

# ATKINS Thermocouple Temperature Measuring Probes

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Temperature measurement is critical in many areas, from maintaining optimum quality during a manufacturing process to ensuring the safety of the food we eat. To achieve the most accurate temperature reading possible, it is important to correctly use a probe suitable for the intended application.

Cooper-Atkins is the leading manufacturer of accurate and reliable digital instruments and probes. Hundreds of probe designs have been developed for a wide variety of applications. This catalog contains a selection of our most popular models, along with suggestions for uses and some how-to information. Please contact our customer service staff at any time with questions or requests for additional information at **(800) 835-5011**.

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# NEEDLE/IMMERSION PROBES

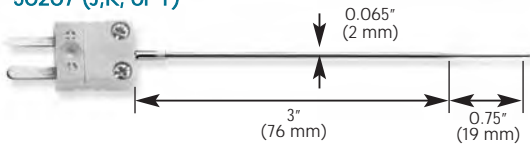
The following probes are suitable for temperature measurement applications which require insertion or immersion in liquids, soft or granular materials, and in some cases, semi-solid or frozen materials. Please see individual probe descriptions for recommended usage.

All measurements are stated in inches followed by the metric equivalent in parentheses.

## Small Diameter Insertion/Immersion Probes

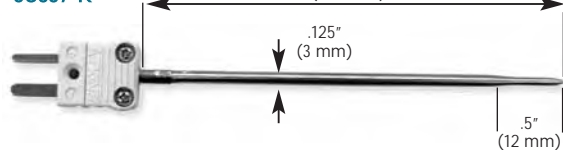
Designed to provide the quickest response with minimal impact on the product. Ideal for small products and semi-solid products such as hamburger patties, shrimp, mushrooms, as well as rubber products. Probe tips are delicate and should be used by trained personnel.

**Micro Needle - Chisel Tip**  
50207 (J,K, or T)



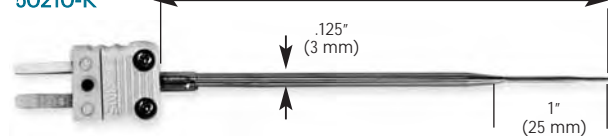
Max Temp Tip:  
500°F (260°C)  
Response Time: 1  
second, liquid

**Dura Needle - Direct Connect**  
50337-K



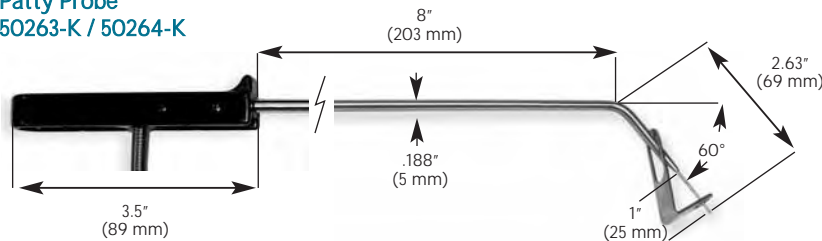
Max Temp Tip:  
500°F (260°C)  
Response Time: 1  
second, liquid  
Type K only

**Micro Needle - Direct Connect**  
50210-K



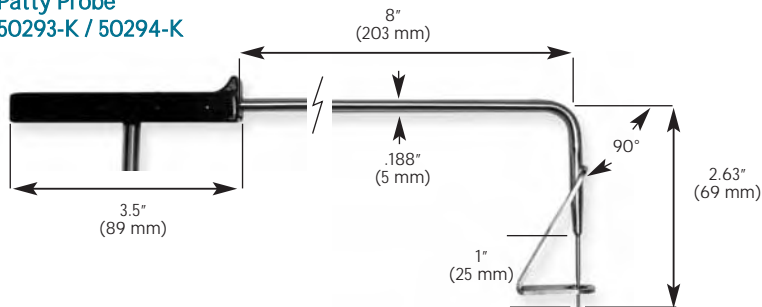
Max Temp Tip:  
500°F (260°C)  
Response Time: 1  
second, liquid  
Type K only

**Patty Probe**  
50263-K / 50264-K



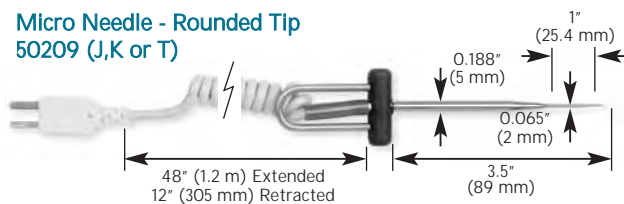
Max Temp Tip, Max  
Temp Handle: 400°F  
(260°C)  
Response Time: 1  
second, liquid  
Cable: Standard coil  
cable  
Type K Only  
Patty Probes are available  
with 3/16" or 1/4" needle  
lengths.

**Patty Probe**  
50293-K / 50294-K



Max Temp Tip, Max  
Temp Handle: 400°F  
(260°C)  
Response Time: 1  
second, liquid  
Cable: Standard coil  
cable  
Type K Only  
Patty Probes are available  
with 3/16" or 1/4" needle  
lengths

