

Descalers



Season Start/Imperial Scale Remover

- Powdered sulfamic acid
- Safe for all metals including galvanizing
- Non-volatile, non-corrosive, non-irritating
- Easy clean up if spilled

Liquid Scale Dissolver

- Hydrochloric (muriatic) acid
- Low-foaming
- No stirring needed

Removing Scale from Cooling Tower Systems

Excessive head pressure can cause a compressor to work harder and draw extra current, which leads to increasing power costs lowering the unit's capacity or even motor burnout (Exhibit 1).

High head pressure can be caused by mechanical factors such as air in the pump, overly small water lines, plugged louvers or sprays, an overloaded tower, fan malfunction, or moisture in the air return. Excessive head pressure can also be the result of a buildup of scale in the pipes (as seen in Figure A) and water regulating valves, which restricts water flow and prevents heat from dissipating. Scale is typically the culprit if the head pressure is more than 10 lbs. above normal, or if the liquid refrigerant line is very warm.

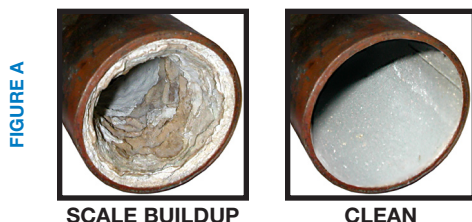
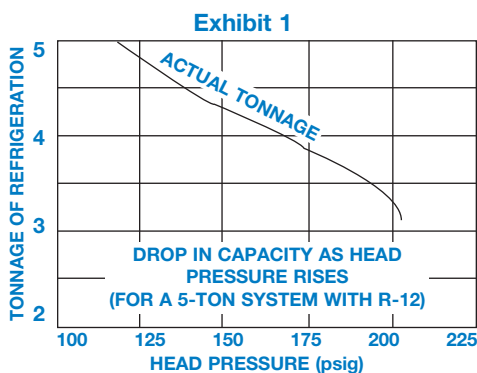
Testing the Scale

To determine if scale remover will dissolve the scale, put a sample of scale into a half glass of water with 2 or 3 teaspoons full of acid and stir. If the scale bubbles, breaks up, or dissolves, the remover will work. If it doesn't, send a sample of the scale to Nu-Calgon for analysis and advice on how to remove it.

Selecting a Scale Remover

Scale remover is available as a powder or a liquid. Powdered acids, such as Nu-Calgon's **Season Start (10lb. 4360-88 & 50lb. 4360-84)**, are safer and easier to use. They are nonvolatile and give off no obnoxious or corrosive fumes and can be easily swept up if spilled. Season Start is safer for equipment, and is properly inhibited to provide protection to steel, copper, brass, aluminum, stainless steel and galvanized surfaces. Season Start will not remove old corrosion products as fast as liquid acids, so there is less danger of springing leaks in old corroded systems.

Liquid acids, such as Nu-Calgon's **Liquid Scale Dissolver (1 gal. 4330-08 & 5 gal. 4330-05)**, work faster and can be more economical than powdered acids. However, do not use liquid scale dissolvers on systems that contain galvanized, stainless steel or aluminum. The hydrochloric acid in these products could damage those and other soft metals. If one does not know what types of metals are in the system use Season Start. Both products include a built-in pH color indicator, which shows how much to use, when to add more, and when the system is clean. pH test paper is also provided.



Cleaning Instructions

First clean the spray nozzles or water distribution holes. Drain and flush out the sump, refill with fresh water and restart. Shut off the bleed, if there is one, to reduce the amount of scale remover needed.

Add 2 to 3 gallons of Nu-Calgon's **Liquid Scale Dissolver** or 10 lbs. of **Season Start** for every 50 gallons of water in the system. If the amount of water in the system is not known, the starting dosage can be estimated from the following chart.

