

# Tube Bundle Warranty Guide



# Water Chemistry

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(Corrosive water voids all warranties)

For your health and the protection of your pool equipment, it is essential that your water be chemically balanced. The following levels must be used as a guide for balanced water.

Recommended Level(s)	Fiberglass Pools	Fiberglass Spas	Other Pool & Spa Types
Water Temp. (Deg. F)	68 to 88	89 to 104	68 to 104
pH	7.3 to 7.4	7.3 to 7.4	7.6 to 7.8
Total Alkalinity (PPM)	120 to 150	120 to 150	80 to 120
Calcium Hardness (PPM)	200 to 300	150 to 200	200 to 400
Salt (PPM)	<b>6000 MAXIMUM</b>	<b>6000 MAXIMUM</b>	<b>6000 MAXIMUM</b>
Free Chlorine (PPM)*	2 to 3	2 to 3	2 to 3
Total Dissolved Solids (PPM)	<b>3000 MAXIMUM</b>	<b>3000 MAXIMUM</b>	<b>3000 MAXIMUM</b>

**\* Free Chlorine MUST NOT EXCEED 5 PPM!**

- Occasional chemical shock dosing of the pool or spa water should not damage the heater providing the water is balanced.
- Automatic chemical dosing devices and salt chlorinators are usually more efficient in heated water, unless controlled, they can lead to excessive chlorine level which can damage your heater.
- Further advice should be obtained from your pool or spa builder, accredited pool shop, or chemical supplier for the correct levels for your water.

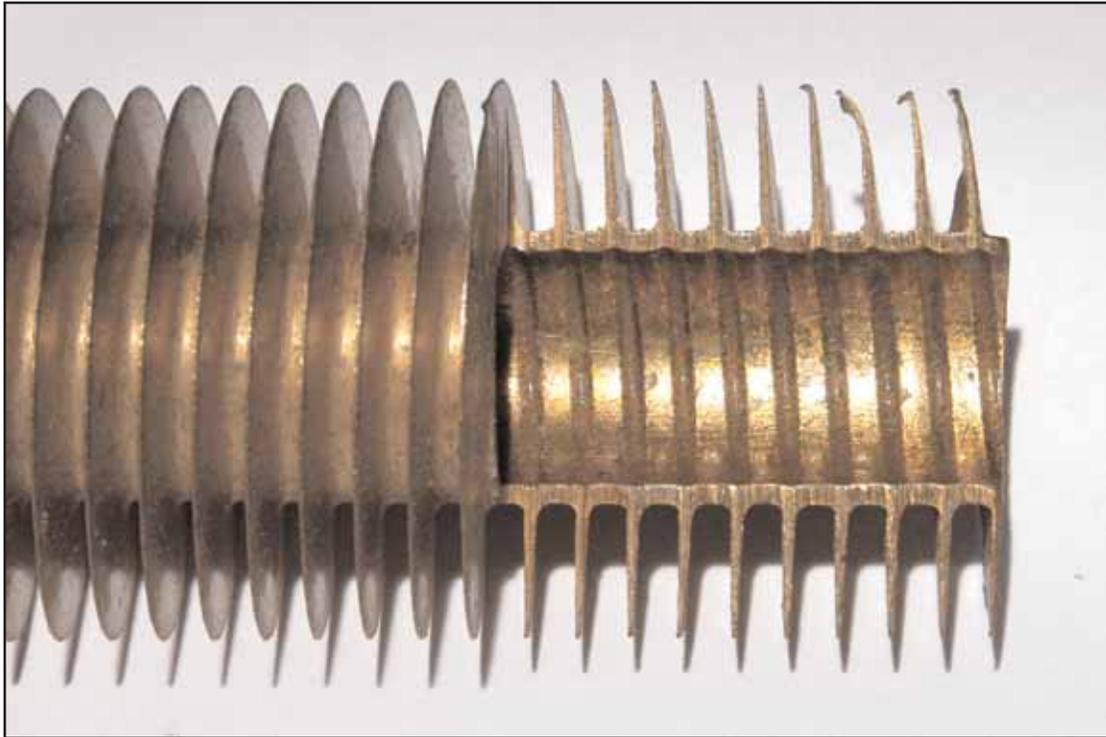
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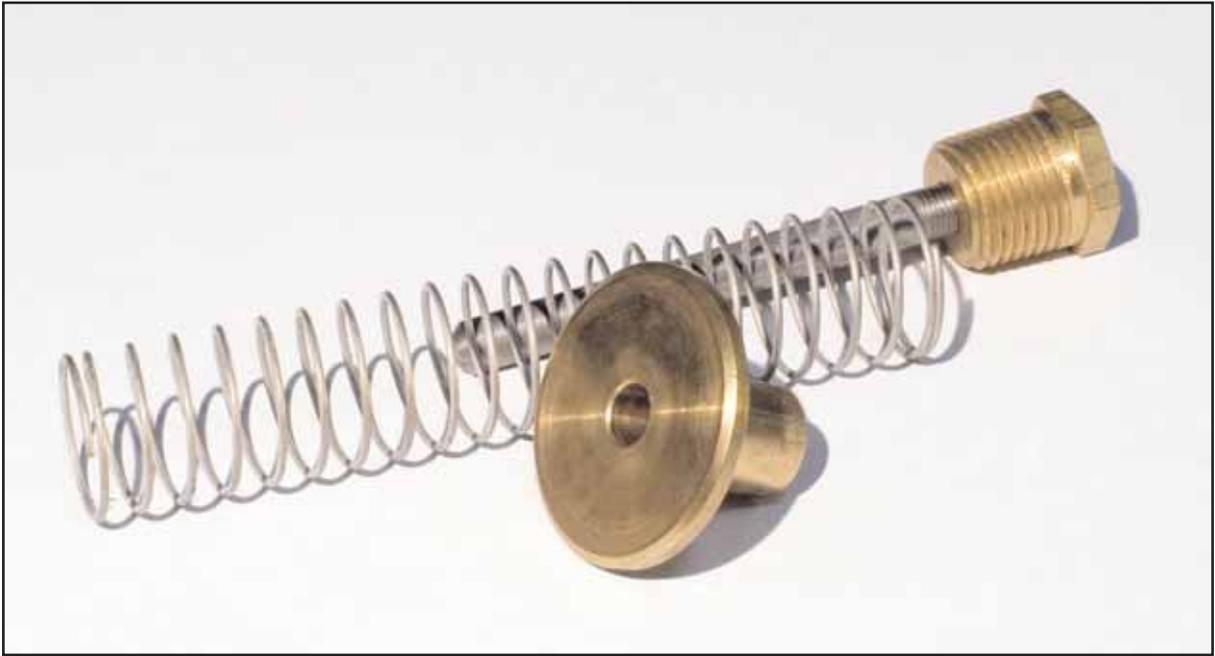
# Good Fin Tube

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# Good Internal Parts

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Manual Bypass Assembly-ASME heaters



UG Assembly

# Bad pH

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pH < 6.0 Alkalinity = 0



Ends of the tubes are worn thin.