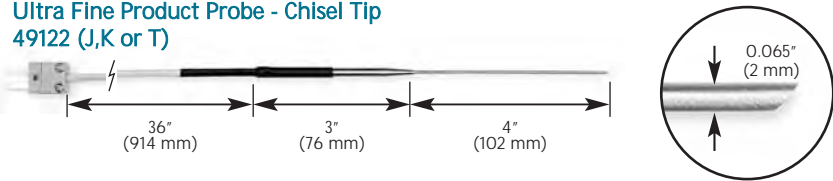
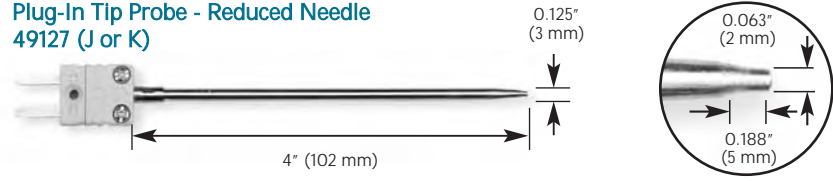
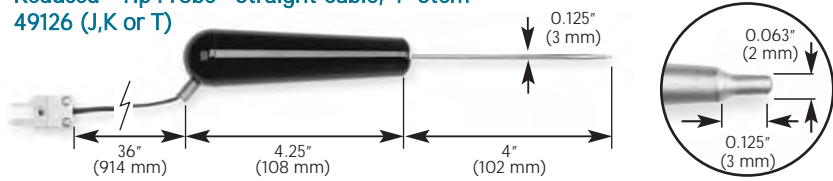
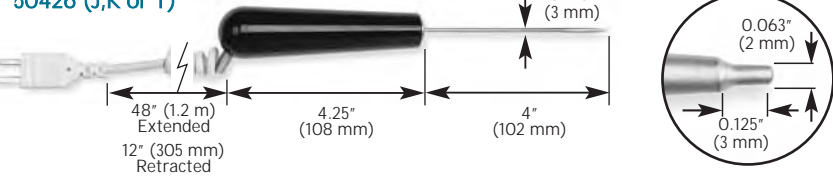
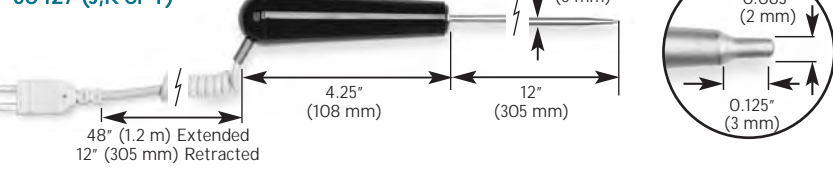
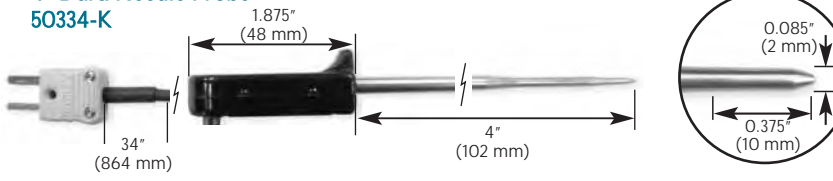
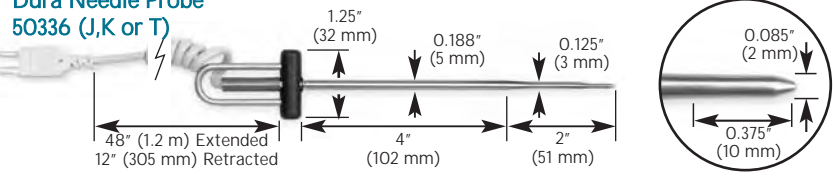
**Micro Needle - Rounded Tip**  
50209 (J,K or T)



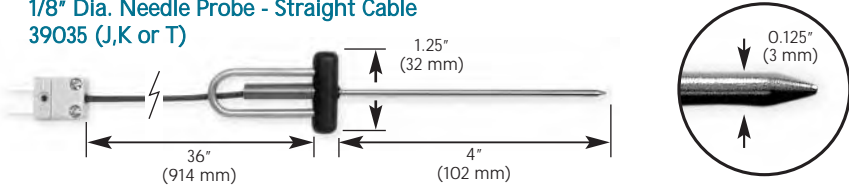
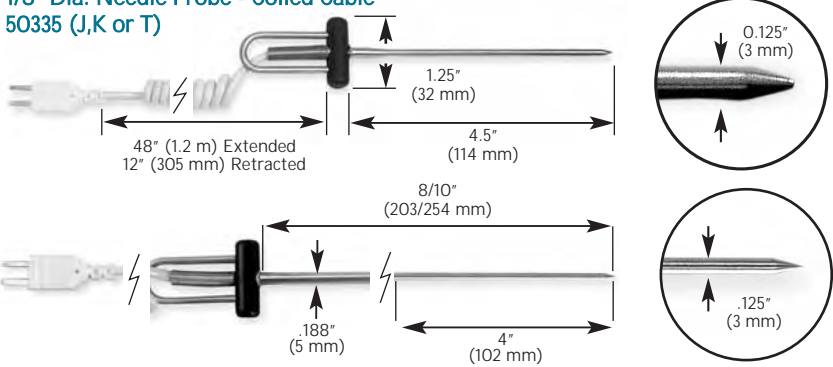
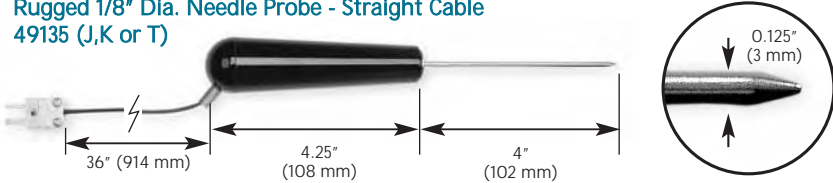
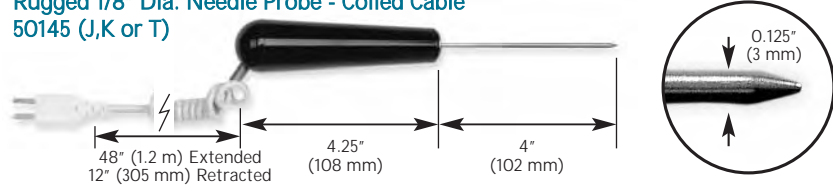
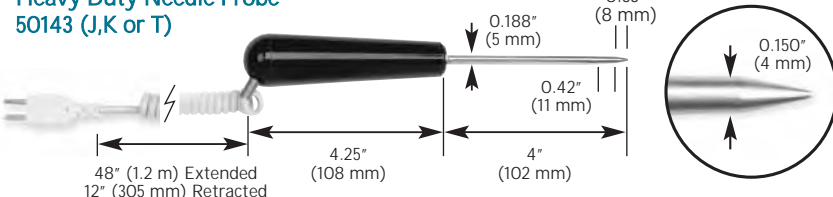
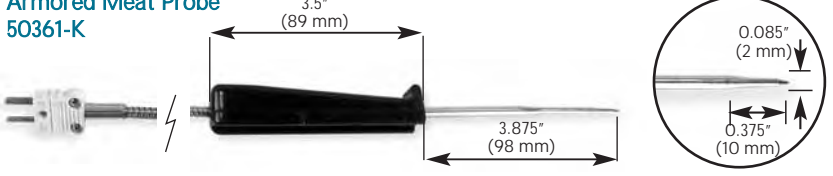
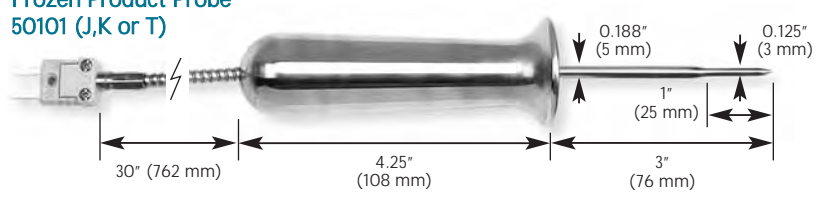
Max Temp Tip: 500°F  
(260°C)  
Max Temp Cable:  
176°F (80°C)  
Response Time:  
1 second, liquid  
Coiled Retractable  
Cable

