



Acoustic Cavitation

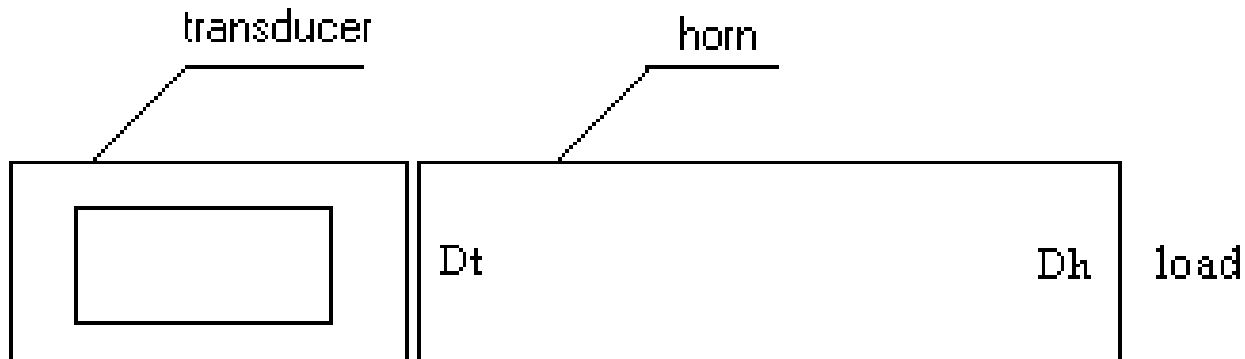
Experimental Results

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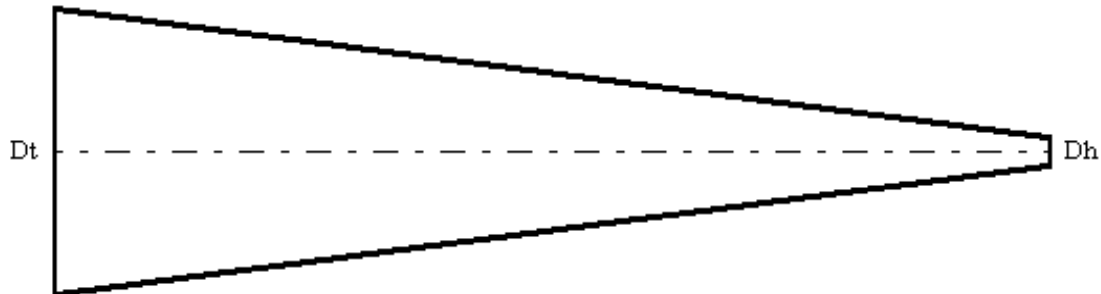
sergei@peshkovsky.com

Part 1. Ultrasound Sources for Producing Cavitation

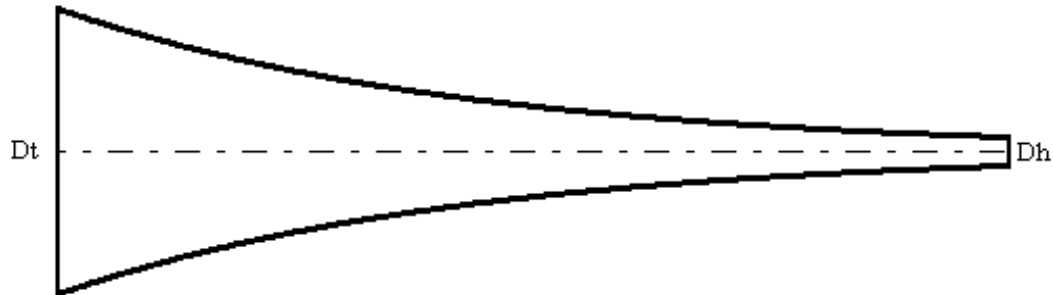


- $\tau'_t / V'_t = r * K^2 * N^2$; $K = V'_h / V'_t$; $N = D_h / D_t$
- $P'_a \cong 1.5 * P_0$; $P'_a = r * V'_h$
- $(\tau'_t / P_0) \cong 1.5 * K * N^2$
- $K * N^2 \cong 15 - 45$

