



The Science Behind Macrosound™

The heart of Macrosound™ technology is a highly destructive energy source, super cavitation.

Super cavitation is a well-known natural phenomenon which engineers often try to avoid because of its destructive nature. Maelstrom Water Technologies has mastered super cavitation and turned it to their advantage. They have termed this controlled super cavitation “Macrosound™”.

Macrosound's™ ability to destroy pathogens comes from 4 sources:

- **Temperature** – thousands of degrees Celsius
- **Pressure** – hundreds of atmospheres
- **Ultrasound Shock Waves** – 20 kHz shock waves
- **Macrosound Spectrum** – a spectrum of acoustic and ultrasound waves

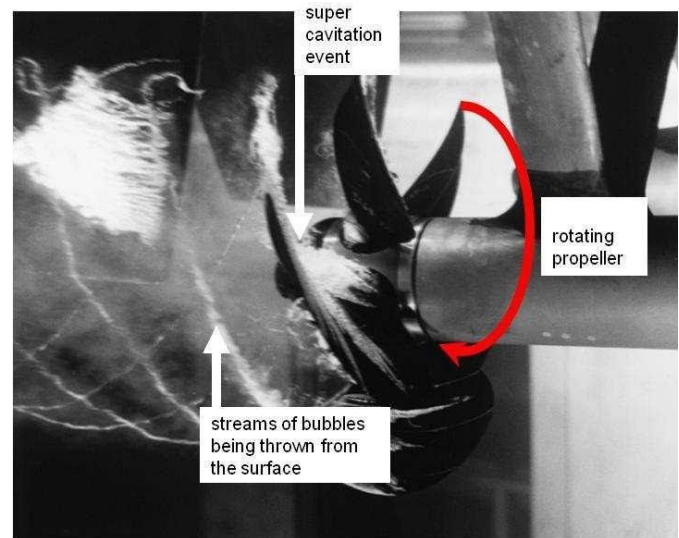
Consider the photograph below showing a corroded turbine where an unwanted super cavitation event has taken place on the surface of the turbine and destroyed a blade.



Super cavitation takes place throughout the environment.

As a turbine or propeller turns, bubbles/cavities are continually being formed on its blades; see the photograph opposite.

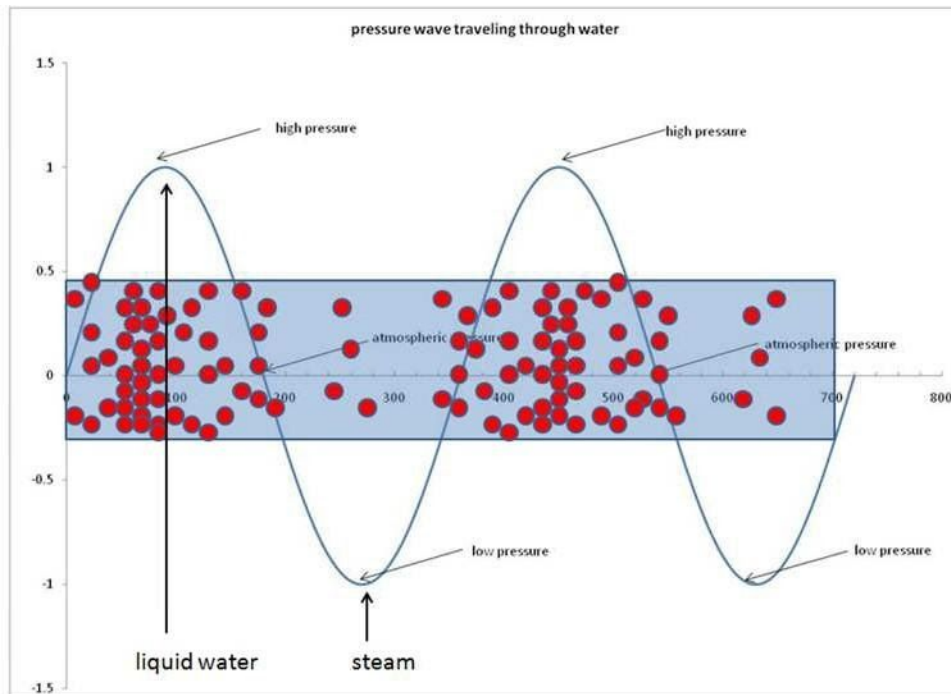
These cavities are the result of a super cavitation process; and in the case of a propeller, they lead to erosion of the propeller and a limited lifetime.