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<p><b>Ultra Fine Product Probe - Chisel Tip</b> 49122 (J,K or T)</p> 	<p>Max Temp Tip: 500°F (260°C) Max Temp Cable: 221°F (105°C) Response Time: 3 seconds, liquid Flexible Cable with PVC Jacket</p>	
<p><b>Plug-In Tip Probe - Reduced Needle</b> 49127 (J or K)</p> 	<p>Max Temp Tip: 932°F (500°C) Response Time: 1 second, liquid</p>	<p><b>Multi-Use Probes with High Temperature Capability</b></p>
<p><b>Reduced - Tip Probe - Straight Cable, 4" Stem</b> 49126 (J,K or T)</p> 	<p>Max Temp Tip: 932°F (500°C) Max Temp Cable: 400°F (205°C) Response Time: 1 second, liquid Flexible Cable with Teflon® Jacket</p>	<p>Designed for many insertion and immersion applications where a quick response is needed or high temperatures are being measured such as food,</p>
<p><b>Reduced - Tip Probe - Coiled Cable, 4" Stem</b> 50426 (J,K or T)</p> 	<p>Max Temp Tip: 932°F (500°C) Max Temp Cable: 176°F (80°C) Response Time: 1 second, liquid Coiled Retractable Cable</p>	<p>chemicals and melt temperatures for plastic molding. Rugged enough for most personnel.</p>
<p><b>Reduced - Tip Probe - Coiled Cable, 12" Stem</b> 50427 (J,K or T)</p> 	<p>Max Temp Tip: 932°F (500°C) Max Temp Cable: 176°F (80°C) Response Time: 1 second, liquid Coiled Retractable Cable</p>	
<p><b>4" Dura Needle Probe</b> 50334-K</p> 	<p>Max Temp Tip: 500°F (260°C) Max Cable/Handle Temp: 400°F (205°C) Response Time: 1 second, liquid Flexible Cable with Viton® Jacket Type K Only</p>	<p><b>Standard Needle Probes</b></p>
<p><b>Dura Needle Probe</b> 50336 (J,K or T)</p> 	<p>Max Temp Tip: 500°F (260°C) Max Temp Cable: 176°F (80°C) Response Time: 2 seconds, liquid Coiled Retractable Cable</p>	<p>Can be used to measure insertion and immersion temperatures for food products, liquids and more. Quick and rugged for dependable performance.</p>