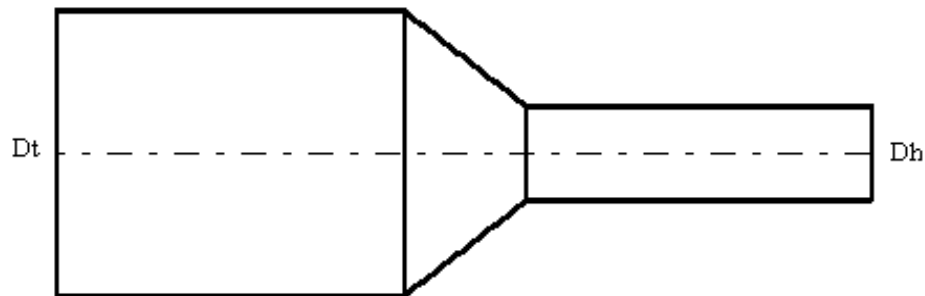
Regular Tapering Horns



- $K > 1$

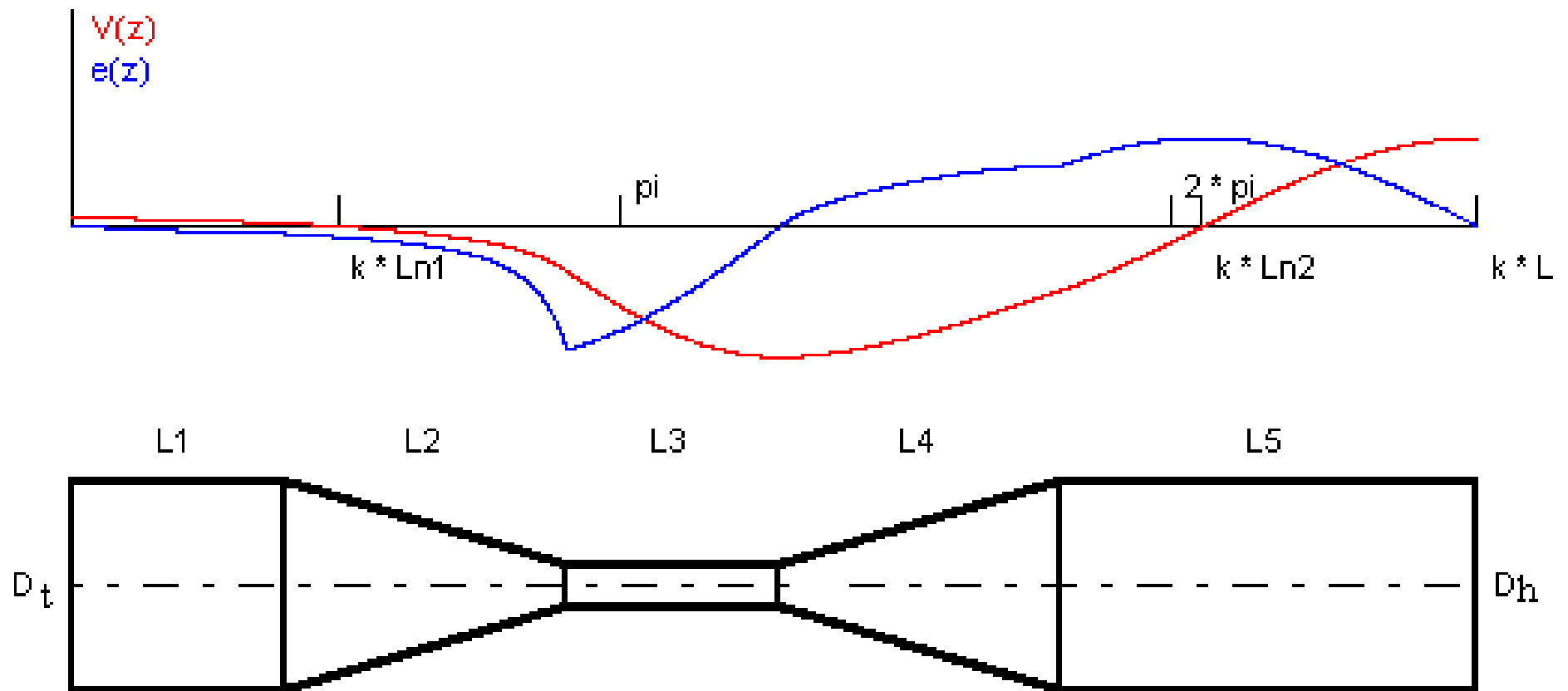


- $N^2 < 1$

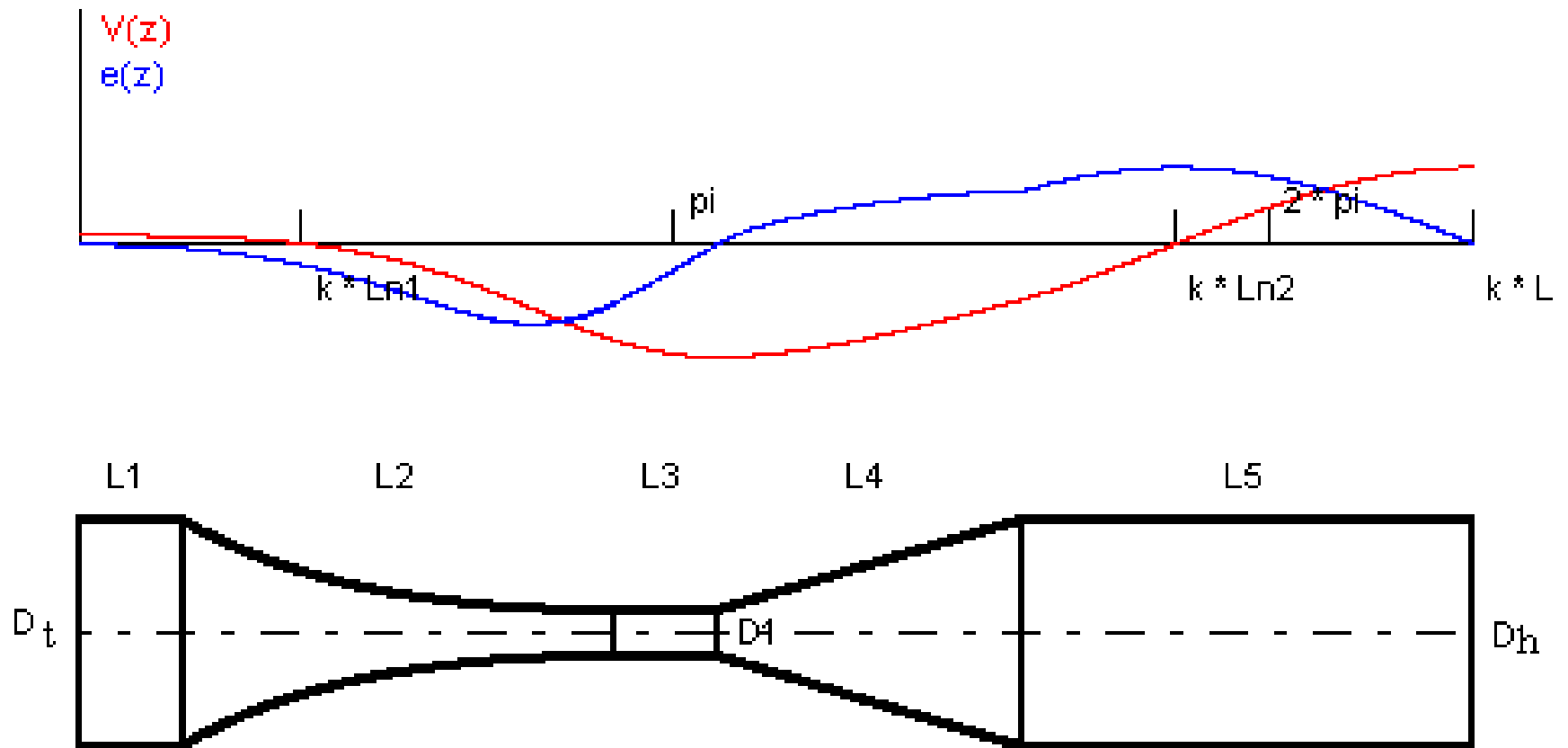


- $K * N^2 \leq 1$

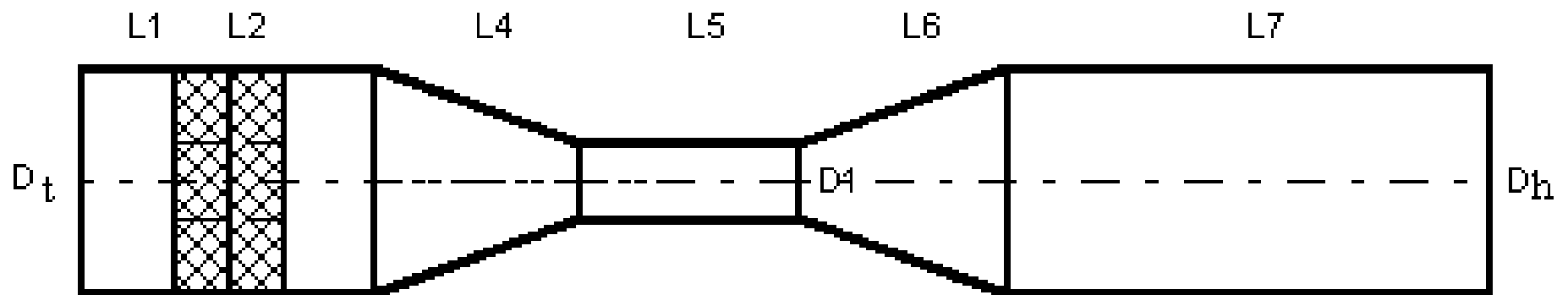
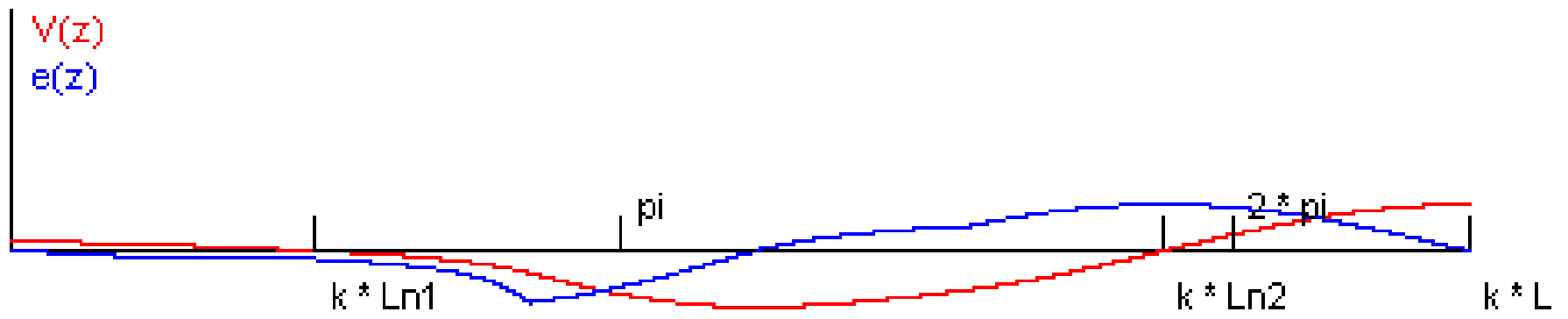
Barbell Horn



