

# MaP Testing's 5-year Anniversary:

A proven process for development & implementation  
of meaningful product performance standards

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watersmart08  
INNOVATIONS

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# A historical perspective & update on MaP Testing

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## Toilet Fixtures



# Origin of a problem...and a solution!

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- EPA Act 92 mandates 1.6-gal maximum flush
- Early U.S. 1.6-gal siphonic toilets did not flush well
- Why? Because many mfrs simply converted a 3.5-gallon toilet to flush with 1.6 gallons
  - No engineering - no hydraulic redesign - same tank size
  - Same tank, but use an “early closing” flapper
  - No rigorous performance requirements
- PLUS, many models could be adjusted to increase the flush volume back to 3 - 4 gals!

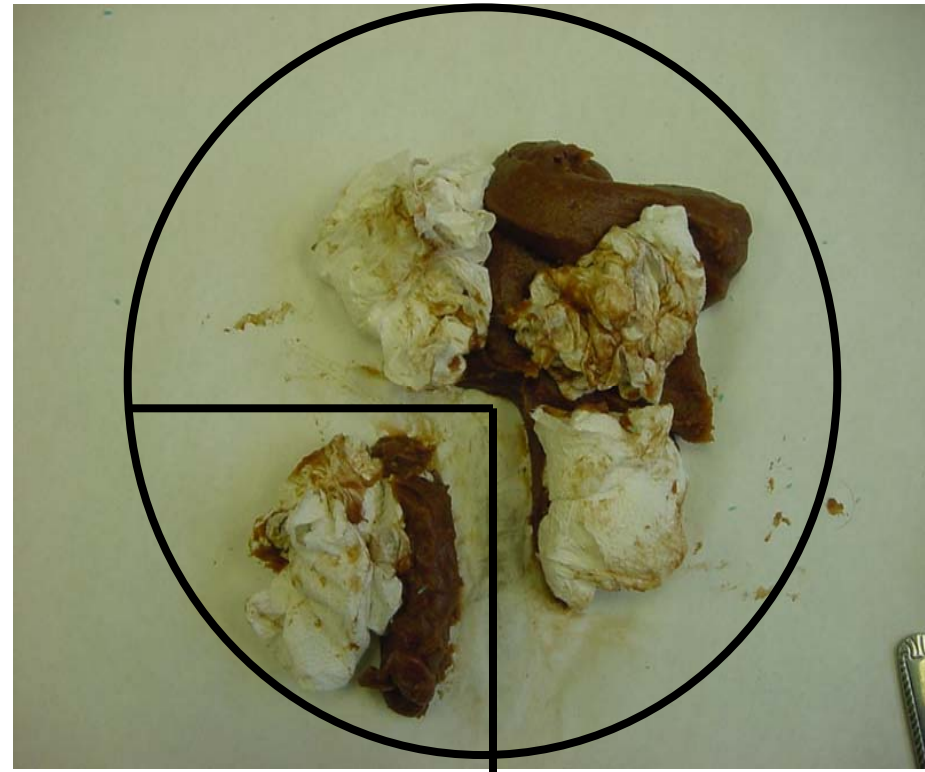
# U.S.-Canadian Certification Process - 3 major problems remain today!!

1. Testing fails to replicate “real world” conditions
  - Sponges?
  - Paper wads....maybe!
  - Granules?
  - Plastic balls?
2. 100% removal of waste  
not required!!
3. Pass/fail only - no rating  
or ranking of performance  
for consumers



# Certification in North America

- Only 22 of 28 media required to clear fixture - 75+%!!
- Question: Would a consumer be satisfied with a toilet that cleared only 75% of waste?





# Like saying....

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✓ Pilot to passengers:

“Folks, this aircraft will only be using 3 of its 4 engines on this trip!  
But, we’ll be OK...”

✓ Car salesman to customer:

“Sir, the brakes on this new vehicle will stop the car at least 75% of  
the time!”

✓ Plumber to homeowner:

“This toilet will regularly remove 75% of the waste!”