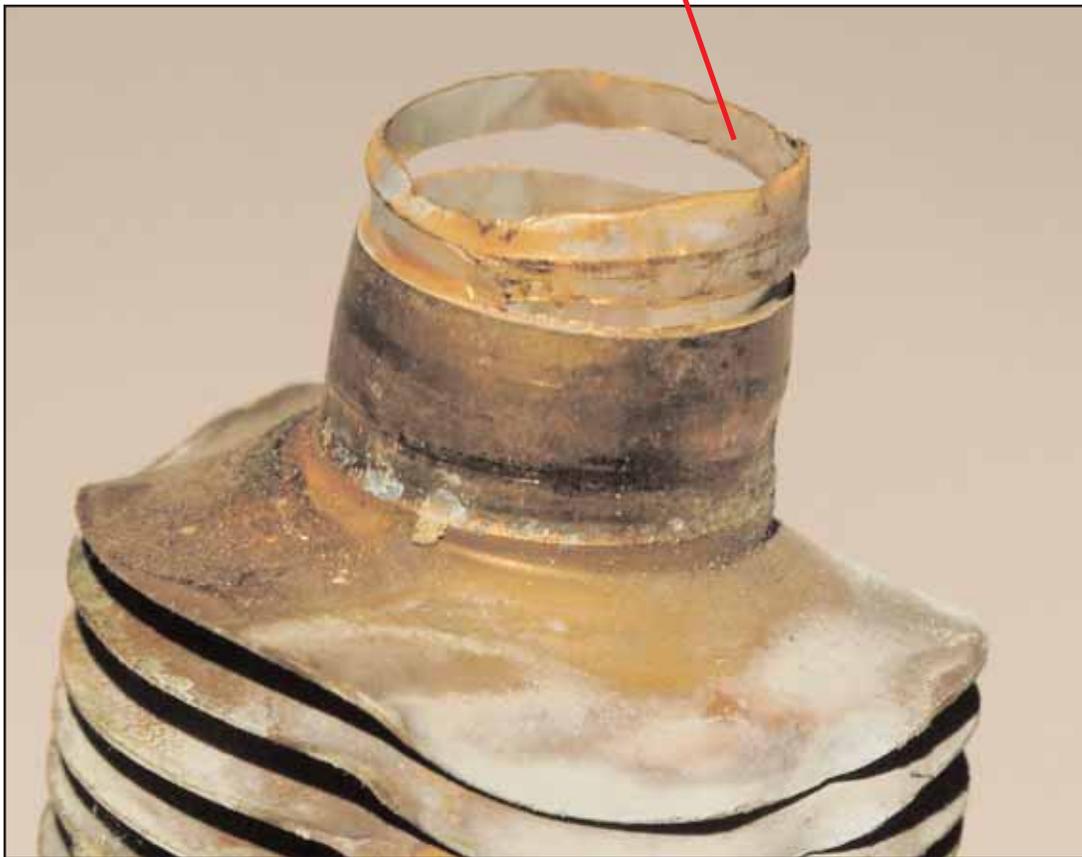


When chlorinating the water with chlorine tablets that have a pH of approximately 3.0 and the pH and alkalinity of the water are not properly maintained, the pH level of the water will drop below 6.0. The water may look crystal clear, but the pH of the water will be so low that it will dissolve the copper tubing in the heat exchanger and cause failure.

# Bad pH

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Rolled end becomes paper thin.

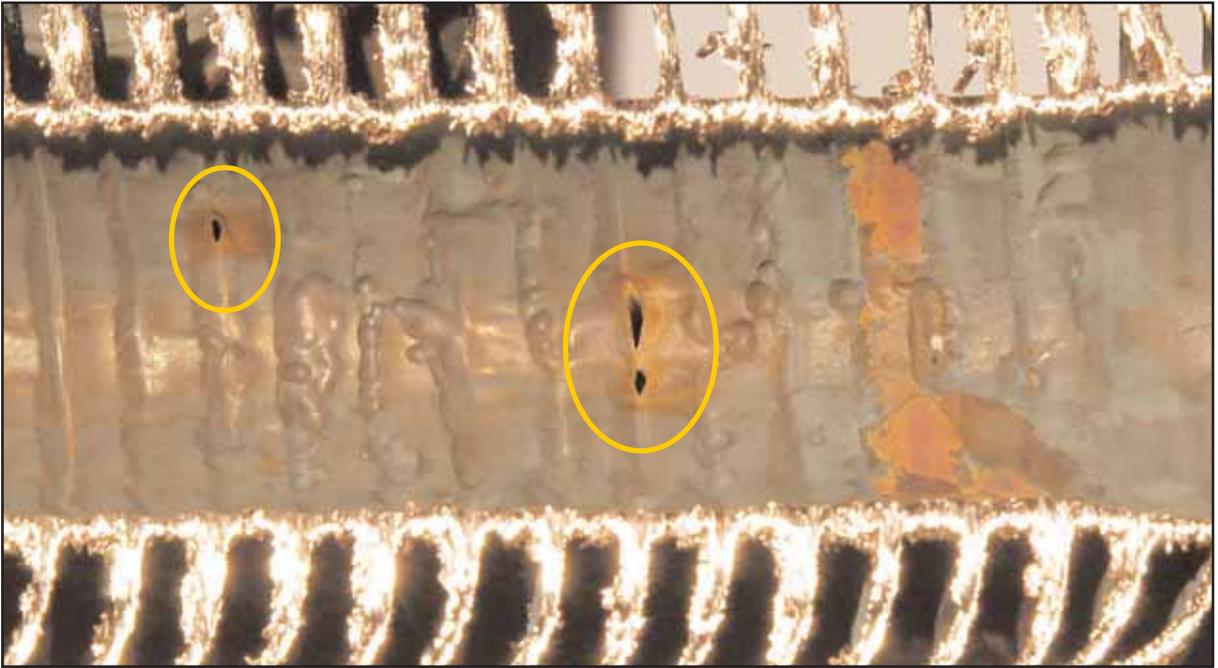


Good bypass

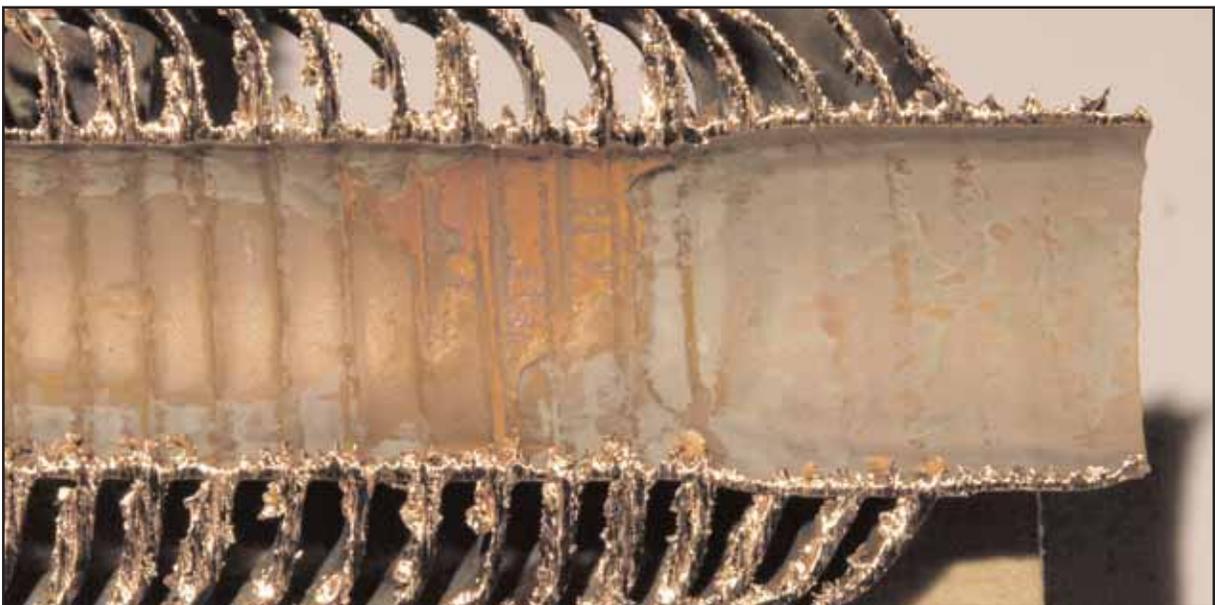
Damaged by  
low pH

# Bad pH

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Pin holes develop from chemical corrosion.



