ULTRASONIC POWER DETERMINATION

Although other methods have been used to determine the amount of power that is delivered to a sample, such as using a hydrophone immersed below the probe, the most common and easiest method is outlined below.

1) Turn on the equipment

2) Set the amplitude as required

3) With the probe in air, not immersed in a sample, record the amount of watts displayed on the power monitor

4) Without changing the amplitude setting, immerse the probe into the sample and record the amount of watts displayed on the power monitor

5) The difference in power readings between step 3 and 4 above, is the amount of power being delivered to the sample in watts

6) To obtain the Power Density in watts/cm², divide the number of watts obtained in step 5 by the area of the probe tip.

Area = (diameter/2)² x π *or* π r²

See below for an example using a 3mm probe.

diameter of 3mm probe = 3mm/10 = .3cm = .15cm radius

.15²cm X 3.142 (π) = .0707cm² area of probe

Divide the # of watts delivered into the sample by the area of the probe

At 20% amplitude, with 1 watt delivered into the sample, the power density would be 1/.0707 = 14 watt/cm²

Amplitude	Output watts in Air	Output watts in Sample	Output watts Delivered to Sample	Watts/cm²
20	1	2	1	14
40	3	6	3	42
60	5	10	5	71
80	8	15	7	99

Intensity is expressed as power per surface area of an ultrasonic probe

(watts/cm²)

NOTE:
The greater the resistance to the movement of the probe, the greater the amount of power that will be delivered to the probe.