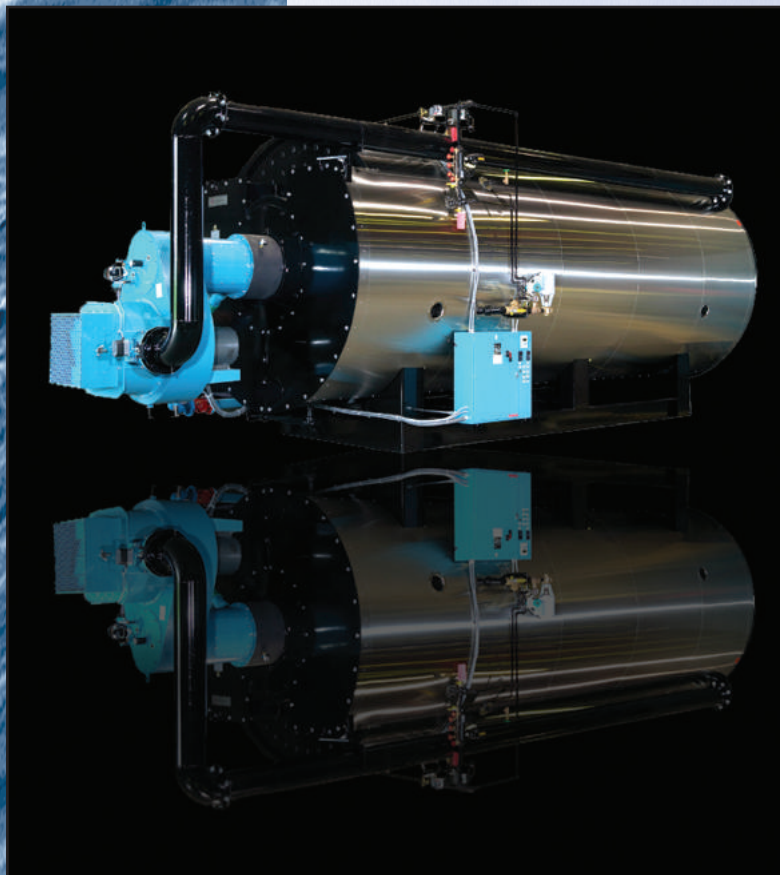


Manufactured Since 1942 by: Apex Engineering Products Corporation

RYDLYME[®]
World's Leading Biodegradable Descaler

Boilers

RYDLYME dissolves water scale, lime, mud and rust deposits safely, quickly and effectively!



*the solution to your
water scale problems*

RYDLYME and the Fundamentals of Scale Deposition

This brochure has been designed to directly address the needs of those who have the responsibility for the operation, safety and maintenance, as well as the economics associated with commercial and industrial boilers.

So, for simplicity sake, let's start off with a quick review of the very basics. What is a boiler? "A boiler is an encased vessel that provides a means for combustion heat to be transferred into water until it becomes heated water or steam. The hot water or steam is then usable for transferring the heat to a process. When water is boiled into steam its volume increases about 1,600 times, producing a force that is almost as explosive as gun powder. This is a very good and efficient means for transferring heat for a process, but it can also be extremely dangerous."

Boilers represent the "heart" of many institutions including: airports, condominiums, dry cleaners, ethanol production, factories, food companies, general industry, hospitals, hotels, housing authorities, medical centers, office buildings, power utilities, schools, shopping malls, and any other locations where hot water or steam is an essential part of the operation.

MINERALS

Scale is the accumulation of minerals such as calcium and magnesium on the water side of boiler heating surfaces. When boiler water turns to steam, residual minerals are left in the boiler. These minerals then settle out of the boiler water and form scale on the boiler heating surfaces. If the water delivered to the boiler contains even small amounts of scale-forming materials, the internal heating surfaces of

