

How CPVC Better Resists Biofilm Formation than Other Piping Materials

FLOWGUARD®
PIPE & FITTINGS

1 What Are Biofilms?

i **Biofilms** are a slimy glue-like substance that can harbor harmful bacteria like **Legionella** and **e-coli**. It forms on piping materials when biomass adheres to surfaces in wet environments.

Cross-section of a pipe

Water
Pipe Wall
Free-Floating Bacteria
BIOFILM
Biofilm Associated Bacteria

2 Why Biofilm Resistance Is Important



Biofilm resistance is a key to keeping water **safe** and **free of harmful contaminants**.



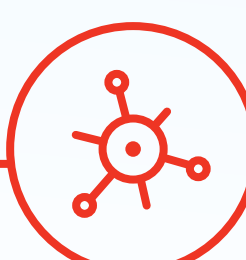
It reduces the risk of:



Accumulation of microorganisms which may cause health problems.



Impaired water quality, including taste and smell.

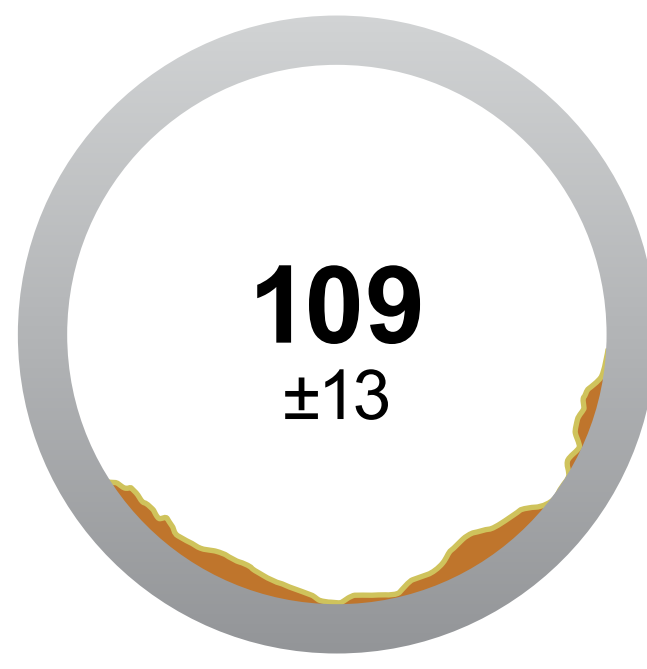


Bacterial growth, including multiplication of **Legionella** and **Pseudomonas** as well as increased counts of **Coliform** bacteria.

3 CPVC Resists Biofilm Formation Better than Alternatives



Biofilm Formation Potential (Pg ATP/cm²)



CPVC Pipe

vs.



Copper



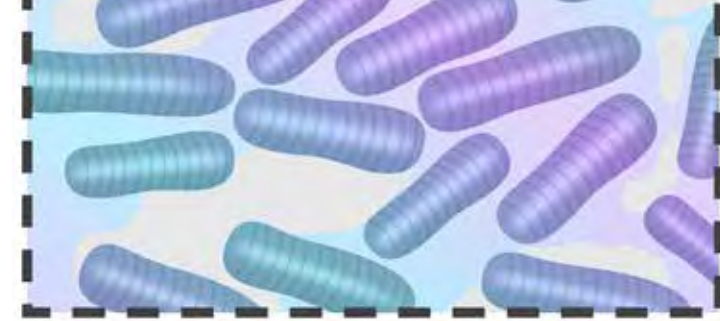
Polypropylene (PPR)



