Critical Nature of Boiler Chemistry

HPAC HEATING PLUMBING AIR CONDITIONING

Presented By

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H_2O_2 = Hydrogen Peroxide

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Awarded patent for first condensing boiler while an employee of Rheem - **Italy 1974**

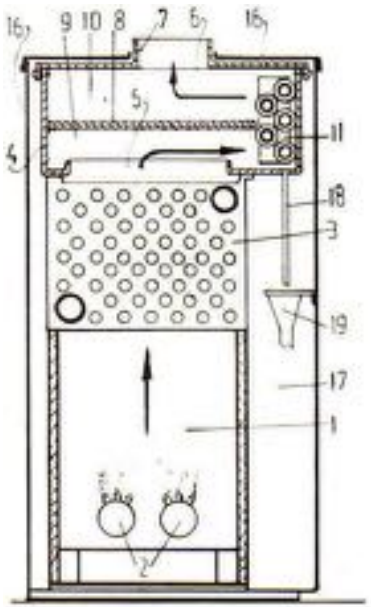

FIG.1

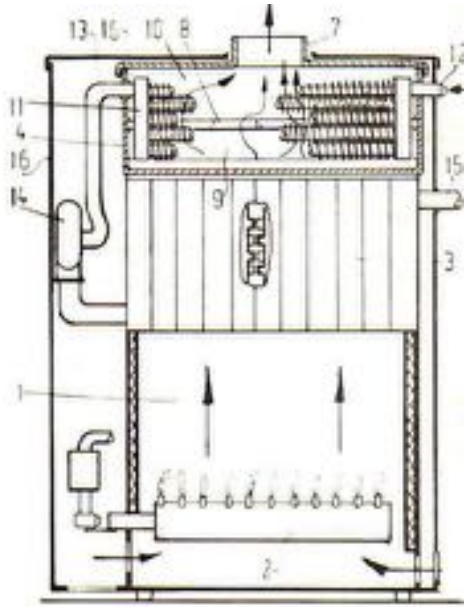

FIG.2

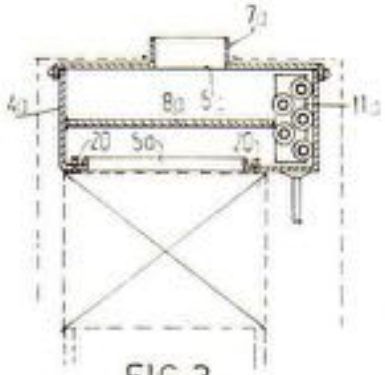

FIG.3

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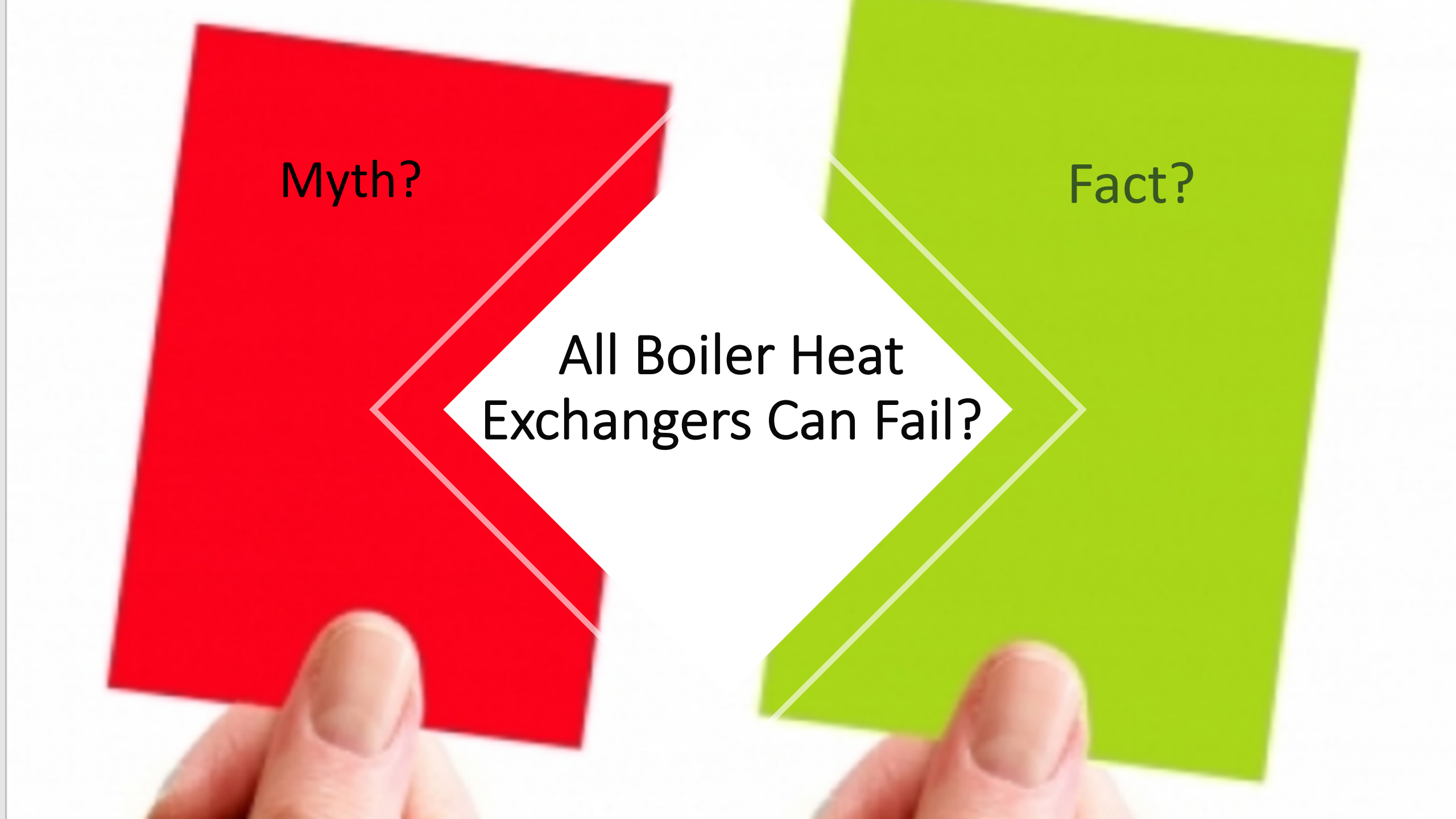
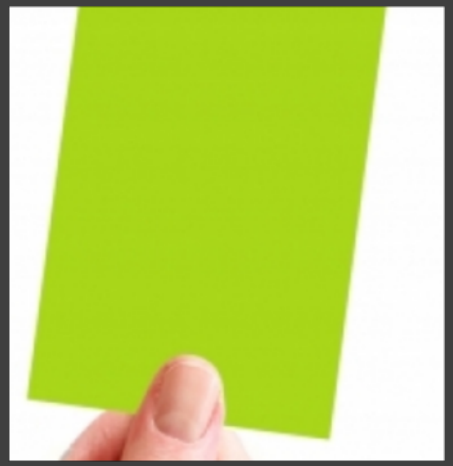

Myth?
Fact?
All Boiler Heat Exchangers Can Fail?