How are super cavitation events generated?

As a propeller rotates through the water it creates pressure waves with high and low pressure regions, akin to the lift generated by the wing of an airplane. As the propeller rotates, pressure waves emit from the blades.

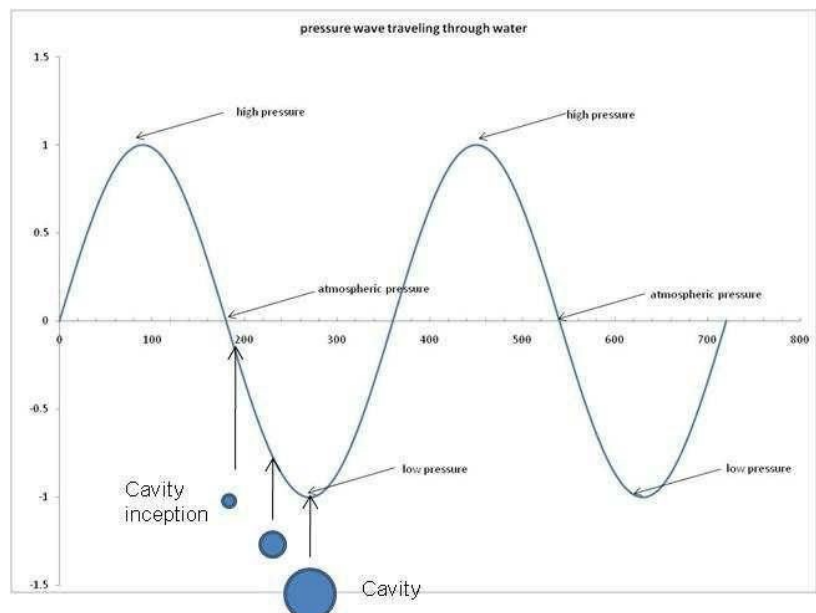
In the diagram below, the pressure wave is made up of peaks and troughs. The peaks of the wave represent areas of high pressure, where the water is compressed. The troughs of the wave represent low pressure, where the water is rarified to the extent that it turns to steam, and a cavity is formed.

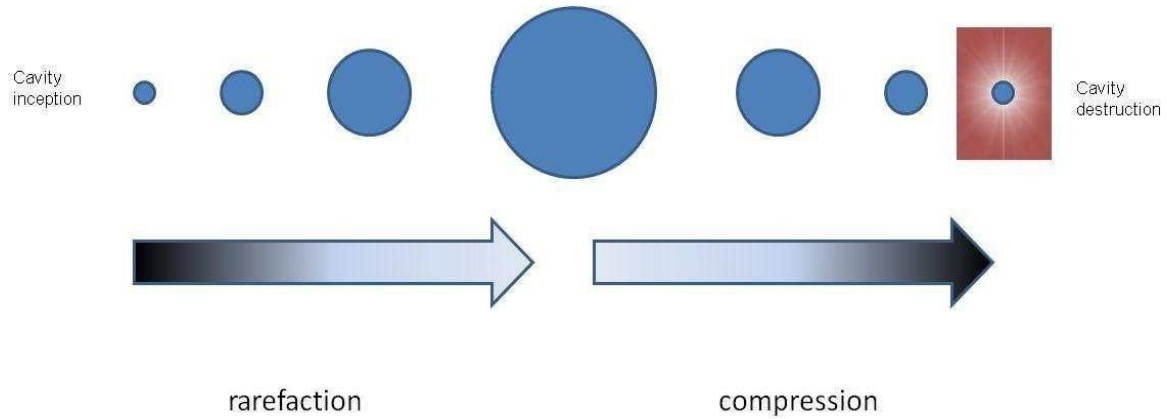


As the pressure further falls the gaseous cavity rapidly expands; the cavity expands while all the time the pressure inside the cavity decreases.

Once the cavity reaches a critical size, its internal pressure drops and the surrounding water starts to crush the cavity. This crushing accelerates compressing the steam within the cavity.

