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# liquid-co2- hydraulic-motor- and-linear- actuators-pistons- by infinity turbine

Infinity Turbine  
LLC

Liquid CO2 Hydraulic Motor and Linear  
Actuators Pistons



This webpage QR code

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Infinity Turbine is experimenting with a CO2 driven hydraulic motor for construction equipment and electric vehicles. This ground breaking technology has a better overall COP than a standard battery-to-electric motor cycle.

PDF Version of the webpage (first pages)

<https://infinityturbine.com/liquid-co2-hydraulic-motor-and-linear-actuators-pistons-by-infinity-turbine.html>

## Powering a electric vehicle or construction equipment with CO2 hydraulic motors and pistons

Infinity Turbine is experimenting with a CO2 driven hydraulic motor for construction equipment and electric vehicles. This ground breaking technology has a better overall COP than a standard battery-to-electric motor cycle.

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## How it works

Heat liquid CO<sub>2</sub> to 30 C (87 F) and it goes supercritical (above 1,000 psi). So why not use this for linear actuators (pistons) and hydraulic motors ?

## High COP

In the HVAC industry, it is well known that a heat pump is more efficient than straight electricity (kW) to heat. By using phase change dynamics, you can get better performance, measured by COP (coefficient of performance).

## How to pressurized liquid CO2

There are many methods of bringing CO2 from liquid to gas, or going supercritical.

One method is direct heat of 30 C (87F) or higher temp. This can be provided by electricity, solar thermal, waste heat, induction heating, and more.

Another method is by cavitating liquid CO2 by spinning a cavitation device in the liquid. We've experimented with that, and it works.

Conventional methods of pressurizing CO2 from a liquid is using a piston pump, similar to the Cat310 pump modified for CO2 service. We've built about 100 supercritical CO2 pump botanical extractors using this process, and it works well. Piston pumps require a electric motor with a gearbox to operate, and have many seals which require replacement (consumables).

Is spinning a disc to cavitate liquid CO2 more efficient than a Cat310 piston pump ? We think so. At the very least, it provides a more cost effective and virtually maintenance free method of pressurizing CO2.

## **Is a electric vehicle with hydraulic motors more efficient than electric motors**

We are currently studying the dynamics of using battery power to power a heat-pump device which provides pressurized CO<sub>2</sub> to hydraulic motors which provide motive power. This is especially interesting for construction equipment including steady-state conveyors, but is also applicable for hydraulic motors to drive wheels, tracks, and marine use propellers.

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