Manufactured Since 1942 by: Apex Engineering Products Corporation

RYDLYME®

World's Leading Biodegradable Descaler

Chillers & Condensers

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

*the **solution** to your water scale problems*

RYDLYME® for Chillers & Condensers

World's Leading Biodegradable Descaler

RYDLYME is an excellent choice for cleaning water formed deposits from Evaporative Condensers, Shell & Tube Condensers, Cooling Tower Systems and Centrifugal Chillers. This descriptive sales brochure should enlighten you to a very helpful tool to add to your toolbox. This tool, called ***RYDLYME***, will help you rid your equipment of scale deposits and have them working at top efficiency in just hours. Let's take a closer look:

Whenever there is a deposit of any type on a heat transfer surface, it retards heat transfer. This is referred to as "thermal resistance" and it requires a corresponding increase in energy to overcome it. Major manufacturers of air conditioning equipment generally design condensers and chiller heat exchangers to operate at a maximum "thermal resistance" or "fouling factor" of 0.0005. As a result, with only 0.036 inches (about 1/32") of deposit corresponds to an increase in energy costs of over 30%!

This 30% increase in costs relates to a hardness scale (calcium carbonate) deposit. Iron deposits (same thickness) are greater insulators and therefore have lower heat transfer coefficients. The actual heat transfer coefficient of a fouling/deposit (scale, lime, corrosion products, dirt, silt) depends on what it is. Certainly, any fouling/deposit contributing a fouling factor (thermal resistance) will increase electrical consumption and decrease efficiency.

The increase in electrical energy takes place in the compressor. Scale deposits increase the resistance to heat transfer, and in the condenser higher refrigerant gas temperatures will result. Higher refrigerant gas temperatures mean higher gas pressures, which require greater energy to compress the refrigerant. Therefore, there is an increase in electrical power to operate the compressor.

To minimize such potential energy losses requires an ongoing, daily monitoring of KW consumed per ton of refrigerant/air conditioning being generated. The purpose is to recognize inefficient operation and determine where the problem is and fix it. Each day of inefficient operation means excess energy expenditures. Fortunately, ***RYDLYME*** dissolves the toughest water-formed deposits from virtually any type of water heated, cooled or operated equipment.

This cost savings example shows the increased energy costs associated with scale deposits. Utilizing the layout in this chart, reference your own equipment, what your facility pays for power and your equipment operating hours. Once you've ascertained your yearly operating costs, add the correlating percentage based on your current scale thickness. ***Now ask yourself, "Can I afford not to do a RYDLYME cleaning"?***

COST SAVINGS EXAMPLE

EQUIPMENT	KW/ TON	LOAD FACTOR	OPERATING HOURS	KWH/ RATE	ENERGY COST
500 TON CHILLER	x .65	x 100%	x 6,570	$ .09	= $192,173

DEPOSIT THICKNESS (INCHES)	% EFFICIENCY LOSS	INCREASED ENERGY COST
0.01	9%	$17,296
0.02	18%	$34,609
0.03	27%	$51,887
0.04	36%	$69,182
0.05	45%	$86,478

Just 1/32 of an inch of scale can add nearly $52,000 to the cost of operating a 500-ton chiller!

ENERGY SAVINGS 0.03" DEPOSIT	CHEMICAL CLEANING COST (EST.)	ANNUAL NET SAVINGS
$51,887	$900	$50,987

Periodic RYDLYME cleaning is necessary for maintaining your equipment at peak operating efficiency and maximum rated output!

Evaporative Condensers/ Fluid Coolers

An evaporative condenser is designed to condense a refrigerant gas and a fluid cooler cools process water contained on the inside of the units tubes. The water is circulated from the basin located at the bottom of the unit up to the top and distributed by spray nozzles to optimize tube cooling coverage. The spray nozzles will distribute the water evenly over the tube bundle located mid section on the inside of the unit. The fan on the top of the unit is used to pull air through the side louvers, enhancing evaporation, resulting in further cooling of the water during its decent to the basin.

Scale deposits form on the exterior tube surfaces of a heat exchange coil, which acts as an insulating barrier. The ultimate result is inadequate cooling, overworked machinery, and expensive, inefficient operation. Scale also restricts the spray coverage of the nozzles at the top of the unit, resulting in the water not flowing over the entire tube surface. This will cause channeling and further minimizing cooling capacity. A scaled evaporative condenser or fluid cooler cannot efficiently cool the water or condense the refrigerant gas inside the tubes.