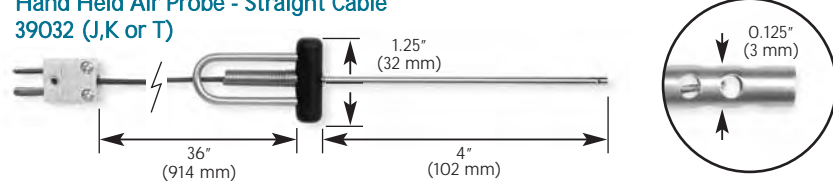
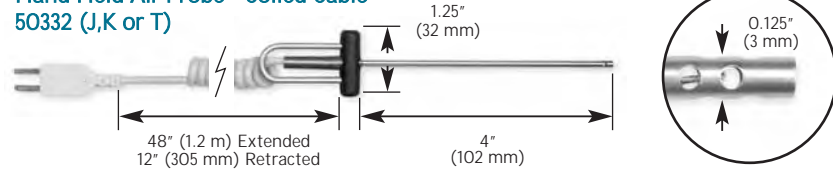
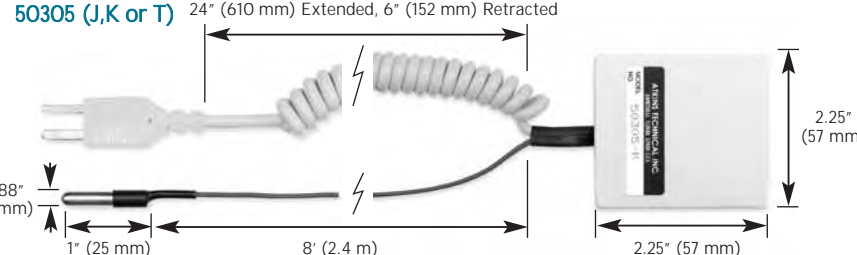
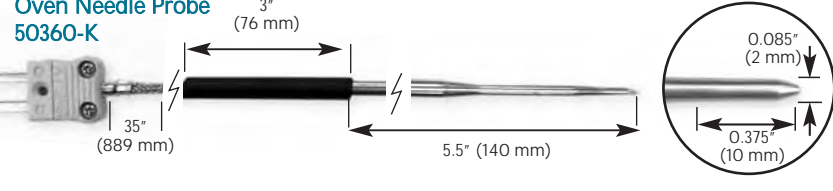
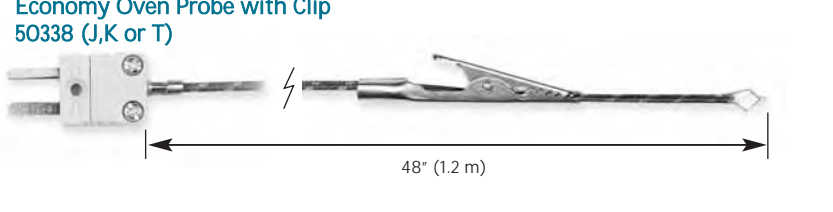
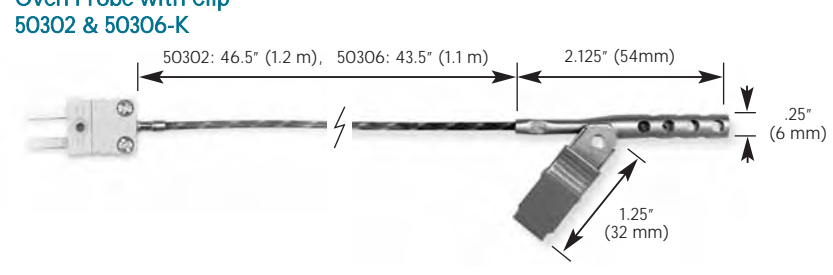


<p><b>1/8" Dia. Needle Probe - Straight Cable</b> 39035 (J,K or T)</p> 	<p>Max Temp Tip: 400°F (205°C) Max Temp Cable: 400°F (205°C) Response Time: 4 seconds, liquid Flexible Cable with Teflon® Jacket</p>	
<p><b>1/8" Dia. Needle Probe - Coiled Cable</b> 50335 (J,K or T)</p> 	<p>Max Temp Tip: 500°F (260°C) Max Temp Cable: 176°F (80°C) Response Time: 4 seconds, liquid Coiled Retractable Cable</p> <p>50335-K is also available in 8" and 10" shaft lengths</p>	
<p><b>Rugged 1/8" Dia. Needle Probe - Straight Cable</b> 49135 (J,K or T)</p> 	<p>Max Temp Tip: 400°F (205°C) Max Temp Cable: 400°F (205°C) Response Time: 4 seconds, liquid Flexible Cable with Teflon® Jacket</p>	<p><b>Heavy Duty Needle Probes</b></p> <p>For insertion or immersion applications where enhanced durability or a larger handle is desired. Quick and very rugged. Applications include fruits, vegetables, meats and asphalt temperatures.</p>
<p><b>Rugged 1/8" Dia. Needle Probe - Coiled Cable</b> 50145 (J,K or T)</p> 	<p>Max Temp Tip: 500°F (260°C) Max Temp Cable: 176°F (80°C) Response Time: 4 seconds, liquid Coiled Retractable Cable</p>	
<p><b>Heavy Duty Needle Probe</b> 50143 (J,K or T)</p> 	<p>Max Temp Tip: 500°F (260°C) Max Temp Cable: 176°F (80°C) Response Time: 5 seconds, liquid Coiled Retractable Cable Available in longer stem lengths at 8", 18" and 24".</p>	
<p><b>Armored Meat Probe</b> 50361-K</p> 	<p>Max Temp Tip, Max Temp Handle, and Max Temp Cable: 400°F (205°C) Response Time: 4 second, liquid Cable Length: 10 ft (3m) Type K only</p>	
<p><b>Frozen Product Probe</b> 50101 (J,K or T)</p> 	<p>Max Temp Tip: 400°F (205°C) Max Temp Cable: 400°F (205°C) Response Time: 4 seconds, liquid Stainless Steel Handle and Flexible Armored Cable</p>	

# AIR TEMPERATURE PROBES

The following probes are suitable for measuring air temperatures. Some are hand-held probes meant to measure the temperature of the ambient air. Some models are designed to monitor internal oven temperatures and include a clip for attaching the sensor inside the oven. The same probes are also capable of measuring freezer/cooler temperatures, as well as some designed specifically for freezer/cooler applications. Check each model for usage recommendations and maximum temperature limits.

All measurements are stated in inches or feet followed by the metric equivalent in parentheses.

