

# VACUUM PUMPS

In order to remove water scale, lime, mud and rust from the casting, rotor, hub, cones and associated piping of your equipment, the following steps should be used.

## ***Cleaning instructions:***

- Write down the “before” amp readings, cfm at vacuum capacity and the vacuum in inches of mercury.
- Take the unit out of service.
- Remove the bottom drain plug and allow all water to drain from the pump casing. Replace bottom plug after the unit is drained.
- Break seal on water piping and attach a pumping discharge hose.
- Remove top plug and attach return hose between there and the recirculation bucket.
- Insert “blanks” in flanges of discharge and suction piping.
- Add prescribed quantity of Dynamic Descaler into the circulation loop.
- In some instances, additional water may be required to maintain circulation.
- Tighten vacuum pump and seal packing to minimize leakage.
- After 15 minutes of Dynamic Descaler circulation, turn pump rotor 90 degrees by pulling on the drive belts or jacketing the starter switch.
- Every 15 minutes thereafter, turn rotor 90 degrees to assure a thorough cleaning of interior part of the pump, including hub and rotor.
- Continue the circulation of Dynamic Descaler for at least two hours or until the foaming stops. Lack of foam indicates either a further application is required or all scale has been dissolved.
- After several hours of circulation time, with intermittent turning of the rotor, the pump should be clean and rotor should turn freely.
- Shut off the circulating pump and add flush water to the recirculation bucket.
- Disconnect return hose and run to drain.
- Restart circulation pump and flush until water runs clear.
- Disconnect pump and all hoses. Remove all the “blanks” in the flanges and reconnect all piping.
- Open seal water valve, start the vacuum pump and operate for 10-20 minutes to thoroughly flush the pump. During this time adjust the seal water rate to the manufacturer’s recommendations. Also readjust the packing compression to the correct setting.
- Return the pump to service.
- After the unit has stabilized, write down the “after” amp reading, cfm at vacuum capacity and vacuum in inches of mercury.
- Compare the “before” and “after” readings to determine the effectiveness of Dynamic Descaler cleaning. Record all information for future reference to schedule next preventative maintenance cleaning.



# HEAT EXCHANGERS

Heat exchangers in many manufacturing facilities are very crucial in everyday operations. Heat exchangers are designed to transfer heat in the form of kinetic energy from one liquid to another. And while transferring heat, the heat exchanger, over a period of time will collect lime, scale and rust on the waterside of the exchanger.

With Dynamic Descaler, you do not have to dismantle or remove the unit from your operations. You may want to install a system, which will inject Dynamic Descaler into your water supply on a regular basis for your cooling tower, chiller, or your closed loop water system. This procedure will eliminate downtime in your everyday operations while cleaning out your exchanger.

If you intend to clean only the heat exchanger, you still do not have to dismantle or remove the exchanger from your operations.

## *Instructions for Dynamic Descaler Cleaning*

- By-pass heat exchanger from operation.
- Remove the existing water in the exchanger. This MUST be done, to ensure proper results.
- Disconnect the water in/out connections from the exchanger.
- Attach the necessary hoses to in/out connections on before attaching the exchanger to a circulating pump.
- Once the circulation has been completed, flush the exchanger with water to remove any insolubles.

Please refer to the Chart on the following pages for the proper amounts of Dynamic Descaler to use and the recommended circulation times.

## *Quantity & Circulation - Calculation Charts*

4" Diameter	
Length (ft)	Gallons/Circulation Time
4	1 Gal. / 45 Min.
6	1 Gal. / 45 Min.
8	1.5 Gal. / 45 Min.
10	2 Gal. / 1 Hr.
12	2 Gal. / 1 Hr. 45 Min.
16	3 Gal. / 1 Hr. 45 Min.
18	3 Gal. / 1 Hr. 45 Min.
20	3 Gal. / 1 Hr. 45 Min.
24	3.5 Gal. / 1 Hr. 45 Min.
30	4 Gal. / 2 Hr.
40	5 Gal. / 2 Hr.

5" Diameter	
Length (ft)	Gallons/Circulation Time
4	1 Gal. / 45 Min.
6	1.5 Gal. / 45 Min.
8	1.5 Gal. / 45 Min.
10	2.5 Gal. / 1 Hr. 45 Min.
12	2.5 Gal. / 1 Hr. 45 Min.
16	3.5 Gal. / 1 Hr. 45 Min.
20	4.5 Gal. / 1 Hr. 45 Min.
24	5 Gal. / 1 Hr. 45 Min.
30	7 Gal. / 1 Hr. 45 Min.
36	8 Gal. / 1 Hr. 45 Min.
40	9 Gal. / 2 Hr.

