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co2-hydraulic-motor

Infinity Turbine
LLC

Liquid CO2 Hydraulic Motor and Linear
Actuators (pistons)



This webpage QR code

Structured Data

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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/co2-hydraulic-motor.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 CO₂ 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 CO₂ 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.