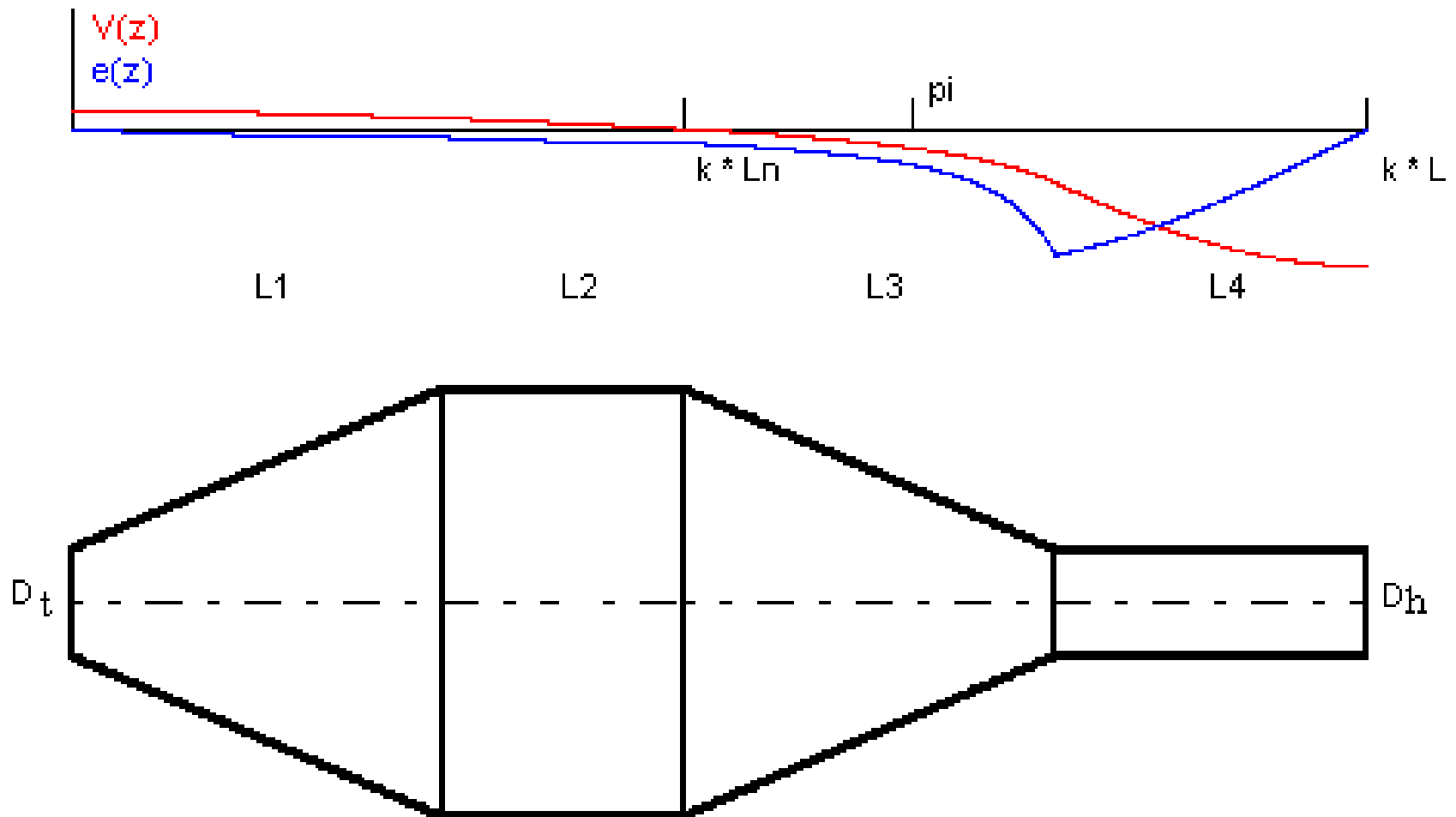
Barbell Horn



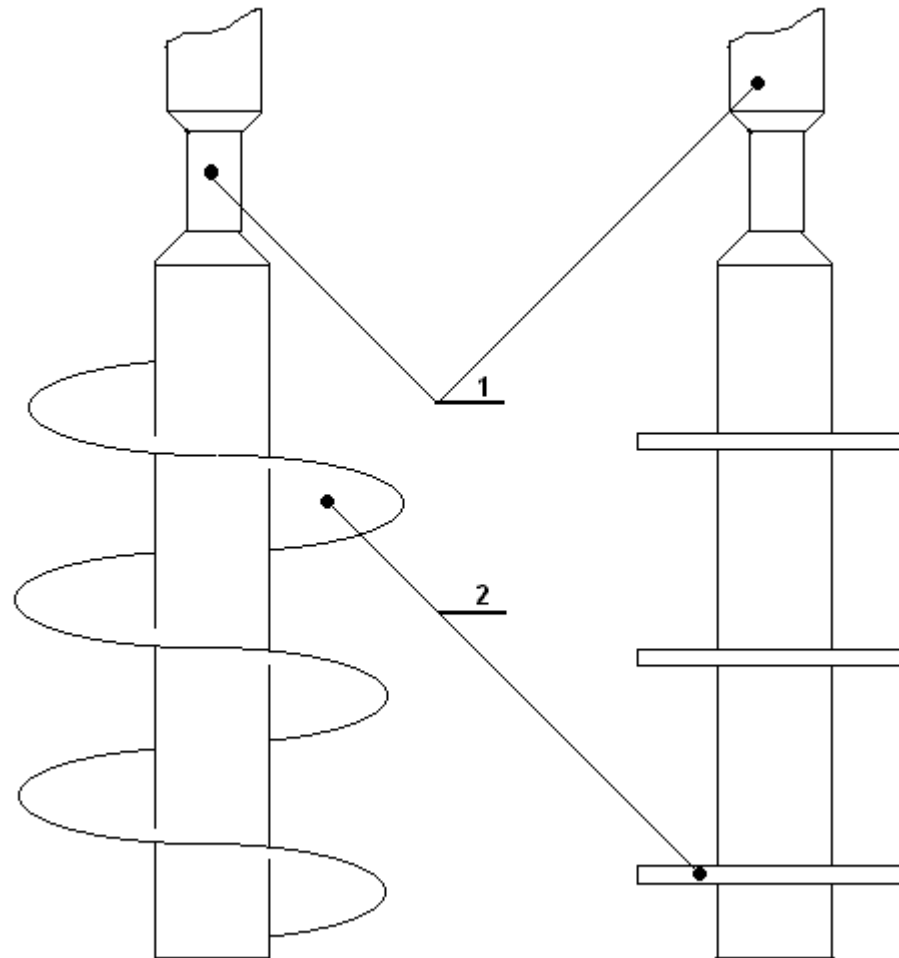
Ceramic Transducer - Barbell Horn