All Boiler Heat Exchangers Can Fail?

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Examples of buildup in Heat Exchangers

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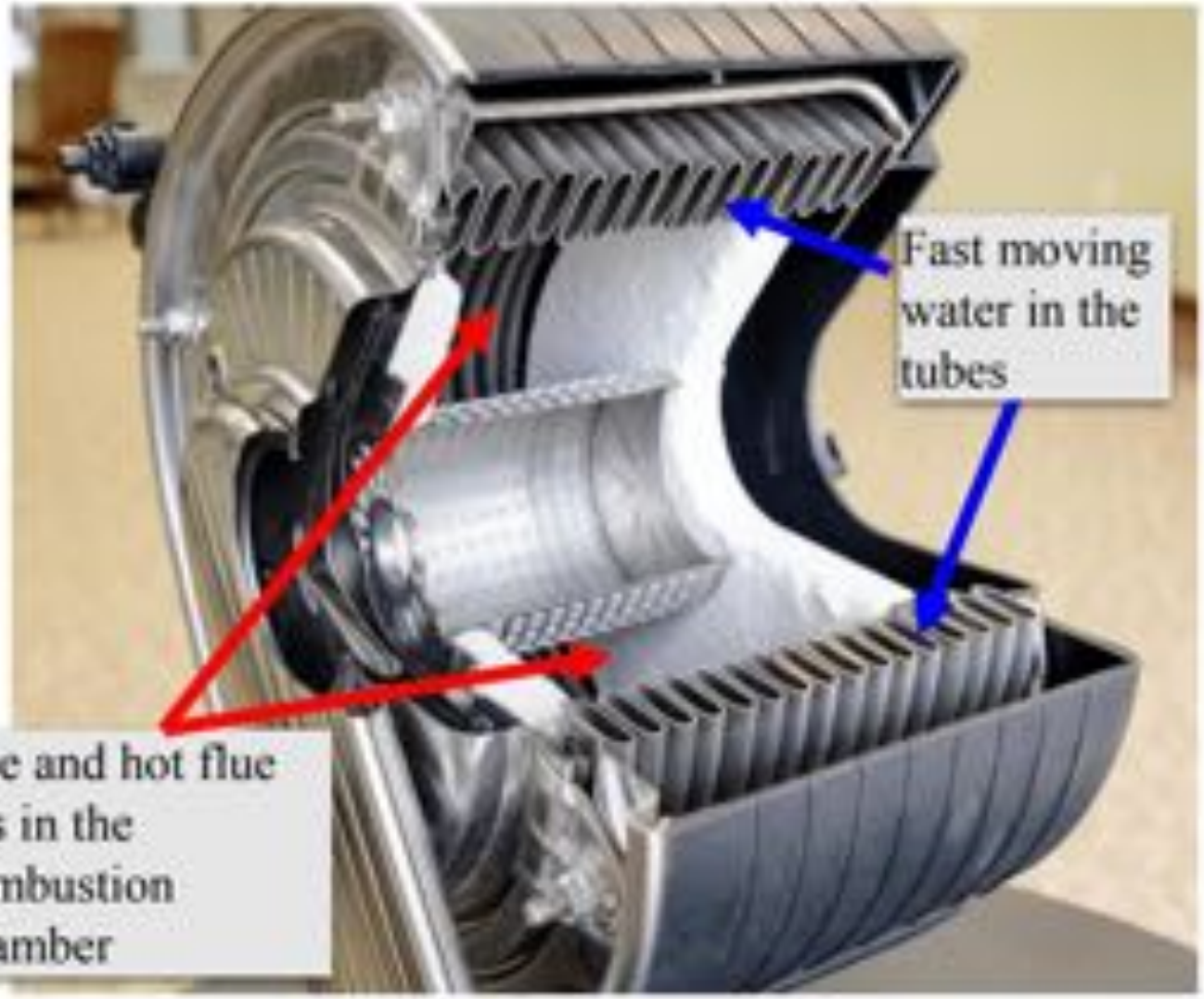
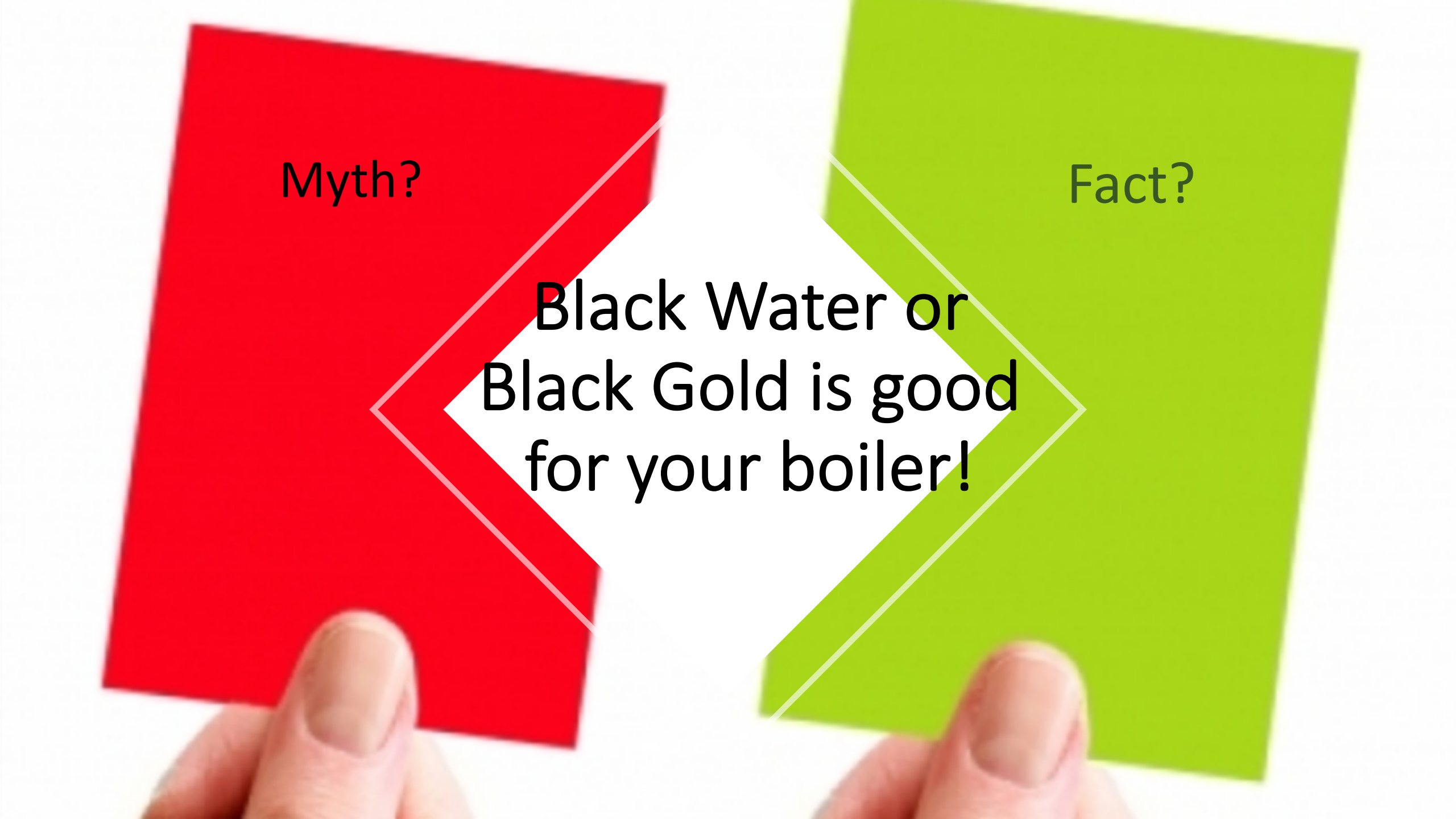
Heat Exchanger Design(s)




