GREEN Plumbing and Mechanical Code Supplement

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2012 NSPC, Appendix G

• Why include GREEN provisions in the National Standard Plumbing Code?
• Why partner with IAPMO to include verbatim provisions from the GPMCS?
• Why should the NJ plumbing industry aggressively support Appendix G of the 2012 NSPC?
• What other choices are available?
What is the GREEN P&M Code Supplement?
GPMCS ~ Overview

• First **GREEN** Plumbing Code
  – Published in February 2010

• A turn-key document
  – *Residential* and commercial sustainable plumbing and mechanical systems
  – Covers all aspects of sustainability ~
    • Water and energy efficiency
    • Hot water system design
    • Alternate water source use
    • Indoor environmental quality
GPMCS ~ Overview

• Bridge between codes and GREEN building schemes
• Overlays ANY published plumbing code
• Baseline for sustainability
  – No tiers of compliance or rating system
• Repository for future code provisions
• Overlays Uniform Codes, including Plumbing, Mechanical and Solar Energy
• Introduces high efficiency products and systems
IAPMO GREEN ~ GPMCS

• Uniform Codes - developed with critical eye on sustainability and on consensus
• 2007- IAPMO BoD calls for a reduction in energy and water consumption in provisions contained within the Uniform Codes
  – Decision made to bring together the best and brightest minds our industry has to offer
  – Created **GREEN Technical Committee (GTC)** to accomplish this aggressive goal
GTC ~ A Diverse Group of GREEN Industry Experts

• 28 experts in GREEN plumbing and mechanical fields ~
  • Inspectors, contractors, plumbers and mechanics, engineers, manufacturers, trade associations, water utilities, water and energy conservation authorities
  • Meet three times per year, two to three days per meeting in an aggressive schedule to develop and maintain GREEN code provisions
  • Supported by numerous plumbing industry organizations known for their GREEN expertise
GTC ~ Task Groups

- 14 task groups (200+ people in total)
  - Largest concentration of P&M sustainability experts ever assembled
  - No other process comes close in sustainable P&M contact hours
    - 3 meetings per year
    - 20+ conference calls per year
    - 100+ contact hours on P&M issues
  - Our industry responds to the call to conserve!
GTC ~ Task Groups ~ Subjects

- Plumbing Fixtures and Fittings
- HVACR
- Hot Water Systems
- Water Pipe Sizing
- Alternate Water Sources
- Potable Rainwater Catchment Systems
- Life Cycle Assessment
- Irrigation
- Food Services
- Pools, Spas and Hot Tubs
- Natural Gas
- Hydronics
- Commissioning and Verification
- General/Administration
- Irrigation
GTC ~ Objectives

• To develop and maintain **GREEN Plumbing and Mechanical Code Supplement**

• Identify opportunities to make Uniform Codes more sustainable

• To maintain a document that addresses emerging **GREEN** technologies

• To do so utilizing a broad-based industry approach in partnership with like minded associations ~ such as ...
Broad Based Industry Support ...

- ASHRAE
- ARCSA
- Alliance for Water Efficiency
- SMACNA
- PPFA
- World Plumbing Council
- Green Plumbers
- Pluming Manufacturers International
- NEBB
- ASPE
- MCAA
- PHCC
- Sanitary Engineering Council
- American Rainwater Catchment Systems Association
- NEBB
Second edition published in April 2012

Enhanced GREEN provisions addressing newer technologies for water and energy conservation.

For more information visit: www.iapmogreen.org/publiccomment
Why the GREEN Supplement?

• Regulatory framework written in code language
  – elevate sustainable construction practices
  – maintain IAPMO’s and likeminded partners high standards for protecting public health, safety and welfare

• Minimum baseline for sustainability

• Repository for provisions that can be integrated into ANY code

• The most advanced GREEN Code available today!
GPMCS ~ Our Response to Energy & Water Conservation?

• Valuable resource for:
  – Progressive jurisdictions looking to adopt more sustainable codes
  – Industry professionals that design, install and approve green plumbing and mechanical systems
Why the Need?
Why the Need for the GPMCS?

• Key industry stakeholders had never been brought together to properly vet sustainable P&M construction practices
  – A valuable reality check for our industry
  – Ensure that health and safety are first priority in achieving sustainable practices
  – Once assured, validate that sustainable technologies can be achieved and verified
  – To provide a vehicle for emerging technologies
Why the Need for the GPMCS?

Why the need continued ...

