Steam Generator

TD-8888

Introduction

The Steam Generator is designed to be used in specific heat and thermal expansion or conductivity experiments. Water in the inner chamber can be brought to a temperature between 50 °C and 90 °C and held there with the lid off. When the lid is placed onto the chamber and sealed, the temperature is increased and the water begins to boil. The steam then passes through the nozzle on top of the lid, allowing it to be used in the Thermal Expansion Apparatus (TD-8856) or a similar device.

Components

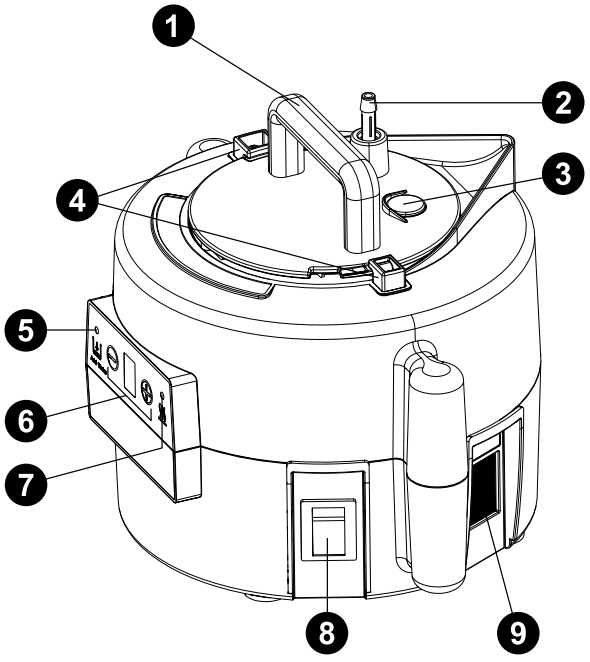
Included components:

- Steam Generator
- Power cord
- Plastic tubing

Recommended equipment:

- Thermal Conductivity Apparatus (TD-8561)
- Thermal Expansion Apparatus (TD-8856)

Features



1 Lid

Use to cover the water tank during experiments which require steam. When the lid is secured in place, the tank's internal temperature increases and the device produces steam.

2 Nozzle

Steam is emitted from here while the lid is secured. The rubber tube should **always** be connected here while the Steam Generator is active and the lid is attached.

3 Pressure release valve

If too much pressure builds up during the experiment, this valve will automatically release the pressure by allowing steam to escape until the pressure returns to a safe level.

4 Lid holder tabs

Use to hold the lid in place during experiments where steam will be produced.

5 Add Water LED

Lights up red to indicate that the water level in the Steam Generator is low and that the tank must be refilled before the heating process can resume. (See **Safety shutoff**.)

6 Setting indicator and buttons

Press the + button to increase the selected setting by one, or press the - button to decrease the setting by one. The LED indicator shows the number of the currently selected setting. A dash is displayed before a setting has been selected, and a flashing E is displayed after a safety shutoff.

7 Heating LED

Lights up green to indicate that the device is currently heating the water in the tank. Blinks to indicate that a safety shutoff has occurred.

8 Power switch

Flip to turn the Steam Generator on or off.

9 Power cord port

Plug the power cord in here.

Safety

> ⚠ **CAUTION:** When using this product, **ALWAYS** adhere to the guidelines below!

- Avoid any contact with hot surfaces!
- The unit generates hot steam, which is *not* always visible. Ensure the rubber tube is connected to the nozzle throughout the experiment. **Do not remove the tube from the nozzle while or shortly after using the heater.** Direct exposure to concentrated steam can cause burns.
- To avoid risk of electric shock, do not expose *any* part of the device other than the tank to water.
- Always turn the device off when the heater is not in use.
- If the fuse needs to be replaced, replace it ONLY with the appropriate type for your model of the Steam Generator:
  - 110 V model: 8A, 250 V Type 5X20 fuse
  - 220 V model: 4A, 250 V Type 5X20 fuse

Settings

The Steam Generator features nine distinct settings, represented by the numbers 1 through 9 on the digital display. The settings correspond to different levels of heater power, with 9 being the hottest and 1 being the least hot. The behavior of the Steam Generator on different levels depends on whether the lid is on or off.