# Result...

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- ✓ Early ULFTs (1.6 gallon) = performance problems
  - ✓ Water utility complaints about sustainability of savings
  - ✓ Customer complaints about flush performance
  - ✓ Outcome: Manufacturers got the “message” and developed improved product (led to the 2nd generation of toilets in the late 1990s)
- ✓ ALSO..... water utility industry steps up to address:
  - ✓ Sustainability of water savings (flappers & adjustability)
  - ✓ Flush performance (customer satisfaction)



## Three Water utility “responses” ...

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- ✓ 2000 - Los Angeles Supplementary Purchase Specification (SPS) for tank-type toilets
  - Mandates durable flappers
  - Limits flush volume adjustability
  - Requires marking with flapper part no.
  
- ✓ 2003 - Maximum Performance (MaP) testing
  - Addresses flush performance issues
  
- ✓ 2005 - UNAR developed for WE programs



# Maximum Performance Testing of Popular Toilet Models (MaP Testing)

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- Cooperative Canadian & U.S. project - 2003
- Development sponsored by 22 water utilities and interested parties in U.S and Canada
- Purposes:
  - Give consumers information they needed on toilet flush performance
  - Provide water conservation programs with info for their approved “lists”



# Maximum Performance Testing of Popular Toilet Models (MaP Testing)

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- Cooperative U.S. and Canadian project - 2003
  - East Bay Municipal Utility District
  - Los Angeles Dept of Water & Power
  - Tampa Bay Water
  - Seattle Public Utilities
  - Calif Urban Water Conservation Council
  - Toronto, Ontario
  - Winnipeg, Manitoba
  - Greater Vancouver Regional District
  - Canada Mortgage & Housing Corp.
  - B.C. Buildings Corp. Victoria B.C.
  - Capital Regional District, Victoria B.C.
  - Canadian Water & Wastewater Association (Lead)
  - Region Durham, Ontario
  - Region Halton, Ontario
  - Region Waterloo, Ontario
  - Hamilton, Ontario
  - Region Peel, Ontario
  - Calgary, Alberta
  - Edmonton, Alberta
  - Montreal, Quebec
  - Ottawa, Ontario
  - Halifax, Nova Scotia



