

Water Connector and Toilet Valve Failures

**What they are, How they fail,
and How to Evaluate Recovery
Issues**

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WATER CONNECTOR FAILURES





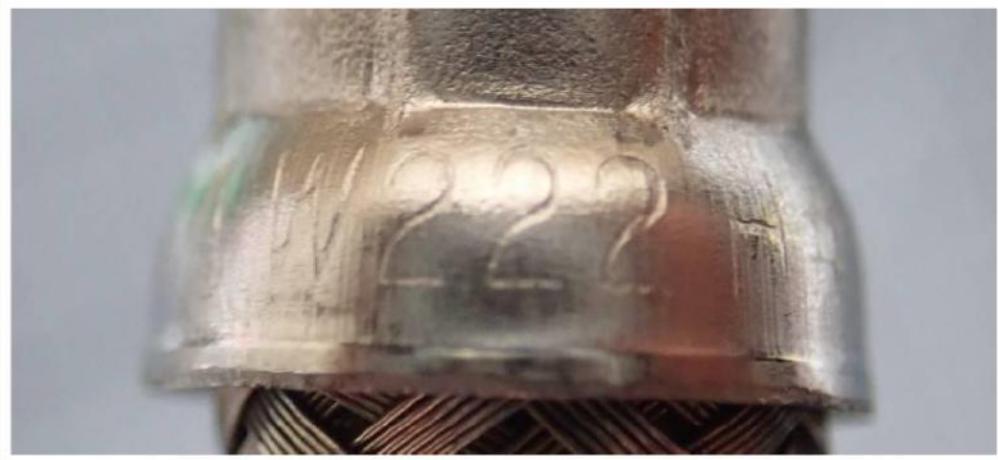
MANUFACTURERS

- Fluidmaster
- Brasscraft
- DuraPro/Interline
- EZ-Flo
- Watts





Photograph 2: Manufacturer's identification.



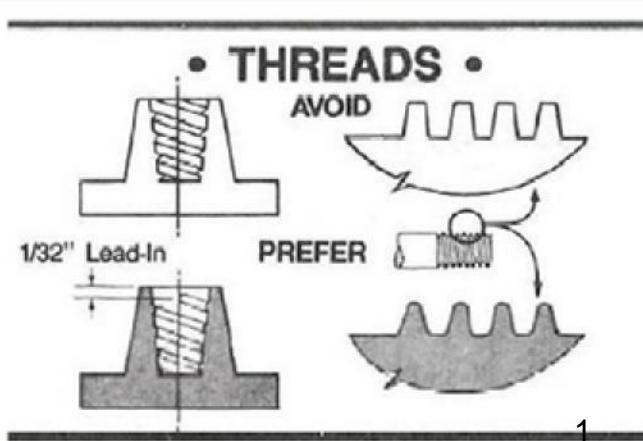
PLASTIC NUT FAILURES

USUAL FAILURE MODE

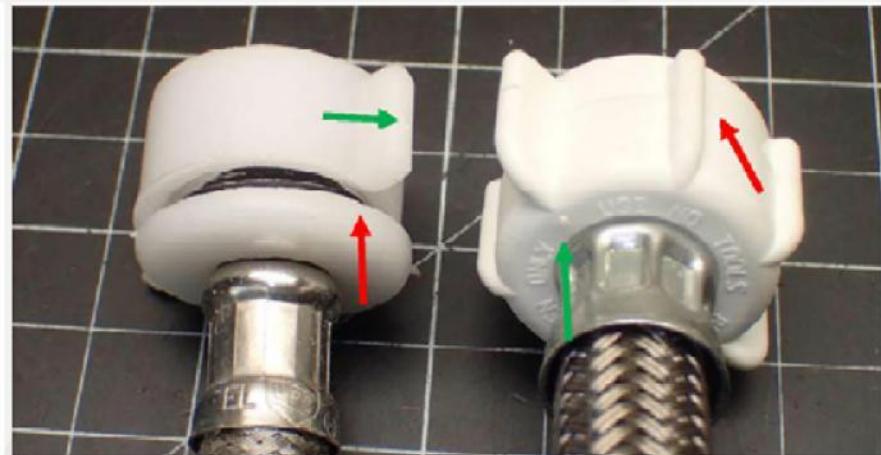
- Circumferentially fractured;
- Eventual total separation of nut;
- Fracture starts at root at base of nut.