Myth?
Fact?
Black Water or
Black Gold is good
for your boiler!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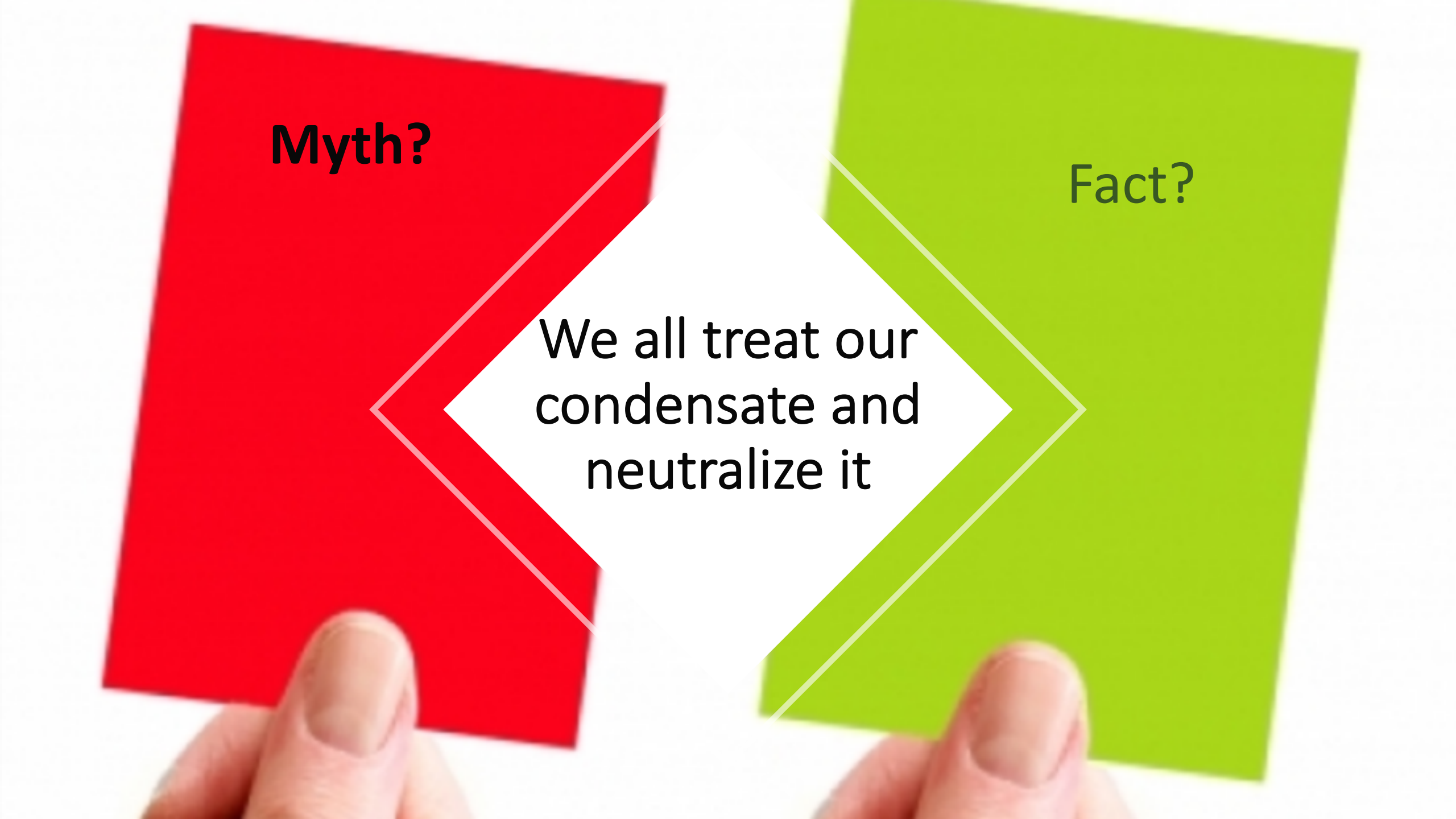
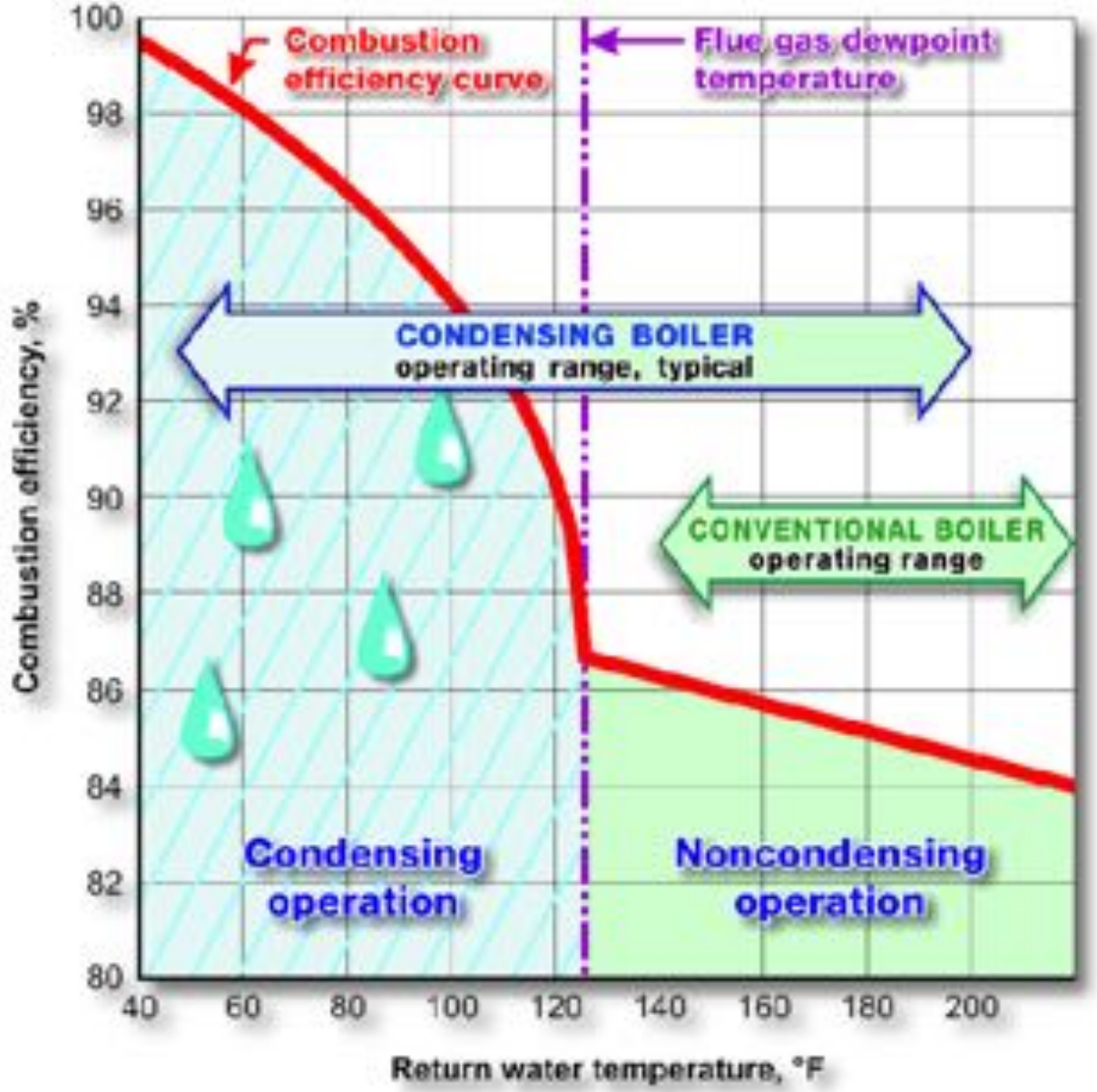