# In-Line Chlorinator

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Automatic chlorinator installed close to the outlet of the heater, with no check valve installed between the chlorinator and the heater. Damage occurs to the heat exchanger when the system is shut off and the high concentration of chlorine is back-fed into the heater. The highly concentrated chlorine solution sits in the heat exchanger overnight and destroys the tubes along with all the other internal components.



# In-Line Chlorinator

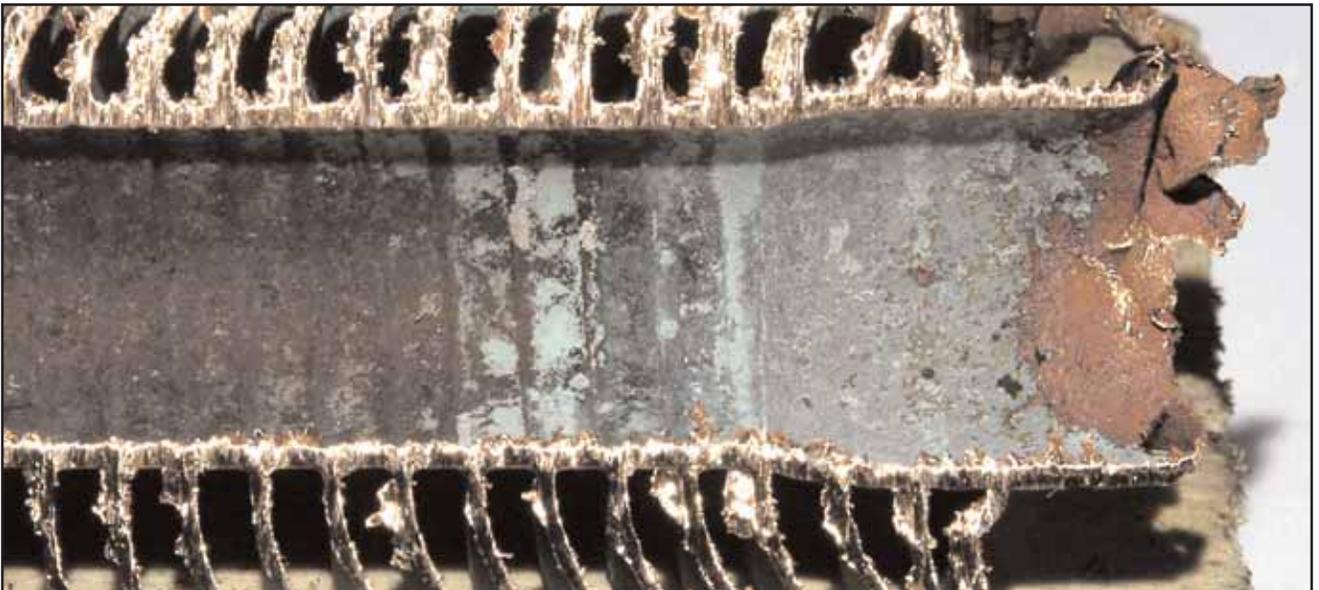
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Tube gets eaten away by corrosive water.

# In-Line Chlorinator

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# Off-Line Chlorinator

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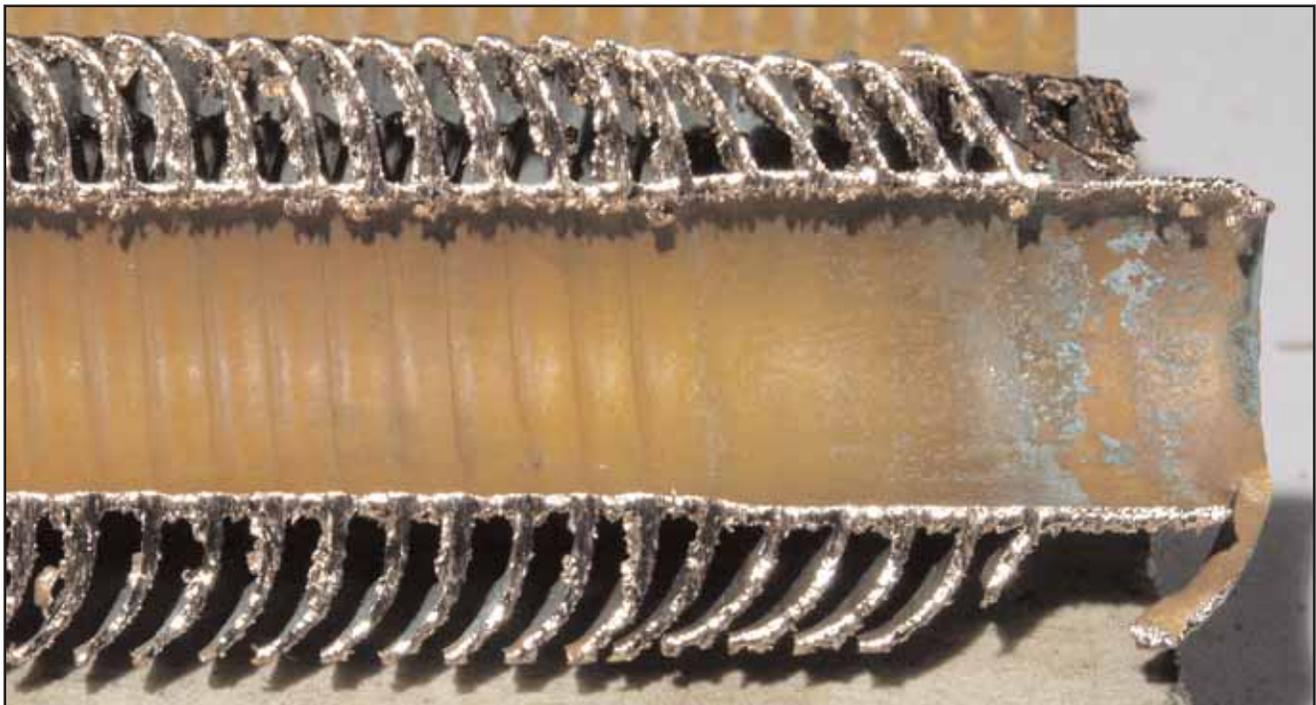
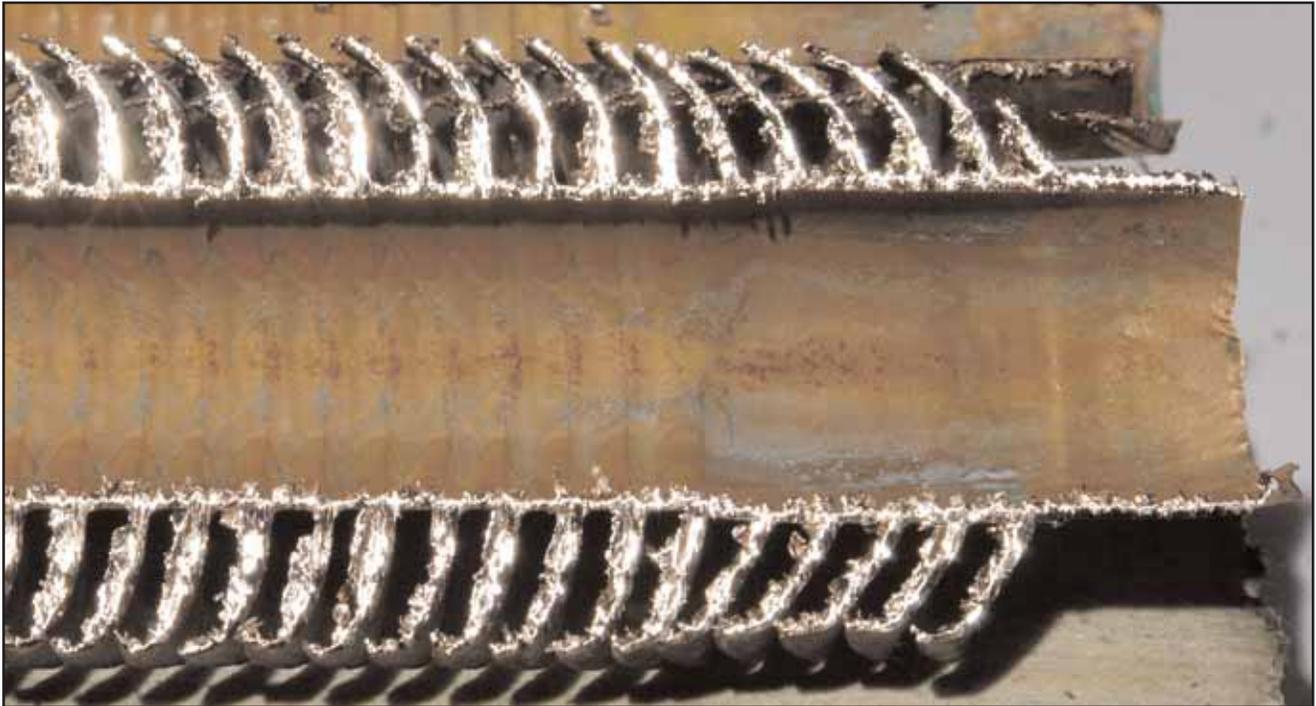
Damage caused by low pH



