

RESONANCE TUBE – SPEED OF SOUND 1

AKD 04.02



Material:

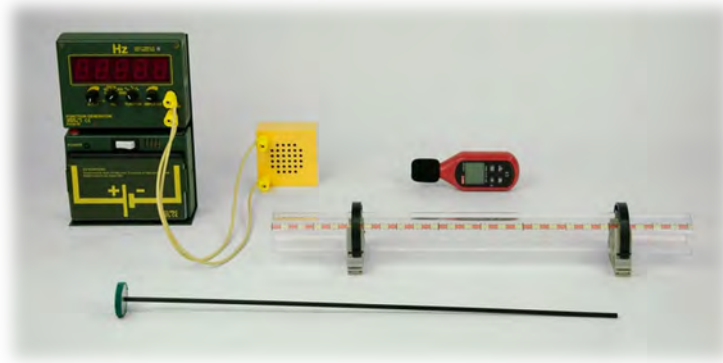
Item Code	Qty	Description
P1350-2K	1	Resonance tube "compact"
P1350-2S	1	Piston for resonance tube
P3120-4A	1	L-shaped assembly platform
P1351-2H	2	Holder for resonance tube, small
MB240-1LS	1	MBC Loudspeaker with nose
P3120-1G	1	Function generator with digital display "inno"
P3120-1B	1	Rechargeable battery, "inno", 6V/10 Ah
DG507-37	2	Safety connecting lead, 37 cm, yellow
DT812-DB	1	Sound level meter "mini", BT
	2	Connecting lead

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Setup:

The holders are pushed onto the resonance tube so that the tube can stand on the table. The loudspeaker is placed at one end of the resonance tube and connected to the function generator, which was plugged together with the battery. The piston is put into the resonance tube. The sound level meter is placed at the end of the tube and switched on.



Experiment:

The function generator is switched on. A frequency of 1000 Hz is set on it (see note). The piston is now moved slowly through the tube. The sound level meter reacts to the change in volume and thus the minima/maxima can be determined again.

Result:

As the piston moves through the tube, the sound becomes sometimes louder and sometimes softer. The movement of the piston changes the display on the sound level meter. If you measure the distance between one minima/maxima and the next but one (see graphic), you get the wavelength λ .

The speed of sound at room temperature can then be calculated:

$$c = \lambda * f \rightarrow c = 0,34 \text{ m} * 1000 \text{ Hz} = 340 \text{ m/s}$$

Note:

The resonance tube has a length of 50 cm, which means that the frequency must be at least 670 Hz so that a whole oscillation (three minima/two maxima) takes place within the tube.