Myth?
Fact?
We all treat our condensate and neutralize it



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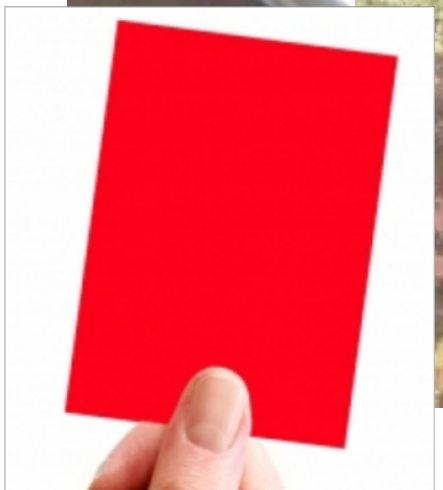
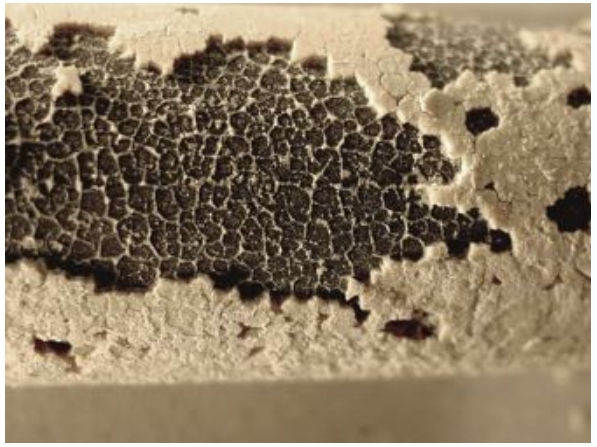



Myth?
Fact?
I don’t need to treat City Water, it’s already been treated

Possible consequences of using untreated tap water

sludge



Lime scale build up

Rust deposits

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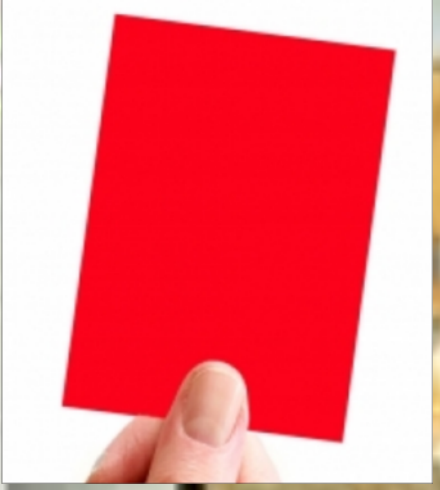

3 Types of Corrosion?

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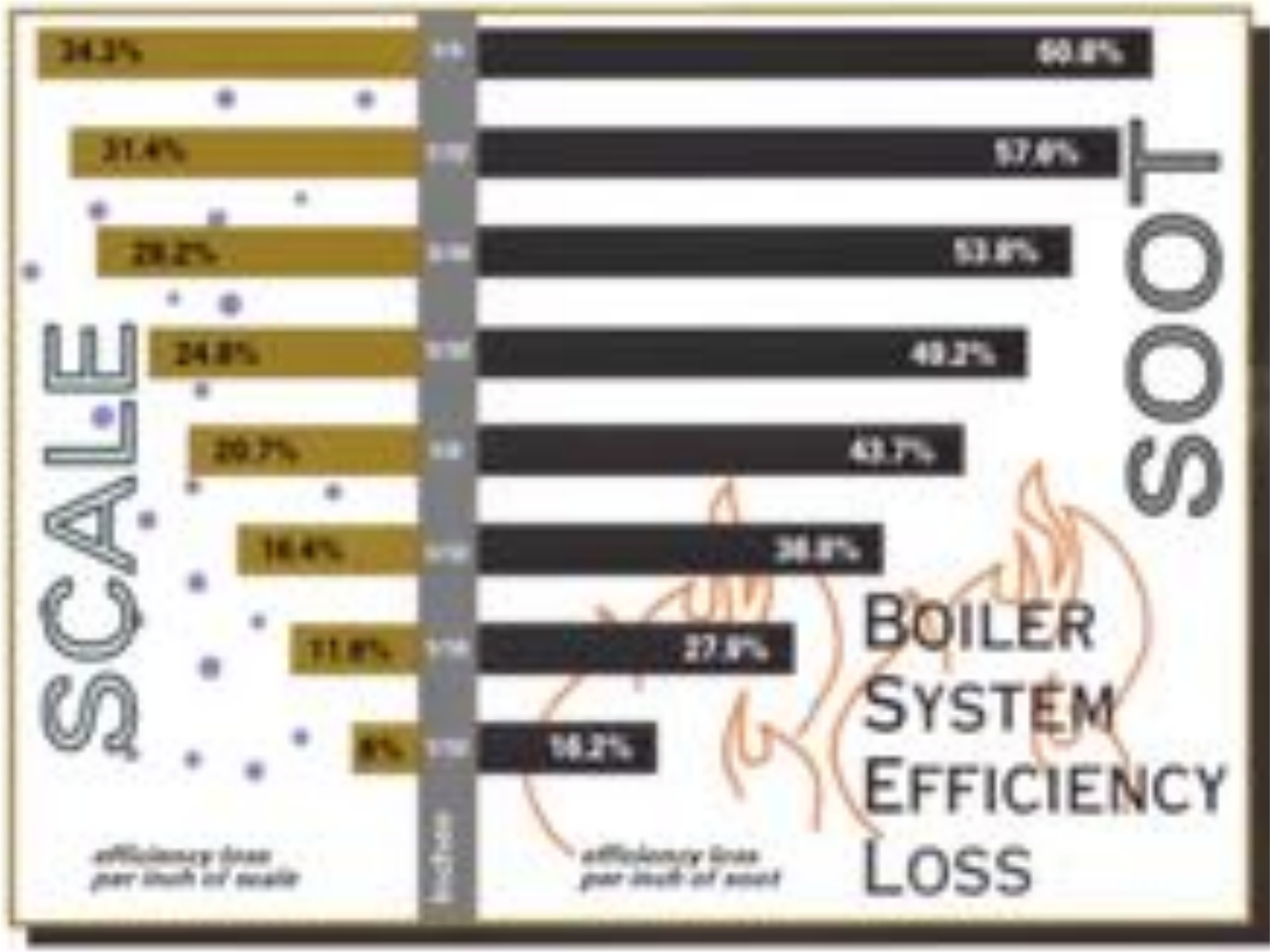

