

# Upgrade Your Aging Piston Pumps and Maximize Your Profits

## Leybold's DIJ Series Diffusion Pumps are good for your profits, your productivity, and the environment!

If your piston pumps are getting old and repairs are needed more often, you will likely need to consider replacing them with new pumps. In such a case, it is time for you to consider whether the piston pump is the best choice as the new replacement pump. If it is the blower, it is even more important to consider your choice of replacement.

### Why Upgrade? Average Savings of Leybold's DIJ 20 Diffusion Pump vs. Your Legacy Pump:

<b>Oil Change Costs:</b>	<b>50% - 80%</b>
<b>Maintenance Labor:</b>	<b>50% - 67%</b>
<b>Maintenance Downtime:</b>	<b>50% - 67%</b>
<b>Power Consumption:</b>	<b>37%</b>
<b>Cooling Water Consumption:</b>	<b>37%</b>

### Our Innovations Drive Your Productivity

A number of critical design innovations make our pumps the most flexible and efficient diffusion pumps on the market:

- The heaters are temperature controlled
- Thermal transfer efficiency is magnitudes higher
- Immersion heater solves multiple problems



**Pioneering products. Passionately applied.**

# Diffusion Pump Upgrade by the Numbers

## DIJ 20 Diffusion Pump vs. Your Legacy Pump

### Power and Cooling Water Costs: 37% Reduction

- The DIJ20 has 10.8 KW of heaters vs. legacy pump with 12KW (10% lower).
- The DIJ20 with heater control runs at an average of 70% power in steady state (7.56KW).
- 7.56KW vs 12KW is 37% lower.
- Heat in = heat out, so cooling water has 37% lower heat load.
- 8,000 hours of operation per year, 10 cents per KWH, cuts your power bill by **\$4,560 per year.**
- This kind of power cut qualifies the equipment for energy trust rebates, get up to **\$7,000 back the first year.**

### Oil Costs: 50% to 80% Reduction

- DC704 silicone oil. Normal price **\$225.00 per liter**
- LVO500 mineral oil Normal price **\$115.00 per liter**
- Leybold oil capacity 4 liters, legacy pump 5 liters.
- Legacy pump. Change oil twice per year with silicone oil. **\$2,250 per year**
- Leybold pump. Change oil once per year with mineral oil. **\$460 (80% lower)**
- Leybold pump change oil once per 18 months, mineral oil. **\$307 (86% lower)**
- **Max savings equal \$1,943 per year.**

### Labor and Downtime Costs: 50% to 80% Reduction

- 16 hours Labor at \$60 per hour cost (wages and taxes) legacy pump. **\$960**
- 5.33 hours labor (for 1 per 18 month oil change). **\$320**
- Downtime: Saving 10.67 hours per year at 450 per hour furnace revenue. **\$4,801 per year.**
- **Total savings equal \$5,441 per year.**

### Total Annual Reduction in Operating Costs

- |                                  |                                       |
|----------------------------------|---------------------------------------|
| • Power                          | \$4,560                               |
| • Oil                            | \$1,943                               |
| • Labor and downtime             | \$5,441                               |
| • <b>Total savings per year</b>  | <b>\$11,944 per year (\$1,000/mo)</b> |
| • Payments / 36 months financing | \$750/mo                              |
| • Net positive cash flow         | \$250/mo                              |

These estimates are based on factory conditions, and results may vary. You could achieve less or more than the example shown.



# Limitations of Legacy Diffusion Pumps

## The Heaters are Always On

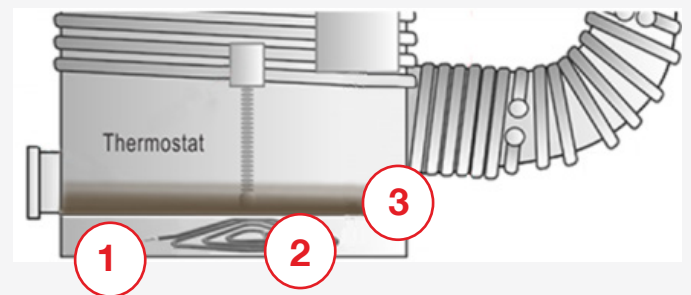
1. Simple on/off pumps operate at one power level – 100%.
- 2. You don't really need 24KW of heat in a 35inch diff pump.**
  - i. Just like you don't need 250HP to drive a car at highway speed.
  - ii. Heater banks are oversized to shorten heat up time.
3. Common diff pumps rely on a snap switch to cycle heaters.
  - i. This is a poor way to operate and it causes oil damage, heater damage, and wear on the snap switch.