# Off-Line Chlorinator

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Damage caused by low pH

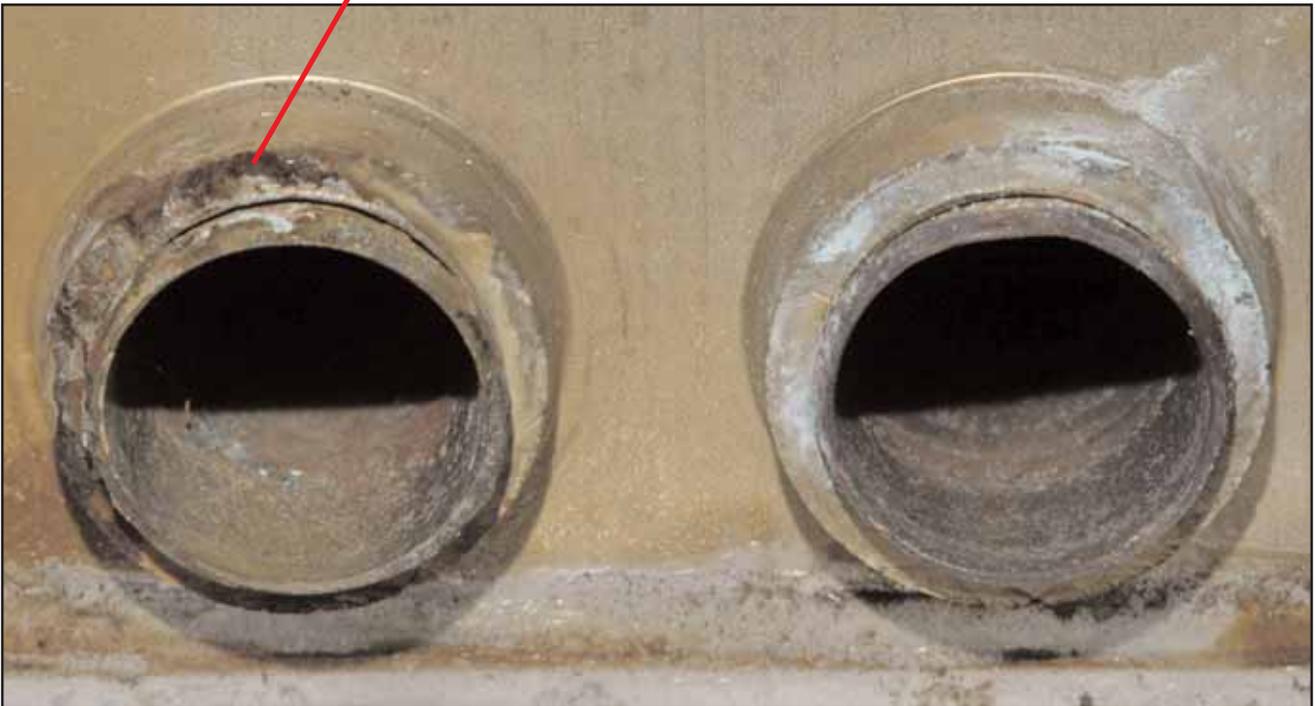


# Salt Chlorine Generator

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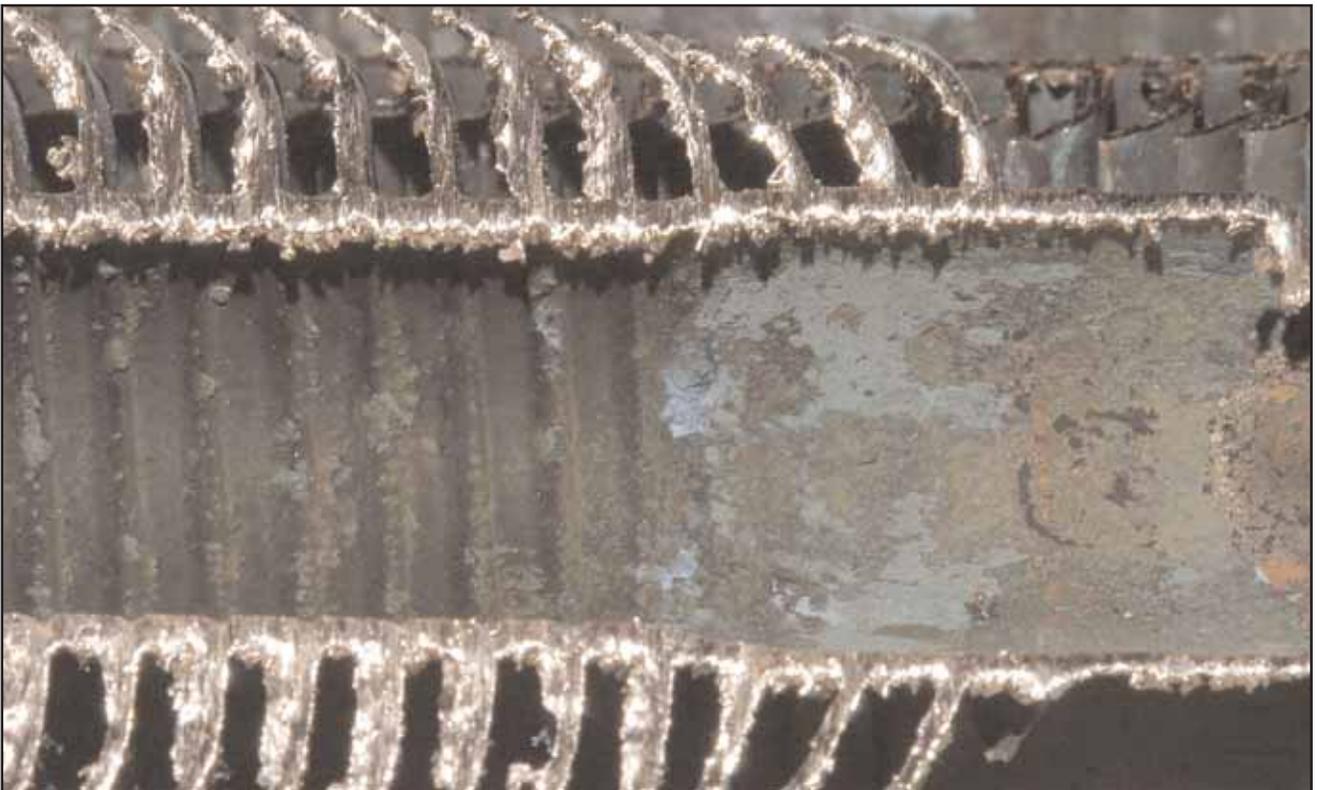
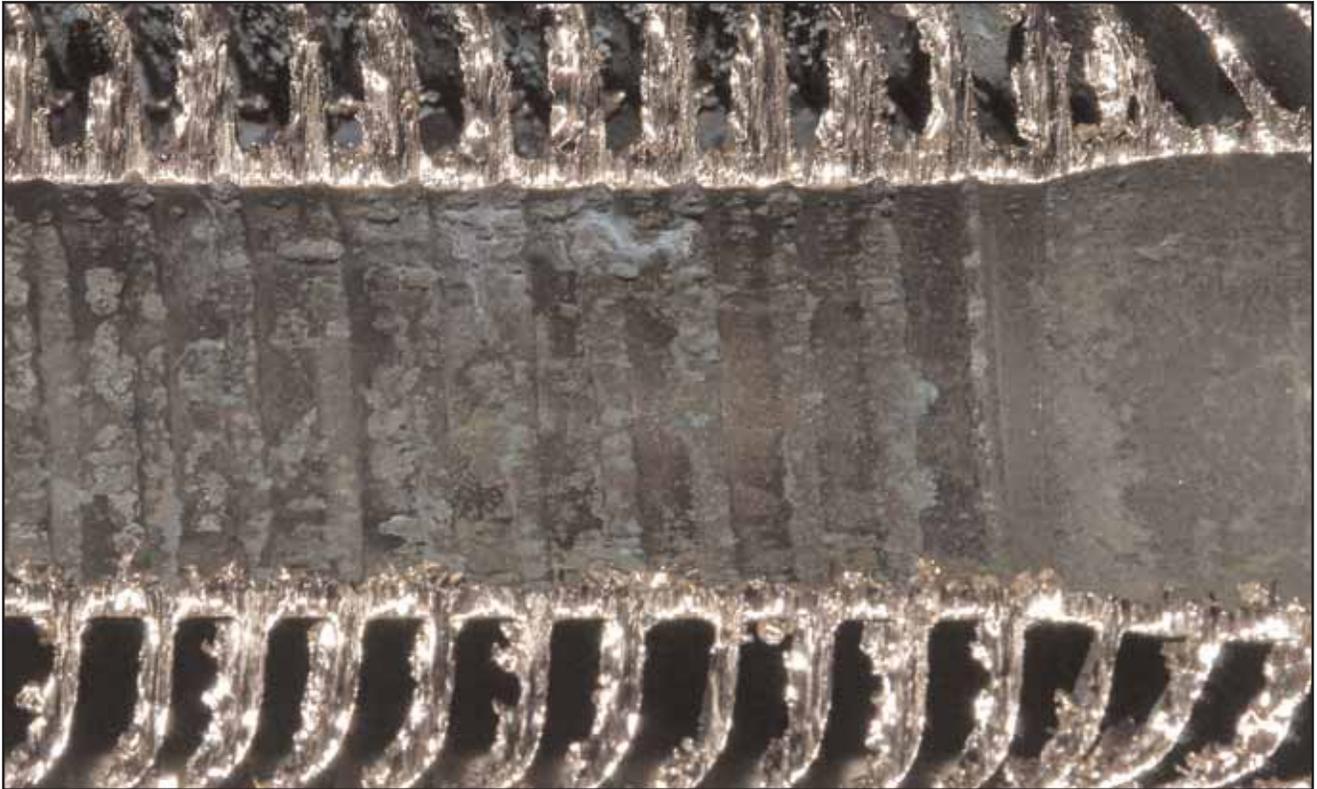