<p><b>Hand Held Air Probe - Straight Cable</b> 39032 (J,K or T)</p> 	<p>Max Temp Tip: 400°F (205°C) Max Temp Cable: 400°F (205°C) Response Time: 11 seconds in 5m/sec. air Flexible Cable with Teflon® Jacket</p>	<p><b>Hand Held Air Probes</b></p> <p>Used to measure ambient air temperatures including walk-in refrigerators and freezers, and air conditioning vents.</p>
<p><b>Hand Held Air Probe - Coiled Cable</b> 50332 (J,K or T)</p> 	<p>Max Temp Tip: 500°F (260°C) Max Temp Cable: 176°F (80°C) Response Time: 10 sec- onds in 5m/sec. air Coiled Retractable Cable</p>	
<p><b>Freezer/Cooler Probe - Mountable</b> 50305 (J,K or T)</p> 	<p>Max Temp Tip &amp; Sensor Cable: 400°F (205°C) Max Temp Coil Cable: 176°F (80°C) Response Time: 25 seconds, air Coiled Retractable Cable Flexible Cable with Teflon® Jacket</p>	<p>Thermometer can be plugged into junction box for quick temperature measurement without opening the freezer or cooler door.</p>
<p><b>Oven Needle Probe</b> 50360-K</p> 	<p>Max Temp: 500°F (260°C) Max Cable Temp: 600°F (316°C) Response Time: 2 seconds, liquid Flexible Cable with Woven Stainless Steel Overbraid Type K Only</p>	<p><b>Oven or Freezer/Cooler Probes</b></p> <p>High temperature capable cables make them ideal for use in ovens and hot holding cabinets, as well as freezers/coolers. Clips can be secured to the rack inside.</p>
<p><b>Economy Oven Probe with Clip</b> 50338 (J,K or T)</p> 	<p>Max Temp: 896°F (480°C) Response Time: 1 second, liquid; 9 seconds in 5m/sec. air Flexible Cable with Fiberglass Jacket &amp; Movable Clip. Note: not recommended for use in foodservice.</p>	
<p><b>Oven Probe with Clip</b> 50302 &amp; 50306-K</p> 	<p>50302 (shown): Max Temp: 896°F (480°C) Flexible Cable with Fiberglass Jacket Note: not recommended for use in foodservice. 50306*: Max Temp: 600°F (316°C) Flexible Cable with Woven Stainless Steel Overbraid *Available Type K only Response time: 1 second, liq- uid, 10 seconds in 5m/sec. air</p>	



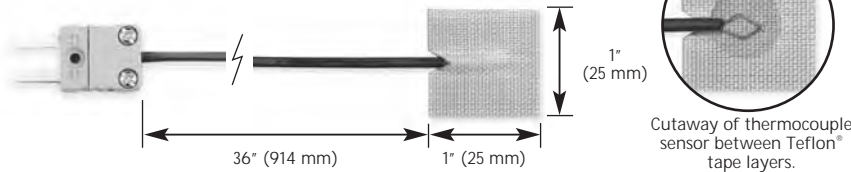
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# SURFACE TEMPERATURE PROBES

The following probes are suitable for measuring temperatures on a variety of surfaces. Griddles or grills may be checked to ensure proper cooking temperatures. Various types of equipment including motors, compressors, or plastic molds may be monitored for proper operation.

All measurements are stated in inches followed by the metric equivalent in parentheses.

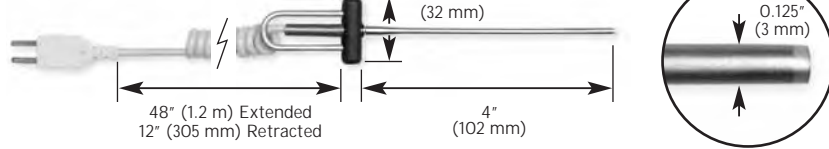
## Flat Tape Surface Probe 50010 (J,K or T)



Max Temp Tip:  
400°F (205°C)  
Max Temp Cable:  
400°F (205°C)  
Response Time:  
9 seconds, metal  
Flexible Cable with  
Teflon® Jacket

Can be placed between packs of food or cartons, which can be indicative of product temperature. Also suitable for platens.

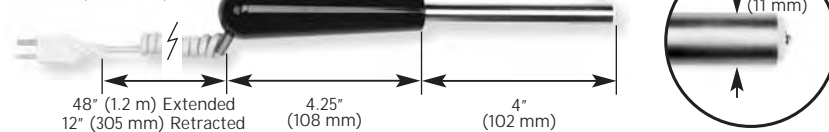
## 1/8" Surface/Immersion Probe - Blunt Tip 50316 (J,K or T)



Max Temp Tip:  
500°F (260°C)  
Max Temp Cable:  
176°F (80°C)  
Response Time:  
6 seconds, oiled metal surface;  
1 second, liquid  
Coiled Retractable Cable

This probe has a flat tip for surface temperatures, but is also a very fast immersion probe. Not recommended for use in highly acidic or alkaline products such as citrus and tomato products.

## Ceramic Tip Surface Probe 50318 (J,K or T)

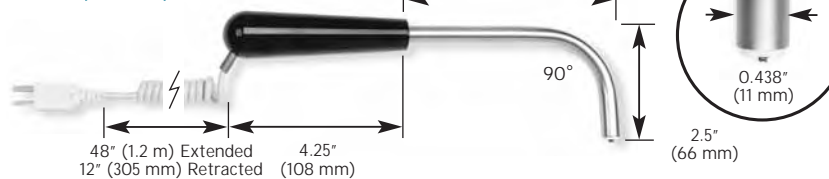


Max Temp Tip:  
1,202°F (650°C)  
Max Temp Cable: 176°F (80°C)  
Response Time:  
1 second, oiled surface  
Coiled Retractable Cable

## Ceramic Tip Surface Probes

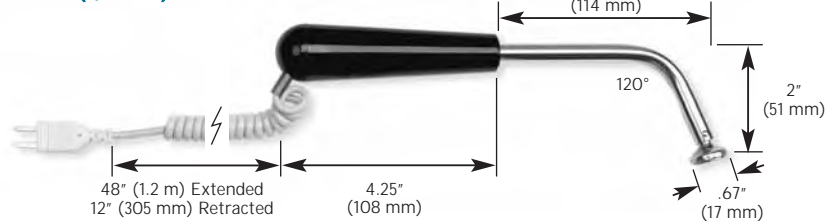
These models provide fast readings on any flat or uneven surface. High temperature capability allows for use on hotter surfaces such as grills, molds, dies and barrels. These probes should only be used on a clean, dry surface. Not as rugged, but quick to respond.

