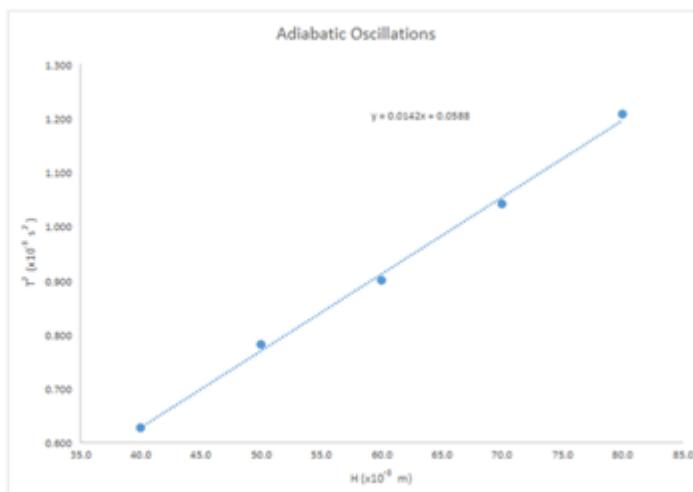


Lab 8 – Adiabatic Oscillations

Data Tables, Graph, Calculation Example

ADIABATIC OSCILLATIONS		
H ($\times 10^{-3}$ m)	T (ms)	T^2 ($\times 10^{-3}$ s 2)
40.0	25.0	0.627
50.0	28.0	0.781
60.0	30.0	0.900
70.0	32.3	1.041
80.0	34.8	1.208

Constants		
g	9.80	m/s 2
p ₀	101300	Pa
m	0.0350	kg
D	32.5	mm
A	0.000829	m 2



Calculations

$$Y = \frac{4\pi^2}{\alpha \left[g + \frac{p_0 A}{m} \right]} = \frac{4\pi^2}{0.0142 \text{ s}^2/\text{m} \left[9.80 \text{ m/s}^2 + \frac{(101300 \text{ Pa})(0.000829 \text{ m}^2)}{0.035 \text{ kg}} \right]} = 1.15$$

$H = 40.0 \times 10^{-3} \text{ m}$				
RUN	start time (s)	end time (s)	# of cycles	T (ms)
1	5.550	5.652	4	25.5
2	1.048	1.122	3	24.7
3	1.935	2.010	3	25.0
4	2.813	2.888	3	25.0
average T				25.0

$H = 50.0 \times 10^{-3} \text{ m}$				
RUN	start time (s)	end time (s)	# of cycles	T (ms)
1	2.292	2.461	6	28.2
2	3.205	3.345	5	28.0
3	4.105	4.244	5	27.8
4	5.002	5.169	6	27.8
average T				28.0