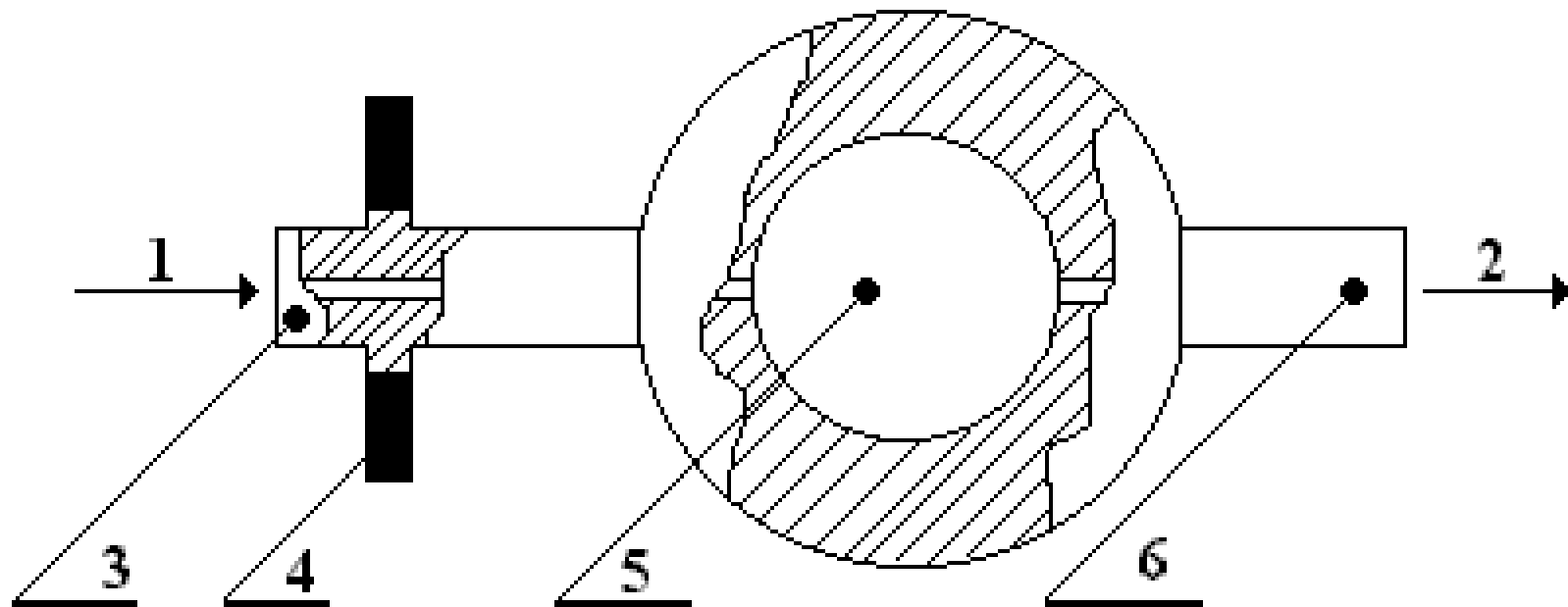
Barrel Horn



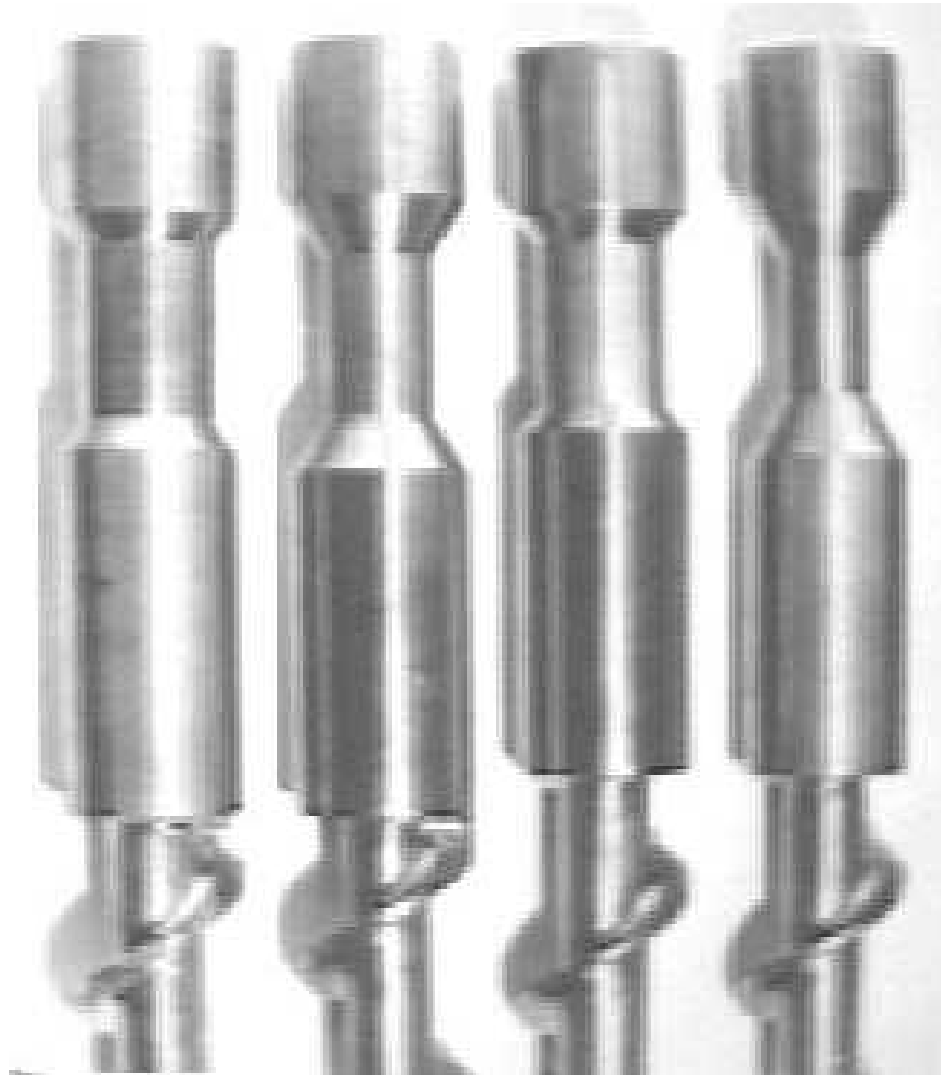
Acoustic Systems



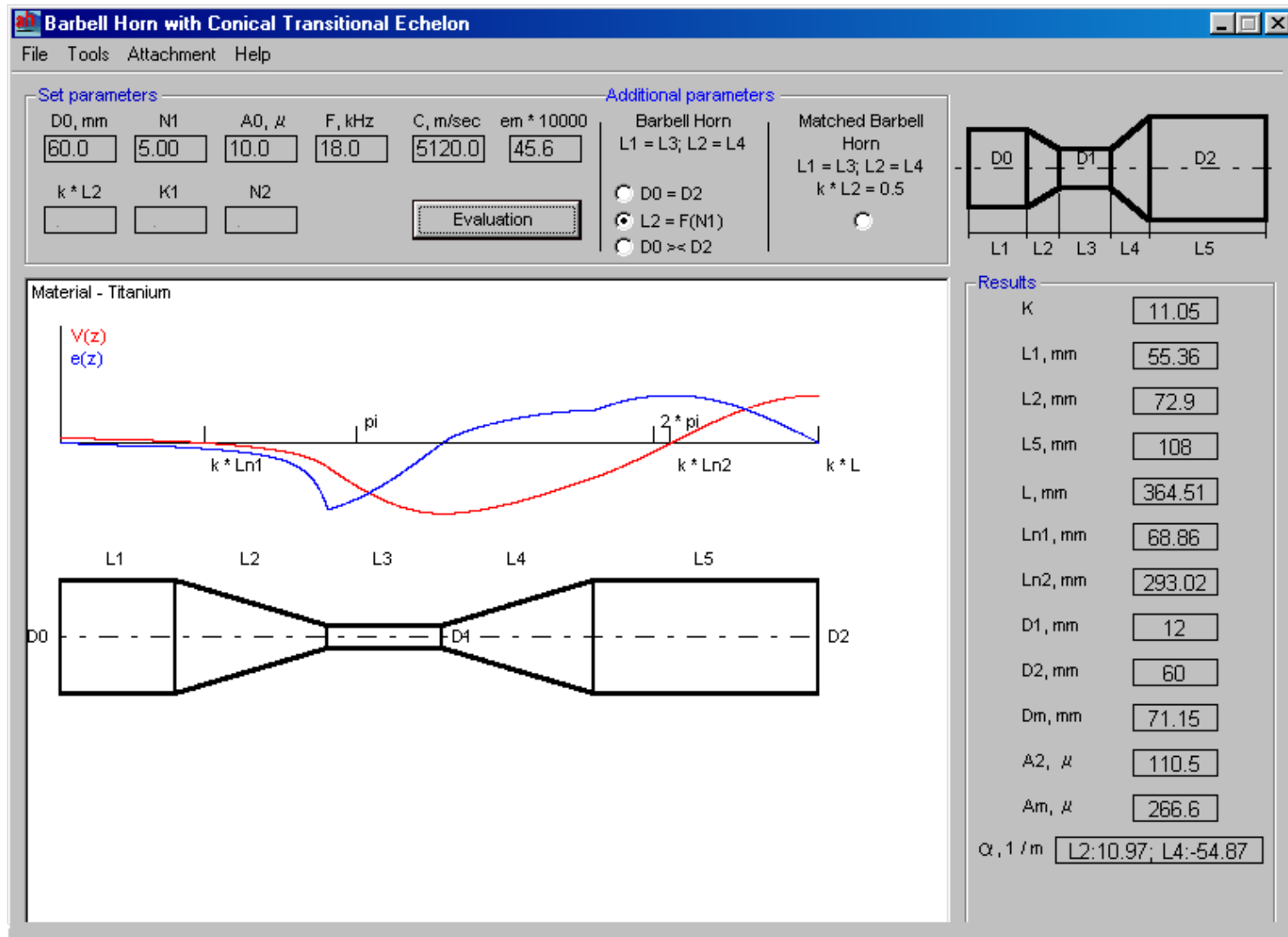