## Ceramic Tip Surface Probe - Right Angle 50319 (J,K or T)



Max Temp Tip:  
1,202°F (650°C)  
Max Temp Cable:  
176°F (80°C)  
Response Time:  
1 second, oiled surface  
Coiled Retractable Cable

## Flat Surface Bell Probe 50012 (J,K or T)



Max Temp Tip:  
500°F (260°C)  
Max Temp Cable: 176°F (80°C)  
Response Time:  
4 seconds, oiled surface  
Coiled Retractable Cable

## Flat Surface Bell Probes

Designed for use on any flat surface. Bell self-ori-ents to the surface, giving superior contact. Ideal for griddles and platens.



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<p><b>Right Angle Flat Surface Probe</b> 50001 (J,K or T)</p>	<p>Max Temp Tip: 400°F (205°C) Max Temp Cable: 400°F (205°C) Response Time: 7 seconds, oiled surface Flexible Armored Cable</p>	
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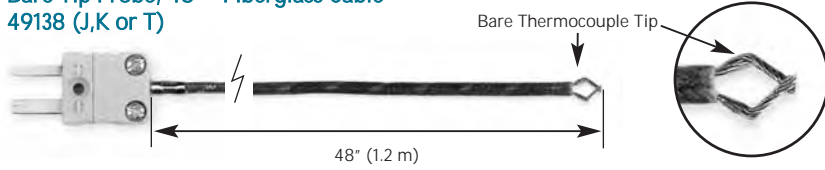
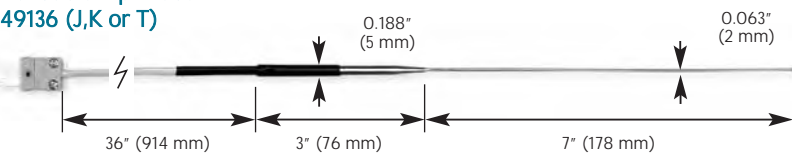
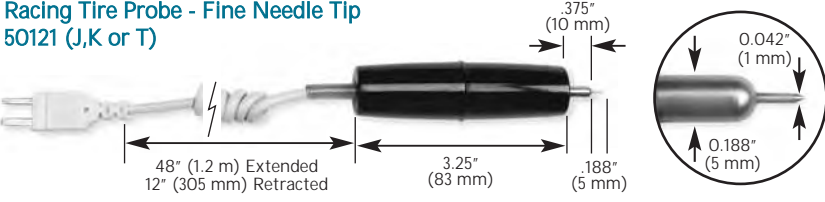
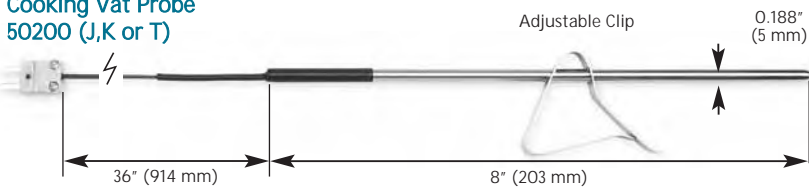
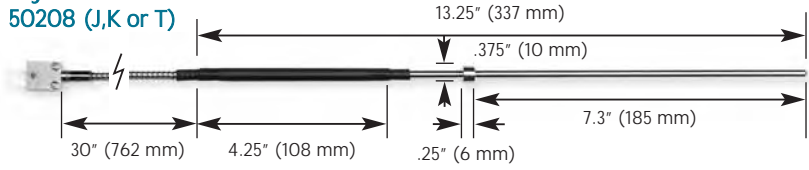
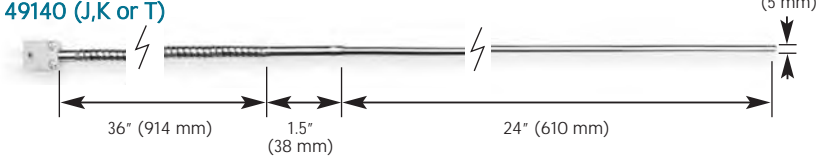
<p><b>Weighted Griddle Surface Probe</b> 50014 (J,K or T)</p>	<p>Max Temp Tip: 500°F (260°C) Max Temp Cable: 400°F (205°C) Response Time: 2 seconds, oiled surface Flexible Armored Cable</p>	<p>Weighted probe allows hands-free use.</p>
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<p><b>Moving Surface Bow Probe - Replaceable Sensor</b> 50069 (J,K or T)</p>	<p>Max Temp Tip: 500°F (260°C) Max Temp Cable: 221°F (105°C) Response Time: 4 seconds, oiled surface Replaceable Sensor: MD3132-10 (Type K); MD3132-8 (Type J) MD3132-12 (Type T) Flexible Cable with PVC Jacket</p>	<p><b>Moving Surface Probe</b></p> <p>Designed for moving surfaces and rollers. Gives a more accurate measurement on moving surfaces than a standard surface probe.</p>
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**MISCELLANEOUS PROBE DESIGNS** All measurements are stated in inches or feet followed by the metric equivalent in parentheses.