Number of Legionella Bacteria from Piping Materials

FLOWGUARD® CPVC

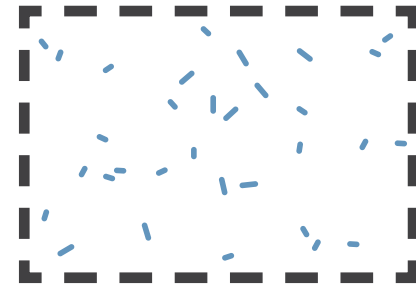
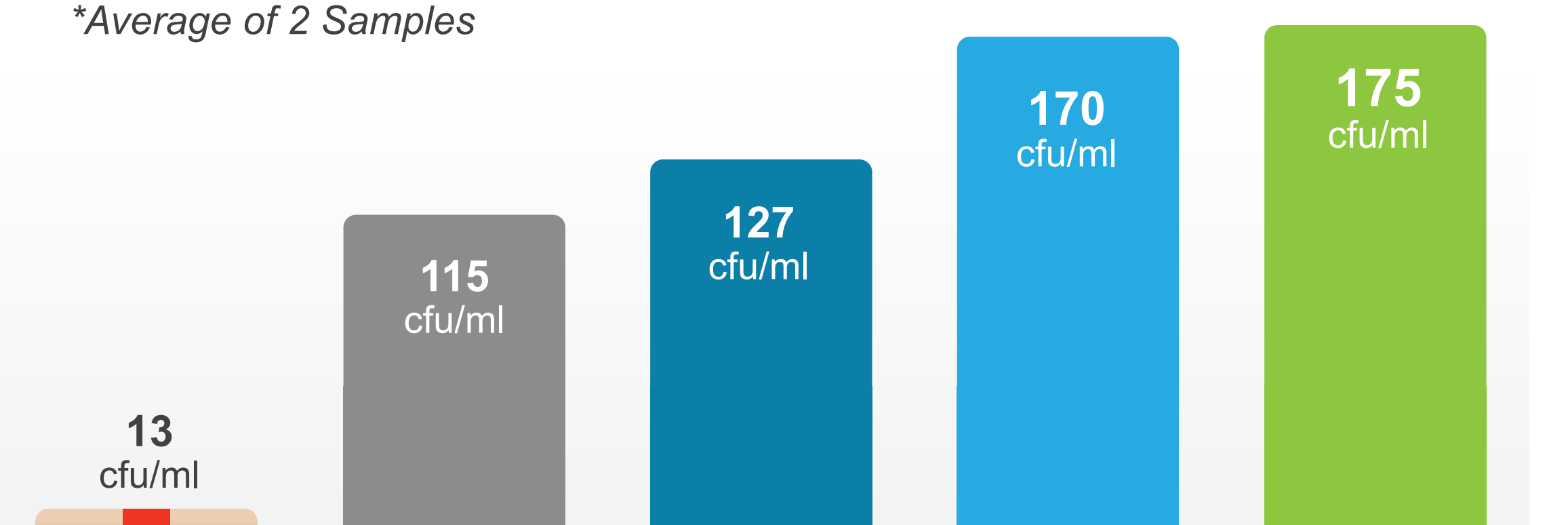
permits much less *Legionella* bacteria growth than other materials. **Legionella** is a type of bacteria that can lead to a serious, potentially deadly, infection. It is transmitted through water vapor, which makes it dangerous when steam is emitted during a shower.



Legionella bacteria

Average after 8, 12 and 15 weeks - Static Test, No Flow.

*Average of 2 Samples



The **Kiwa Assessment**, and multiple other international studies, confirm that **CPVC consistently outperforms alternatives**, including PPR (polypropylene), when it comes to resisting biofilm formation.

FLOWGUARD® CPVC

has been approved for potable water applications by major international agencies including:



“CPVC consistently outperforms most other non-metallic piping materials with regard to its ability to resist the formation of biofilms.”

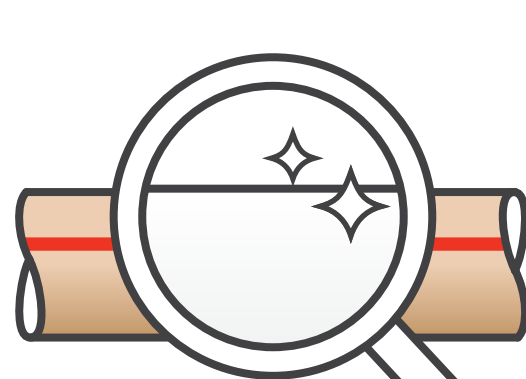
– Dr. Paul Sturman

Research Professor and Industrial Coordinator for
The Center for Biofilm Engineering at Montana State University

4 How CPVC Resists Biofilm Formation

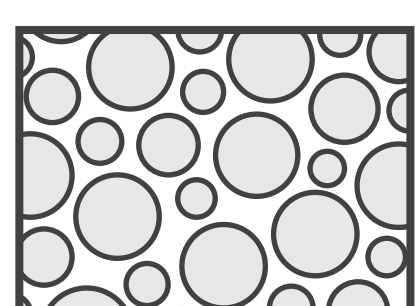


CPVC is made of 67% salt, which is a medium not suitable for bacterial growth.



Smoother interior pipe surface and superior corrosion resistance.

Corrosion creates pockets on the pipe surface for biofilm and bacteria to latch onto. **PPR** is prone to corrosion from chlorine and chlorine dioxide in water.



Higher Density Material.

Less bacterial attachment by reducing the contact area between bacteria cells and pipe surface.



Contains no plasticizers.

In plastics, plasticizers and other additives offer a nutrient source to fungus. **FlowGuard CPVC** contains no additives for fungus to feed on.



FlowGuard CPVC is **NSF 61 Annex G** certified, which verifies the weighted average lead content within the piping material is less than 0.25%.

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REFERENCES:
<https://cdn2.hubspot.net/hubfs/4206233/KIWA%20Assessment%20for%20Water.pdf>
<https://www.cdc.gov/legionella/about/signs-symptoms.html>