Studies have shown a scale thickness of only 1/32" will reduce the heat transfer coefficient of an evaporative condenser by approximately 16%! Reduction of efficiency directly relates to added energy consumption and higher energy bills. This is where the ***RYDLYME*** comes into action! As ***RYDLYME*** comes in contact with the deposits, it effectively dissolves them into solution, thus removing that insulating barrier and re-establishing the equipment efficiency. For directions to perform a simple ***RYDLYME*** cleaning, please refer to the procedure in this brochure.

Recommended *RYDLYME* Quantities

TONNAGE	EVAPORATIVE* CONDENSERS	COOLING TOWER AND THE LOAD*	CIRCULATING HOURS
10	4	7	3
25	10	20	4
50	20	35	4
75	30	55	4
100	40	70	5
125	50	90	5
150	60	105	5
200	80	140	5
250	100	175	5
400	160	280	5
500	200	350	6
750	300	525	6
1000	400	700	7
2000	800	1400	7
3000	1200	2100	8

*Please note, the **RYDLYME** amounts depicted in this chart are to be utilized as starting points based on an average scale build-up of 1/16".*

** gallons of **RYDLYME***

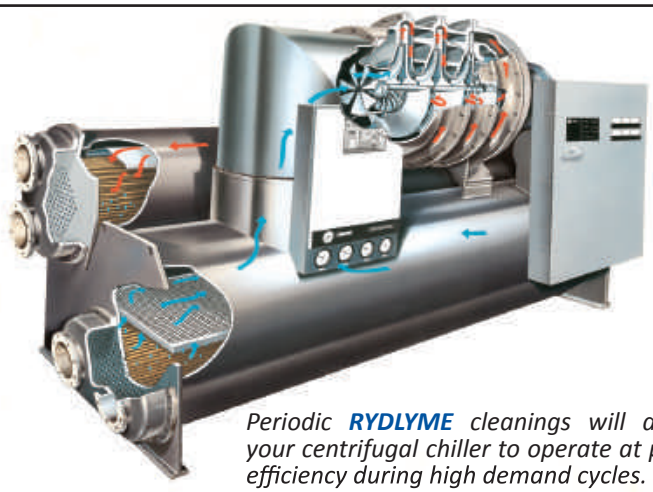
Please contact an Apex Engineering Products sales technician at 630.820.8888 for more information regarding your specific system.

Cooling Tower Systems

The basic principal of a cooling tower is to cool the water that has picked up heat generated by equipment within the facility. The operation begins in the tower basin where the cooled water is pumped out into the facility and utilized for cooling the equipment on the tower system. As that equipment is cooled, the water picks up the heat and returns to the top of the cooling tower. The hot water is distributed onto a hot deck or through the sprayer nozzles that evenly distribute it over the tower fill media. The tower fill media is designed to increase surface area, as well as contact time between air and water. This enhances evaporation and allows further cooling of the tower water. The water then falls into the tower basin where it is then pumped back into the facility continuing to cool the equipment.

Scaling within a cooling tower can restrict the water distribution of spray nozzles, reduce the water flow through the openings of a hot deck and restrict the airflow within the tower. All of these conditions will result in diminished cooling capacity and inefficient operation of the associated equipment on the cooling tower system.

Adding ***RYDLYME*** to the cooling tower basin allows the tower's transfer pump to circulate the solution throughout the entire cooling system while in operation. This can all be accommodated during the normal operation of the cooling tower without shutdown! It is imperative when calculating a required amount of ***RYDLYME*** needed for a cooling tower system to include enough ***RYDLYME*** for the equipment load of the tower.



*Periodic **RYDLYME** cleanings will allow your centrifugal chiller to operate at peak efficiency during high demand cycles.*

Chillers

When isolating and cleaning just the barrel on a chiller, this chart will assist the technician in ascertaining the correct amount of ***RYDLYME*** required. ***RYDLYME***, when circulated through the tubes, will completely clean the tubes, including the enhancements. A ***RYDLYME*** cleaning will insure optimal efficiency is restored, bringing approach temperatures down to "as designed" specifications. When cleaning a chiller barrel, add the recommended amount of ***RYDLYME*** per the chart, then flood the remainder of the bundle with water to obtain circulation. Circulate the ***RYDLYME*** and water solution through the lowest point of the bundle and return out a high point. If the return point you are planning to use is below the top tubes of the barrel, make sure your return hose is elevated above the highest point of the bundle. This step will insure all the high side tubes are flooded and cleaned and avoid the potential of them becoming air bound. After circulating ***RYDLYME*** for the prescribed time and determining the tube bundle is clean, always perform a thorough water flush of the bundle.