<p><b>Combo Probe 50701-K</b></p>	<p>Max Temp Tip: 500°F (260°C) Max Temp Cable: 400°F (205°C) Response Time: 2 seconds, liquid Flexible Cable with Viton® Jacket Type K only</p>	<p><b>Combo Probe</b></p> <p>The Combo probe is ideal for measuring meat combos, large cooking kettles &amp; vats, and compost.</p>
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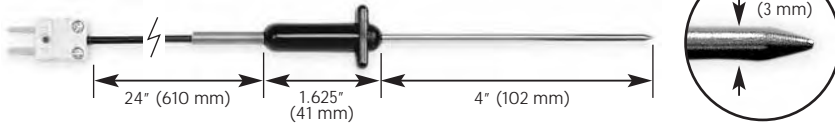
<p><b>Bare Tip Probe, - Teflon® Cable 39138 &amp; 50416 (J,K or T)</b></p>	<p>Max Temp Tip: 400°F (205°C) Response Time: 1 second, liquid; 7 seconds, in 5m/sec. air Flexible Cable with Teflon® Jacket</p>	<p><b>Bare Tip Probes</b></p> <p>Bare thermocouple junctions can measure immersion or air temperatures, or can be installed in substrates of surfaces. Can be embedded in products for freezing and heating studies.</p>
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<p><b>Bare Tip Probe, 48" - Fiberglass Cable</b> 49138 (J,K or T)</p> 	<p>Max Temp Tip: 896°F (480°C) Response Time: 1 second, liquid; 9 seconds, in 5m/sec. air Flexible Cable with Fiberglass Jacket Not recommended for use in foodservice.</p>	
<p><b>Bendable Tip Probe</b> 49136 (J,K or T)</p> 	<p>Max Temp Tip: 1,652°F (900°C) Max Temp Cable: 221°F (105°C) Response Time: 1 second, liquid MgO Filled Tip; Flexible Cable with PVC Jacket</p>	<p>Stainless steel tip is bendable. Ideal for air or liquid temperatures in which quick response is desired or higher temperatures are being measured.</p>
<p><b>Racing Tire Probe - Fine Needle Tip</b> 50121 (J,K or T)</p> 	<p>Max Temp Tip: 500°F (260°C) Max Temp Cable: 176°F (80°C) Response Time: 1 second, liquid Coiled Retractable Cable</p>	
<p><b>Cooking Vat Probe</b> 50200 (J,K or T)</p> 	<p>Max Temp Tip: 400°F (205°C) Max Temp Cable: 400°F (205°C) Response Time: 12 seconds, liquid Flexible Cable with Teflon® Jacket</p>	<p>Ideal for continuous monitoring of cooked products. Probe can be secured to the side of a pot or vat. Clip slides up and down probe shaft for depth adjustment.</p>
<p><b>Fry Vat Probe</b> 50208 (J,K or T)</p> 	<p>Max Temp Tip: 400°F (205°C) Max Temp Cable: 400°F (205°C) Response Time: 8 seconds, liquid Flexible Armored Cable</p>	<p>Designed for immersion temperatures. Ideal for fryer or cooking vat temperatures.</p>
<p><b>High Temperature Probe</b> 49140 (J,K or T)</p> 	<p>Max Temp Tip: 2,012°F (1100°C) Max Temp Cable: 400°F (205°C) Response Time: 2 seconds, liquid Flexible Armored Cable</p>	<p>High temperature probe for hot air or liquids. MgO Filled Tip. Stainless steel tip is bendable.</p>

# ECONOMY PROBE LINE

The following products were created to provide a line of economically priced temperature probes with the accuracy and durability of a thermocouple. They are compatible with any Type K thermocouple thermometer which accepts a standard mini connector. This line is available only through distribution. Contact Cooper-Atkins for your nearest stocking distributor.

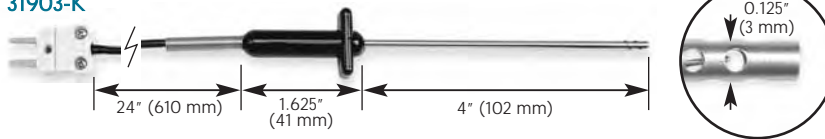
## Economy Needle Probe 31901-K



Max Temp Tip: 400°F (205°C)  
Max Temp Handle: 300°F (149°C)  
Max Temp Cable: 400°F (205°C)  
Response Time: 4 seconds, liquid

Needle probe suitable for most insertion/immersion measurements.

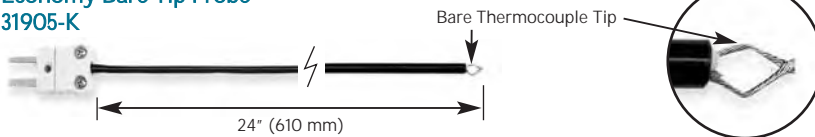
## Economy Hand-Held Air Probe 31903-K



Max Temp Tip: 400°F (205°C)  
Max Temp Handle: 300°F (149°C)  
Max Temp Cable: 400°F (205°C)  
Response Time: 9 seconds in 5m/sec. air

Hand-held air probe for ambient air temperatures.

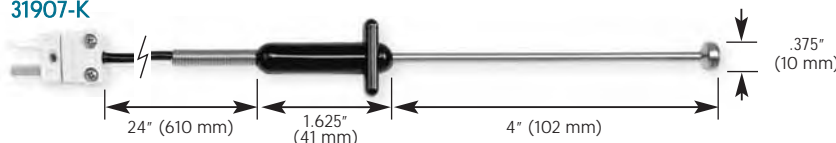
## Economy Bare Tip Probe 31905-K



Max Temp Tip: 400°F (205°C)  
Max Temp Cable: 400°F (205°C)  
Response Time: 1 second, liquid; 3 seconds in 5 m/sec air.

Bare tip probe for immersion or air temperatures.