Design Defects Lead to Failures

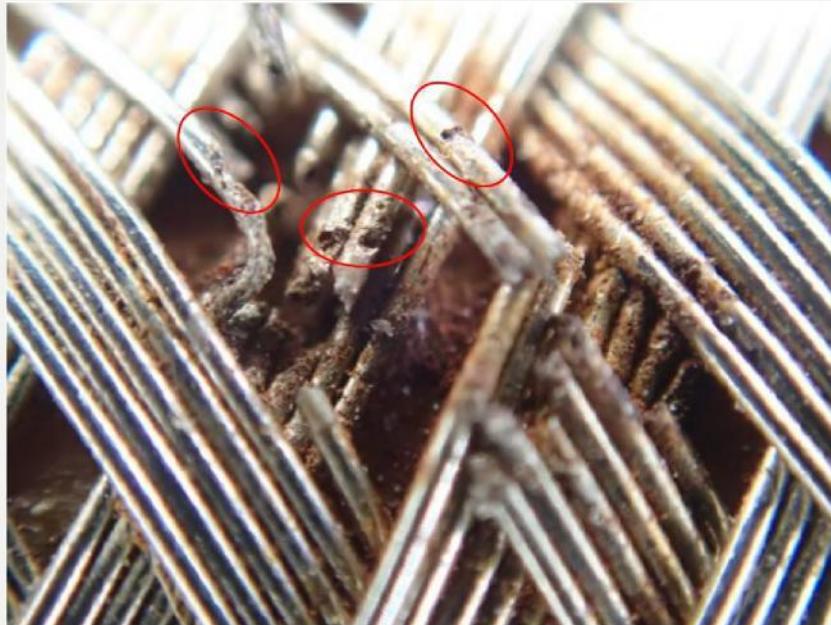


1. Sharp teeth v. Rounded teeth
2. Sharp transitions at bottom and crest v. Rounded



¹¹Society of the Plastics Industry, & Berins, M. L. (1991). *Plastics engineering handbook of the Society of the Plastics Industry*. New York: Van Nostrand Reinhold. Figure 1, 1-13, page 319.

HOSE FAILURES



Corroded and broken stainless steel braid and burst inner tubing



CAUSE:

Exposure to common household cleaning products containing chlorine/chlorides (chlorine-induced stress corrosion cracking)

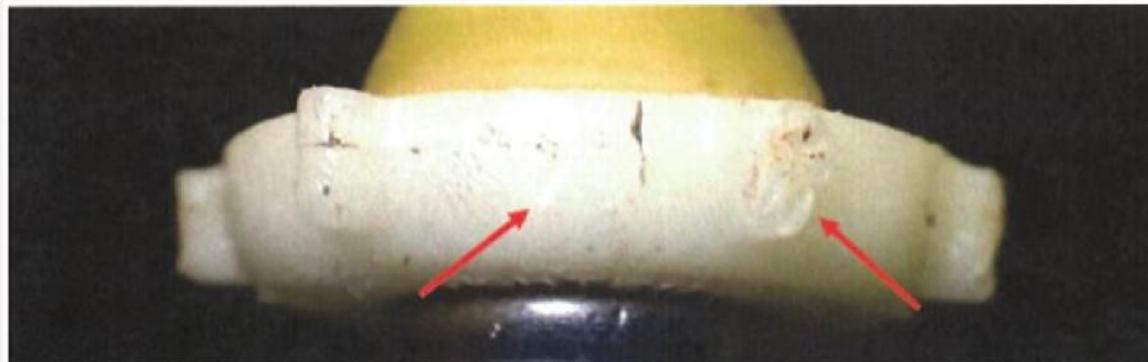


WHAT MANUFACTURERS ARE SAYING



Overtightening

Abuse of the connector



Tool marks found on coupling nut.



Tool marks found on coupling nut.