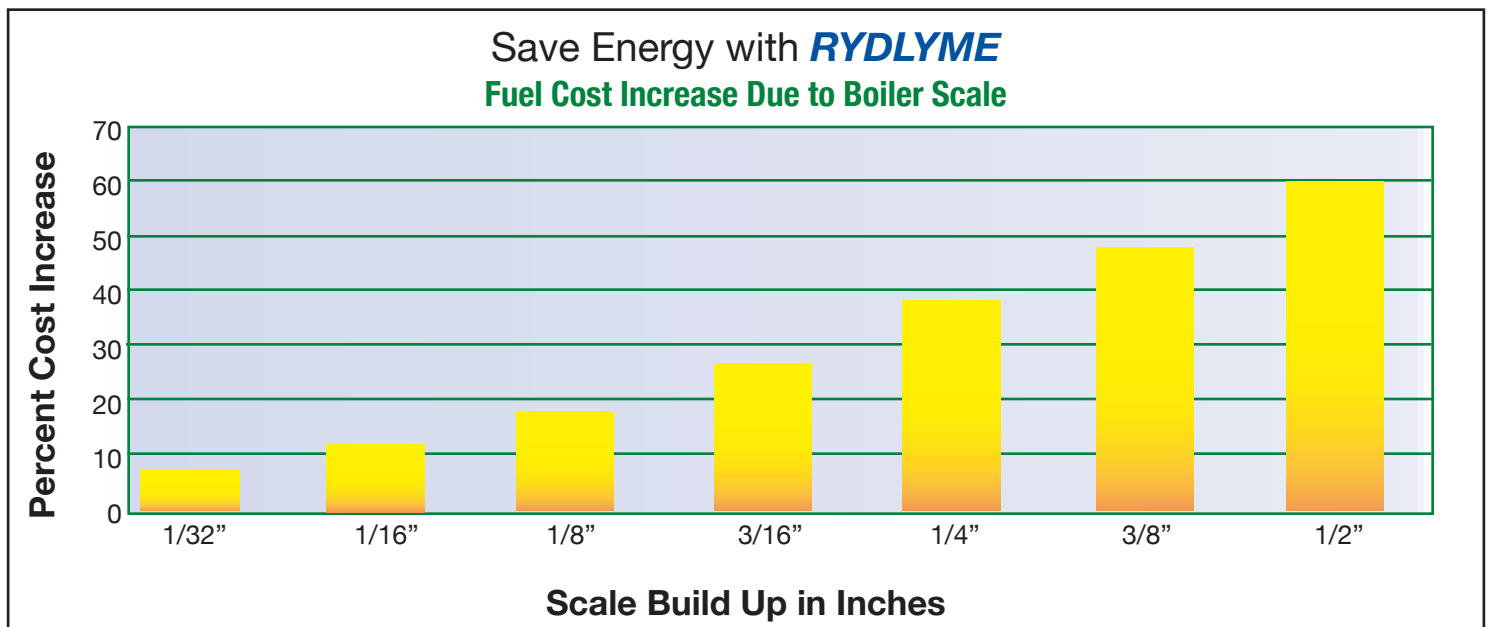
the boilers can soon become coated with scale, leading to overheating, increased fuel consumption and subsequent tube failures. Even light or spotty scale deposition can be the foundation for hot spots, cracking, and distortion. For this reason, regularly cleaning the interior of steam generator systems is imperative.

Boiler maintenance is crucial to the continued efficient operation of your facility. One component to your boilers preventive maintenance program should be an annual cleaning to remove mineral scales that have accumulated within the boiler. These deposits are great insulators that inhibit heat exchange and cause the boiler to lose heat transfer, thus efficiency. For instance, as you can plainly see from our chart, scale that is only 3/16" thick will cause the boiler to use 27% more fuel! A common unknown fact is that boiler tube failures account for the majority of a power plant's forced outages. This, all because the boiler may be suffering from inadequate heat transfer.

Water scale deposited in steam boilers is usually harder and denser than deposits found in hot water boilers. This is due primarily to the temperatures involved. But even the smallest amount of boiler scale deposits hamper good over-all heating efficiency. These mineral deposits may occur from poor blow down and/or poor water treatment practices.