# Maximum Performance Testing of Popular Toilet Models (MaP Testing)

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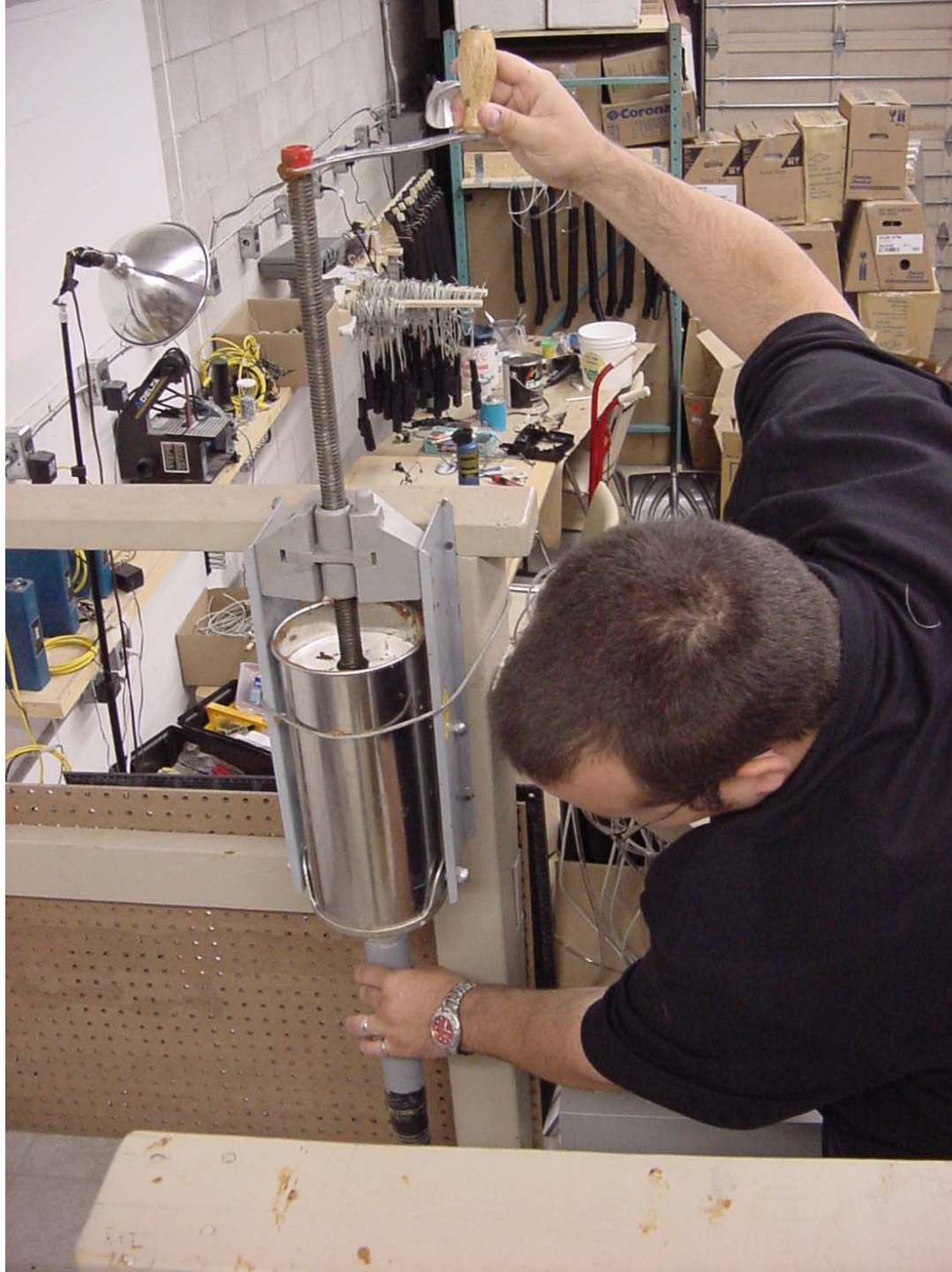
- Why MaP? ....because certification testing is a very poor measure of “real world” performance of toilet fixtures.... and consumers want to compare!
- MaP Features -
  - Replicates “real world” with special test media
  - An independent measure of toilet performance
  - Scientifically based minimum performance threshold for waste removal (250g)
  - User-friendly basis for toilet selection



# Test Media: Soy Bean Paste

















# Maximum Performance Testing of Popular Toilet Models (MaP Testing)

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- ✓ Uncased soy bean paste: primary test media
- ✓ BUT, costs escalate
  - ✓ One-time use
  - ✓ Worldwide distribution
- ✓ Seek out a “re-usable” alternative =  
encased soy bean paste





# Maximum Performance Testing of Popular Toilet Models (MaP Testing)

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- ✓ 12th Edition report now posted (June 08)
  - 720+ different toilet fixture models tested for flush performance and rated!!
  - Tank-type AND flushometer valve fixtures
- ✓ Used or adopted by various large production builders, designers, specifiers, retailers, water utilities, consumers, & others for product selection
- ✓ Used by U.S. EPA for WaterSense Program
- ✓ Manufacturers worldwide now testing to MaP
- ✓ Manufacturers submit products for **independent testing**
- ✓ Future MaP initiatives -
  - Flushometer valve toilet fixtures
  - Urinals

