

# Water Connector and Toilet Valve Failures

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

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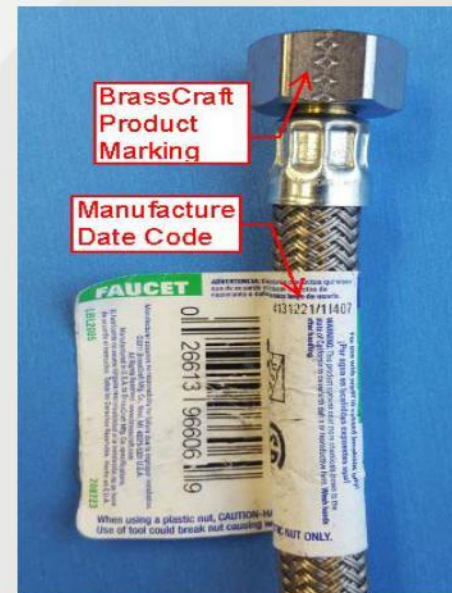
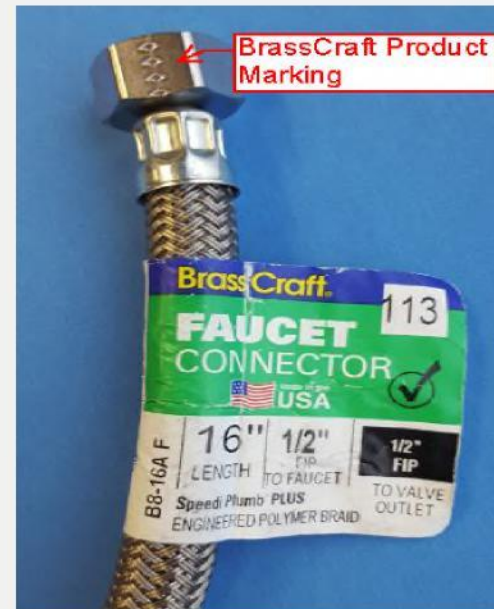
# **WATER CONNECTOR FAILURES**

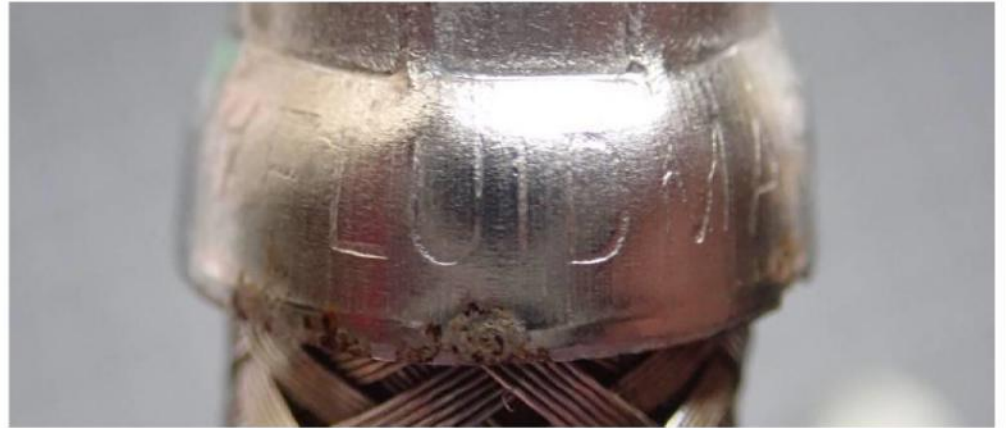




# **MANUFACTURERS**

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





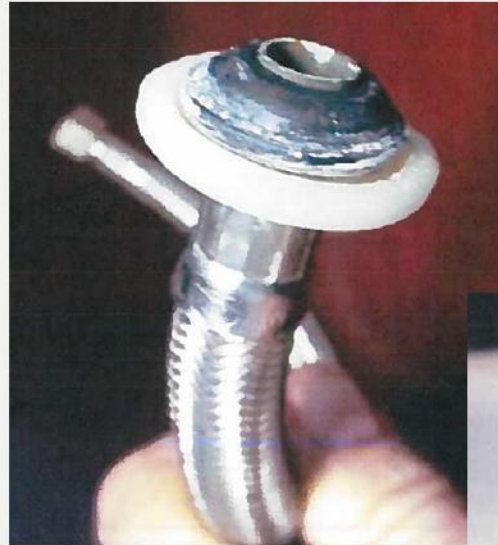
Photograph 2: Manufacturer's identification.