The salt attacked the stainless steel as well as the copper tube.



# Salt Chlorine Generator

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# TDS

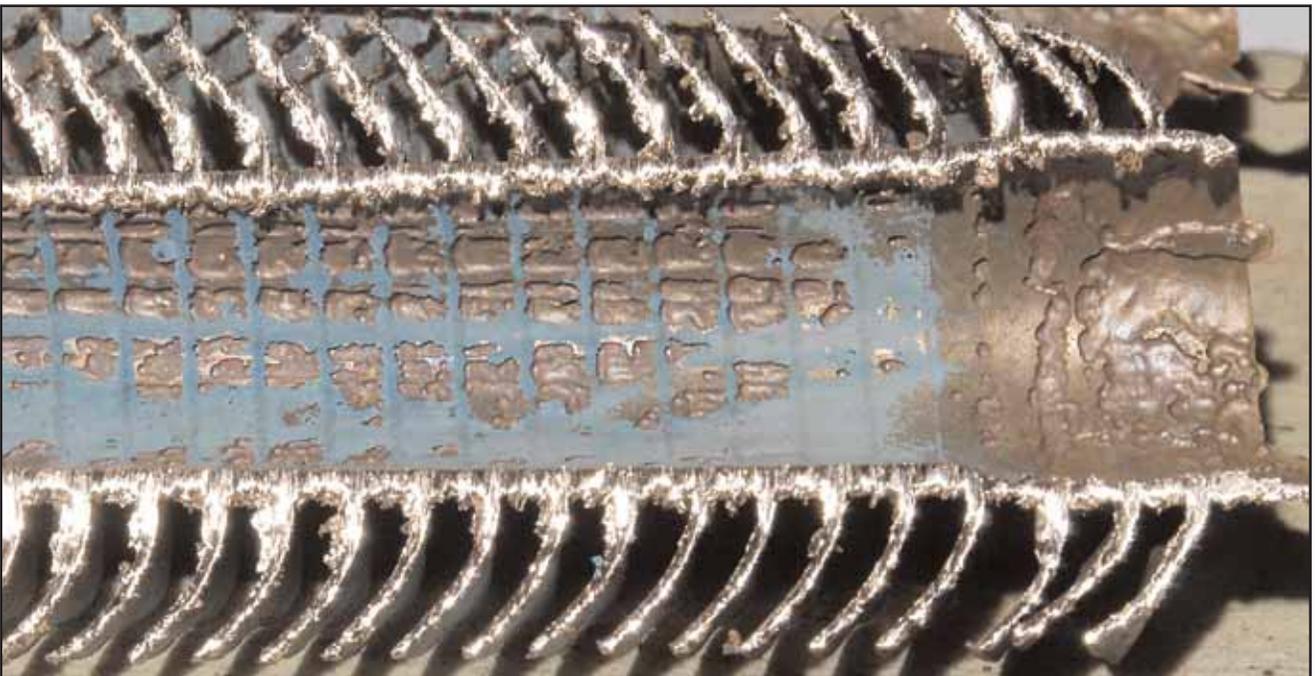
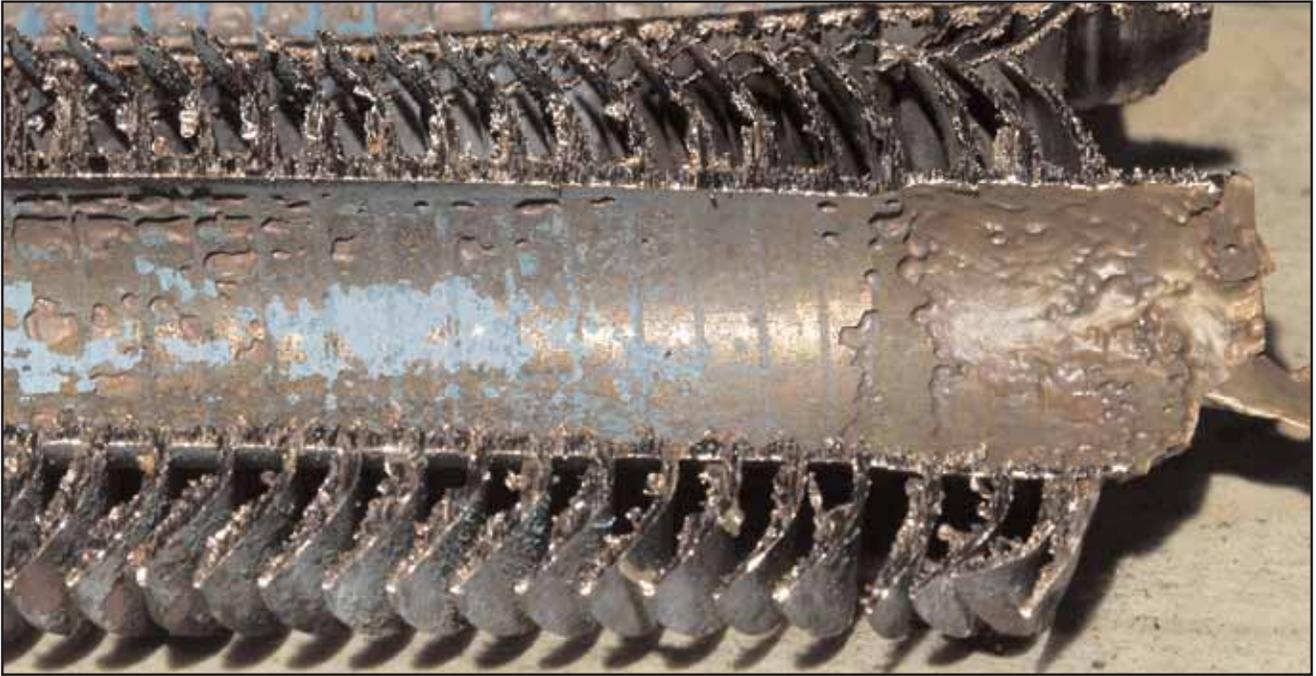
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Total Dissolved Solids



