

Understanding the Common Causes of Corrosion in HVAC Heat Exchangers

SLIDELL, LA, UNITED STATES, October 2, 2026 /EINPresswire.com/ -- Heat exchangers play an important role in many heating and cooling systems, transferring thermal energy between air, water, refrigerant or combustion gases while keeping separate fluids or gases from mixing. Because heat exchangers routinely encounter temperature changes, moisture and environmental contaminants, corrosion can become an important maintenance concern.

Corrosion occurs when metal deteriorates through chemical or electrochemical reactions with surrounding substances. The process may develop gradually and can take several forms depending on the heat exchanger material, operating conditions and surrounding environment.



According to [Jennifer Lingo](#) with [LOUMIS Air](#), which services Louisiana and Mississippi, understanding the conditions surrounding corrosion can help explain why heat exchangers require inspection as part of HVAC maintenance.

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Jennifer Lingo

“Heat exchangers operate in environments where temperature changes, moisture and contaminants can all be present,” Lingo said. “Corrosion may begin in a relatively small area, so identifying contributing conditions can be important when evaluating equipment condition and performance.”

Moisture is one of the common factors associated with corrosion.

Condensation can develop when warm, moisture-containing air or combustion gases encounter cooler metal surfaces. Under certain operating conditions, that moisture can remain on the heat exchanger long enough to contribute to oxidation or other forms of deterioration.

Condensation can become particularly important when acidic compounds are present.

In combustion equipment, water vapor is one of the products created during normal combustion. If combustion gases cool sufficiently, water vapor can condense. Depending on fuel type and combustion conditions, that condensate may contain compounds capable of accelerating corrosion on susceptible metals.

Modern condensing heating equipment is designed to manage condensation through appropriate materials and drainage systems. Equipment not intended to operate with sustained condensation may respond differently when moisture repeatedly develops in areas where drainage or corrosion resistance is limited.

Environmental conditions can also influence corrosion.

Louisiana and Mississippi are known for humid conditions, and many areas are located near coastal environments. Moisture in the air combined with airborne salts can contribute to corrosion of exposed metal components.

Commercial and industrial facilities may introduce additional contaminants.

Cleaning chemicals, manufacturing processes, pool chemicals, airborne particles and other substances can affect metal surfaces depending on concentration and exposure. Corrosion can develop more rapidly when moisture combines with contaminants capable of producing an aggressive chemical environment.

Different metals also react differently to surrounding conditions.

Heat exchangers may be constructed from stainless steel, copper, aluminum, carbon steel or various alloys depending on the equipment and application. Each material has particular characteristics involving thermal conductivity, strength and corrosion resistance.

Material selection therefore plays a role in how a heat exchanger responds to operating conditions.

Galvanic corrosion represents another potential concern when dissimilar metals are present. When certain metals are electrically connected in the presence of an electrolyte such as water, electrochemical activity can cause one metal to deteriorate more rapidly.

Water quality is especially important in heat exchangers involving hydronic systems, cooling towers, boilers or other water-based equipment.

Mineral content, dissolved oxygen, pH and chemical treatment can influence corrosion rates. Water that falls outside appropriate operating parameters can contribute to scaling, corrosion or both.

Scale introduces another complication.

Mineral deposits can accumulate on heat-transfer surfaces and reduce thermal efficiency. Deposits may also create localized conditions where corrosion develops beneath the accumulated material.

Lingo noted that corrosion does not always appear as uniform rust covering an entire component.

“Corrosion can take different forms depending on the material and conditions involved,” Lingo said. “Pitting, surface oxidation and deterioration around specific areas can indicate different processes, which makes visual inspection and operating history useful parts of an equipment evaluation.”

Pitting corrosion can create small cavities or holes in a metal surface. Because the damage may be concentrated in relatively small areas, significant deterioration can sometimes occur without widespread visible rust.

Crevice corrosion can develop in narrow spaces where moisture or contaminants become trapped, including joints, seams and areas beneath deposits.

Temperature also influences chemical reactions.

Heat exchangers repeatedly experience heating and cooling cycles. Those cycles can cause expansion and contraction while also changing the behavior of moisture and contaminants on metal surfaces.

In some systems, improper combustion can introduce additional concerns.

Fuel-burning equipment depends on appropriate airflow, fuel delivery and venting. Problems affecting combustion can change the composition and temperature of combustion gases, potentially contributing to deposits or corrosive conditions.

Drainage problems can further increase moisture exposure.

Condensate drains, pans and related components are intended to move water away from equipment. Blockages, improper drainage or standing water can expose nearby metal components to moisture for longer periods.

Routine inspection can help identify visible signs associated with corrosion, including discoloration, rust, pitting, deposits and water staining. Unusual operating behavior may also warrant further examination.

Not every sign of surface oxidation indicates immediate equipment failure, and not every serious problem produces obvious external corrosion. The location, depth and extent of deterioration all matter when evaluating a heat exchanger.

Corrosion is ultimately the result of interactions among metal, moisture, temperature, contaminants and operating conditions.

Understanding those interactions provides useful context for evaluating heat exchanger condition and determining why deterioration may be occurring.

In humid and coastal regions such as Louisiana and Mississippi, environmental exposure adds another consideration to an already complex process.

About LOUMIS Air

LOUMIS Air provides heating, ventilation and air-conditioning services throughout Louisiana and Mississippi. Services include work involving commercial and industrial HVAC systems, equipment maintenance, repair and related mechanical systems.

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