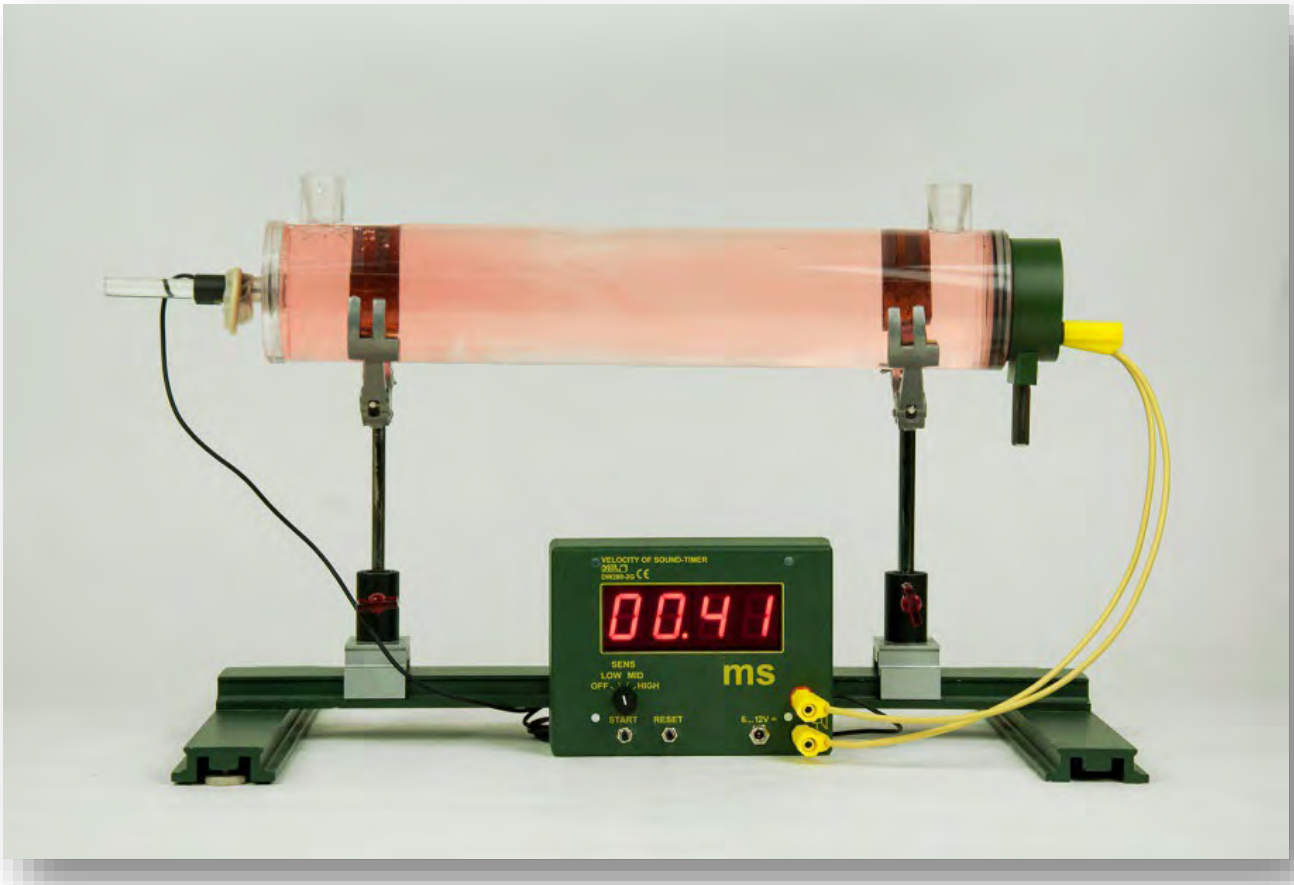
DETERMINATION OF THE SPEED OF SOUND IN WATER

AKD 02.09d



Material:

Item Code	Qty	Description
DW280-2R	1	Tube for measuring sound velocity
DW280-2L	1	Loudspeaker, waterproof, on support
DW280-2G	1	Sound velocity meter "inno"
DS101-1G	1	Support base, large, L=500 mm
DS093-04	2	Sliding saddle "Sepp", H=40 mm
C7002-2A	2	Universal clamp, 0 - 80 mm, with cork
C9010-9A	1	Fine pressure regulation valve
C1520-1M	1	Vacuum hose, plastics, D=6 mm, L=100 cm
DE722-1T	1	Thermometer "inno", 1100 °C
	1	Membrane
	2	Connecting lead

DETERMINATION OF THE SPEED OF SOUND IN WATER

AKD 02.09d

Goal:
Sound propagates faster in water than in air.

Setup:
The two sliding saddles are positioned on the support base. The universal clamps are fixed in the sliding saddles and opened completely. The sound velocity meter is connected to the loudspeaker, here the correct polarity must be ensured. The correct polarity is found out by measuring the "dead time" of the setup. To do this, the sound velocity meter is switched on and set to "Low". Now hold the microphone to the connected loudspeaker and make a measurement. If there is the slightest deviation, the polarity is correct. The value obtained should be noted, as it should be included in the calculations ($\sim 0{,}09\ ms$).

The waterproof loudspeaker is then inserted into the tube (be sure to insert it completely into the tube, otherwise the distance between the microphone and the loudspeaker will no longer be 40 cm).

The tube is placed in the opened universal clamps and brought into a horizontal position with them. The microphone of the sound velocity meter is covered with a membrane before it is put into the tube. This is done to prevent damage from water. (do not insert the microphone too far).

DETERMINATION OF THE SPEED OF SOUND IN WATER

AKD 02.09d

Experiment:
The tube is filled with water; food coloring can be used for better visibility. Once the tube is completely filled with water, one or more measurements can be started (the "Mid" setting is recommended for this purpose).

Result:
The calculation is:

$$c = \frac{0{,}4\ m}{(0{,}00041 - 0{,}09)s} = 1250\ m/s$$

The guide value for sound velocity in water is around 1400 m/s in the sea.

Note:
For emptying, the experimental units must still be plugged in and the tube may only be tilted carefully.