Acoustic System



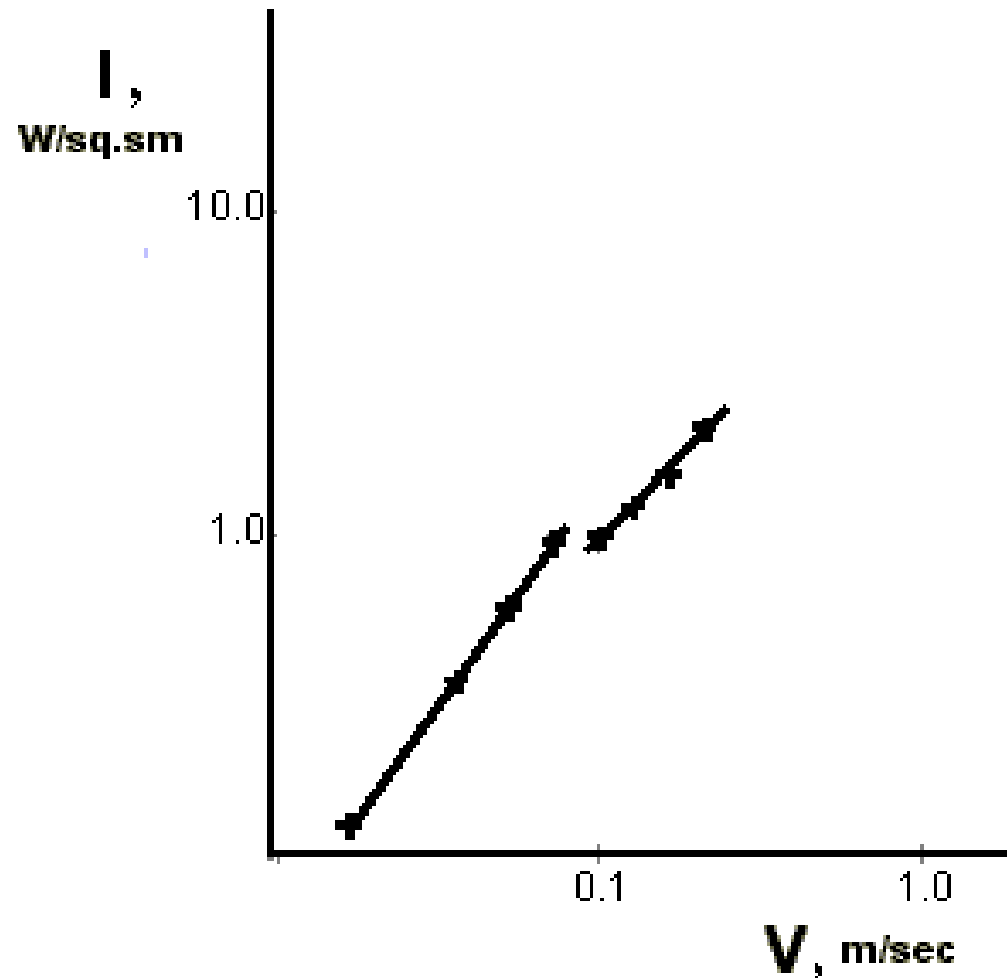
Photograph of Acoustic System



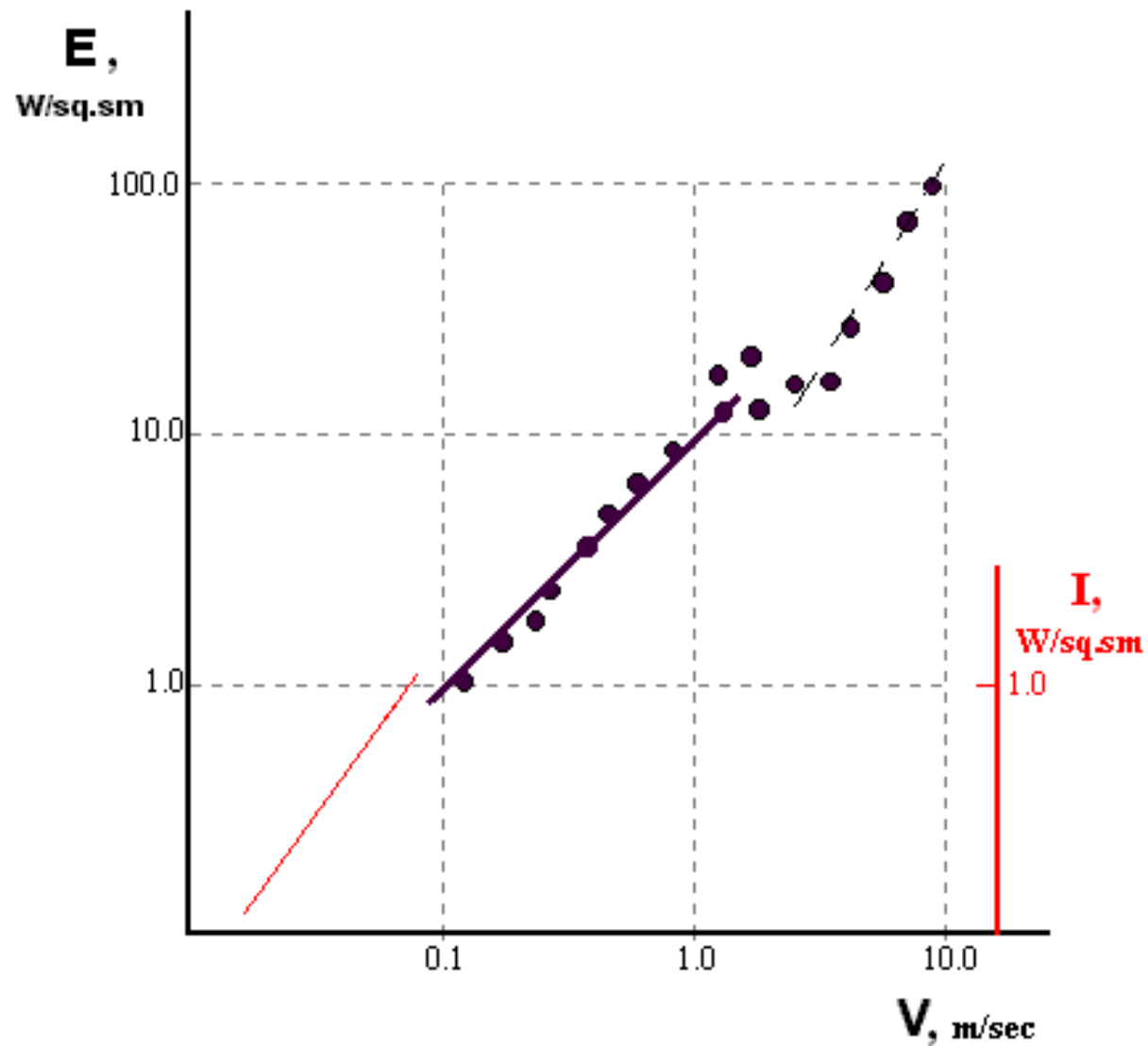