– Tool to “hard wire” water and energy conservation together
– To date nothing focusing solely on plumbing and mechanical systems
– Nothing covering all aspects of sustainable construction for Residential and Commercial systems
– Finally, to be responsive to legitimate concerns
Water Efficiency and Conservation

• 20%+ more efficient than current codes

• Coverage areas:
  – High efficiency plumbing fittings, fixtures and appliances
  – Water softening equipment
  – Boiler make-up water
  – Occupancy specific provision in restaurants and medical facilities
  – Cooling towers and evaporative coolers
High Efficiency Plumbing Fixtures and Fittings

• 1.28 gpf maximum toilets
  – Gravity
  – Pressure Assist
  – Dual Flush

• 1.6 gpf maximum flushometer valve
High Efficiency Plumbing Fixtures and Fittings

• 0.5 gpf or less urinals
• Non-water using urinals
  – Supply line rough-in at minimum height for backflow prevention device
  – Shut-off to isolate dead end
  – 1 water-supplied fixture upstream to address potential drainline blockage
High Efficiency Plumbing Fixtures and Fittings

Lavatory Faucets

• Residential Faucets
  ~ 1.5 gpm

• Commercial Faucets
  – 0.5 gpm
  – 0.25 gallons per metering cycle
High Efficiency Plumbing Fixtures and Fittings

- 2.0 gpm max showerheads
- Tub diverter leakage ≤ 0.1 gpm
High Efficiency Plumbing Fixtures and Fittings

• Multiple Showerheads in a compartment
  – 2.0 gpm max per 1,800 sq. in.
  – No limit on number of outlets
High Efficiency Plumbing Fixtures and Fittings

• Pre-rinse spray valves
  – Maximum flow rate of 1.6 gpm
  – Auto shut-off
  – Typical valves-
    • consume 2/3 of water used in a restaurant
    • exceed 3.0 gpm
    • operate for 5+ hrs/day
Sub-meters

• Proven water efficiency tool
• No accountability without individual metering
• Behavior modification and system monitoring
Sub-meters

• Required in commercial applications
  – Tenant spaces
  – Landscape irrigation systems
  – High water-using processes
  – Make-up water to cooling towers, evaporative condensers, large boilers
  – Means of communicating data to consumer
Water Softeners and Water Treatment Systems

• Timer regeneration prohibited
  – Demand initiation regeneration required

• Regeneration efficiency
  – Sets max salt consumption
  – Water (5 gallons/1000 grains)

• Auto shut-off for Reverse Osmosis discharge
Water Softeners and Water Treatment Systems

- Rough-in for homes with hard water (≥9 grains/gal)
- Required treatment for hard water supplied to heating equipment (≥9 grains/gal)
- Battelle study indicated that hard water reduces the efficiency of heating water by up to 24%
Alternate Water Sources

• Comprehensive provisions addressing
  – Rainwater harvesting (nonpotable and potable)
  – Reclaimed (recycled) water
  – Gray water
  – On-site treated non-potable water systems

• Minimum water quality
  – Treatment/disinfection based on application
  – 100 micron filter required for fixture flushing and drip irrigation (except for reclaimed)

• Backflow prevention for potable water make-up

• Cross-connection test

• System design ...
  – person registered or licensed to perform plumbing design work
• Permitting – required for most systems
• Maintenance and inspection
• System marking and coloring
Rainwater Harvesting

- Irrigation, toilet and urinal flushing
- Treatment not required for irrigation applications
Reclaimed (Recycled) Water

- Municipally treated
- High quality and reliability
- Irrigation, toilet and urinal flushing
Gray Water

• Untreated waste from:
  – bathtub
  – shower
  – lavatory
  – clothes washer
  – laundry tub

• Irrigation applications only
Diverter Valve Required

- Tub vent
- Sink vent
- Toilet vent
- P-trap
- Vent through roof
- Vents tied together 12" above spill point of highest fixture
- 3-way diverter valve
- Swing check or backwater valve
- No-hub connector
- To Septic or Sewer

Always divert greywater downstream from vents
Three Types of Gray Water Systems

• **Subsurface Irrigation**
  – 2” minimum depth below grade
  – Drip feeders
  – Covered with mulch, rock or soil
Three Types of Gray Water Systems

• Subsoil Irrigation
  – Deep root irrigation only
  – Also known as gray water disposal system
Three Types of Gray Water Systems

- **Mulch Basin**
  - Trench or pit
  - 10” minimum depth
  - Minimum volume
  - Filled with mulch
On-Site Treated Nonpotable Water
On-Site Treated Nonpotable Water

• Gray water, condensate, storm water can be used for:
  – Fixture flushing and irrigation
  – System must be third-party certified
  – Installed in accordance with system Listing

– Required disinfection:
  • Chlorination
  • UV sterilization
  • Ozone
• Comprehensive provisions addressing water heating system efficiency include:
  • Equipment efficiency
  • Insulation
  • Recirculation
  • Maximum volume of hot water
  • System controls

• The US DOE advises energy used to heat water can account for 14 to 25% of the energy consumed in a home
Water Heating System Design, Equipment and Installation

• Required Insulation for hot water pipe & returns
  – Min. thickness equal to pipe dia. ≤ 2”
  – Min. thickness of 2” for pipe dia. >2”
  – K factor ≤ 0.28
Water Heating System Design, Equipment and Installation

• Required maximum volume of hot water
  – 32 ounce max between heat source and shower valve, kitchen sink or lavatory faucet
  – 16 ounce max in run out of recirculation loop

• On-demand recirculation in residential occupancies

• Geothermal systems
  – Detailed design and installation criteria
Solar thermal systems must comply with the USEC

Governs the installation, inspection and certification of solar systems
Installer Qualifications

- Green systems require unique skills
  - AHJ granted authority to require a demonstration of competency
IAPMO Green Updates

Visit web page at: www.iapmogreen.org

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Questions?

I thank you for your kind attention!!!