Source: Department of Building Inspection, Milwaukee, Wisconsin
Calculated with formulas from Mark's Standard for Mechanical Engineers, ninth edition

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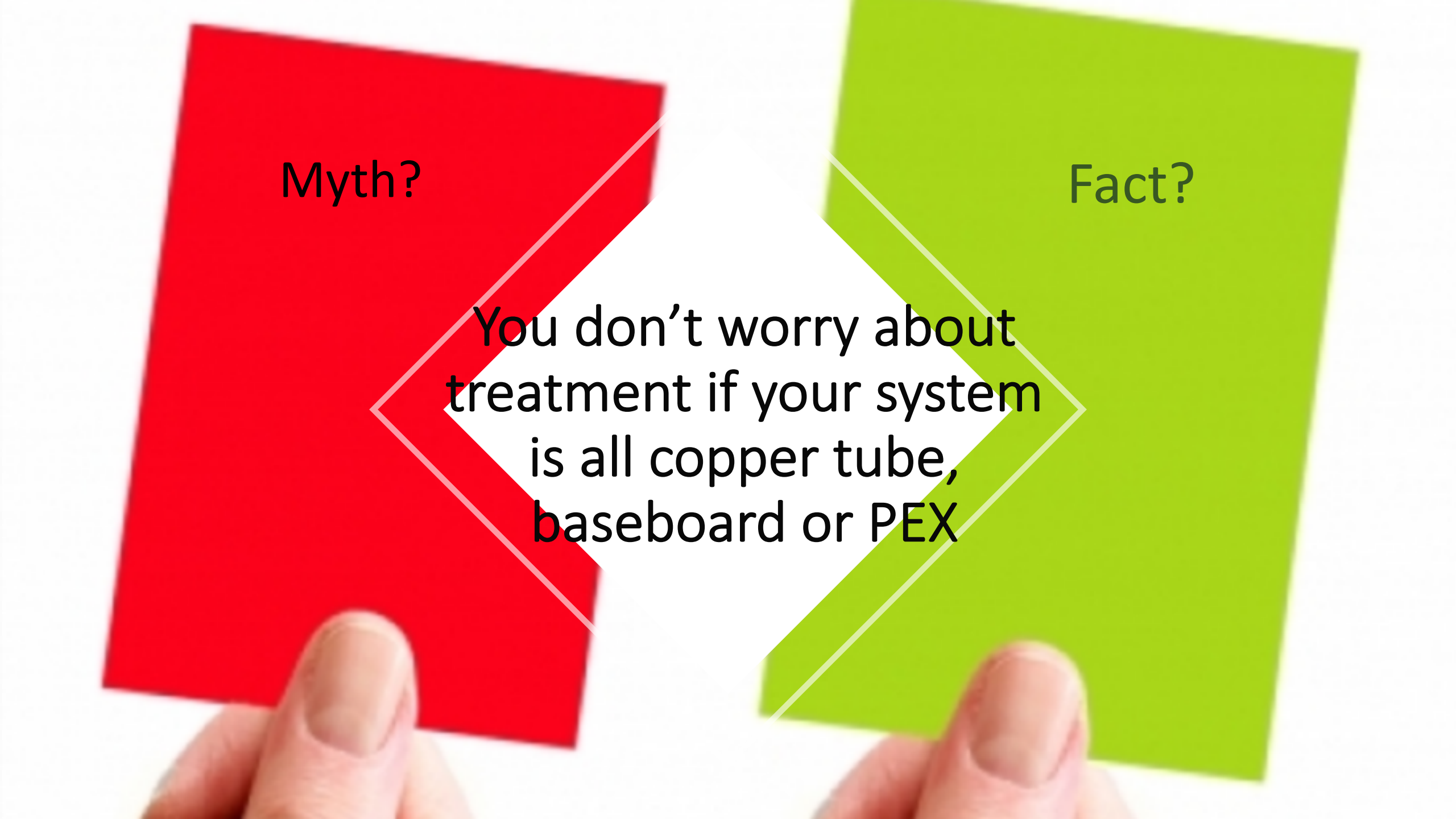
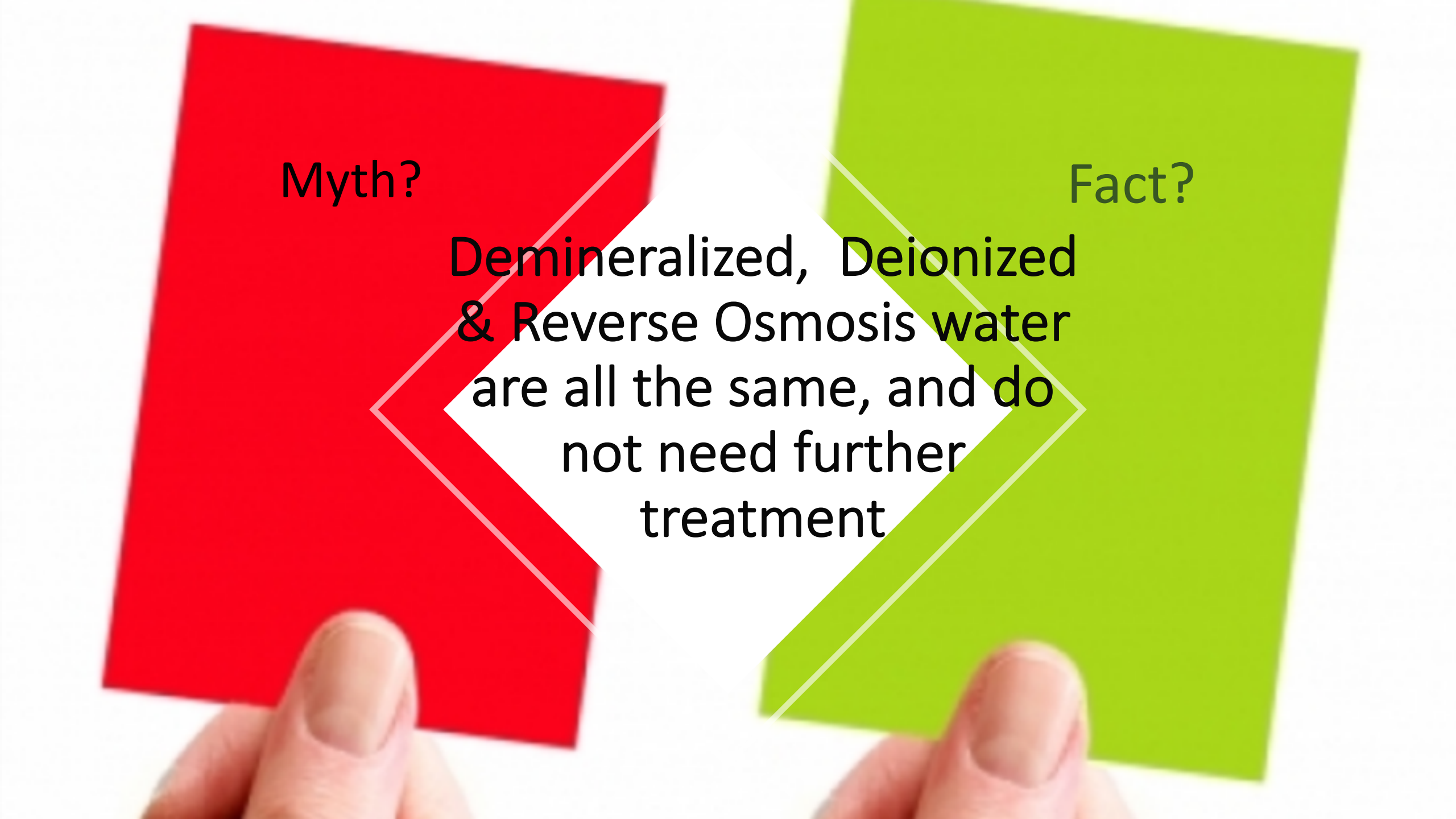