# PLASTIC NUT FAILURES

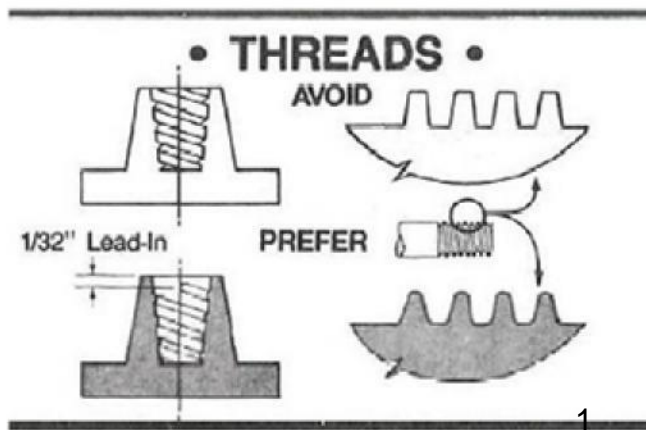
## USUAL FAILURE MODE

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

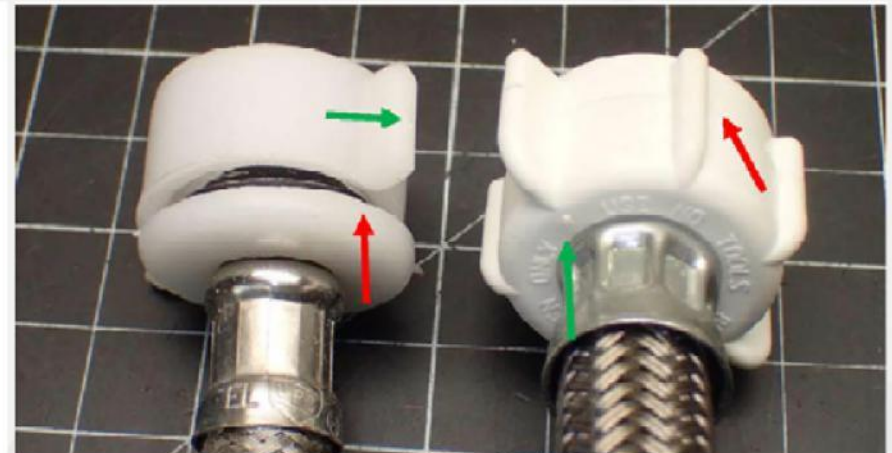




## Design Defects Lead to Failures



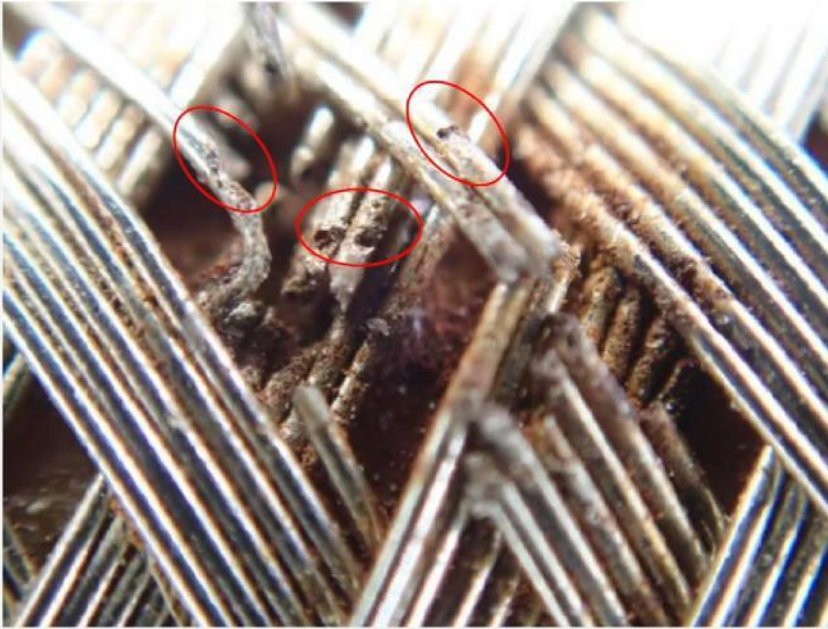
1. Sharp teeth v. Rounded teeth
2. Sharp transitions at bottom and crest v. Rounded



1. Parting line at base of nut v. continual mold
2. Lack of additional wings/ribs.
3. Injection from side v. bottom

<sup>11</sup>Society 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)



