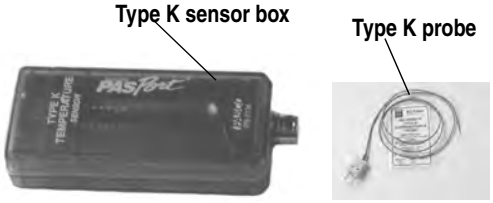
PASPort™

Type K Temperature Sensor

PS-2134



Sensor Specifications	
Sensor/Probe tip range:	-200°C to +1000°C
Probe insulation range:	-73°C to +482°C
Accuracy:	±3°C or 3% of reading, whichever is greater
Resolution:	0.1°C
Default sample rate:	2 samples per second
Maximum sample rate:	10 samples per second
Sensing element:	chromel and alumel thermocouple

Type K Sensor Quick Start

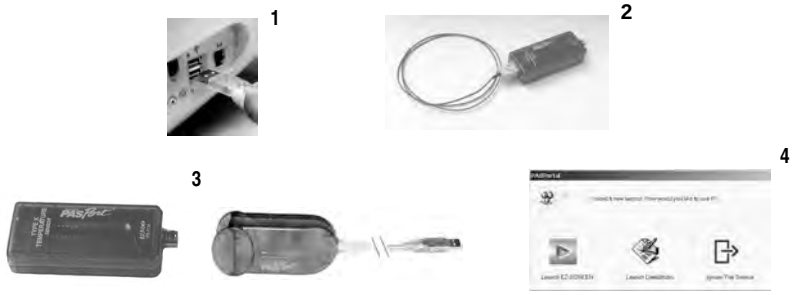
The PS-2134 Type K Temperature Sensor measures high temperatures of gases, open flames, or objects ranging from -200 to +1000 degrees Celsius.

Additional Equipment Needed

- PASPORT™ interface (USB Link, PowerLink, Xplorer, etc.)
- EZscreen or DataStudio® software (version 1.8.5 or later)

Equipment Setup

1. Connect the PASPORT interface to a USB port on your computer or to a USB hub.
2. Plug the cable of the Type K probe into the Type K sensor box.
3. Connect the Type K Sensor to the PASPORT interface.
4. The software launches when it detects a PASPORT sensor. From the PASPORTAL window, select a point of entry.

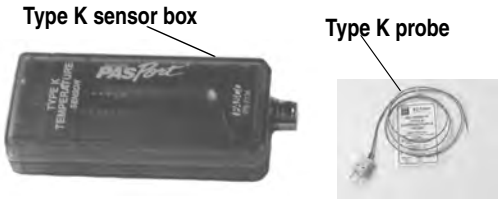


CARD 1A

PASPort™

Type K Temperature Sensor

PS-2134



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PASCO®
800-772-8700 • 916-786-3800 • techsupp@pasco.com • www.pasco.com
012-08453B

Calibrating the Type K Temp. Sensor

Note: Calibration of the Type K Temp. Sensor is not required. However, if you wish to calibrate for better accuracy, follow the instructions below.

CAUTION: The probe of the PS-2134 Type K Temperature Sensor was not designed for use in chemical solutions, other than water. (However, if you cover the probe with an optional Teflon® sleeve*, you can use the probe in chemicals.*) Also, never place the Type K sensor box in liquids, a heating element, or fire. Placing the sensor box in liquids or an open flame will permanently damage the sensor. PASCO will not replace or cover the costs of a damaged sensor due to negligent or improper use.

DataStudio Calibration

Equipment required: Type K Temperature Sensor, boiling water, cold water, thermometer, two beakers or plastic containers

Procedure (two-point calibration)

1. Plug the Type K sensor box into a PASPORT USB interface connected to your computer. Plug the Type K probe into the sensor box.
2. In DataStudio, click on the **Setup** button to open the PASPORT Setup window.
3. In the PASPORT™ Setup window, scroll to the Type K Temperature Sensor box and click the **Calibrate** button. (Note: The software is set to use 0°C and 100°C as the two points for calibration. You may choose to enter different values and use a thermometer as a reference.)
4. Place the Type K probe in the beaker filled with 0°C water (or water at your first temperature point).
5. In the Calibration window, click the **Set** button.
6. Repeat steps 4-5 for a beaker filled with 100°C water (or water at your second temperature point).
7. Click the **OK** button to save the calibration values.