Myth?
Fact?
You don’t worry about treatment if your system is all copper tube, baseboard or PEX


Myth?
Fact?
Demineralized, Deionized & Reverse Osmosis water are all the same, and do not need further treatment

What's the best solution?

	CHEMICAL DIFFERENCES	EFFECTS ON SYSTEM	RISK OF LIMESCALE	RISK OF CORROSION (Galvanic)
Untreated water	Numerous chemicals in solution, often including calcium ions and bicarbonates	As the temperature increases, the calcium carbonate precipitates and forms limescale	*High*	*High*
Softened water	Has the same saline content as untreated water but with low levels of calcium and magnesium, which are replaced by sodium	Only a minimal quantity of salts precipitate	*Medium - low*	*Medium*
Softened water with chemical conditioning	Numerous chemicals in solution, with the addition of corrosion-proofing agents and hardness stabilisers	As the temperature increases, a minimal quantity of salts may precipitate	*Low*	*Low*
Demineralised water	Almost entirely free from chemicals in solution. Electrical conductivity is very low	No salts precipitate and the galvanic effects with different materials are drastically reduced	*Absent*	*Absent*

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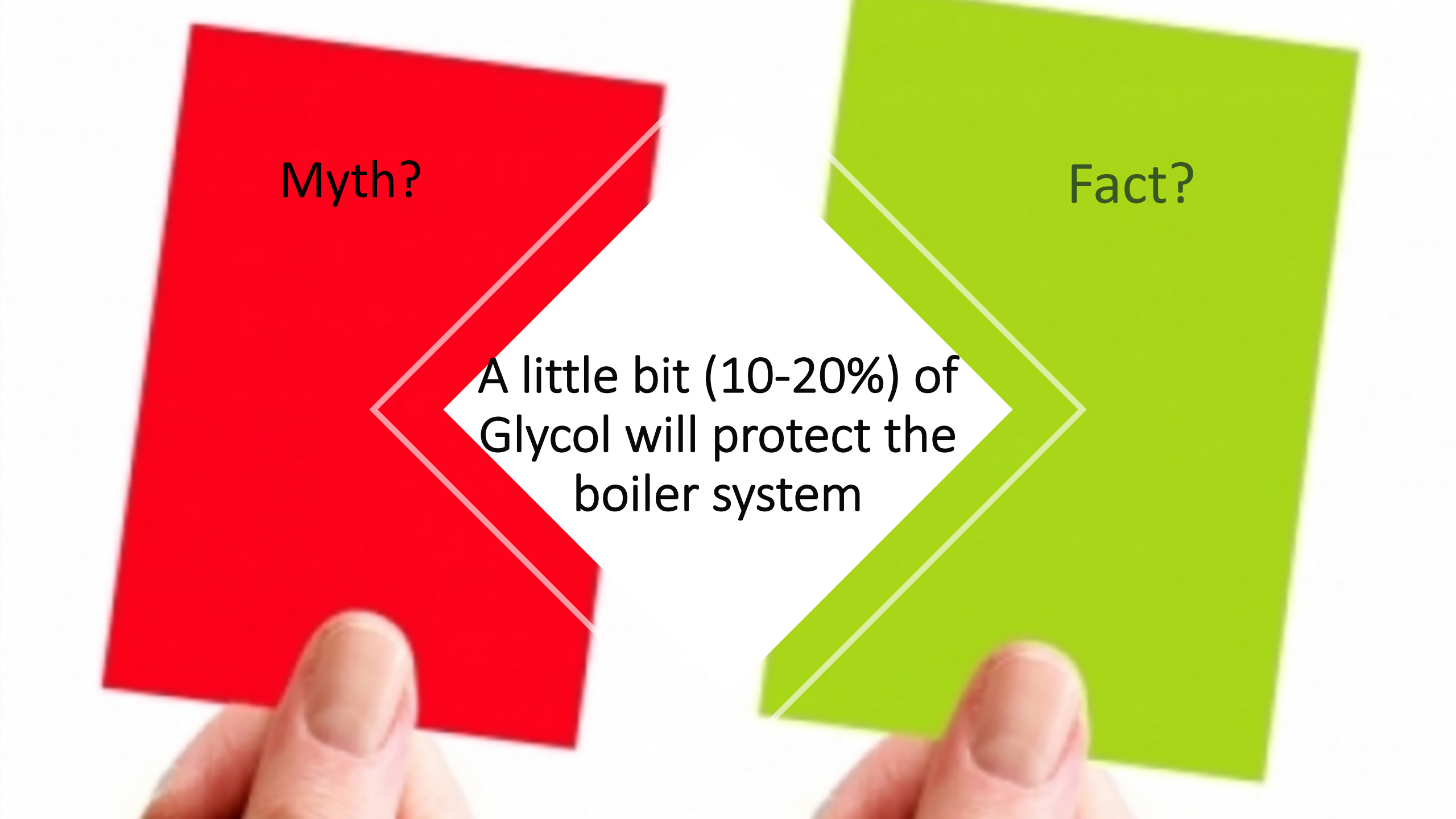
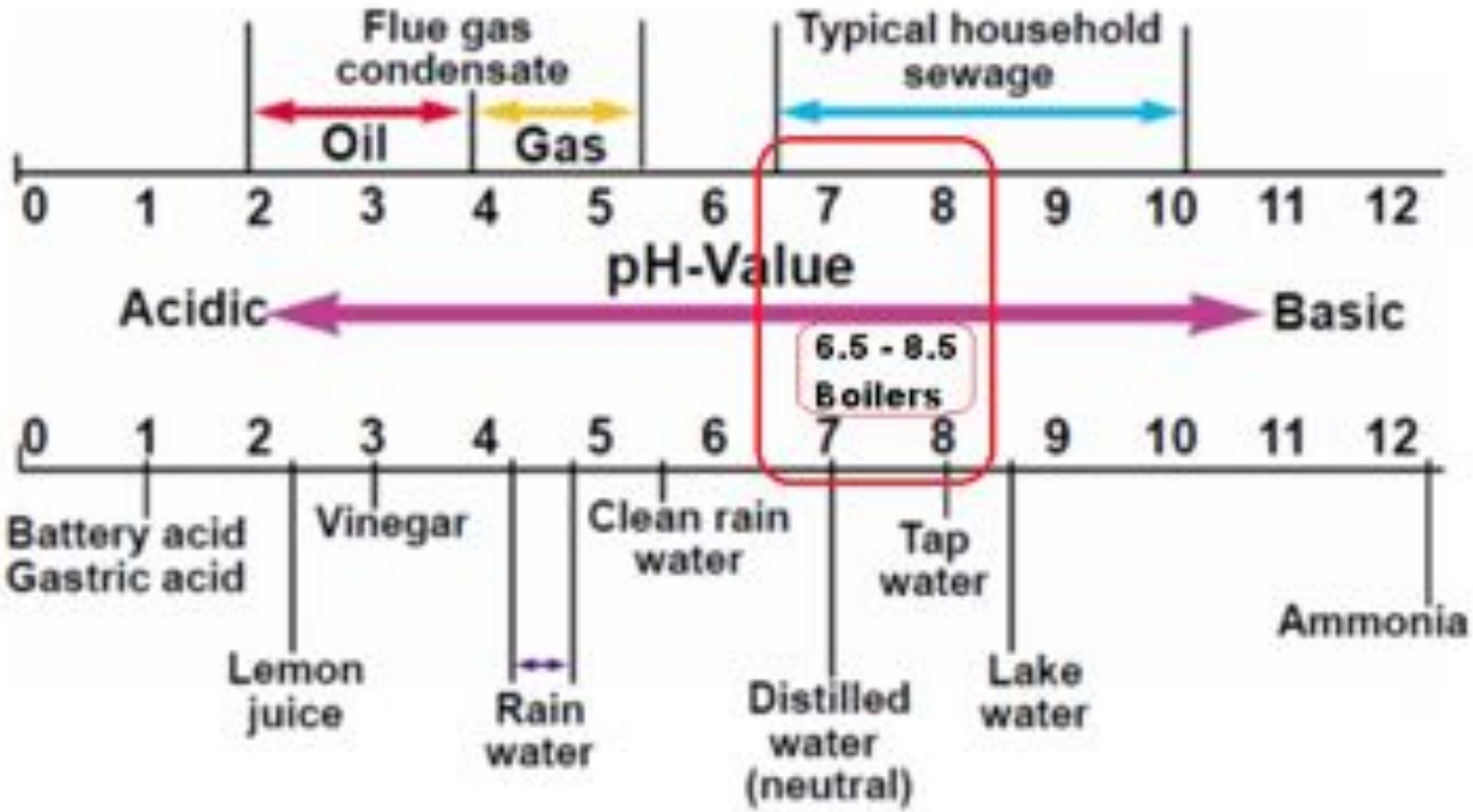