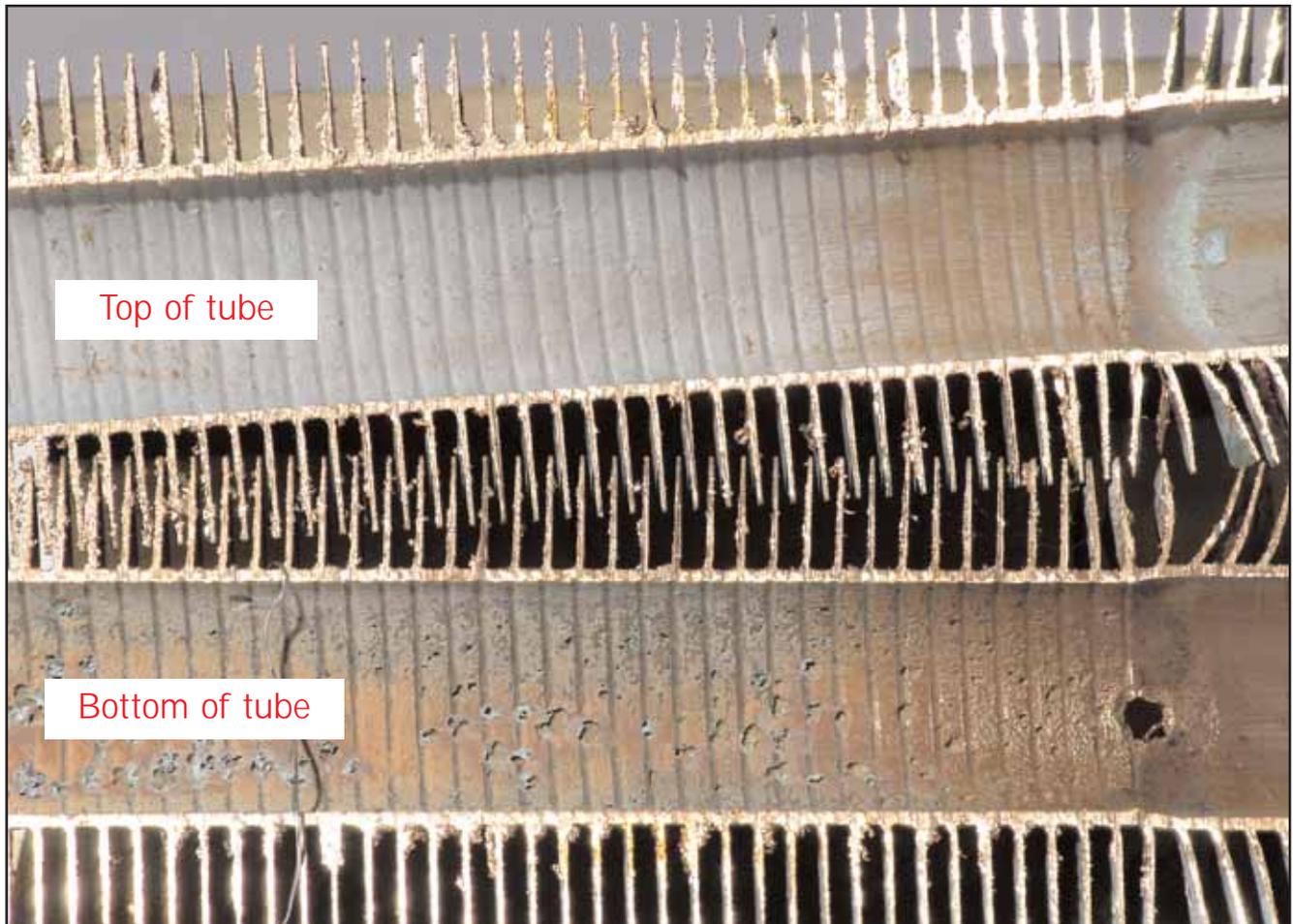
# TDS

Total Dissolved Solids



# TDS

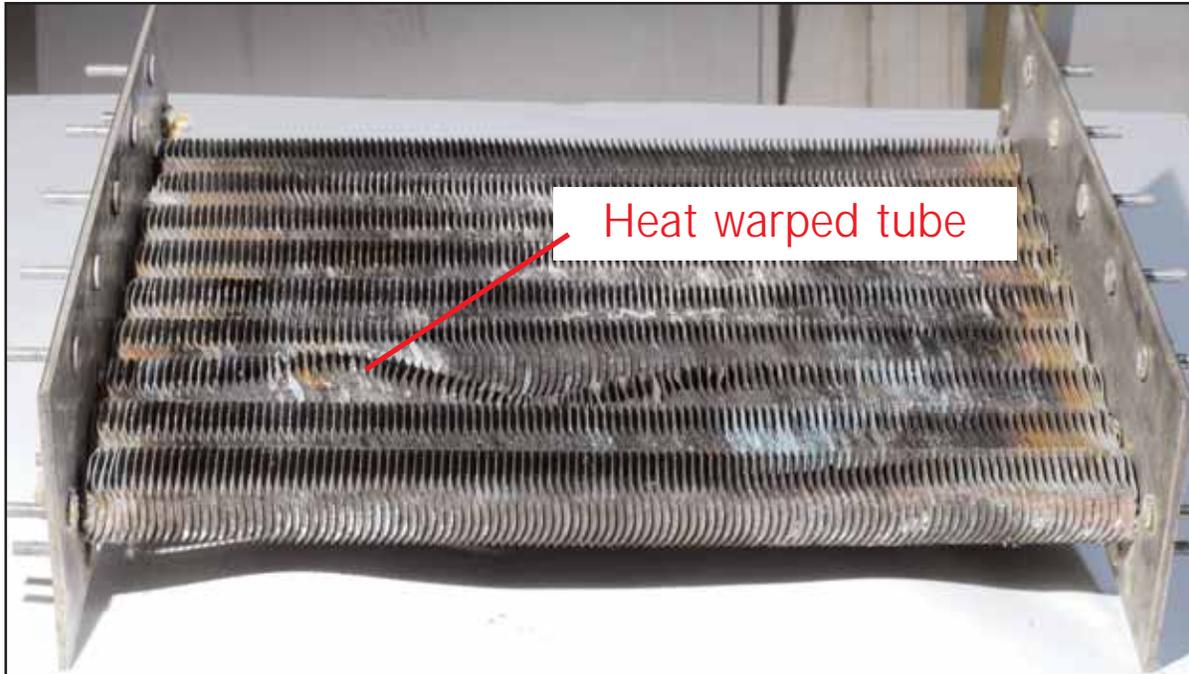
## Total Dissolved Solids



Pitting on the bottom of the tube and not on the top suggests that when the system is shut off, the deposits in the water settle. When at rest, they react with the copper leaving little craters in the surface of the tube.