## Economy Bell Surface Probe 31907-K



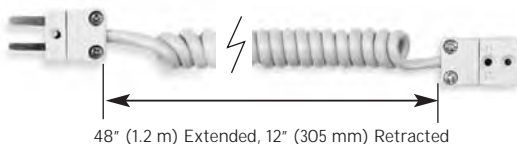
Max Temp Tip: 400°F (205°C)  
Max Temp Handle: 300°F (149°C)  
Max Temp Cable: 400°F (205°C)  
Response Time: 5 seconds, oiled surface

Suitable for temperature measurements on any flat surface.

# CONNECTORS and EXTENSION CABLES

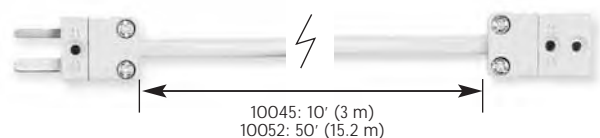
## Extension Cable, Coiled Retractable Cable 10040 (J,K or T)

Max Temp: 176°F (80°C)



## Extension Cables, 20 Ga. 10045 and 10052 (J,K or T)

Max Temp: 221°F (105°C)



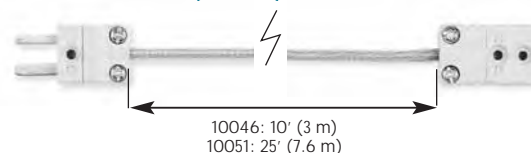
## Miniature Thermocouple Connectors Male: PD1389-10 Female: PD1389-52



Type K shown, also available in Type J and T

## Extension Cables, Kevlar® Reinforced 10046 and 10051 (J,K or T)

Max Temp: 400°F (205°C)



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# Notes & Temperature Measurement Tips

**When ordering, please specify the thermocouple type of the probe you wish to order. The probe thermocouple type must match that of the thermometer.**

The response of a thermocouple probe of temperature versus time can be graphed as an exponential function. One Time Constant is defined as the time required to reach 63.2% of the temperature change. Two Time Constants is 86.5% and Three is 95% of the temperature change. At Cooper-Atkins, the response time is stated at Three Time Constants of the temperature change.

**Response times are intended as a general guideline and can differ widely in actual usage conditions. Any testing done at the factory is under controlled conditions.**

**Air Temperatures:** Air has very little thermal conductivity and density so probe response time seems quite slow. To achieve a more rapid response in air, wave the probe tip back and forth to obtain air motion over the measurement tip. Unless using a probe designed for air, select the lightest weight probe available to let the air heat or cool it more quickly, and shield the probe from direct exposure to heated or cooled sources.

**Surface Temperatures:** Surface temperatures are the most difficult to measure accurately, especially on poor heat-conducting materials such as paper and some plastic films. It is generally not practical to try to estimate the temperature within a solid by measuring the temperature on its surface.

The major source of error in making surface temperature readings is in obtaining adequate heat transfer from the surface into the measuring probe tip. To reduce this error: 1) use a small amount of oil or grease if at all possible to improve heat transfer into the tip; 2) use as large a contact area as practical – a big “footprint”; and 3) the probe tip's surface needs to fit snugly against the measured surface.

**Needle Probes:** To respond quickly, the probes must usually have only a small amount of metal at the measuring point, so oftentimes, the strongest probe tips may respond more slowly. Conversely, smaller probes may respond more quickly, but are often more fragile. Take care not to use excessive force when inserting the probe into the material to be measured.

**Frozen Products:** Some frozen products are soft or pliable and some products are hard and solid. It is impossible to recommend one probe for all frozen food applications. Avoid using the probe tip as an ice pick. When measuring temperatures of hard frozen products it is ALWAYS recommended to pre-drill the hole first, then insert the smaller needle.

## Other Recommendations for Care and Usage:

- To prevent cross-contamination, sanitize probes between uses with wipes or a sanitizing solution. Do not allow the probe tips to remain in the sanitizing solution. After probes are sanitized, dry the probe tip and store.
- Avoid over-stretching or kinking the probe cables for longest life.
- Detach probe from thermometer by holding the plug firmly, do not pull plug out by the cable.
- Avoid forcing probe into any product as you may risk bending the probe.
- Always use a probe designed for your application.

**Thermocouple Types:** Specifications shown are for thermocouple Type K models. Most probes are also available in thermocouple types J and T. In some cases, the upper temperature limits for types J and T may differ from that shown in the catalog. Call for availability or specifications.

Probes with Special Limits of Error Cables are available for quote to high-volume users.

Cooper-Atkins reserves the right to change specifications without notice.

## Accuracy Tolerances for Standard Thermocouples (A.N.S.I. MC 96.1 - 1982)

### Type K Thermocouples

Above 32°F or 0°C:  $\pm 0.75\%$  of reading (or  $\pm 4^\circ\text{F}$  (2.2°C) if greater) to 2,282°F (1,250°C)

Below 32°F (0°C):  $\pm 2.0\%$  of reading (or  $\pm 4^\circ\text{F}$  (2.2°C) if greater) to -328°F (-200°C), Atkins limit -112°F (-80°C)

### Type J Thermocouples

Above 32°F or 0°C:  $\pm 0.75\%$  of reading (or  $\pm 4^\circ\text{F}$  (2.2°C) if greater) to 1,382°F (750°C)

Below 32°F (0°C): No A.N.S.I. specification. Atkins spec is  $\pm 1.0\%$  of reading (or  $\pm 4^\circ\text{F}$  (2.2°C) if greater) to -112°F (-80°C)

### Type T Thermocouples

Above 32°F or 0°C:  $\pm 0.75\%$  of reading (or  $\pm 1.8^\circ\text{F}$  (1.0°C) if greater) to 662°F (350°C)

Below 32°F (0°C):  $\pm 1.5\%$  of reading (or  $\pm 1.8^\circ\text{F}$  (1.0°C) if greater) to -328°F (-200°C), Atkins limit -148°F (-100°C)