6" Diameter	
Length (ft)	Gallons/Circulation Time
4	1 Gal. / 45 Min.
6	1 Gal. / 45 Min.
8	2 Gal. / 1 Hr. 45 Min.
10	3 Gal. / 1 Hr. 45 Min.
12	4 Gal. / 1 Hr. 45 Min.
16	5 Gal. / 1 Hr. 45 Min.
20	6 Gal. / 1 Hr. 45 Min.
24	7.5 Gal. / 1 Hr. 45 Min.
30	11 Gal. / 1 Hr. 45 Min.
36	14 Gal. / 1 Hr. 45 Min.
40	15 Gal. / 1 Hr. 45 Min.

## Quantity & Circulation - Calculation Charts

8" Diameter	
Length (ft)	Gallons/Circulation Time
4	2 Gal. / 45 Min.
5	2 Gal. / 45 Min.
6	3 Gal. / 45 Min.
8	4 Gal. / 1 Hr. 45 Min.
10	6 Gal. / 1 Hr. 45 Min.
16	8.5 Gal. / 1 Hr. 45 Min.
20	11 Gal. / 1 Hr. 45 Min.
24	15 Gal. / 1 Hr. 45 Min.
30	18 Gal. / 2 Hr. 45 Min.
36	23 Gal. / 2 Hr. 45 Min.
40	25 Gal. / 2 Hr. 45 Min.

12" Diameter	
Length (ft)	Gallons/Circulation Time
4	5 Gal. / 1 Hr. 45 Min.
6	7 Gal. / 1 Hr. 45 Min.
8	10 Gal. / 1 Hr. 45 Min.
10	14 Gal. / 1 Hr. 45 Min.
12	17 Gal. / 1 Hr. 45 Min.
16	23 Gal. / 1 Hr. 45 Min.
20	28 Gal. / 2 Hr. 45 Min.
24	34 Gal. / 3 Hr. 45 Min.
30	44 Gal. / 3 Hr. 45 Min.
36	52 Gal. / 3 Hr. 45 Min.
40	54 Gal. / 3 Hr. 45 Min.

16" Diameter	
Length (ft)	Gallons/Circulation Time
5	11 Gal. / 1 Hr. 45 Min.
6	16 Gal. / 1 Hr. 45 Min.
8	19 Gal. / 1 Hr. 45 Min.
10	23 Gal. / 2 Hr. 45 Min.
12	29 Gal. / 2 Hr. 45 Min.
16	41 Gal. / 3 Hr. 45 Min.
20	52 Gal. / 3 Hr. 45 Min.
24	60 Gal. / 3 Hr. 45 Min.
30	80 Gal. / 4 Hr. 45 Min.
36	95 Gal. / 4 Hr. 45 Min.
40	110 Gal. / 4 Hr. 45 Min.

20" Diameter	
Length (ft)	Gallons/Circulation Time
6	24 Gal. / 2 Hr. 45 Min.
8	31 Gal. / 2 Hr. 45 Min.
10	39 Gal. / 3 Hr. 45 Min.
12	49 Gal. / 3 Hr. 45 Min.
16	64 Gal. / 3 Hr. 45 Min.
18	74 Gal. / 4 Hr. 45 Min.
20	79 Gal. / 4 Hr. 45 Min.
24	95 Gal. / 4 Hr. 45 Min.
30	115 Gal. / 4 Hr. 45 Min.
36	145 Gal. / 4 Hr. 45 Min.
40	155 Gal. / 4 Hr. 45 Min.

24" Diameter	
Length (ft)	Gallons/Circulation Time
5	27 Gal. / 3 Hr. 45 Min.
6	34 Gal. / 3 Hr. 45 Min.
8	49 Gal. / 3 Hr. 45 Min.
10	55 Gal. / 3 Hr. 45 Min.
12	65 Gal. / 4 Hr. 45 Min.
16	90 Gal. / 4 Hr. 45 Min.
20	115 Gal. / 4 Hr. 45 Min.
24	135 Gal. / 4 Hr. 45 Min.
30	175 Gal. / 4 Hr. 45 Min.
36	215 Gal. / 5 Hr. 45 Min.
40	235 Gal. / 5 Hr. 45 Min.

30" Diameter	
Length (ft)	Gallons/Circulation Time
6	52 Gal. / 4 Hr. 45 Min.
8	70 Gal. / 4 Hr. 45 Min.
10	85 Gal. / 4 Hr. 45 Min.
12	105 Gal. / 4 Hr. 45 Min.
16	145 Gal. / 4 Hr. 45 Min.
18	160 Gal. / 4 Hr. 45 Min.
20	175 Gal. / 4 Hr. 45 Min.
24	215 Gal. / 5 Hr. 45 Min.
30	275 Gal. / 5 Hr. 45 Min.
36	325 Gal. / 6 Hr. 45 Min.
40	355 Gal. / 6 Hr. 45 Min.