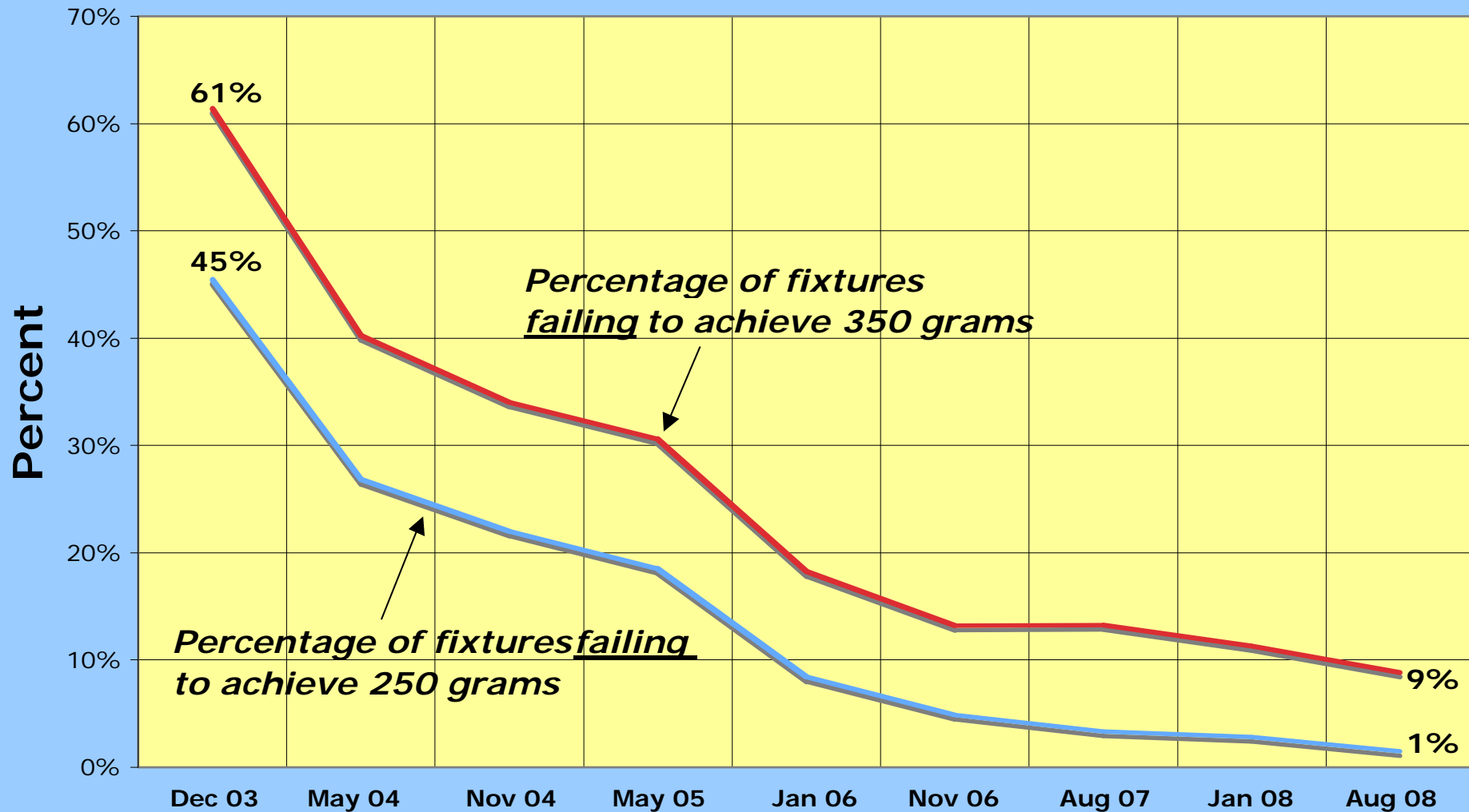


# Performance Progress through MaP Testing

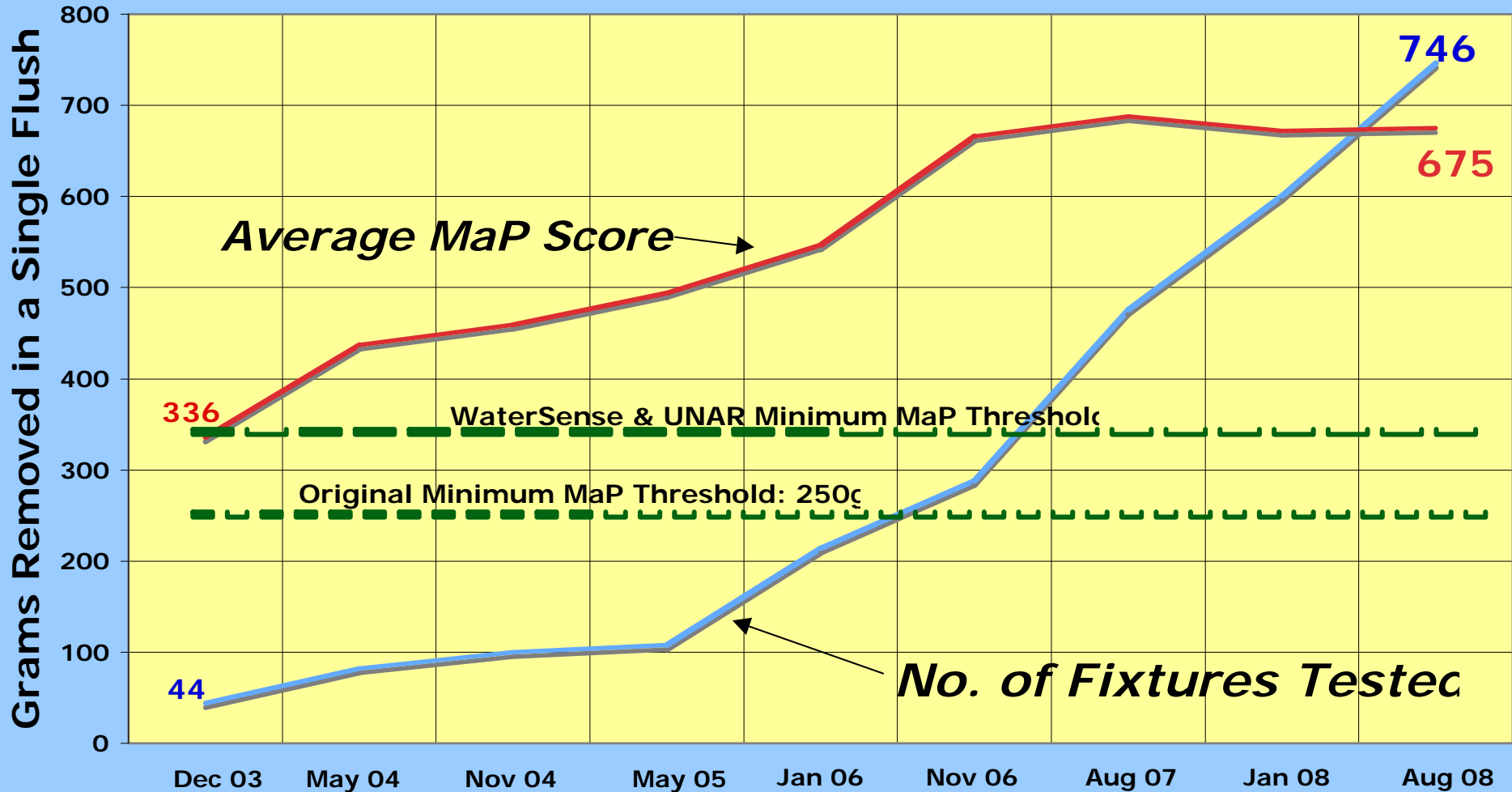
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- Early ULFTs (1.6gal) - minimal testing, poor performance
- Today's ULFTs - MaP testing leads to improved performance
- New HETs (1.0 to 1.28gal) - MaP testing is leading to outstanding performance