Myth?
Fact?
A little bit (10-20%) of Glycol will protect the boiler system

pH VALUES OF VARIOUS FLUIDS



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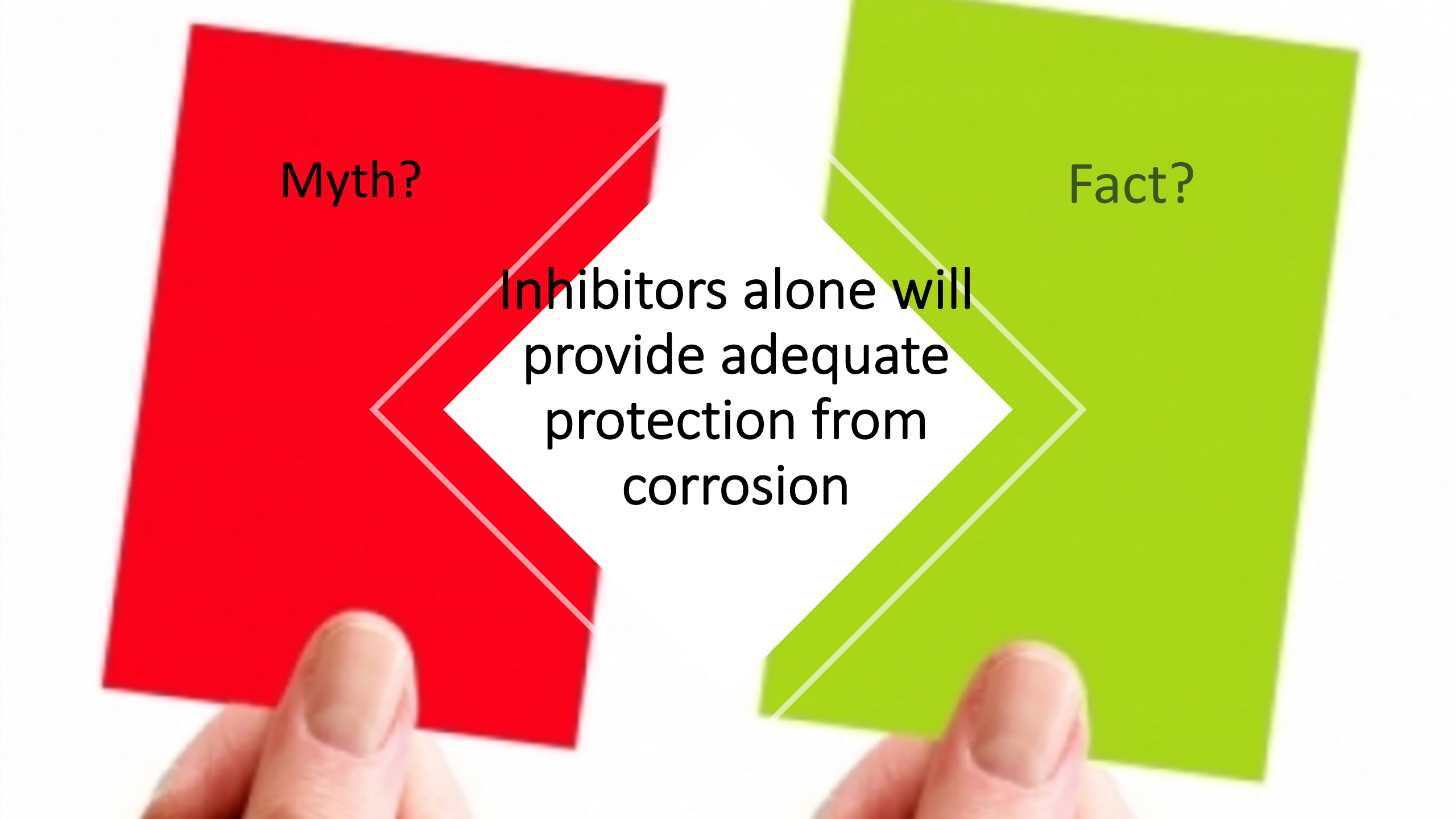
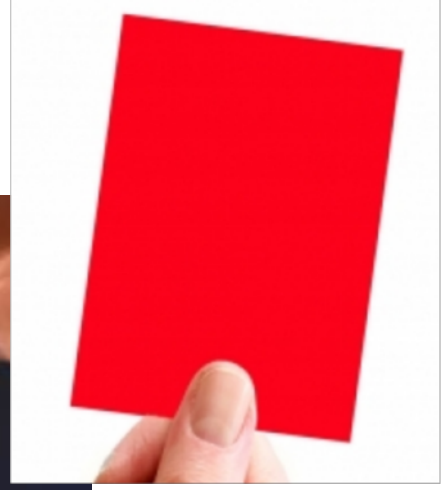