# COOLING TOWERS

## Cooling Towers & Closed Circuit Cooling

Dynamic Descaler cleaning of cooling towers and closed circuit water cooling systems is most usually accomplished while the water cooled equipment is online and without the necessity of shut-down. In order to dissolve all water scale, lime, rust and dirt from the waterside of your equipment, it is imperative that these instructions are followed.

### Cleaning instructions:

- When units to be cleaned are in operation or merely connected with water flowing into them, shut off make-up water and bleed-off to tower and/or sump tank.
- Open drain valve in bottom of sump tank and lower the water level to a point where pump still circulates without cavitating. If pump sucks air, add minimum amount of make-up water to maintain circulation.
- In order to clean the entire system, including cooling tower, sump tank, pump piping, and all associated equipment to tower while system is in operation, you must first determine the tonnage of your cooling tower. Documentation supplied with your tower or nameplate on the tower should indicate the cooling capacity, in tonnage.
- Please refer to the Sizing Chart here to compute the proper amount of Dynamic Descaler required.
- Slowly add this quantity of Dynamic Descaler to the sump pump over at least a two-hour period.
- Circulation time should be at least five hours, during which all equipment should be online. However, anytime thereafter, the make-up water can be turned on and the bleed-off opened and set in order to remove all of the dissolved solids from the system.
- In order to purge all insoluble material from closed circuit systems, it is suggested that, after circulation, the drain valve should be opened and make-up water added until all water in system is clear. Close drain and establish proper bleed-off and make-up.
- When convenient, it is recommended that the sump tank be drained and flushed and that the strainer screen be removed and inspected for any insoluble material.

When cleaning cooling towers and closed circuit coolers it is sometimes hard to determine the amount of scale build-up that has been accumulated over a period of time. For example, there might be a case where you

have a 500-ton cooling tower and you need more than the recommended 150 gallons of Dynamic Descaler. The amounts on the Sizing Chart are just for the cooling tower and the closed circuit cooling only, not for the entire system, (pump piping and all the associated equipment that is using the cooling water). For the entire system, take the tonnage and multiply by 0.7, which equals the amount of Dynamic Descaler to be used.

Sizing Chart	
Tonnage	Gallons of Dynamic Descaler
10	3.0
15	4.5
20	6.0
25	7.5
30	9.0
50	15.0
75	22.5
100	30.0
125	37.5
150	45.0
200	60.0
250	75.0
300	90.0
400	120.0
500	150.0
750	225.0
1000	300.0
2000	600.0
3000	900.0
4000	1200.0

# BIODESCALER



# AIR COMPRESSORS

A Reciprocating Compressor is normally a heavy-duty, continuous service compressor. Cylinder construction usually incorporates a water-jacketed cylinder and water-jacketed heads to remove some of the heat of compression and also to improve the lubrication and reduce carbonization of valve parts. Water jacketing around valve and packing is essential, since these are points of localized heating.

As time goes on, you will have lime, water scale and rust accumulation inside the water jackets, which, in time, will overheat the air compressor. This will also occur in the intercooler and aftercooler. With Dynamic Descaler you can clean these vital parts, without disassembling the cylinders, aftercooler, and the intercooler. Simply remove the water in/out connection from each part and circulate Dynamic Descaler for the recommended amount of time. After the circulation, flush with water and connect the water in/out connections back to the proper location.

If your compressor is running off a closed loop water system or a cooling tower, you may want to pour the Dynamic Descaler into one of these systems. This will eliminate the downtime in your plant operation versus disconnecting the in-out connections from each vital part. Before proceeding with these operations, please contact us so we can assist you.

For the proper amount of Dynamic Descaler and circulation times, please refer to the following chart:

Horsepower	Gallons-Hours of Circulation				
	Low-Pressure Cylinder	High-Pressure Cylinder	Intercooler	Aftercooler	Total
30	6-2	6-2	3-1	2-1	17-2
50	10-2	8-2	7-1	5-1	30-2
100	14-3	10-3	11-1	7-1	42-3
125	18-3	13-3	15-1	9-2	55-3
150	26-3	16-3	19-1	11-1	72-3
200	30-3	20-3	27-2	17-1	94-4
250	34-4	22-4	35-2	21-2	112-4
300	38-4	24-4	41-2	25-2	128-4
500	42-4	28-4	44-2	29-2	143-4
700	50-4	35-4	48-2	33-2	166-4
1000	62-5	47-5	60-3	45-3	214-5

Example: If a compressor is 50 H.P. and the low-pressure cylinder is to be cleaned. It would take ten (10) gallons of Dynamic Descaler and approximately two (2) hours to clean it. To clean the high-pressure cylinder you would need an additional eight (8) gallons of Dynamic Descaler. It would then take eighteen gallons of Dynamic Descaler and approximately two (2) hours to clean the high pressure and low-pressure cylinders.

For proper quantity and circulating times to run Dynamic Descaler through the cooling tower or closed loop water system to clean the compressor, (without shutting down plant operations), please contact Biodescaler FZE.

# BIODESCALER