If the lid is *off*, the Steam Generator maintains the water inside the tank close to a specific temperature. The approximate temperature of each setting is indicated by the table below.

Setting	Approx. Temperature (°C)
1	50
2	55
3	60
4	65
5	70
6	75
7	80
8	85
9	90

NOTE: After changing the setting, it may take a few minutes for the water to reach the new temperature and stabilize there, particularly if the new temperature is lower than the previous one. If desired, you can use a thermometer or a temperature sensor, such as the Wireless Temperature Sensor (PS-3201), to monitor the water temperature as it increases or decreases.

If the lid is *on* and secured in place, then the settings do not correspond to the above values. The temperature of all settings will be increased to above the boiling point of water, and steam will emerge from the nozzle. The setting on the front panel controls the rate at which steam is created and emitted, with setting 1 corresponding to the lowest rate of steam release and 9 corresponding to the highest rate.

Usage

Follow the setup instructions below for the type of experiment you will be using the Steam Generator for.

Setup for specific heat experiments:

1. Connect the power cord to a standard wall outlet, then plug the other end of the cord into the power cord port on the side of the Steam Generator.
2. Fill the tank of the Steam Generator with up to 500 mL of water.
3. Flip the power switch to turn on the Steam Generator, then use the + and - buttons to select an appropriate heat setting for your experiment.
4. Wait a few minutes while the device heats up. If desired, you can monitor the temperature of the water using a thermometer or temperature sensor.

Setup for experiments requiring directed steam:

1. Connect the power cord to a standard wall outlet, then plug the other end of the cord into the power cord port on the side of the Steam Generator.
2. Fill the tank of the Steam Generator with up to 500 mL of water.
3. Align the slots on the edges of the lid with the lid holder tabs and lower it onto the apparatus. Turn the lid slightly clockwise to secure it in place.
4. Cover the nozzle on the lid with one end of the plastic tubing, then connect the other end to the apparatus you will be using. **Do not remove this tubing at any point while the Steam Generator is running!**

   NOTE: If you are using the Steam Generator with the Thermal Expansion Apparatus (TD-8856), you must instead use the specialized tube included in that product to connect the Steam Generator to the apparatus.
5. Flip the power switch to turn on the Steam Generator, then use the + and - buttons to select an appropriate heat setting for your experiment.
6. Wait a few minutes while the device heats up until steam begins to be produced.

Safety shutoff

To prevent overheating, the Steam Generator features a safety shutoff function, which turns off the heater if the water level becomes too low. A sensor inside the device monitors the water level and triggers the shutoff if the water falls below a certain threshold. When this happens, the heater will immediately turn off, the Add Water LED will light up, the Heating LED will begin to blink, and the setting indicator will display a flashing **E** instead of a number.

If a shutoff occurs, remove the lid and refill the tank with water up to a maximum of 500 mL. Replace the lid and secure it in place, then press the + button to turn the heater back on. You can also restart the heater after a safety shutoff by cycling the power switch off and back on and selecting a setting as usual.

Specifications and accessories

Visit the product page at pasco.com/product/TD-8888 to view the specifications and explore accessories. You can also download experiment files and support documents from the product page.

Technical support

Need more help? Our knowledgeable and friendly Technical Support staff is ready to answer your questions or walk you through any issues.

Chat	pasco.com
Phone	1-800-772-8700 x1004 (USA) +1 916 462 8384 (outside USA)
Email	support@pasco.com

Limited warranty

For a description of the product warranty, see the Warranty and Returns page at www.pasco.com/legal.

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Product end-of-life disposal

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CE statement

This device has been tested and found to comply with the essential requirements and other relevant provisions of the applicable EU Directives.