# Lime-Scale

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Completely plugged tube.

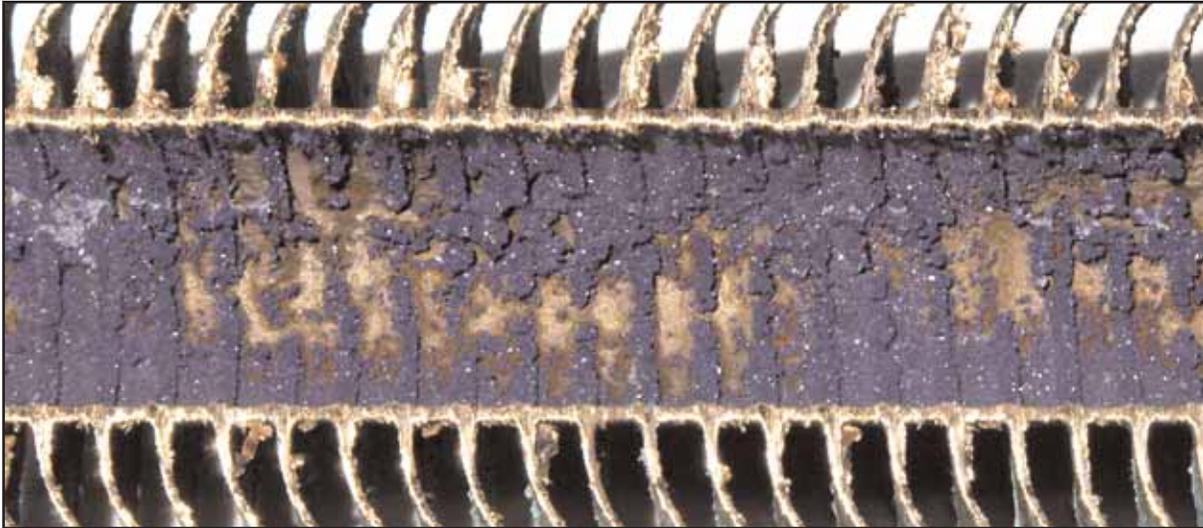
# Lime-Scale

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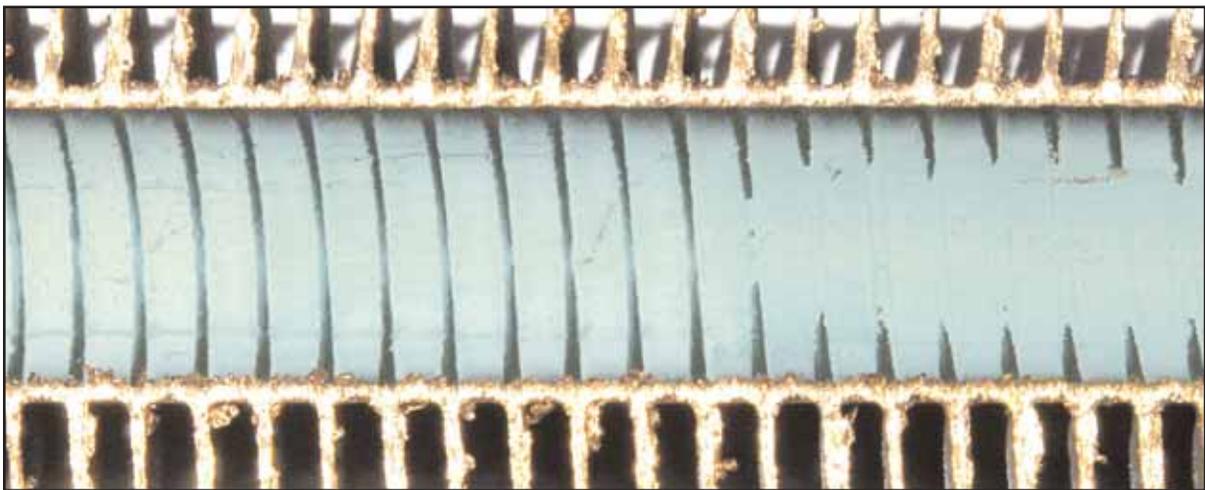


# Water Chemistry

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Purple crystal formation.



Light green-high chlorine levels

# Water Chemistry

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Pin hole leak. Leaking pool water can turn to Hydro-Chloric acid in the combustion chamber, causing the fins to get eaten away over time.



High chlorine levels caused a pin hole leak.

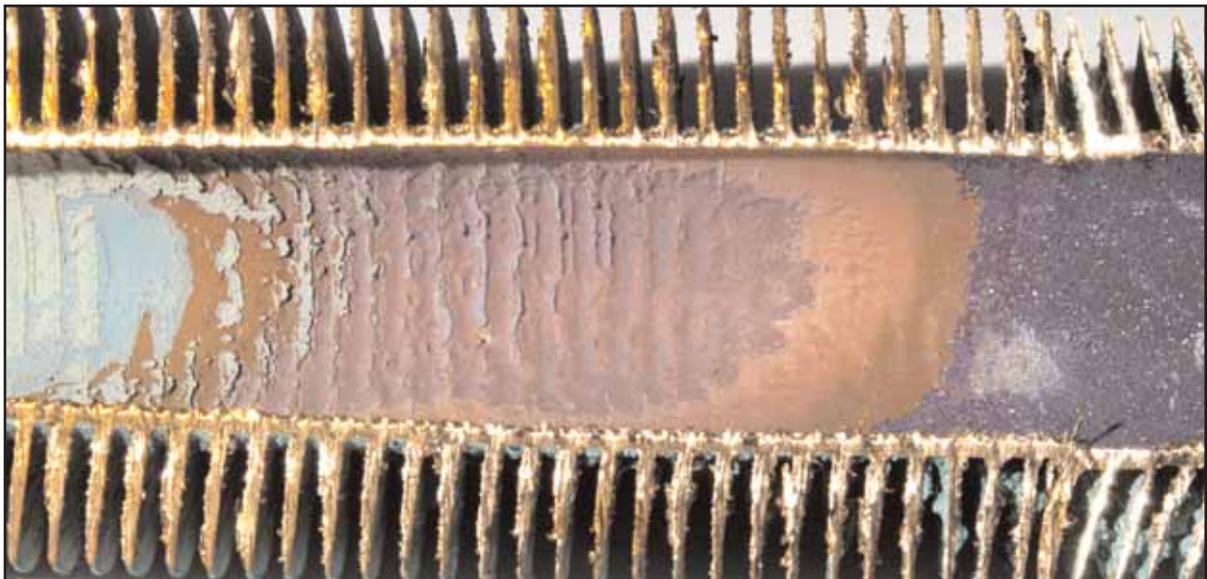
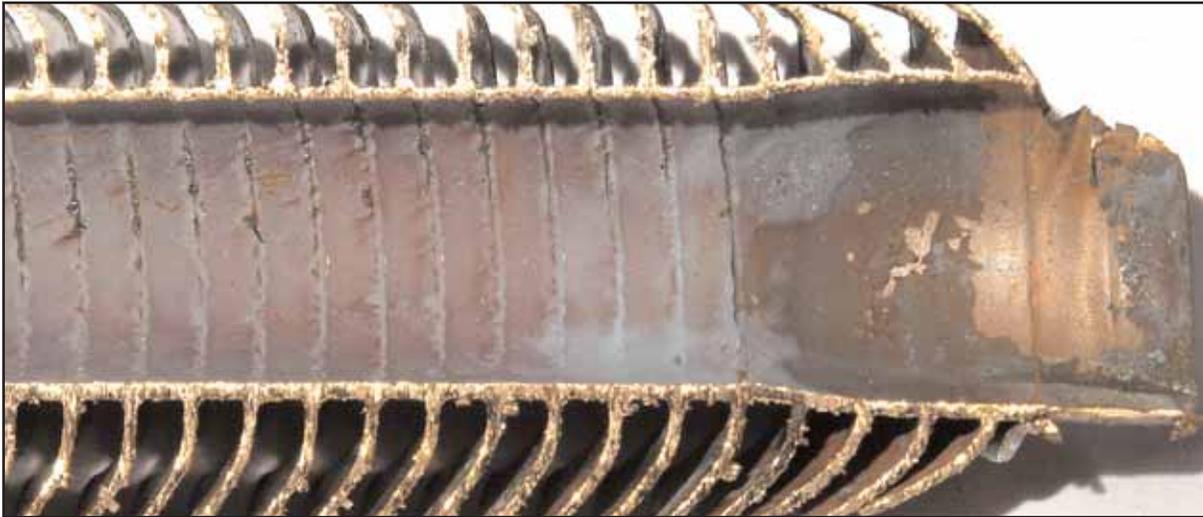
# Water Chemistry