PASPORT Xplorer Calibration

Equipment required: Type K Temperature Sensor, boiling water, cold water, thermometer, two beakers or plastic containers

Procedure:

1. Plug in the Type K Sensor (with probe attached) into an Xplorer.
2. Turn on the Xplorer.
3. Press **Display** ( ) until the calibrate screen appears.
4. Press the **Check** ( ) button.
5. Press the **Tab** ( ) button to move through the digits.
6. Use the **Plus (+)** or Minus **(-)** buttons to increase or decrease each digit until the display matches the value of the selected standard sample.
7. Place the Type K probe in the beaker filled with 0°C water (or water at your first temperature point). (Note: The software is set to use 0°C and 100°C as the two points for calibration. You may choose to enter different values and use a thermometer as a reference.)
8. Press the **Check** ( ) button.
9. Repeat steps 7-8 for the beaker filled with 100°C water (or other water temperature for your second point).

*Teflon sensor covers are available from PASCO. If you plan to frequently use the Type K Temperature Sensor with chemicals, you can order a package of 10 Telfon covers using part no. CI-6549.

Teflon® is a registered trademark of DuPont.

CARD 2A

Calibrating the Type K Temp. Sensor

Note: Calibration of the Type K Temp. Sensor is not required. However, if you wish to calibrate for better accuracy, follow the instructions below.

CAUTION: The probe of the PS-2134 Type K Temperature Sensor was not designed for use in chemical solutions, other than water. (However, if you cover the probe with an optional Teflon® sleeve*, you can use the probe in chemicals.*) Also, never place the Type K sensor box in liquids, a heating element, or fire. Placing the sensor box in liquids or an open flame will permanently damage the sensor. PASCO will not replace or cover the costs of a damaged sensor due to negligent or improper use.

DataStudio Calibration

Equipment required: Type K Temperature Sensor, boiling water, cold water, thermometer, two beakers or plastic containers

Procedure (two-point calibration)

1. Plug the Type K sensor box into a PASPORT USB interface connected to your computer. Plug the Type K probe into the sensor box.
2. In DataStudio, click on the Setup button to open the PASPORT Setup window.
3. In the PASPORT™ Setup window, scroll to the Type K Temperature Sensor box and click the Calibrate button. (Note: The software is set to use 0°C and 100°C as the two points for calibration. You may choose to enter different values and use a thermometer as a reference.)
4. Place the Type K probe in the beaker filled with 0°C water (or water at your first temperature point).
5. In the Calibration window, click the Set button.
6. Repeat steps 4-5 for a beaker filled with 100°C water (or water at your second temperature point).
7. Click the OK button to save the calibration values.

PASPORT Xplorer Calibration

Equipment required: Type K Temperature Sensor, boiling water, cold water, thermometer, two beakers or plastic containers

Procedure:

1. Plug in the Type K Sensor (with probe attached) into an Xplorer.
2. Turn on the Xplorer.
3. Press Display ( ) until the calibrate screen appears.
4. Press the Check ( ) button.
5. Press the Tab ( ) button to move through the digits.
6. Use the Plus (+) or Minus (-) buttons to increase or decrease each digit until the display matches the value of the selected standard sample.
7. Place the Type K probe in the beaker filled with 0°C water (or water at your first temperature point). (Note: The software is set to use 0°C and 100°C as the two points for calibration. You may choose to enter different values and use a thermometer as a reference.)
8. Press the Check ( ) button.
9. Repeat steps 7-8 for the beaker filled with 100°C water (or other water temperature for your second point).

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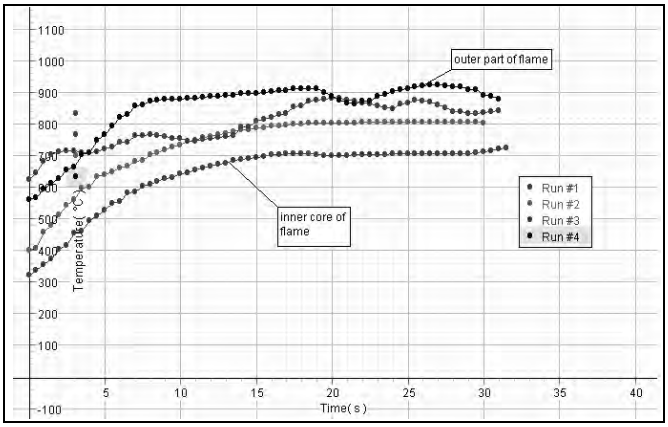
012-08453B

Comparing Temperatures in Different Parts of a Candle Flame



DataStudio/DataStudio Lite Task:	Procedure:
Change units of measurement:	In the PASPORT Sensor window, scroll to the Type K sensor. Use the down arrow to select degrees C, F, or K.
Scale to fit the data:	Click the **Scale-to-Fit** ( ) button.
Scale the axes:	With your mouse, click on the x-axis and drag left or right; click on the y-axis and drag up and down.
View data statistics:	Click the **Statistics** ( ) button and select Minimum, Maximum, or Mean.