WHAT MANUFACTURERS ARE DOING

- Design Changes To The Hose

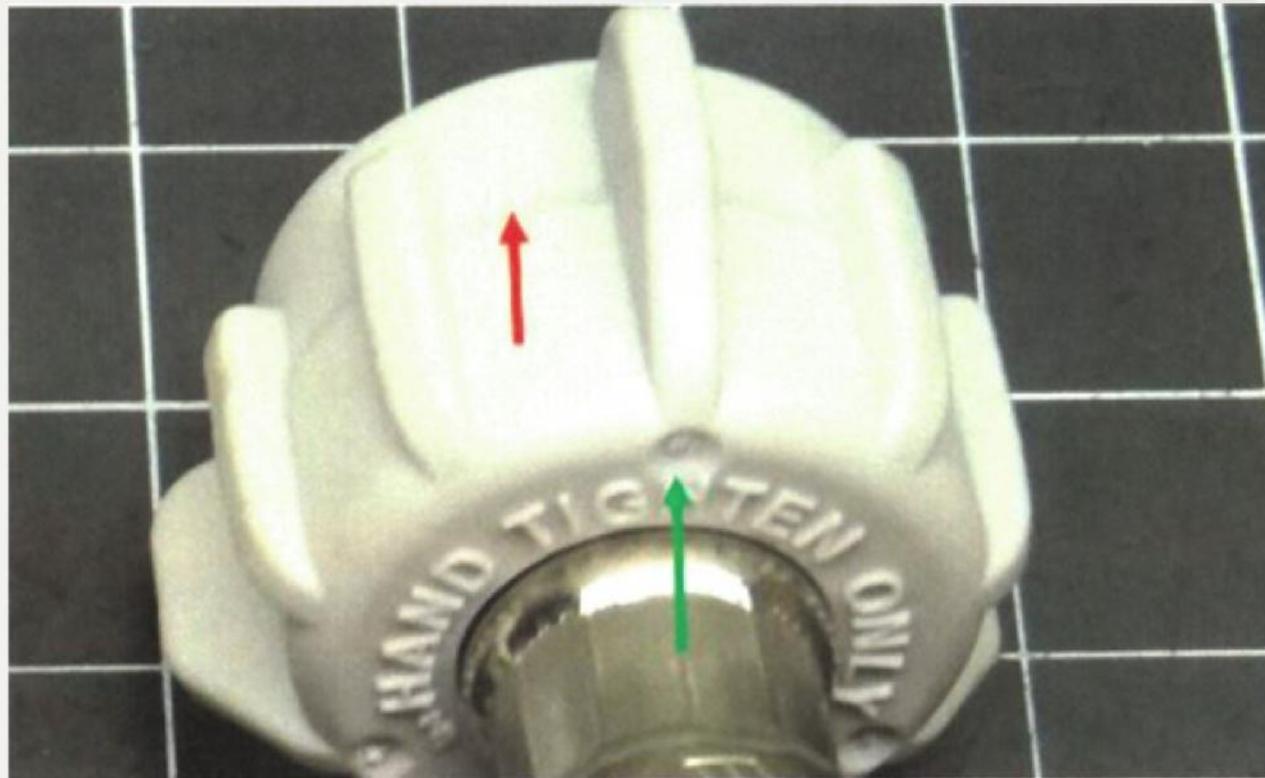


Exemplar supply lines that are readily available are more resistant to the subject supply line failure. Watts supply line with polyvinyl-coated exterior (left). BrassCraft supply line with engineered polymer braiding (center), and Watts supply line with exterior plastic jacket used to protect braiding (right).



The stainless-steel braid of an exemplar Watts brand supply line that has corroded due to chloride exposure. Note the reinforcement of the inner polymer tubing prevented the supply line from bursting and leaking.

- Design Changes To The Nut





WHAT TO DO WHEN YOU GET A WATER CONNECTOR FAILURE LOSS

- Photos
- Identify the manufacturer
- Secure the connector
- Retain an expert
- What to expect from the manufacturer
- Challenges

TOILET VALVE FAILURES





Continuous Flushing

1.3 gpm leaking from fitting



The Culprit

- (A) Rubber U-Seal
- (B) Brass Piston



Porcelain Fractures



Class Action

- Vortens, Inc. & Sanitarios Lamosa S.A.
 - Serial Nos. 3464 & 3412
 - Manufacturing date of 2011*