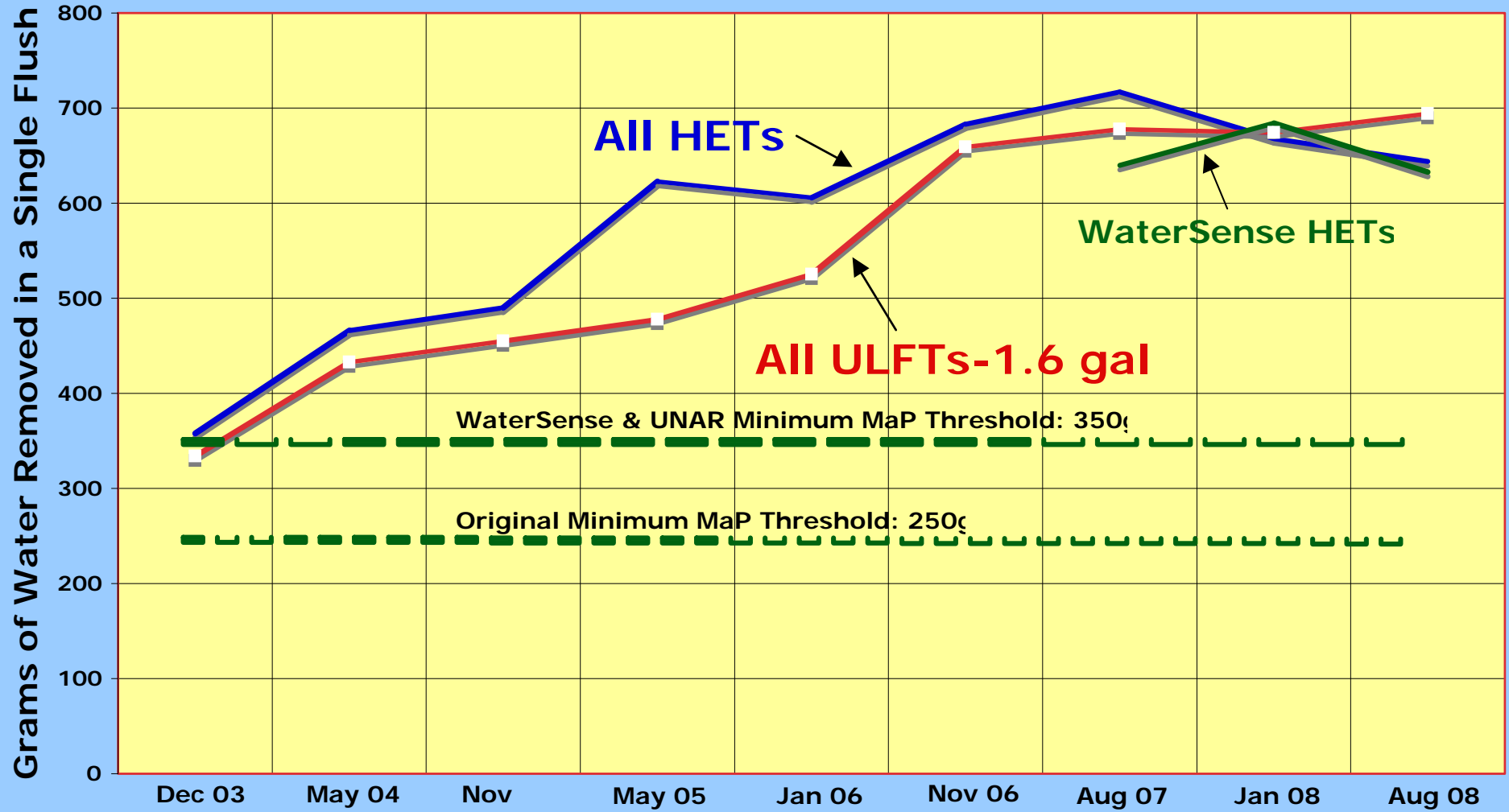
# Percentage of MaP-tested fixtures failing to meet minimum performance