Myth?
Fact?
Inhibitors alone will provide adequate protection from corrosion

Test – 90 Minutes

Test – 150 Minutes



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Test – 2 Days

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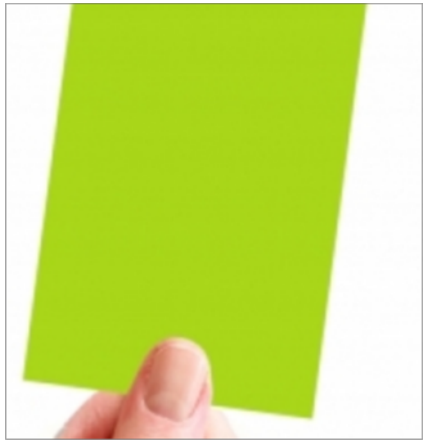
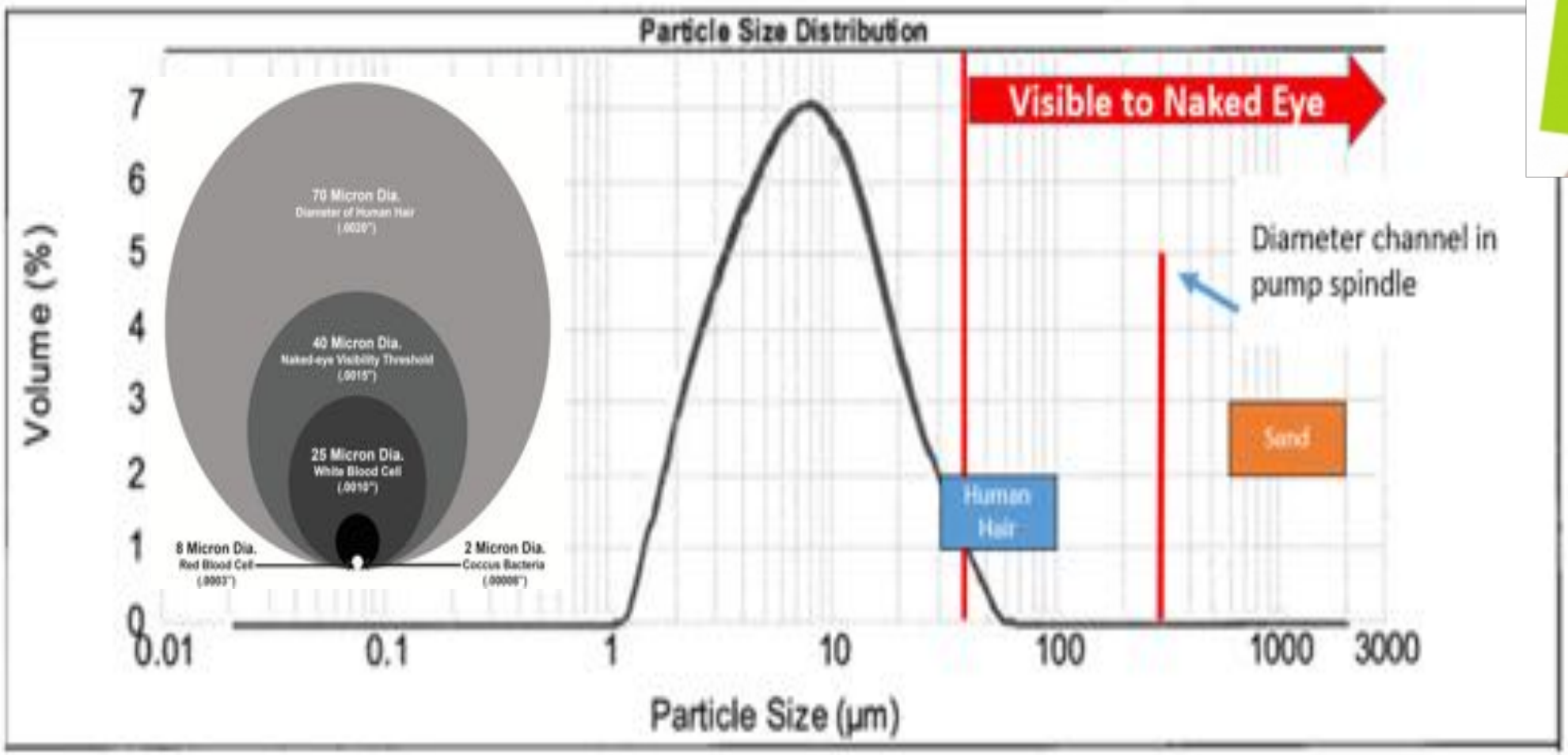
Myth?
Fact?
Air and Dirt separators, with or without magnets, were originally designed for Air Removal on the Supply Side of your system



Some Issues

- Pump seals leaking
- IFC's stuck
- Circulators seized
- Zone valves hung up
- Low water cutoff probes fouled
- Plugged heat exchangers in modcons
- Percolating boilers (noise in modcons)
- Aluminum boilers vulnerable

Magnetic Particle Size



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What’s the solution?

How Do You Counteract Corrosion?

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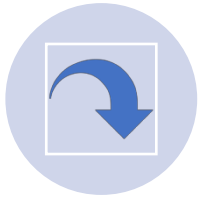
So, what can you do about water quality issues?



ENSURE ADEQUATE PUMP/FLOW SIZING

USE FILTERS/STRAINERS TO CATCH LARGER DEBRIS,

USE MAGNETIC FILTRATION ON RETURN TO THE BOILER(S)

TREAT BOILER FEED WATER.

USE A CORROSION AND SCALE INHIBITOR ON EVERY JOB.

REPAIR SYSTEM LEAKS AS SOON AS POSSIBLE.

ANNUAL TEST OF SYSTEM WATER

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Fill Water Options:

Untreated Water

Galvanic Corrosion

Limescale Formation

Softened Water

Chemically Treat

Galvanic Corrosion

Demineralized Water plus inhibitors

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Then you should be protecting your boilers!!

Would You Wear Protection for This?

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Thank You!