Mineral deposits come from:

- 1.) Operating hours
- 2.) Feed water hardness
- 3.) Boiler treatment methods
- 4.) Feed-water control fluctuations
- 5.) Blow down techniques and procedures

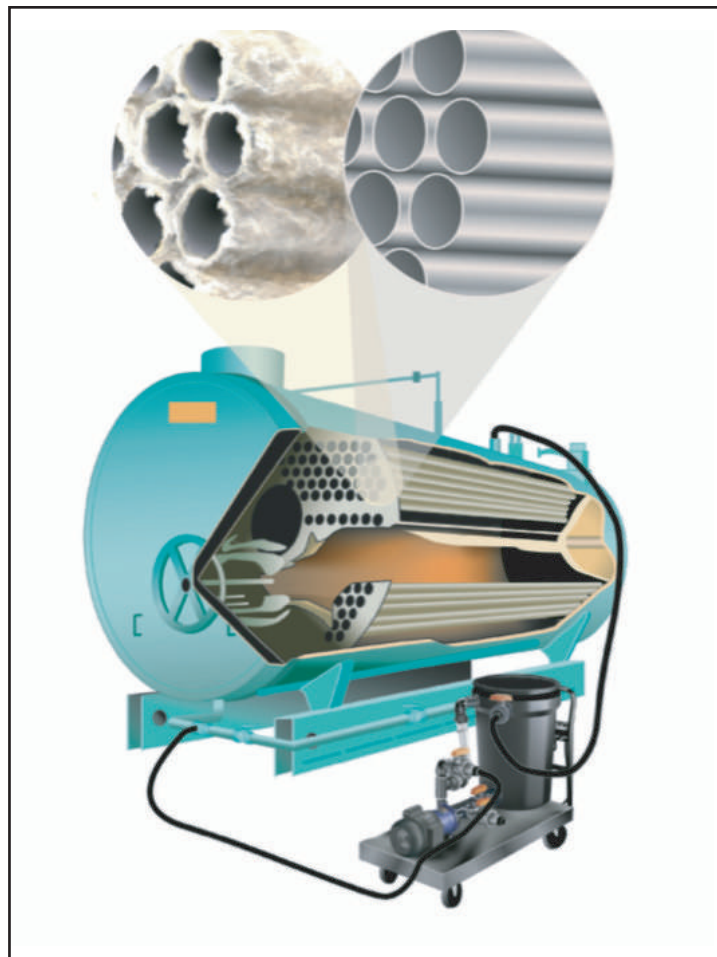
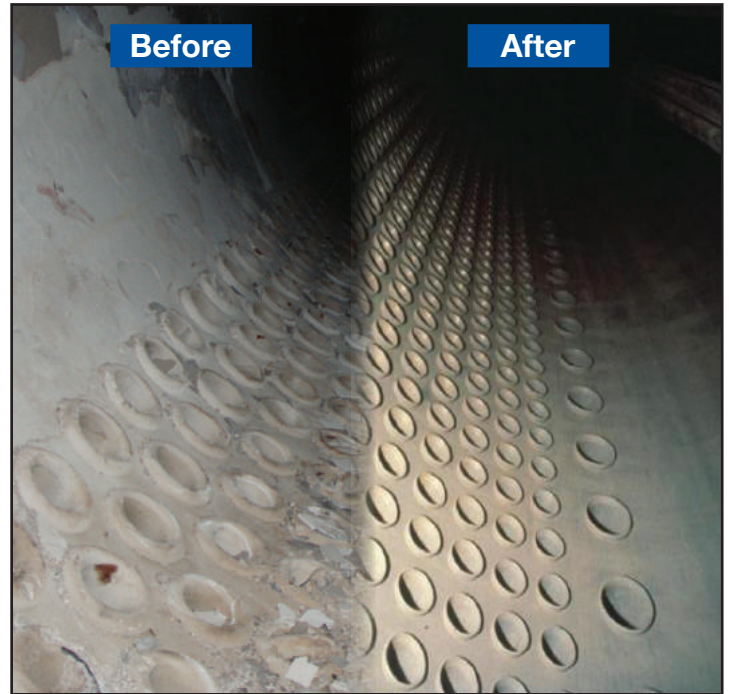


RYDLYME

RYDLYME is the perfect tool for dissolving these deposits that rob efficiency and dramatically increase your fuel consumption. An annual **RYDLYME** cleaning will dissolve the calcium, magnesium, rust, and other deposits into solution without harming the metallurgy or components within your boiler. **RYDLYME** is non-hazardous to the personnel who perform the cleaning and disposal is simple upon completion of the cleaning; as **RYDLYME** is biodegradable.

Our biodegradable and innovative descaler, **RYDLYME**, is the universal product of choice for boiler scale removal. Besides avoiding boiler failures, with **RYDLYME** you regain original design steam output, efficiency, and reliability! **RYDLYME** cleaning the waterside on a regular basis will improve the boiler's technical and economic performance.