Computer-Aided Design



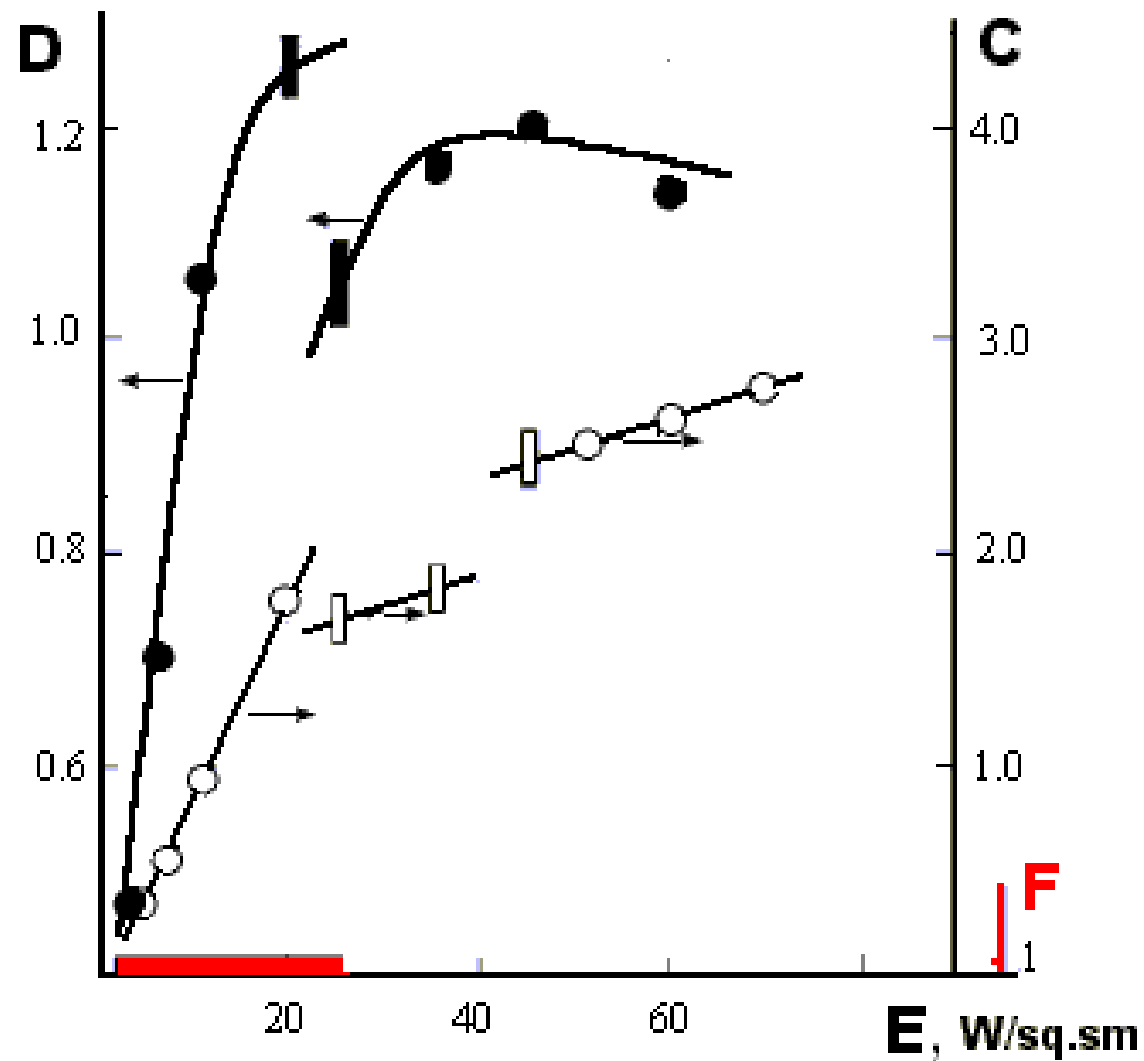
Part 2. Experimental Examination of Water at Cavitation (Dr. Y. Kikuchi)