Length of Chiller Barrel

Diameter Inches	4'	5'	6'	8'	10'	12'	16'	18'	20'	24'	30'
10"	4	5	6	8	10	12	16	18	20	25	30
12"	6	7	9	12	15	18	24	27	30	35	45
16"	10	13	16	21	25	30	42	50	55	60	80
20"	16	20	25	32	40	50	65	75	80	100	120
24"	25	30	35	50	60	70	95	110	120	140	180
30"	35	45	55	75	90	110	150	165	180	220	280
36"	55	65	80	110	130	160	220	250	275	330	400
40"	65	80	100	130	160	200	260	300	330	400	500
44"	80	100	120	160	200	240	320	360	400	475	600
48"	100	120	140	190	240	280	380	425	480	560	710
50"	105	130	160	210	260	315	415	470	520	625	780
54"	120	150	180	240	300	360	480	540	600	715	895
60"	150	185	220	295	370	445	590	665	740	885	1105

Gallons of RYDLYME

= 1 Hour = 2 Hours = 3 Hours = 4 Hours = 5 Hours = 6 Hours = 7 Hours = 8 Hours

- *For approach temperatures ranging from 5 to 10, please utilize half the amount quoted in this chart.*
- *For approach temperatures ranging from 11 to 20, please utilize the amount quoted in this chart.*
- *For approach temperatures greater then 21, please consult an Apex Engineering Products technician.*

*The following is a detailed procedure for cleaning a cooling tower system or an evaporative condenser / fluid cooler with **RYDLYME**. To ensure a successful cleaning, please contact Apex Engineering Products Corporation for technical assistance prior to starting the cleaning procedure.*

1. Close make up water valve to tower basin.
2. Turn off all chemical or non-chemical water treatment, conductivity meters and pH meters.
3. It is recommended that all loose water scale, lime, mud, rust and other foreign matter be manually removed from tower basin prior to starting the cleaning.
4. Lower the water level in the tower basin to a point where the pump can maintain circulation without cavitation and close the bleed-off valve.
5. It is recommended that the fans be turned off during the cleaning.
6. Determine the proper amount of **RYDLYME** to be added to the system. Please note that the amounts recommended in the chart are just guidelines and that your application may require 2-4 times the chart amount, depending on the severity of the deposit build-up in your system.
7. To minimize excessive foaming, you may now slowly add required amount of **RYDLYME** to the tower basin.
8. The bubbling and foaming you will observe is a natural reaction of the **RYDLYME** dissolving the water-formed mineral deposits within the system.
9. Once the **RYDLYME** is in the tower system, allow it to circulate. Start charting your pH readings or performing calcium spot tests to measure the effectiveness of the **RYDLYME** solution during the cleaning ("Testing the Effectiveness" is available at our website or contact us directly for a copy). If the **RYDLYME** cleaning solution expends prior to the completion of the recommended circulation time, there is more scale in the system. It is recommended that you repeat steps 6-9 to complete the cleaning.
10. It is recommended that the **RYDLYME** cleaning solution be cycled out of the system to prepare it for normal operation. At this time, strainers should also be removed, inspected and cleaned as well.
11. Once the cleaning material has been cycled from the tower system, turn your conductivity, pH meters or any other equipment back on. Return the make-up water and bleed-off valves per the manufacturer's recommendations. Lastly, resume normal system operation.

CAUTION: **RYDLYME** is non-corrosive, but the application of **RYDLYME** may expose pre-existing under deposit corrosion (pitting, holes or similar damage) that can result in leaks in pipes, equipment or systems.

Why Should You Use RYDLYME ?

RYDLYME is EFFECTIVE . . . it dissolves approximately two pounds of scale per gallon!
RYDLYME is NON-HAZARDOUS . . . it does not fall under any of the seven federally designated classes of hazardous waste!
RYDLYME is BIODEGRADABLE . . . it has a biochemical oxygen demand of 16 mg/l and can be disposed of through existing plant sewers!
RYDLYME is SAFE . . . it can be held in the open hand without injury!
RYDLYME is ECONOMICAL . . . Call us at (800) 451-6291 to learn how an investment in **RYDLYME** can multiply your efficiency!

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