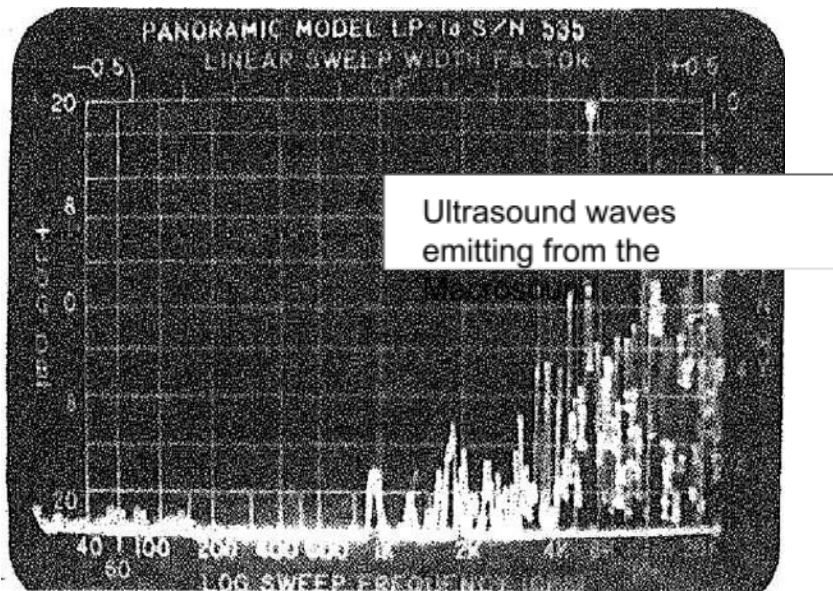
The crushing forces the pressure within the cavity to hundreds of atmospheres and the temperature rises to several thousands of degrees – for less than a fraction of a second, the cavity has the temperature and pressure of a microscopic sun, before it is annihilated in an ultrasound shockwave.





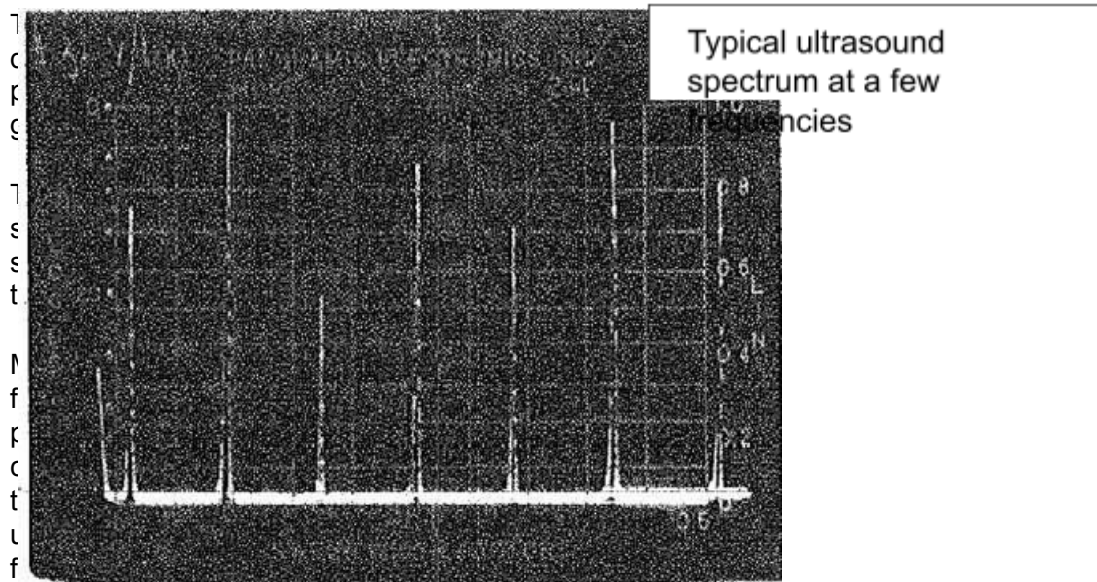
The sudden and violent collapse of these microscopic suns is not without consequences and the shock waves radiate outwards from the cavity causing further destruction in its path.

These shock waves have been directly detected emitting from the Macrosound™ technology as acoustic and ultrasound waves with a range of frequency 1 kHz to 20 kHz, see photograph below.



Ultrasound waves are destructive in their own right, as they pass through the water killing pathogens and breaking up solids.

Why Macrosound™?



the millions of imploding cavities within the Macrosound™ technology are able to expose and exploit every weakness in pathogens and solids.

Why Maelstrom Water Technologies “Macrosound™”?

The secret to the Maelstrom Water Technologies: Macrosound™ technology is the patented tooling within the system; it is designed to produce cavities, but the formation of these cavities takes place within the water and not on the surface of the machine itself.

The formation of these cavities remote from the surface of the equipment means that the collapsing cavities are not eroding the machine; instead the cavitation energy is delivered directly into the water where it can cause the maximum destruction to solids and pathogens.