## Heater Location

1. Heaters in legacy pumps are located external to the boiler at the bottom of the pump.
2. The bottom of the boiler is where the dirt and heavy oils accumulate, which is an insulating layer. Thus, heaters have to run hotter to provide the same heating power to the oil.
3. Thermal contact between the pancake heaters and the boiler surface is an insulating layer, reducing the heat transfer by half or more, even with thermal grease.
4. Heaters are not temperature controlled, so they heat until the thermal snap switch is tripped. Heaters are often in over temperature condition.
5. Heater temperature is not monitored, so there is no warning of heater trouble. That can cause scrap if the heater fails during production.
6. These heaters burn out often enough that there is an electric supply company that does nothing but supply diffusion pump heaters to replace them.
7. Replacing heaters often requires unmounting pump from furnace. Major evolution with major downtime.

## Oil Degradation

1. As dirt and heavy oil accumulates on the bottom of the boiler, the layer adjacent to the boiler wall must get hotter over time compensate. Hotter oil degrades faster, exacerbating the problem.
2. Degraded oil affects performance of the pump.
3. Degraded oil can stick to the pump jets, requiring cleaning, which can become a time consuming maintenance issue.
4. Degraded oil streams into your backing pump, creating more maintenance.
5. Time with your furnace down is lost production. Very costly.

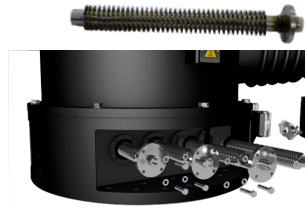


- 1. 6 or more pancake heaters 12 KW for 20 inch diffusion pump.**
- 2. Tiny air gap between heater and boiler plate kills heat transfer rate.**
- 3. Heavy oil and dirt sinks to bottom creating insulating layer right where heaters are.**

# The Leybold Solution

## The DIJ Series High Throughput Diff Pumps

1. Active heater control.
2. Full immersion heaters.
3. Standard mineral Oil.
4. Cleanable in situ.
5. Full communications with furnace PLC.
6. Saves 30% energy input and 30% cooling water load.
7. Heaters are easy to access.
8. Heaters immersed near top of oil not at the bottom of the sludge pile.
9. Heaters rarely need replacement.
10. Higher quantity of smaller heaters allow continued operation if a heater ever fails.
11. Digital monitoring of water flow, heater temperature, oil temperature, and heater power.
12. Data logging and PLC interface available.



## Energy Efficiency Control (EEC)



Actual Oil Temperature

Target Oil Temperature

Percent Heater Power

Buttons Change Screens Displayed



If heater temperature goes significantly higher than oil temperature, you are running low on oil or your heaters are getting fouled. If oil level is OK, time to clean heaters. Heater fouling happens very seldom.



Energy Efficiency Control (EEC) makes this into a smart pump.



# Upgrade Your Pump System Today!

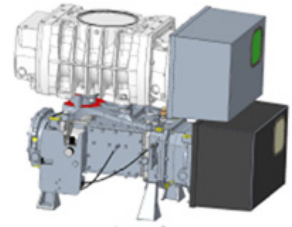
## DV650/WH2500

- Replaces 400 cfm piston pump with blower
- Fast pump down for short production cycles. Cuts your current pump down by 60%. Super quiet, water cooled, ultra-durable.
- Promo price for this campaign: **\$47,450.00**
- Add optional e-saver to cut power use by 45% for **\$3,500.00**



## DV300/WH2500

- Replaces standard piston pump with blower
- Slower pump down but excellent pumping speed at vacuum, perfect for long cycle operations.
- Promo price for this campaign: **\$33,110.00**



## DV500/WH2500

- Promo price for this campaign: **\$37,660.00**
- Very close performance to standard piston pump/blower package.

## VD400i +

- Dual VD200 in parallel backing a WSU2001 blower
- All air cooled dry screw technology with easy to use controls.
- A good piston pump replacement with excellent energy profile suitable for furnaces with longer cycle durations.
- Promo price for this campaign: **\$35,652.00**



## DIJ20 diffusion pump upgrade: (also DIJ35 available)

- Diffusion pump with 20-inch ASA flange. Flanges match to most popular diffusion pump models.
- Save up to 40% energy input for same performance. Oil and heaters run cooler reducing oil change frequency.
- Change heaters while pump is still in place.
- Promo price for this campaign: **\$24,750.00**



**Questions?** Contact your account manager today  
or call **+1-800.764.5369**

