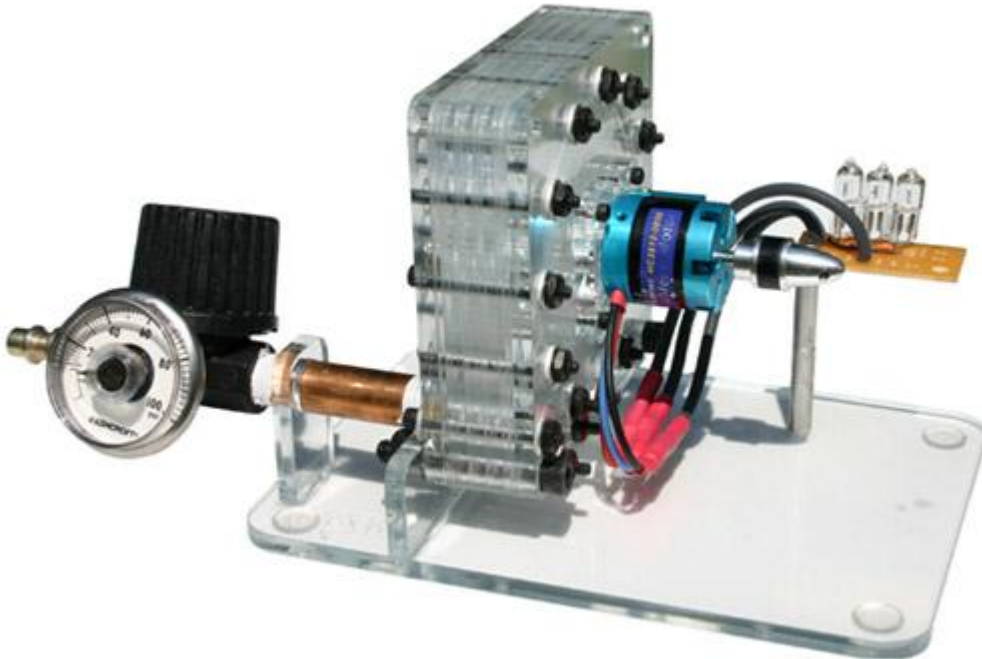


# Tesla Turbine

Invented by the creator of the AC power system this is a truly unique technology that has been forgotten for nearly 100 years



## Introduction to the technology

A Tesla turbine is a quite unique technology. It was invented and patented by Nikola Tesla on the 21st October 1909 at the United States Patent Office from experiments done in England. The patent 1061206 was granted on the 6th May 1913. Although, it is thought that a Tesla first showed a 200 hp 16,000 RPM version on the 10th of July 1906 (on Tesla's 50th birthday).

From what Tesla wrote in the patent it seems his experiments were mainly done with fluids but had confirmed it works with air as well. Unlike a conventional turbines, jet engines and most pumps, Tesla's turbine can be designed to be reversible with no loss in efficiency. Normally compressed air, fluids or steam is applied to the 'inlet' and the turbine spins giving a mechanic rotational output. However, it can also double up as a pump, by rotating the shaft the air/fluid/steam can and be sucked and blown from the inlets / outlets. This makes it unique in being a reversible turbine and a reversible pump. However efficiency increases can be made by tailoring the pump to the medium.

## **Who was Nikola Tesla?**

Nikola Tesla (July 10, 1856 - January 7, 1943) was a physicist, inventor, and electrical engineer of unusual intellectual brilliance and practical achievement. He was of Serb descent and worked mostly in the United States.

## **Some of the more notable things Nikola Tesla invented**

Late 1800s Pioneered work with spark plugs  
1882 Polyphase electric power (almost all mains systems run on this today)  
1888 Set the 60 Hz standard for North America while working for Westinghouse  
1888 Brushless synchronous and induction motors  
1891 Wireless electric power transmission concepts  
1892 X-Rays (3 Years before Willhelm Roentgen re-discovered them!)  
1893 Practical Radio  
1895 Designed first commercial three-phase AC power plant for use at Niagara Falls while working for Westinghouse  
1898 Demonstrates wireless remote controlled boat (first wireless remote control)  
1906 Tesla bladeless turbine and pump

## **How Tesla Turbines work**

On a simple level conventional turbines and pumps scoop up the medium and then expel it. Tesla turbines work by using the boundary layer effect, using viscosity and the adhesion. This basically means that gasses and fluid drag the disks around when being used as turbine and the disks drag the fluid/gas round when it's a pump.

Tesla claimed that by keeping the "sudden changes, shocks and vibrations" to a minimum it stops "imparting to, or deriving energy from a fluid, such as pistons, paddies, vanes and blades". In other words it's more efficient.

Because of the simplicity of the design and construction it is less likely to have flaws, limitations. Design and construction costs are also much lower.

Arguments about how efficient they are and for which purpose they are best used, have been going on since it's been invented. Professor Rice concluded that Tesla turbines were not as efficient as some types of turbines but should be considered for some applications.

## **Advantages of Tesla turbines**

- \* Lower design and production costs than standard turbines, jet engines and pumps Blade-less
- \* High-speed (100,000rpm+ be achieved with some versions)
- \* Low friction (uses boundary layer effect , adhesion + viscosity rather friction)
- \* Reversible
- \* Can be run on a vacuum
- \* Can be powered by air, steam, gasses or liquids
- \* Proven technology (but rarely used)
- \* Lower complexity the conventional Jet Engine
- \* Can be used as a pump by rotating the shaft
- \* Quieter in operation than conventional machinery
- \* Noise is more 'white'
- \* 2 stage or multi stage versions can run on combustible gas/liquids (Just like a jet engine)

## **Possible Disadvantages**

- \* Low rotor torque
- \* Often not suitable for a direct replacement for conventional turbines and pumps, without changes to the machinery it is interacting with.
- \* Proof of its efficiency compared to conventional turbines is still questionable and needs more research
- \* It has remain underdeveloped and hence design improvements are still being made

## About this product

Despite the technology being available for over 100 years now, as far as we are aware this is the first affordable production tesla turbine. It has been design for educational use and also to promote Tesla turbine technology. It should appeal to physicists , teachers, engineers, technologists and Tesla Enthusiasts. This model runs from air pressure 40psig to 70 psig and generates electricity from a 3 phase AC motor/generator (approximately 60Watts @ 25,00rpm). It has a see through design that enables visual inspection and easy explanation of the technology and forces. It has a standard air-line connector that is used throughout the world. Most air compressors and air-lines can be easily connected and used to power it. For UK customers we would recommend screwfix air compressors.

### Dimensions

The whole unit:	5" wide x 11" long x 5" high
turbine housing:	4" square by 1" deep
rotors:	4, each 3" in diameter and 0.110" thick
space between rotors	0.06"
weight	approximately 3 lbs.

### Operational Information

Max. Speed:	35,000 RPM
Max. Pressure:	70 psig
Typical Power:	60 watts @ 10.5 VAC @ 25,000 RPM
Air Consumption	T.B.D.

### Key Facts

Runs of:	compressed air
Reversible:	No
Can be used as a pump:	No
Maintenance	Bearings need to be oiled

## Turbines are not toys

If handled incorrectly they can be dangerous

- \* Don't Run the turbine above 35,000 RPM  
The air pressure must not exceed 70 psig
- \* The compressed air should be at room temperature and oil free if possible
- \* The Turbine should not be moved/turned while in operation
- \* The AC generator should not be removed or replaced with a different generator
- \* The turbine should not be stored in a very cold or hot conditions
- \* It should not be run if any cracks are visible
- \* The fastening should not be lose or over tightened
- \* The open bearings do need to be oiled with a light oil.