



tribogen

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Infinity Turbine
LLC

Tribo Effect Tribogen Static Electricity to
Power

Structured Data



This webpage QR code

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Company Name: Infinity Turbine LLC
Product: TriboGen Waste Heat to Energy Systems and Technology
Makes: Static electricity from CO2 with no moving parts
Working Fluid: CO2
Moving Parts: Solid state turbine generator. No moving parts.
Machine: Tribogen.
Industry: Energy
Applications: Waste heat to power, utilities, server farms, bitcoin mining, hot geothermal
High Technology Uses: Converting waste heat to power starting at 30C.
Machine Features: Solid state turbine technology.
Machine Runs On: Liquid CO2. 30C (89F) heat.
Other Technology: Tribo effect power.

PDF Version of the webpage (first pages)

<https://infinityturbine.com/tribogen.html>

Static Electricity Using CO2 With No Moving Parts

Since 2008 Infinity Turbine has been experimenting with all forms of waste heat to power generation. All modern day expanders have moving parts, which necessitates bearings and complicated seal technology and maintenance. The holy grail of energy production is no moving parts (solid state). To that end, after 10 years of trying to reduce a rotating expander to one part (successfully done), we finally achieved the ultimate waste heat to power device, the solid state turbine generator. This is done using CO2 which goes supercritical (phase change from liquid to high pressure vapor) at 88F or 31C.

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Static Electricity Using CO2 With No Moving Parts

TriboElectric Effect:

Nikola Tesla worked with static electricity and wireless transmission in 1899 from the top of Pikes Peak to his lab in Colorado Springs, Colorado. Fast forward to 2016. Infinity was working with Supercritical CO2 systems, when they discovered an interesting effect which was static electricity when CO2 passed over certain materials. That discovery became a commercial product called the TriboTube, which is a electrostatic precipitator that assists in removing oil and particulates from CO2 gas. Now Infinity is developing a solid state power generator, utilizing CO2.

Carbon Dioxide Unique Properties:

CO₂ is unique in that it goes supercritical (liquid to gas phase) at 31 C (88 F). Typical steam plants require 212 F and higher to generate steam to spin a turbine and generator to make power. Sandia Labs has experimented with CO₂ and has identified it as the future working fluid of power plants, from its unique power density that results in smaller footprint power generation equipment. Using the Brayton Cycle, the CO₂ gas is heated, and expanded over a turbine to spin a generator to make power.

The cycle is like a jet engine, in that the working fluid stays as a gas. A standard fossil fuel power plant uses Rankine Cycle to make power – that is taking water, adding heat to make steam, then expanding that over a turbine to spin a generator to make power. The steam is then condensed back to water, and the process is repeated.

The issues with these methods of generating power are that they use inherently expensive equipment, and require huge installations to get economies of scale (i.e. affordable power). What is needed is a scaleable solid state power generator, which is able to use the entire spectrum of heat range from low to high heat.

TriboGen:

Infinity has developed a process to use the power dense CO₂ in a closed-loop Supercritical Rankine Cycle, to produce DC electricity.

Because CO₂ can do a phase change from liquid to gas at 31 C, it opens up huge low quality heat sources that can now generate power. It is optimal for Supercritical Rankine Cycle applications.

Our system makes electricity from heated liquid 31 C and higher, which includes solar, hot geothermal, engine waste heat from stack and oil cooling, data centers, cloud server cooling, compressor, and industrial waste heat. TENG (Tribo Electric Generation). The process can also be used to power ESP (Electro Static Propulsion).

Power That's Scalable:

What's unique about the Triboelectric effect that Infinity is developing, is that it can be used in a small nano or micro-channel application to generate IC chip power, or in a larger assembly to power a smartphone, house, or numbered up to distributed power generation.

What is significant about this technology is the ability to access an utilize low grade heat, as low as 31 C (88F).

Here is a snapshot of the technology:

- can use heat as low as 31 C (CO₂ goes supercritical at 31C)
- requires the use of a compressor or pump (this is a supercritical Rankine cycle)
- the expanding CO₂ can also be used for a rotating turbomachinery (to further expand on power produced), but this requires a more complex arrangement, which extends the solid-state turbine technology in original concept. Under this complex arrangement, complex bearings will need to be used, and mechanism to drive generator developed (if externally driven generator), including, but not limited to high pressure shaft seals, which are not required in the solid-state turbine portion.
- the expanding CO₂ cooling may be used for other technology (chiller, etc)
- the expanding CO₂ can be used in a jet-pump (possible solid-state feedpump) but this has to be developed and tested
- the expanding CO₂ can be used for electrostatic precipitation (ESP)
- the static power generated can be used for a plasma wing
- the static generated can be used for wing deicing
- technology can be made on small scale and then scaled up to any size
- technology can be used at point-of-use to utilize waste heat where it is produced
- the static produced can be possibly used in a boiler or heat recovery unit to significantly enhance the evaporation of liquid to pressurized vapor.
- a rotary cavitation disc can be installed as a pressure reduction device to vaporize liquid to pressurized vapor (act as a compressor)
- technology can be used to excite coils wirelessly
- technology can be used with electronic switching to make what is effectively a solid state electrical generator
- technology can be used to charge a coil (rail gun, laser, etc.)
- technology can be used to make a magnetic field
- technology can be used to produce a corona discharge, to UV purify water, or light welding, cutting, and engraving