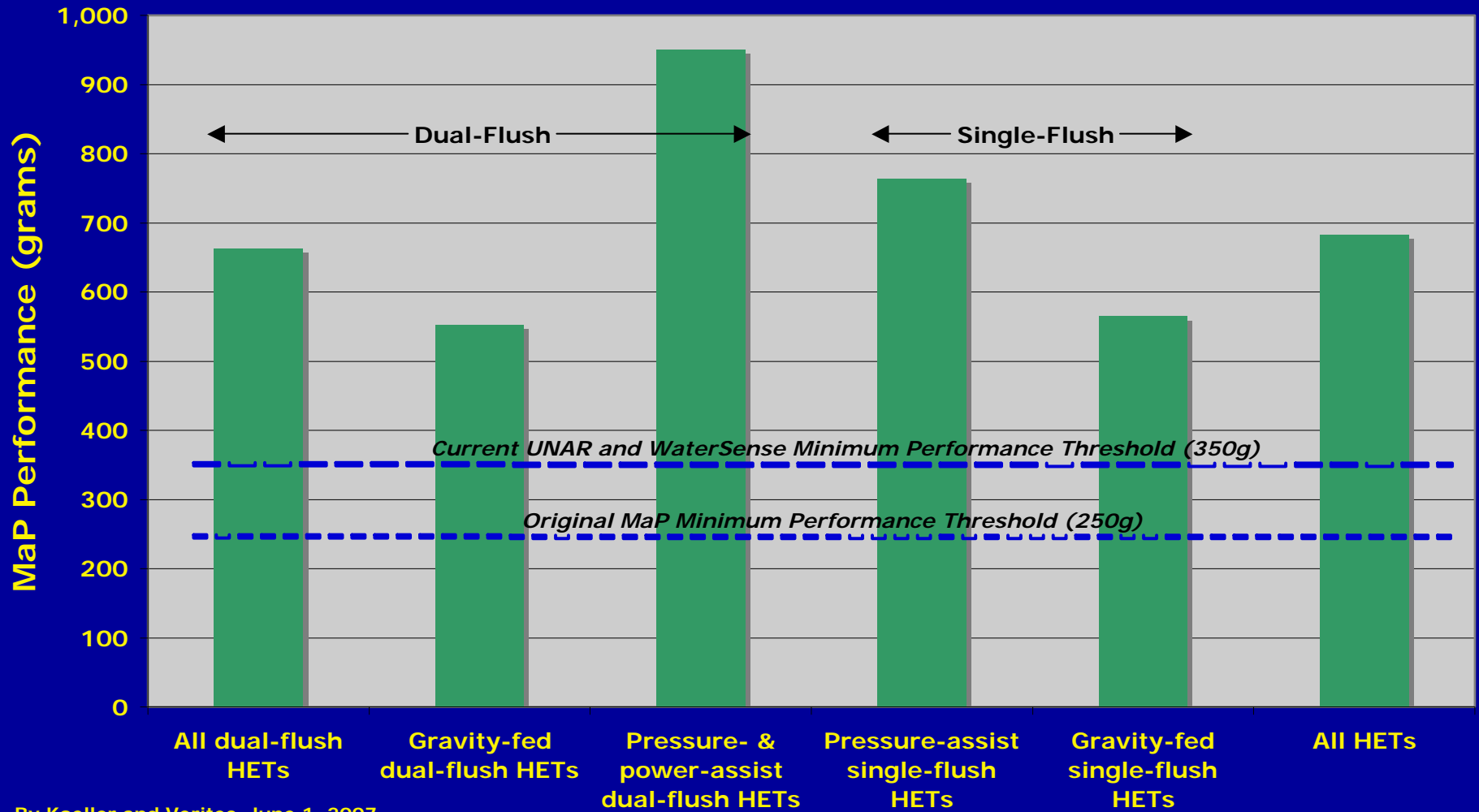
# Toilet Fixtures Tested - Average MaP Score



# Average MaP Scores - 2003 to 2008



# MaP Scores for HETs (1.28 gpf - 4.8 Lpf and less)





# High-Efficiency Toilet (HET) Specifics

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- TODAY: Over 300 different HET models available  
(220+ WaterSense certified!)
  - ✓ 26 mfrs of dual-flush HETs with 143 different models
  - ✓ 14 mfrs of 1-gal single-flush pressure-assist HETs - 47 models
  - ✓ 15 mfrs of 1.28-gal single-flush gravity HETs - 62 models
  - ✓ 4 mfrs of 1.28 flushometer valve toilets for commercial - 12 models
- 2008 is seeing dozens more!



# What's Next?

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- New MaP test for flushometer bowl-valve HET combinations (1.28 gal)
  - “Super log”
  - Toilet seat covers & paper towels
  - More floating media
- U.S. EPA WaterSense Program - test protocol for flushometer bowl-valve combinations
- More “matched” flushometer bowl-valve combinations from single manufacturers
  - Kohler, American Standard, Toto, Zurn & ??



# Thank you...

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## *Contact...*

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