserve water resources. Newer technologies include "ultra low-flow" urinals, which use only ½ gallon per flush and—the most efficient alternative—"waterless" urinals. Thousands of waterless urinals are now in use in commercial, Federal, and DOD facilities, and save millions of gallons of water annually.

Benefits

Waterless urinals offer many economic, operational, and environmental benefits:

- They reduce water and sewer costs. (Each unit can save up to 45,000 gal of water and sewage per year.)
- They require no freeze protection.
- They lower electricity costs (to pump water and sewage).
- They eliminate infrastructure costs to provide fresh water or collect and treat sewage.
- They reduce septic system load and treatment time.
- They require no installation, maintenance, or repair costs for flush valves, handles, sensors, or water supply piping.
- They require no batteries, transformers, or other electronics.
- They are environmentally friendly.

Sustainability

Waterless urinals reduce the Army's environmental burden by saving water and energy, and reduce sewage and maintenance expenses. They divert fewer Army resources from the mission (e.g., for emergency repairs of flush urinals). The use of waterless urinals is consistent with Federal Executive water and energy conservation requirements, and helps projects earn SPiRiT (Sustainable Project Rating Tool) or LEED® (Leadership in Energy and Environmental Design) credits. Moreover, waterless urinals are strongly encouraged in drought-prone locations such as Arizona, where the state requires them to be installed in all state buildings. Products listed below are available in the United States; many similar products are available for use in other countries.

Costs

Initial installation cost and annual reoccurring costs (LCC input) vary by vendor, but in general, simple payback time typically ranges between 1/2 and 3 years for new installation and retrofit. Annual savings vary depending on the flush volume of replaced urinals, the number of uses per day per fixture, and the cost of water and sewer. Each waterless urinal replacing a 1.0 gallon per flush (gpf) unit with 75 uses per day at (Seattle) water and sewer costs ($6.83 per 748 gallons), could save between $250 and $875 per year. This reflects the deferred cost of 27,375 gallons of water and sewer per year used by a new, or 95,812 gallons per year for an older 3.5 gpf urinal. Including maintenance costs for replacement fluid and/or cartridges (between $45 and $120/urinal annually), the waterless alternative would yield a net savings between $130 and $830 each. A spreadsheet for quick computation of simplified economics, and good example of how waterfree urinals generate savings, respectively, are available through URLs:

http://www.waterless.com/SaveEval.pdf
http://www.falconwaterfree.com/pdf/savings.pdf

"Lifetime" waterless urinal cartridges are now available; while they appear more cost effective than the typical cartridges, they do not currently meet IPC or UPC plumbing codes because they have a mechanical (not a liquid) trap. Their use would invalidate Sloan or Falcon warranties (see URL: http://lifetimecartridge.com/).

Encl. 3

Waterless Urinals

Implementation & Maintenance

Most existing wall-mounted fixtures and all new urinals can be replaced with waterless urinals to save the cost of water, sewage treatment, and pumping power. Waterless urinals connect to standard 2-in. drain lines and require no water supply line. Waterless urinals available in the United States typically have a replaceable trap and/or liquid sealant that floats on top of the urine to form a barrier to keep sewer vapor from escaping. Other alternatives include the trapless "Airflush" urinal made in Sweden, which uses a small exhaust fan to extract odors instead of the replaceable trap and/or sealant, and an Australian design that simply turns off the water and replaces it with a small block of microbes each week. Successful implementation for new and retrofit applications depends on:

- *Correct Drain Pipe Material and Slope.* Drain lines must slope at least ¼-in. per foot, and cannot be made of copper pipe, which corrodes. Drain lines must be clean before urinal installation. (Test kits are available to determine if drain pipes are sloped adequately for retrofit.) http://www.falconwaterfree.com/pdf/029-Pitch.pdf
- *Eliminating Drain Pipe Obstructions.* Studies on the corrosive effects of urine on drain pipes have proven that encrustation is due more to the mineral content of water than to urine. While several waterless urinal users report that they rout their drain lines annually to keep them clear, other users have reported no buildup problems. For retrofit projects, the sewage lines should be cleaned out with a power sewer snake with a rotating cutter head before installation of waterless urinals.
- *Following Vendor Maintenance Instructions Exactly.* Different vendors suggest specific cleaning materials, maintenance procedures and intervals.
- *Keeping a Urinal Maintenance Log.* Keep a log of cartridge replacement dates or trap service dates to guard against premature or overly frequent cartridge replacements or trap servicing. Keep a record of all sealant and cartridge purchases to determine average sealant costs per urinal. Monitor high use facilities during peak usage periods.

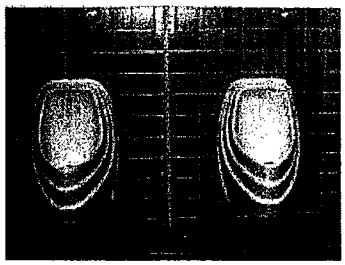
Waterless urinals have been endorsed or accepted in many parts of the country, but some state and local code agencies may prohibit their use or permit only "test" projects. UFC 3-420-01 permits their use in DoD facilities, which overrides local codes, but educating local code officials on the benefit of waterless urinals may speed their acceptance.

Recommendation

It is recommended that waterless urinals be considered for new urinal installations and to replace existing urinals that use 1.5–3 gpf if retrofit criteria are met and proper maintenance procedures can be budgeted and assured.

Vendor List (Partial)

DesertCube® Waterless Urinal	http://www.desert.com.au/html/intro.htm
Falcon WaterfreeTM urinal	http://www.falconwaterfree.com/
Sloan WaterfreeTM urinal	http://www.sloanvalve.com/waterfreeindex2.htm
Waterless No-FlushTM urinal	http://www.waterless.com
Zero Flush	http://www.zeroflush.com/
German-made Dry Urinal	http://www.duravit.com
Zurn Z5795 Non-Water-Using Urinal	http://www.zurn.com/
Kohler®	http://www.us.kohler.com/onlinecatalog/waterlessurinal.jsp
Airflush (Ifo Sanitar AB, not in U.S. yet)	http://www.greenspec.co.uk/html/products/airflush.html http://www.ifosanitar.com/



References

DoD specifications are contained in the Construction Criteria Base (CCB) available on the *Whole Building Design Guide* website at: http://www.wbdg.org

International Code Council International Plumbing Code – 2003 (ICC IPC), 10-01-2004, UF-15400 *Plumbing, General Purpose* http://www.wbdg.org/ccb/DOD/UFGS_jan06/UF15400.pdf

Unified Facilities Guide Specs UFC 3-420-01, *Design: Plumbing Systems*, 25 October 2004: http://www.wbdg.org/ccb/DOD/UFC/ufc_3_420_01.pdf

"Why Non-Flushing Urinals Fail (And How to Prevent Those Failures)," *Environmental Building News*, vol. 13, No. 11, Nov. 2004, pp. 4 - 6. http://www.buildinggreen.com/auth/article.cfm?fileName=131104b.xml

Army Knowledge Online – Water Conservation Web Site. Additional information on waterless urinals will be made available through URL. https://eko.usace.army.mil/fa/water/