

## Solar ray collector

Article no: P2360100



### Principle

The solar ray collector is illuminated with a halogen lamp of known light intensity. The heat energy absorbed by the collector can be calculated from the volume flow and the difference in the water temperatures at the inlet and outlet of the absorber, if the inlet temperature stays almost constant by releasing energy to a reservoir. The efficiency of the collector is determined from this. The measurement is made with various collector arrangements and at various absorber temperatures.

### Benefits

- Complete solution to study all aspects of thermal energy using a solar ray collector
- Covers one of the most important and highly visible technologies in renewable energy

### Tasks

To determine the efficiency of the solar ray collector under various experimental conditions.

- Absorption of energy from the environment (20 °C) without illumination by sun or halogen lamp, water temperature at the absorber inlet  $T$
- Illumination with halogen lamp. Water temperature  $T$
- Illumination with halogen lamp. Water temperature  $T$

### Learning objectives

- Absorption
- Heat radiation
- Greenhouse effect
- Convection
- Conduction of heat
- Collector equations
- Efficiency
- Energy ceiling

## Scope of delivery

Solar ray collector	06753-00	1
Lab thermometer,-10..+110 °C	38056-00	2
Lab thermometer, w.stem , -10 ... +110 °C	38060-00	1
Circulating pump w.flowmeter	06754-01	1
PHYWE Power supply, 230 V, DC: 0...12 V, 2 A / AC: 6 V, 12 V, 5 A	13506-93	1
Heat exchanger	06755-00	1
Solar collector stand, teaching aid	06757-00	1
Immersion heater,1000W,220-250V	04020-93	1
Halogen lamp 1000 W	08127-93	1
Hot/cold air blower	04030-93	1
Tripod base PHYWE	02002-55	1
Support rod, stainless steel, different lengths	02031-00	2
Right angle clamp expert with fulcrum screw	02054-00	2
Universal clamp	37715-01	1
Beaker, Duran®, high-form	36010-00	1
Beaker, boro, low-form	46059-00	1
Safety gas tubing, DVGW, sold by metre	39281-10	3
Measuring tape, l = 2 m	09936-00	1
Digital stopwatch, 24 h, 1/100 s and 1 s	24025-00	1
Connecting cord, 32 A, 500 mm, red	07362-01	1
Connecting cord, 32 A, 500 mm, blue	07362-04	1
Support base DEMO	02007-55	1
Plate holder, opening width 2 - 35 mm	06509-00	1