Is my RWH system certified?
3rd party verification of RWH cisterns and Pretreatment Devices

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Who is Contech?

- Provider of site solutions for engineers, contractors, architects, and owners
Rainwater Harvesting
Stormwater Management Products

- Hydrodynamic Separators
  - Separate and trap trash, debris, sediment, and hydrocarbons from stormwater runoff

- DuroMaxx – Steel Reinforced Polyethylene (SRPE)
  - Underground storage of captured stormwater
Pretreatment: why is certification important?

- Poor pretreatment can result in:
  - Bacteria growth in cistern
  - Pump damage
  - Filtration clogging
  - Degradation of reuse water quality
- Verification of performance claims assures that a device is capable of providing the expected level of pretreatment as designed
Pretreatment: National performance verification programs for manufactured stormwater treatment devices

- These programs are used for the approval for these devices to be used in jurisdictions for Stormwater Management
  - NJ Dept. of Environmental Protection (NJDEP)
    - Lab testing
    - Adopted by many jurisdictions throughout Eastern US
  - Washington Dept of Ecology (WADOE)
    - Lab testing component
    - Field testing component
    - Adopted by many jurisdictions throughout Western US
  - Canada Environmental Technology Verification (ETV)
    - Lab testing protocol similar to NJDEP
    - Used to gain approval in Canada
Pretreatment: Hydrodynamic Separator (HDS) Verification

- Protocol developed by Technical Committee comprised of industry professionals for NJ Dept. of Environmental Protection (NJDEP)
- Laboratory test of sediment removal efficiency
- Test data verified by NJ Corporation for Advanced Technology (NJCAT)
HDS how do they work?

- Water enters and swirls
- Gravity, hydrodynamic action, and screening separate pollutants
  - Higher flows reduce sediment removal efficiency
- Pollutants are stored
  - Higher flows increase risk of washing out collected sediment or “scour”
- Treated water exits
Pretreatment: Hydrodynamic Separator (HDS) Verification

• Testing protocol focused on sediment removal efficiency based on
  • Removal efficiency for a given Particle size distribution (PSD)
    • A device may get 100% removal of golf balls, but 10% removal of silt
  • Washing out of sediment collected at high flow rates or “scour”
    • A device may achieve high removal efficiency, but is not able to retain captured sediment which washes out of the system
• Testing does not account for trash capture (cans, sticks,..) although this is a feature that is some HDS have that is needed for RWH
HDS: Removal efficiency

- Particle Size Distribution (PSD) of NJDEP Testing Protocol
  - 100% particles smaller than 1mm
  - 60% particles smaller than 100 micron
    - 100 micron = diameter of human hair
  - Deemed by NJDEP to be representative of PSD found in “real world” conditions

- Removal Efficiency measured at
  - 25% MTFR (Maximum Treatment Flow Rate)
  - 50% MTFR
  - 75% MTFR
  - 100% MTFR
HDS : Scour testing

- Device is preloaded with sediment at 50% of the stated storage capacity

- Removal efficiency is measured at 125% and 200% of the device Maximum Treatment Flowrate (MTFR)

- Simulates real world condition when a device experiences high intensity storm event
Pretreatment: Results of testing

- NJCAT verifies test report for compliance with the NJDEP Protocol
- Test Data can be used to determine flow rate for target removal efficiency
- Test Data verifies that device will not “scour” under heavy flow

- Certification bridges the gap between design and “Real world” by verifying that the device performs as advertised
- Result = lower maintenance cost and better re-use water quality
Certification bridges the gap between design and “Real world” by verifying that the device performs as advertised.

- Protects pump and filtration
- Lower maintenance cost
- Better re-use water quality
Cistern: why is certification important?

- System installed in traffic areas must be capable of maintaining structural strength
- Leakage of stored water diminishes the goal of RWH and could also cause degradation of the backfill and structural strength
Storage: Cistern Verification

- International Association of Plumbing and Mechanical Officials (IAPMO)
- Technical Committee of industry professionals developed the IAPMO standard Z-1002 “Rainwater Harvesting Tanks”
- Testing to standard by IAPMO R&T
- Certification provided by review committee
Storage : Cistern Verification

• IAPMO standard Z-1002 focuses on
  • Design
  • Materials
  • Manufacture
  • Testing
  • Marking
IAPMO Cistern: Design

- Maintenance Access
  - 20 inch minimum
  - Riser covers
    - Lockable
    - Labeled “Confined Space – Do not enter”
    - Watertight
    - Cable of supporting traffic loads

- Drain Openings
  - Means to allow access for emptying / cleaning

- Venting
IAPMO Cistern: Design / Materials / Manufacture

- Structural Strength: Buried Tanks
  - Capable of with structural loads
    - Internal hydraulic pressure
    - External earth load
    - Vehicular traffic
  - Design calculations to be stamped by Professional Engineer

- Raw material property testing
  - Flexural strength / Modulus of Elasticity / Melt index / Thickness
  - Environmental Stress Crack Resistance
IAPMO Cistern: Testing

• Vacuum Testing
  • 2 psi with no loss of pressure for 5 minutes

• Water Testing
  • Filled to outlet invert with no leakage for 1 hour

• Air Test
  • 1.5 to 3 psi
  • Coat outer surface with leak detection fluid with no signs of leakage
IAPMO Cistern: Marking/Documentation

- Tank marked with
  - Manufacturers name
  - Model or Serial number
  - Volume
  - Date of manufacture
  - Maximum design load and maximum burial depth

- Installation Instructions
- Maintenance Instructions
IAPMO Certification

• Initial manufacturing plant inspection by IAPMO to verify compliance with standard
• Inspection report sent to IAPMO review committee
• Committee vote to certify product

• Subsequent annual manufacturing plant inspections upon certification
Cistern Certification

- Provides Engineer with assurance that cistern will perform as designed
- Provides on site inspector with a visible verification of certified product meeting code
- Provides owner with a reliable, watertight system
Is my RWH certified?

- Protocols /Standards developed by industry professionals
- Independent third party verification
- Certification = Assurance

- QUESTIONS?