Exhibit 2

| Capacity of System- Tons or Horsepower | Initial Dosage | |
|--|----------------|----------------------------|
| | Liquid Acid | Season Start Scale Remover |
| 10 | 2 gals. | 10 lbs. |
| 30 | 5 gals. | 30 lbs. |
| 50 | 10 gals. | 50 lbs. |
| 90 | 15 gals. | 75 lbs. |

NOTE: The figures shown in the chart above are for an average amount of scale. For light scale use 1/2 the recommended dosage and for heavy scale use twice the dosage shown.

Even though Nu-Calgon's Liquid Scale Dissolver has a good anti-foaming ingredient, pour slowly into the system to avoid foaming or pump locking. Higher temperatures, greater solution strength and faster circulation rate increase the speed of dissolving scale.

Do not allow the temperature of the acid to exceed 160°F. Allow the acid solution to circulate for several hours, depending on the thickness and type of scale. Make sure that the recirculating water containing the acid is not carried away by air or drained or splattered on personnel or surrounding surfaces.

When the acid solution returning from the condenser does not contain any foam or the green color is retained for 20-45 minutes, the equipment is clean. Flush the system and check all lines for loose or undissolved scale or other materials. Check the pH of the recirculating water and add sufficient alkali to raise the pH above 7.0.

pH Color Indicator

The built in pH color indicator in our Season Start scale remover and Liquid Scale Dissolver is a very good guide to the proper application of the product. It gives the water a green or light blue color with the acid at the desired strength and causes the water to turn dark blue or purple when the product is neutralized thus, no scale is being dissolved at this time. When this occurs add more acid to change the water back to a light blue or green. This process can be repeated three times before the water is saturated and needs to be completely dumped and the process restarted. The color indicator may not show up well in systems where there is a lot of dirt, rust, algae etc. Use the pH testing strips if this occurs.

Preventing Acid Corrosion

- It is safe to leave powdered scale remover in a system for up to 24 hours as long as the parts are not corroded. However, a system where piping is thin or held together by old scale or corrosion products should be checked constantly and flushed as soon as head pressure is normal. Never leave strong liquid acids in a system for more than 4 to 6 hours.

- After the cleaning job is finished, the acid solution should be thoroughly flushed from the system and all lines checked to make sure they are not blocked by any loose and undissolved scale or other materials.
- Repeated acid cleaning will eventually remove protective galvanizing from all metal surfaces. Hot dip galvanizing can withstand several cleanings before an appreciable amount of the galvanizing is removed, while electroplated steel will likely lose its thin galvanizing coating after one cleaning. Although there is no known inhibitor that provides complete protection to galvanizing when copper corrosion products or copper salts are present in the system, laboratory tests have shown that Season Start Scale Remover can provide excellent protection under these conditions.
- Die-cast or "white metal" parts are subject to rapid attack by any acid.
- It is not unusual to find both copper and steel parts in a recirculating cooling water system. When installed in an all-copper system, the steel parts can corrode rapidly by electrolysis, resulting in water leaks. In many cases corrosion products build up on the steel parts, plugging up the water. Do not use acid to clean a system in this condition, or failure of the fittings or the condenser may result. Where rapid corrosion of steel parts occurs, replace the steel parts with ones of non-ferrous metal.
- In some evaporative condensers where water is sprayed directly on copper tubes at high velocities, rapid attack may occur where the spray hits the coil, particularly when strong liquid acids are used. In these cases, use a separate acid pump to recirculate the cleaning solution over the tubes in a gentle stream. Abnormally high velocities through water cooled condenser tubes can cause the same type of rapid attack, particularly at points where the direction of flow is changed.

Cleaning Individual Condensers with an Acid Pump

When cleaning the condenser with **No. 31-TX Acid Pump (4603-0)** mix no more than 1 pound of Season Start for each gallon of water or 1 gallon of Liquid Scale Dissolver for each 5 gallons of water. Circulate the acid solution for 1/2 to 3 hours depending upon the thickness and type of scale. Check the circulating solution periodically with pH test paper to ensure that it remains at the proper acid strength.