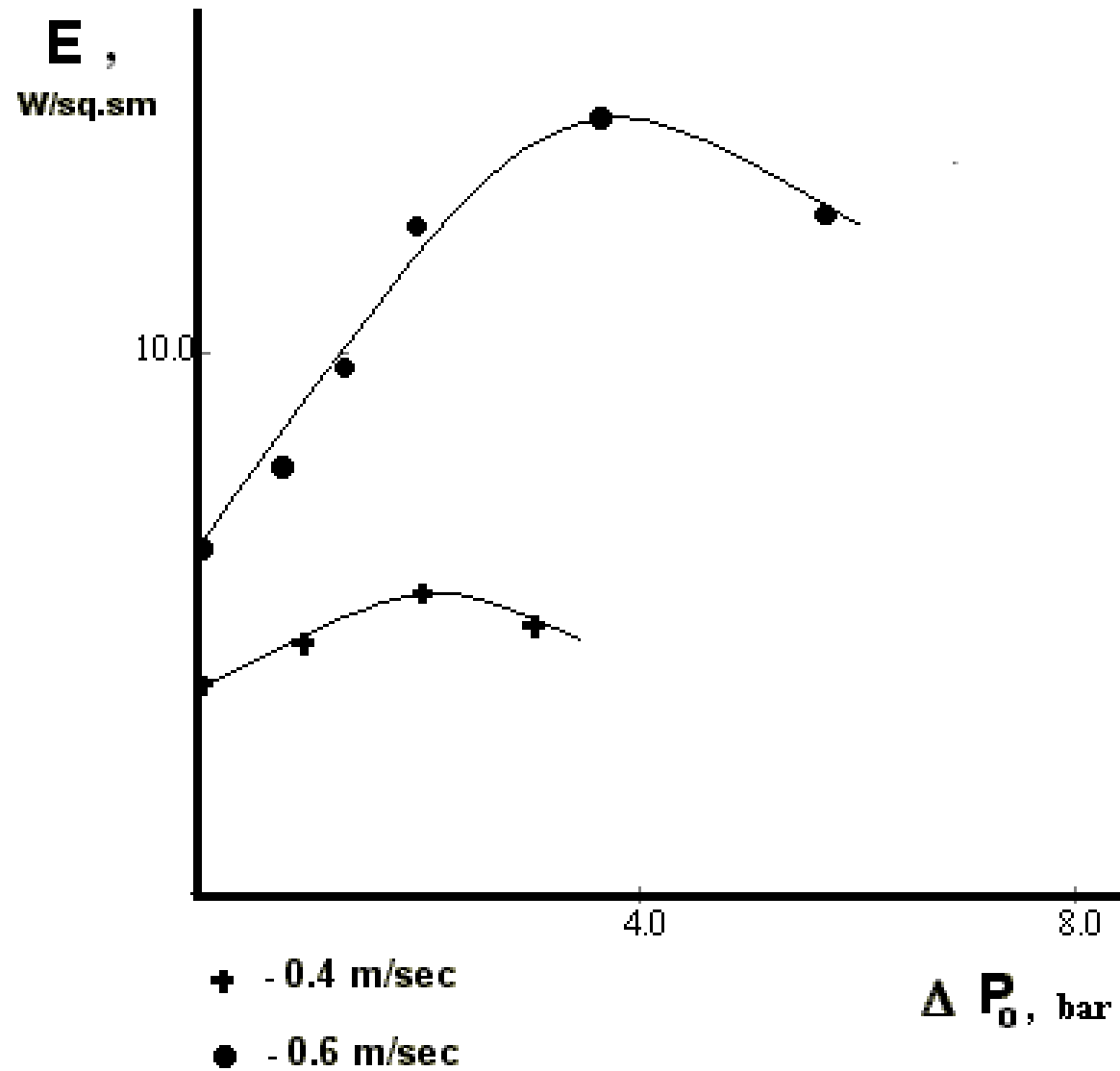
Experimental Examination of Water (Water Calorimeter)



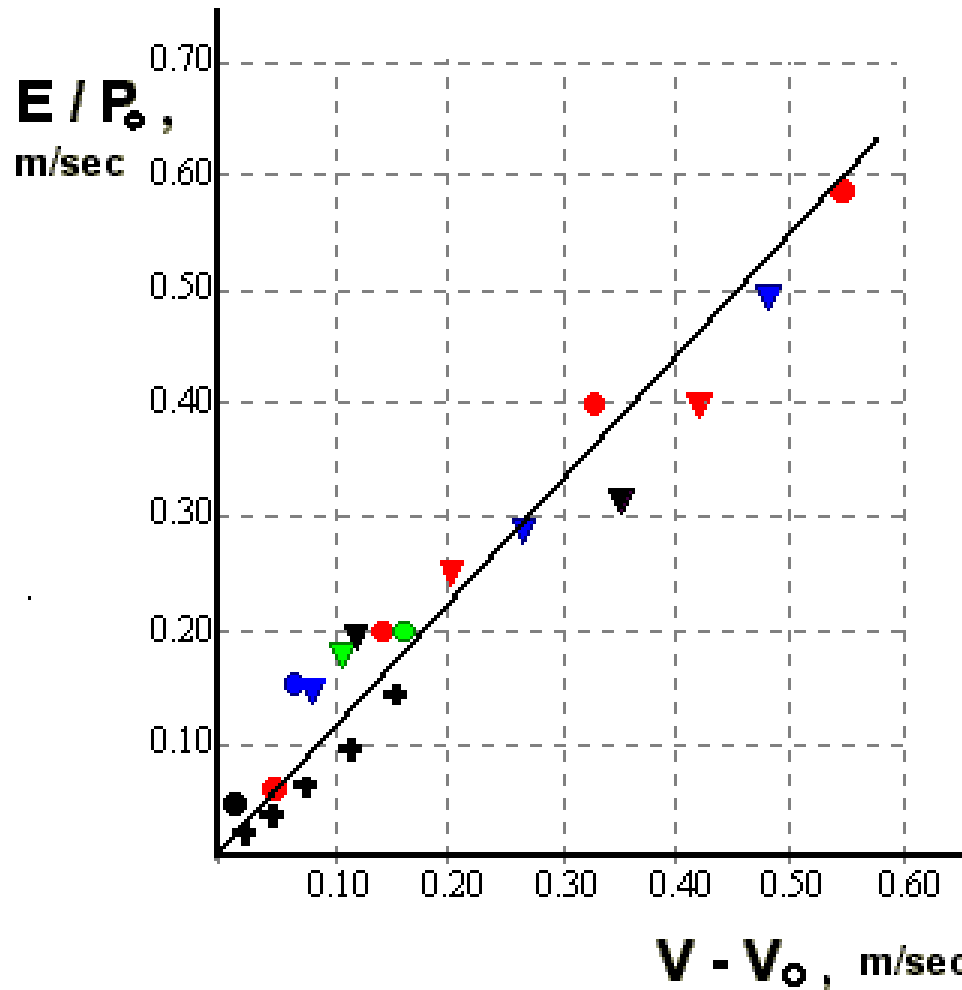
Activity of Acoustic Cavitation



Dependence from Static Pressure



Consolidated Experimental Data

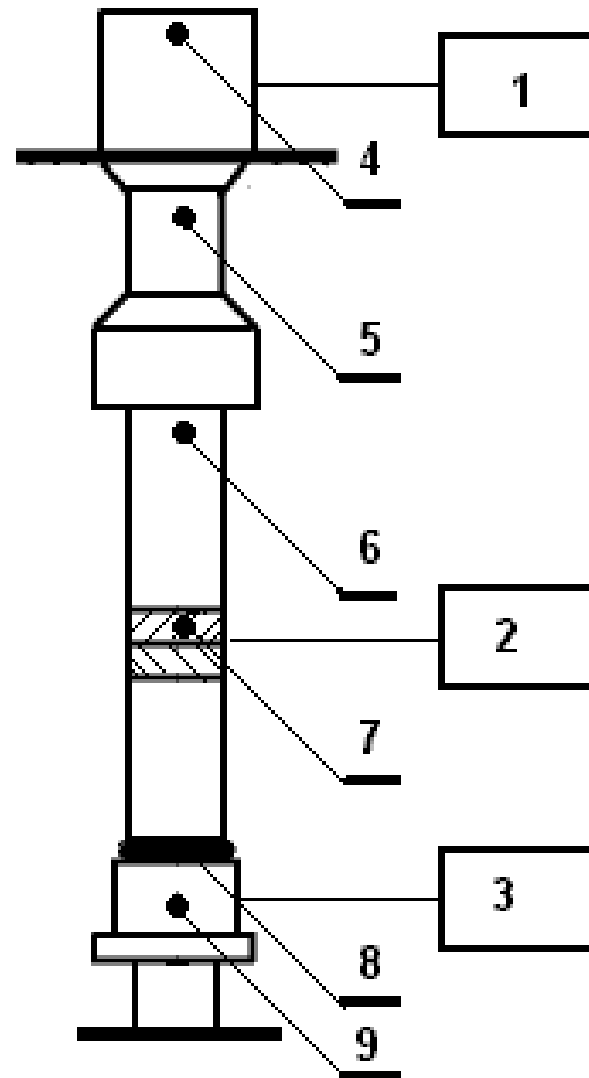


+ - Y.Kikuchi; ● - 1.0 bar; ● - 1.35 bar; ▼ - 1.5 bar;
 ▼ - 2.0 bar; ▼ - 3.0 bar; ▼ - 4.0 bar; ● - 5.0 bar;
 ● - 7.0 bar.

