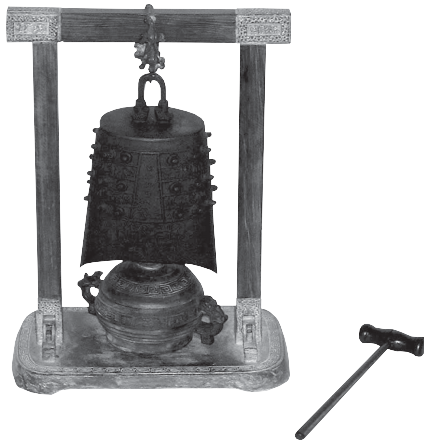


U30002 Yi bell

Operating instructions

1/03 ALF



The Yi bell is used to demonstrate the relationship between temperature and oscillation damping.

1. Safety instructions

- Only use solid fuel (Esbit) in the students' experiment.
- In the demonstration experiment, do not saturate the cloth with liquid fuel (methylated spirit).
- Exercise particular caution when igniting the fuel.
- Only ignite the fuel with matches.
- Do not touch the bell or burner during or after the heating phase.
- Allow the bell to cool after completing the demonstration.

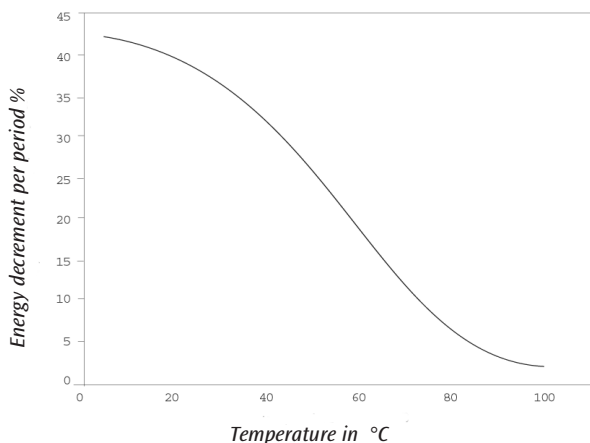


Figure 1
Graph of energy decrement per period as a function of temperature

2. Description, technical data

This „bell of faith“ was copied from a 2-tone bell discovered in 1978 in the grave of the Chinese marquis Yi from the 5th century BC. It is cast from a newly developed copper-magnesium alloy and possesses a singular physical characteristic resulting from its special shape and the effect of temperature on oscillation damping. A curve of the energy decrement per period is plotted against the temperature in Figure 1. The change in the elastic characteristics of the alloy, $(A_n - A_{n+2})/A_n$, expressed here as a percentage, is considerable from room temperature to approximately 100°C. At room temperature, the bell only sounds dull and wooden. However, if it is heated for several minutes with an alcohol burner, it produces a beautiful tone. Figure 2 shows the acoustic oscillations before and after the bell is heated.

The bell is stowed in a robust wooden box with a fabric and velvet lining.

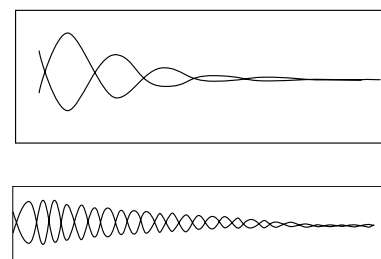


Figure 2
Change in the attenuation and frequency of the bell before and after heating. Top: cold; bottom: hot

Dimensions: 295 mm x 210 mm x 120 mm
Weight: 3000 g
Storage box: 330 mm x 265 mm x 145 mm

3. Scope of delivery

Bell
Bronze base plate with wooden support beams
Bronze suspension device
Alcohol burner with cover
Wooden hammer
Storage box

4. Procedure

- Moisten the loth with liquid fuel (methylated spirit) from the burner. In the students' experiment, only use solid fuel.
- Position the burner below the bell.
- Ignite the fuel carefully with a long matchstick.
- Heat the bell for 2-3 minutes.
- Place the cover carefully on the burner to extinguish the flame.
- Strike the bell with the hammer.