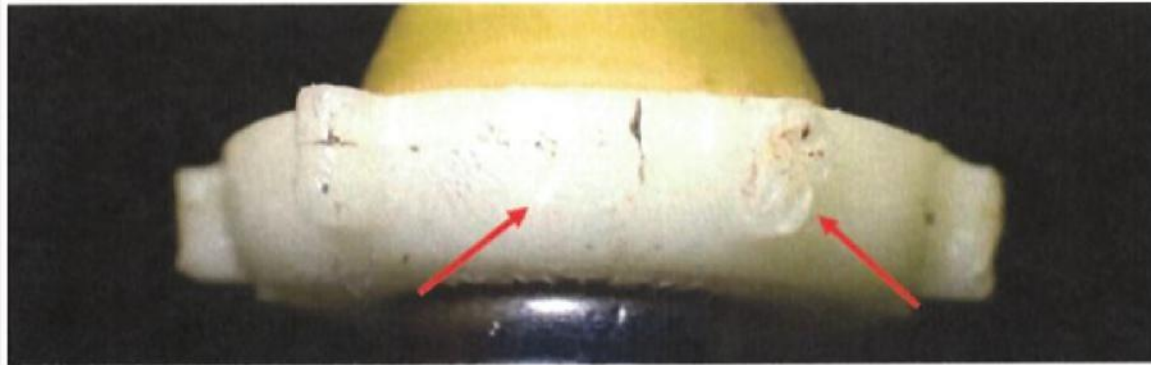


# WHAT MANUFACTURERS ARE SAYING

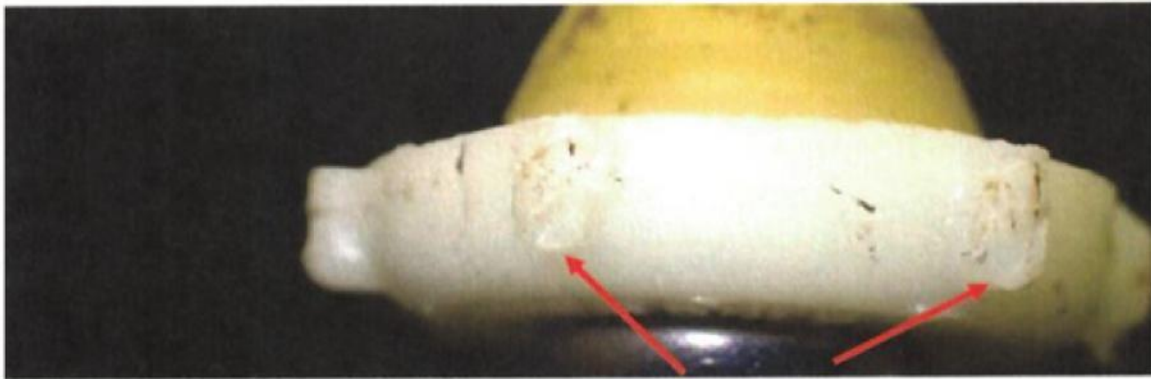


Overtightening

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

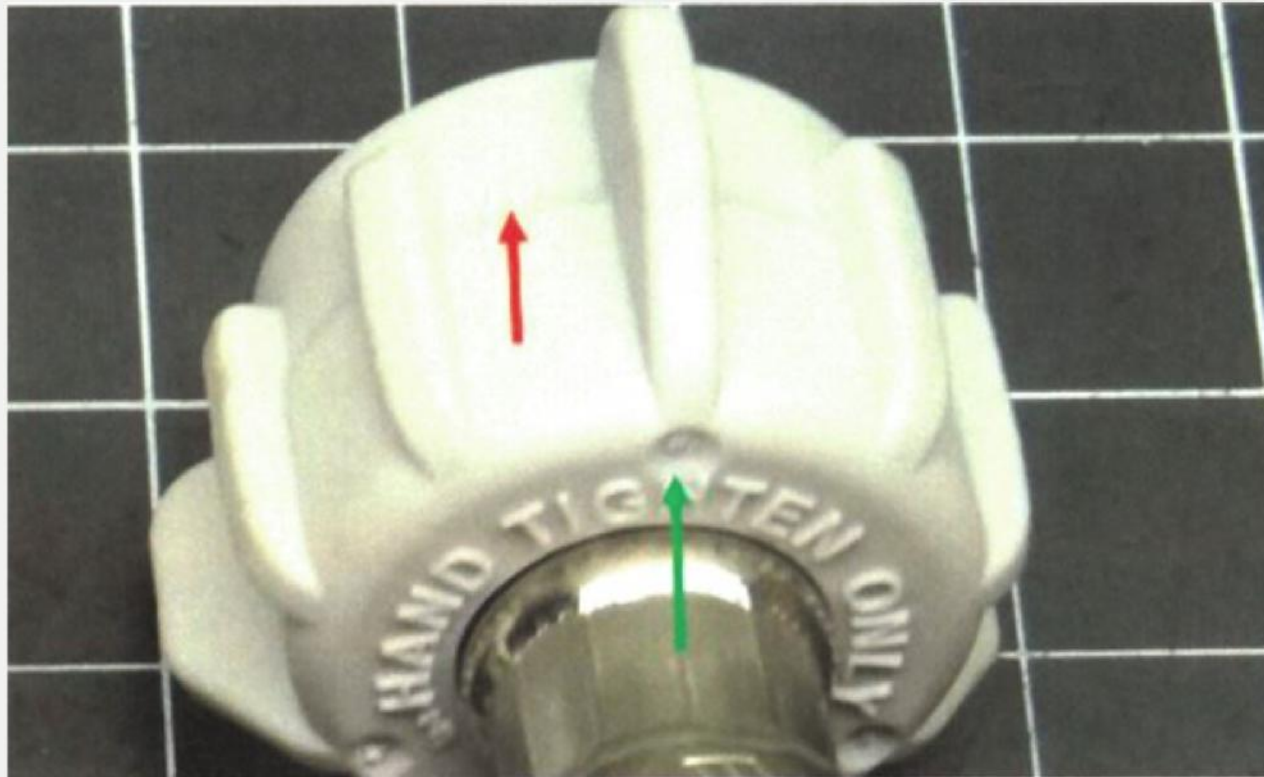


Exemplar supply lines that are readily available are more resistant to the subject supply line failure. Watts supply line