Propagation of sound in air and in vacuum

Object of the experiment

1. Investigating the propagation of sound in air and in vacuum

Setup

Apparatus

1 Bell, electric	561 05
1 Vacuum experiment plate	378 89
1 Vacuum bell jar, coated	378 561
1 Rotary-vane vacuum pump S 1.5	378 73
1 Pointer manometer, DN 16 KF	378 510
1 Air inlet valve, DN 10 KF	378 771
1 Cross piece, DN 16 KF	378 015
1 Hose nozzle, DN 16 KF	378 031
2 Centering rings, DN 16 KF, set of 2	378 045ET2
1 Centering ring (adapters) DN 10/16 KF, set of 2	378 040ET2
4 Clamping rings DN 10/16 KF	378 050
1 Vacuum rubber tubing, 8 mm diam.	667 186
1 Transformer 6/12 V	521 210
1 Connecting lead, 19 A, 50 cm, red/blue, pair	501 45

Carrying out the experiment

- Put the electric bell on a sponge and put them together on the experiment plate.
- Connect the bell to the 4 mm sockets of the vacuum experiment plate.
- Connect the power supply (U = 6 V ~) to the 4 mm sockets on the underside of the vacuum experiment plate, and check whether the bell works by switching the power supply on. Then switch it off again.
- Put the vacuum bell jar over the vacuum experiment plate and evacuate it by approx. 1000 hPa. Then switch the vacuum pump off.
- Switch the power supply on, observe the bell, and try to hear the ringing.
- Open the air inlet valve slightly so that air enters the jar slowly, and pay attention to the ringing.

Observation

Under the evacuated vacuum bell jar, the ringing is not heard, although it is clearly seen that the tongue of the bell strikes the gong.

If air is let into the vacuum bell jar slowly, the ringing is heard faintly in the beginning and then increasingly loud.

Evaluation

Sound can only propagate if there is a sound conductor.

The oscillations of the sound source (bell) are transferred to the sound receiver (ear) via the sound conductor (air).

If the sound conductor is removed from around the sound source (evacuation of the vacuum bell jar), the sound can no longer get from the sound source to the sound receiver.

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