As long as you have spent the time and money on tracking tube failures, boiler inspections, and general boiler conditions, now is the time to purchase **RYDLYME** to maintain the water side of your boiler in peak operating condition.



A typical **RYDLYME** circulation with our 15MDC Pump Cart System.

INSPECTIONS & FREQUENCY

Boiler manufacturers, industrial cleaning companies, and industry organizations have published standards that recommend the frequency for boiler cleanings. Most standards use the deposit weight density from a tube sample to decide when a boiler should be chemically cleaned. You should confirm that a consistent method is used when comparing results over time.

Some boilers can take a great deal of abuse and inattention and still function at competent levels. They may even have davited and hinged doors to easily expose the tubes for inspection and cleaning. Regardless of the type and design of your boiler, the deposits should be monitored by visual inspection, tube sampling, or other methods.

VARIOUS OTHER RYDLYME APPLICATIONS

The following are some names or terminology of boilers and other associated water-operated equipment that can also be cleaned with **RYDLYME**: economizers, fire tube boilers, fuel gas vaporizers, furnace and flue tubes, furnace tubes, performance gas heaters, pressure reducing systems, reheaters, Scotch marine boilers, sectional boilers, superheaters, thermal fluid heaters, water bath heaters, water tube boilers, water heat recovery coils, and other similar applications.

FACTORS TO CONSIDER BEFORE BOILER CLEANING

- Type and design of boiler; low temperature hot water, high temperature hot water, low pressure steam or high pressure steam?
- Size of boiler can be obtained from the name plate or other documentation.
- What is boiler used for? Heating or process (heat exchanger)?
- Age of boiler?
- The characteristics of the deposits and deposit analysis.
- Thickness of deposit; thickest area, thinnest area, average?
- Date last cleaned, if ever?
- Has any boiler feed-water treatment been used?
- Boiler history?
- What is the boiler's water capacity?
- Compatibility of the cleaning solvent with the metallurgy of the system.
- Ease of the cleaning application.
- Method of spent solvent disposal.
- Cost of cleaning method.
- Any tubes or sections leaking now? If so, they should be fixed before cleaning.

AMOUNT OF RYDLYME REQUIRED

Boiler cleaning has been around virtually since the very first boiler was invented. Initially, boilers were only cleaned to help prevent catastrophic failures, but nowadays boiler cleanings are performed to conserve energy and are recommended at least annually.

The exact quantity of **RYDLYME** required to thoroughly clean your boiler can be difficult to ascertain for various reasons. The discrepancies arise due to the numerous and different types of boiler designs, sizes, volumes, and severity of scale accumulation. A basic rule of thumb for most boilers on a preventative maintenance program, would be to utilize a 25% **RYDLYME** solution of the total water volume. Obviously, heavily fouled boilers or those maintained in less than perfect condition, would require additional product. Our strong recommendation is to contact your **RYDLYME** representative or our headquarters for technical assistance to help determine the appropriate circulating times and proper quantities of **RYDLYME**.

CLEANING WITH RYDLYME CAN REDUCE OR ELIMINATE ENVIRONMENTAL ISSUES

If you do NOT use **RYDLYME** for accomplishing your thorough annual boiler cleaning, the following is a short check list of potentially dangerous and costly items that can hinder your best efforts.

Hazardous Material Precautions:

- "Hazard Communications Standard" including SDS's
- "Confined Space Entry" Permits
- Parking Permits; to prevent blocked alley ways and driveways
- Lockout & Tagout Procedures
- Contractor's waste stream generator, hauling and disposal site permits
- "Sudden & Accidental Pollution" insurance
- DOT regulations
- EPA regulations
- High temperature solutions
- Installation of heaters, piping, valves, pumps, neutralizers, etc.
- "If it is your drain, it is your responsibility!"
- Other plant safety measures

BASIC BOILER CLEANING PROCEDURES

1. Shut down boiler.
2. Blow down with pressure still on.
3. Drain and flush unit.
4. Close steam valve.
5. Add **RYDLYME**, and then top off with water.
6. Circulate through the drain or low point and return from the pressure relief valve or high point of the boiler back to a vented container.
7. Circulate for 4-8 hours depending on volume.
8. Open steam valve.
9. Drain, flush, re-fill and start up.

For detailed instructions please visit our website or contact our technical staff for assistance.



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