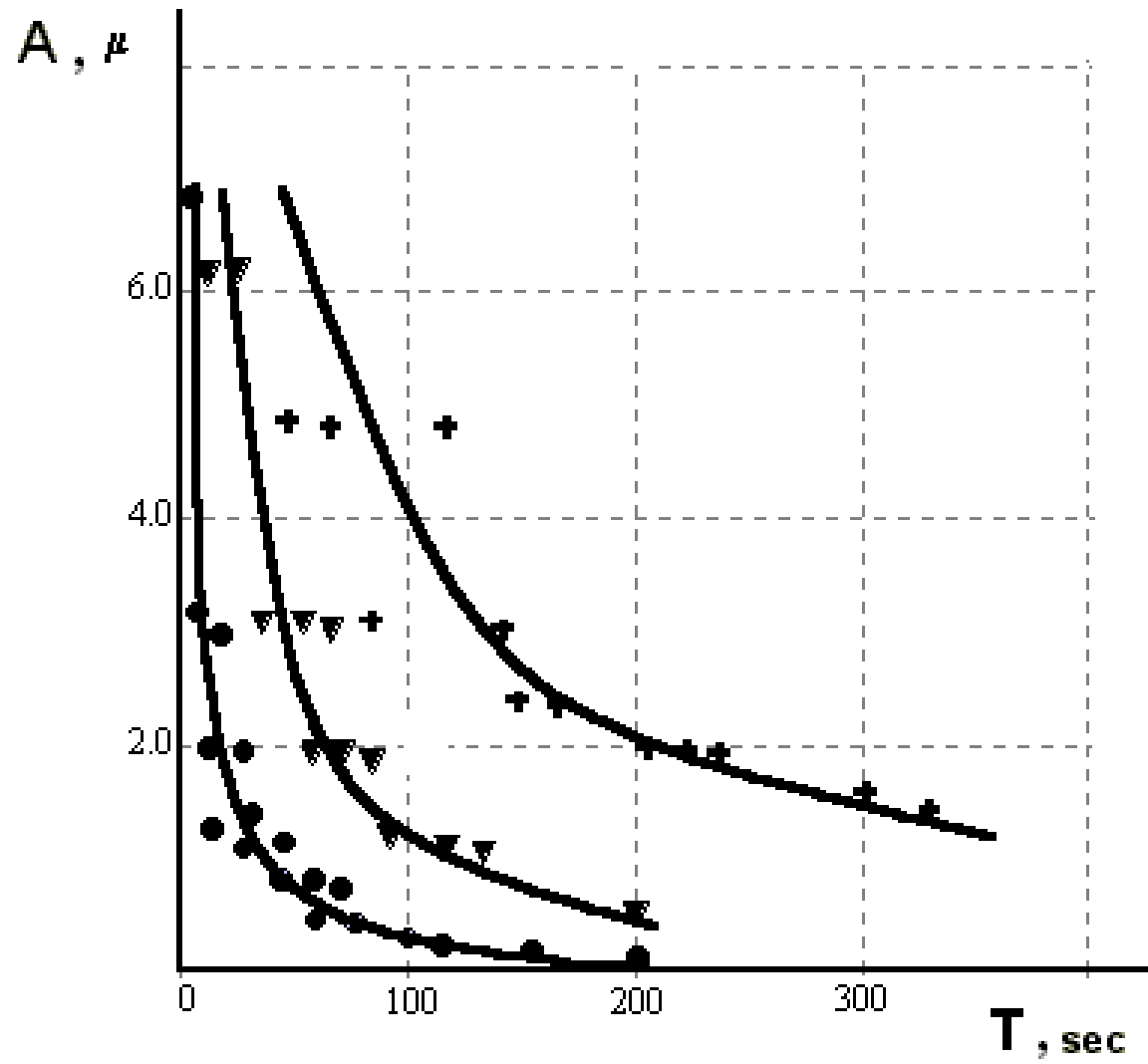
$$E / P_0 = 1.1 * (V - V_0)$$

$$P_a \cong 1.5 * P_0$$

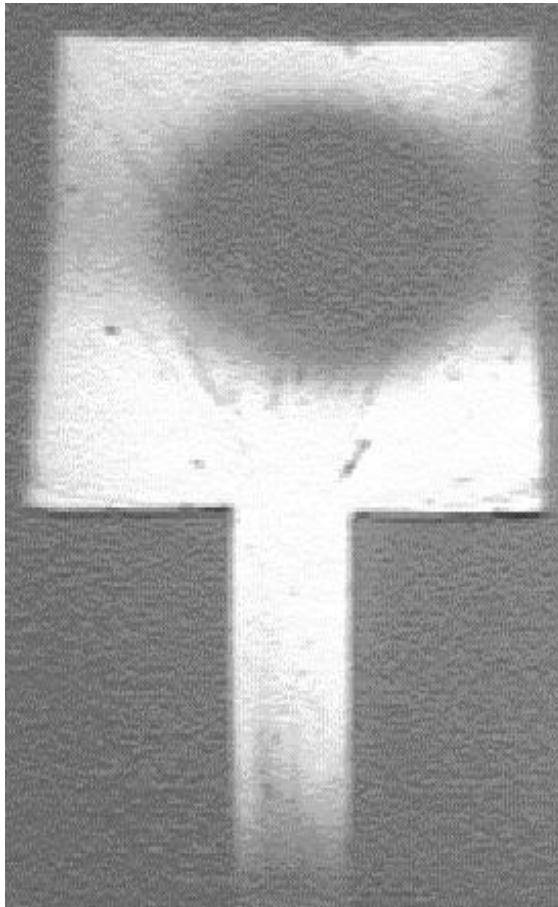
Part 3. Experimental Examination of Molten Polymers



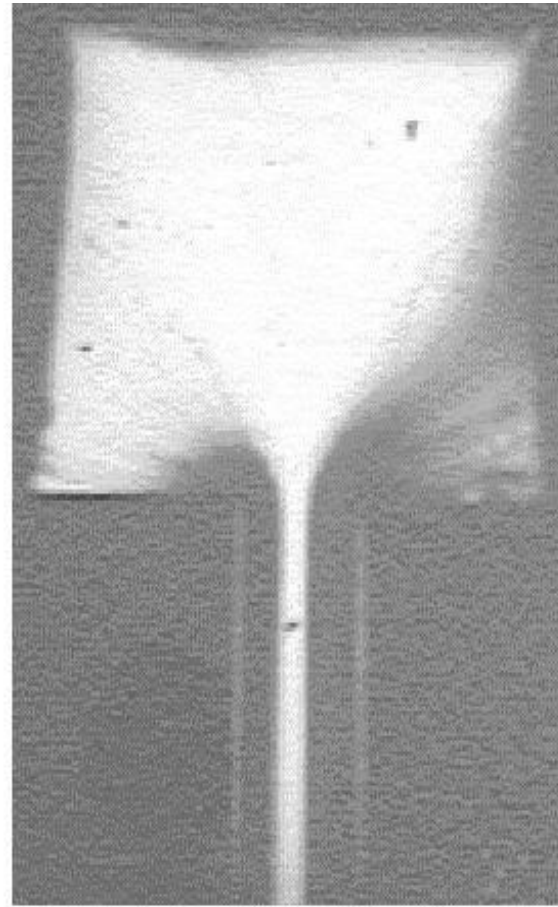
Threshold Amplitude of Acoustic Oscillations



Cavitation Area in Polymer



1



2