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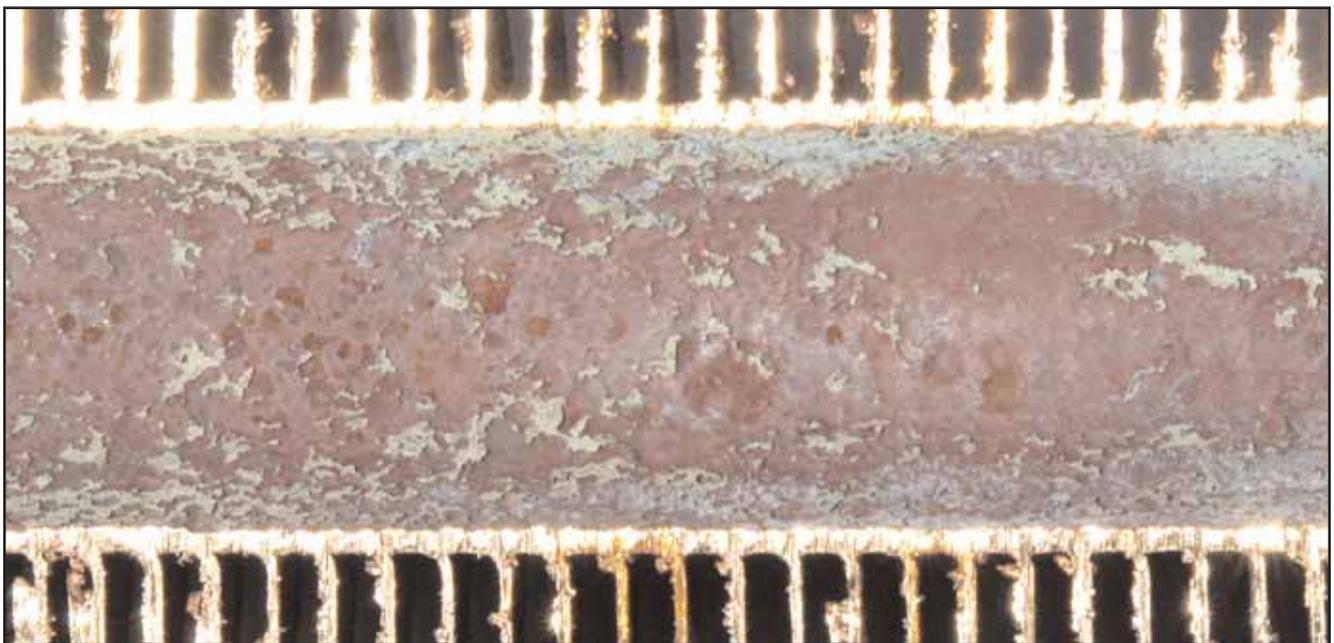
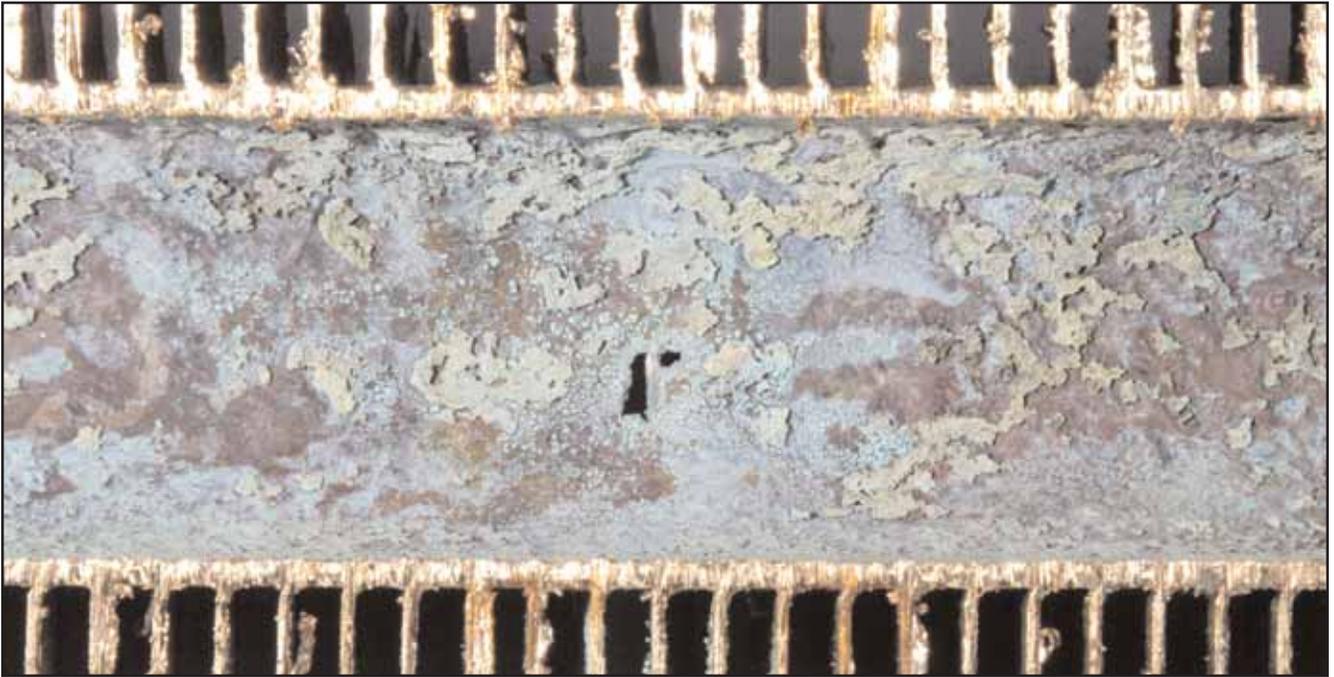
# Water Chemistry

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# Water Chemistry

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# Water Chemistry

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