with polyvinyl-coated exterior (left). BrassCraft supply line with engineered polymer braiding (center), and Watts supply line with exterior plastic jacket used to protect braiding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





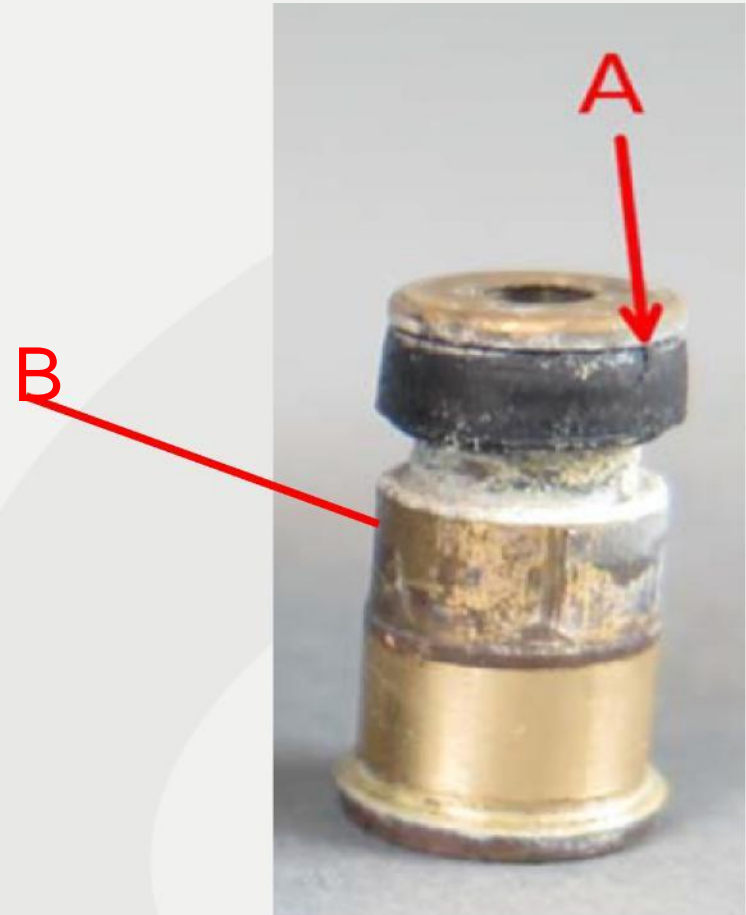
# Continuous Flushing

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\*