Type K Activity - Mapping the Temperature of a Candle Flame

Equipment required: PS-2134 Type K Sensor, PASPORT interface, USB-compatible computer, DataStudio software (version 1.8.5 or later), candle with glass holder, matches.

SAFETY WARNING: When working with candles or other hot objects, always follow standard fire and health safety precautions in your classroom. Do not touch the Type K probe with your hands, fingers, or any other body part. When the probe is put in a hot flame and removed, the probe will be hot (between 400 to 1400 degrees Celsius). Touching or mishandling the probe could cause severe burns or permanent bodily injury.

Procedure:

1. Connect the Type K Temperature Sensor to a PASPORT interface connected to your computer (See CARD 1A for instructions).
2. Light a candle and place it in a glass holder.
3. Open a Graph display in DataStudio and click the **Start** button.
4. (Before performing the next few steps, please read the safety warning above.) Slowly insert just the tip of the Type K probe into the red, inner core of the candle flame to take a reading.

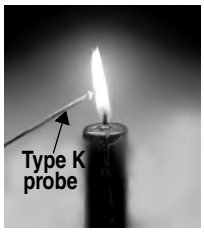
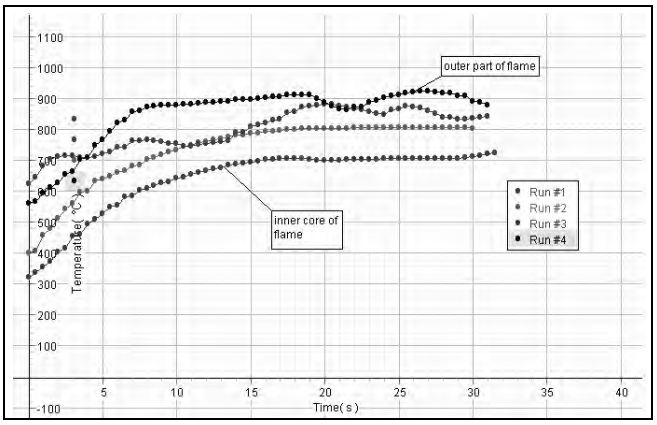


Figure 1

5. After about 30 seconds, click the **Stop** button. Slowly remove the probe, being careful not to touch the probe with your hand or to any other body parts.
6. Allow the probe to cool to room temperature on a metal surface.
7. Repeat steps 5 and 6 for the orange, yellow, and blue colors in the flame. *(Note: Move the probe directly across, not up and down the flame.)* Compare your results. Explain why different colors of the flame have different temperatures. Is the temperature higher in the inner core or the outer part of the flame? Why?

CARD 1B

Comparing Temperatures in Different Parts of a Candle Flame



DataStudio/DataStudio Lite Task:	Procedure:
Change units of measurement:	In the PASPORT Sensor window, scroll to the Type K sensor. Use the down arrow to select degrees C, F, or K.
Scale to fit the data:	Click the **Scale-to-Fit** ( ) button.
Scale the axes:	With your mouse, click on the x-axis and drag left or right; click on the y-axis and drag up or down.
View data statistics:	Click the **Statistics** ( ) button and select Minimum, Maximum, or Mean.

Type K Activity - Mapping the Temperature of a Candle Flame

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Procedure:

1. Connect the Type K Temperature Sensor to a PASPORT interface connected to your computer (See CARD 1A for instructions).
2. Light a candle and place it in a glass holder.
3. Open a Graph display in DataStudio and click the **Start** button.
4. (Before performing the next few steps, please read the safety warning above.) Slowly insert just the tip of the Type K probe into the red, inner core of the candle flame to take a reading.

Figure 1

5. After about 30 seconds, click the **Stop** button. Slowly remove the probe, being careful not to touch the probe with your hand or to any other body parts.
6. Allow the probe to cool to room temperature on a metal surface.
7. Repeat steps 5 and 6 for the orange, yellow, and blue colors in the flame. *(Note: Move the probe directly across, not up and down the flame.)* Compare your results. Explain why different colors of the flame have different temperatures. Is the temperature higher in the inner core or the outer part of the flame? Why?