"Improving Heat Transfer Efficiency at the Least Cost"

Fuel Efficiency, LLC

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ULTRA SCALE-AWAY CLEANING OF HEAT EXCHANGERS

To obtain the quantity of UltraScale-Away needed to clean your heat exchanger, you will need to know the diameter and length first. Once you have that information, please refer to the table for the quantity and circulation times. The volume given in the reference chart depicts a 50% concentration, therefore the same amount of water will be required to flood the unit and circulate the solution. If you are cleaning a plate & frame exchanger, please consult the formula for figuring your volumes. When isolating the water-side of the unit for cleaning, additional UltraScale-Away
may be necessary if the isolation valves are not located close to actual supply and return ports of the exchanger. To account for this added volume, add in the piping volume from the exchanger to the valves, to ensure the adequate amount of solution.

1. Isolate and drain the waterside of the exchanger to be cleaned.

2. Place a ball valve (not less than 1") between the isolation valves and the heat exchanger on both the supply and return.

3. Attach the UltraScale-Away pump and hoses so that the UltraScale-Away will be pumped in the bottom or supply, and back out the top or return.

4. Begin pumping all the required UltraScale-Away into the exchanger, once that is accomplished, begin to add water to complete the circulation. Please note: the water deposits will take up volume within the heat exchanger, so you will not be able to add the same amount of water in the beginning.

5. Continue circulating the solution for the recommended amount of time. As the circulation progresses, and the product dissolves the deposits inside the unit, the volume will increase. To account for the increase in volume, please add water to the circulation vessel as needed. If you begin adding a lot of water, please caution, it is possible there is a leak in the system.

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6. It is a good idea to periodically check the effectiveness of the solution while circulation is in progress. This can be accomplished by utilizing a pH meter and as long as the solution retains a low pH, the product is active. Should the circulating solution reach a pH of 5.5-7.0 before the recommended time is up, you will need to add more UltraScale-Away and possibly extend the circulation time.

7. Upon completion of the recommended circulation time, the solution may be purged to a normal sewer and flushed with water. Placing the return hose in the drain, and adding water to the circulation container until the discharge line runs clear completes this process.

8. The unit is ready to be returned to service.

9. These same instructions may be used for plate & frame type heat exchangers; for volumes consult the appropriate formula...

Please note if your situation dictates you cannot take your heat exchanger off-line, please contact the manufacturer for additional on-line cleaning instructions.

Your heat exchanger(s) should now be operating at peak efficiency, and therefore saving your facility valuable time and money.

<u>Formula to figure volume (Shell & Tube HE)</u>
Radius^2 x 3.14 x length = cu. area (if inches; convert to cubic feet)
Total cubic inches ÷ 1728 = cubic ft
Cubic feet x 7.5 = total gallons
Total Gallons ÷ 2 = volume in gallons per side
Volume per side ÷ 2 = US-A required at 50% solution strength

<u>Formula to figure volume of (plate & frame HE)</u>
W" x H" X thickness of plate pack" (in inches)
Total cubic inches ÷ 1728 = cu ft
Cu ft x 7.5 = total gallons
Total gallon ÷ 2 = volume in gallons per side
Volume per side ÷ 2 = US-A required at 50% solution strength

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UltraScale-Away
Quantities and Circulation Times
Shell & Tube Heat Exchangers

When utilizing UltraScale-Away to thoroughly dissolve all water scale, lime, mud and rust deposits from the water side of your heat exchangers, the following chart should be used to determine UltraScale-Away quantities and circulating times.

We also advise, that the UltraScale-Away solution be circulated from the bottom of the unit and out the top of the equipment. Circulate for the prescribed amount of time, then water flush for 30 minutes or until the return water runs clear. You should always circulate from an open receiver bucket, venting the solution to atmospheric conditions. When UltraScale-Away dissolves water formed deposits, it emits a non-toxic carbon dioxide gas. If this gas is not vented, it could build up pressure.

Circulation time will vary from 1 – 8 hours depending on size of unit and amount of scale build-up.

- **Quantities of UltraScale-Away to Clean Water Side of Heat Exchangers**

	4'	5'	6'	8'	10'	12'	16'	18'	20'	24'	30'	36'	40'
4"	1	1	1	2	2	2	3	3	3	4	5	6	6
5"	1	1	2	2	3	3	4	5	5	6	8	10	10
6"	2	2	3	3	4	5	6	7	7	9	12	15	16
8"	3	3	4	5	7	8	10	12	13	16	20	25	30
10"	4	5	6	8	10	12	16	18	20	25	30	40	45
12"	6	7	9	12	15	18	24	27	30	35	45	55	60
16"	10	13	16	21	25	30	42	50	55	60	80	95	110
20"	16	20	25	32	40	50	65	75	80	100	120	150	160
24"	25	30	35	50	60	70	95	110	120	140	180	220	240
30"	35	45	55	75	90	110	150	165	180	220	280	330	360
36"	55	65	80	110	130	160	220	250	275	330	400	495	550
40"	65	80	100	130	160	200	260	300	330	400	500	600	660
44"	80	100	120	160	200	240	320	360	400	475	600	720	800
48"	100	120	140	190	240	280	380	425	480	560	710	850	950

GALLONS OF ULTRASCALE-AWAY

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

- Quantity required for tube side vs. shell side is typically very similar.
- Quantities recommended above reflect an approximate usage of a 50% solution of one side of exchanger.