CDN®
Measurement Tools

THERMOMETER AND SCALE TECHNOLOGY

Essential tools in any home or professional kitchen, cooking thermometers ensure that food is cooked safely to the desired doneness and scales help to regulate portion control. CDN offers the highest quality in reliable, fast and easy-to-read models, with the broadest assortment of thermometers and scales on the market.

There are five different types of CDN thermometers:

- Bimetal
- Glass Column
- Digital – Thermistor
- Digital – Thermocouple
- Infrared

and two different types of CDN scales:

- Digital
- Mechanical

This brochure is designed to help you understand how these types of thermometers and scales vary in technology, features and price. You'll also find information about BioCote®, NSF® Certification HACCP, and IP Code.

BioCote®

BioCote®, the only HACCP certified antimicrobial on the market, is a safe antimicrobial that helps prevent surface cross-contamination by inhibiting growth in a broad spectrum of microbes such as bacteria, mold and fungi on a product's surface.

BioCote®'s silver-based antimicrobial additive is added to the plastic of CDN NSF® Certified thermometers at the time of manufacture to provide safe and long lasting product protection, working 24 hours a day for the expected lifetime of the product.

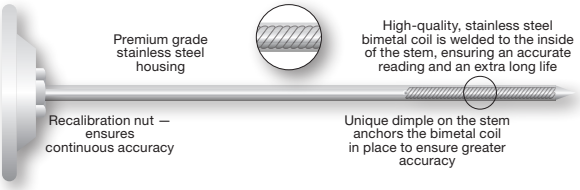
While BioCote® offers an extra form of protection against microbes, it must be used in conjunction with good hygiene/cleaning practices. Yet even in the cleanest environments, microbes will begin to multiply on surfaces in between cleaning. To complement cleaning practices, BioCote® reduces the levels of harmful microbes on surfaces by up to 99.9% over a 24-hour period.

BIMETAL THERMOMETERS

Bimetal (or dial) thermometers are durable, inexpensive and recalibratable. Some are designed to leave in the oven and others are not, but all bimetal thermometers use the same basic technology to measure temperature.

Metal expands and contracts when heated and cooled. Different metals expand or contract at different rates. Bimetal thermometer sensors are constructed of two different metals bonded together. When heated, the combination will bend because one metal is expanding faster than the other.

A bimetal strip can be wound in the shape of a coil, similar to the mainspring of a clock. In this shape the coil will wind, or unwind, as the temperature changes. If one end of the coil is held so that it cannot move, the other end will be free to move. A pointer is attached to the free end, and the temperature registers on the dial beneath the pointer. The scale is calibrated to the bimetal coil. Bimetal coils vary in length from just over one inch to up to two inches.



CDN Bimetal INSTA-READ® Thermometers are a top choice of professional chefs because they respond quickly and accurately to temperature changes. The combination of a sensitive helical bimetal sensor and a thin stainless steel tube allows these thermometers to respond rapidly and accurately to changes in temperature in 15 to 20 seconds. Other CDN advantages include special bimetal coils and a welded dimple anchoring the coil in the stem, which also shows where the top of the coil is welded. Since all bimetal thermometers need to be recalibrated periodically, CDN's bimetal thermometers feature a NSF® Certified recalibration nut for easy field calibration using ice or boiling water. Some include a recalibration tool on their sheaths.

Advantage: Easy to use, field calibration, no batteries required. A cost-effective alternative to digital thermometers.

Disadvantages: Speed. The thermometer has to be inserted past the top of the bimetal coil. (approximately 1.25-2 inches long.) Good quality bimetal thermometers have a dimple on the stem that anchors the coil as well as showing how far to insert the thermometer for an accurate reading.

NSF® Certified

The equipment identified as certified in the NSF listing for Standard 2 complies with the requirements of NSF/ANSI Food Equipment Standards, UL Standards and CSA Standards. The Standards apply to foodservice equipment, components and materials, and they define requirements for materials, design, construction and performance necessary for easy clean ability, food protection and freedom from harborage of germs.

Many CDN thermometers and scales carry the ProAccurate® label. This means that they are NSF® Certified and full-featured: designed with the professional chef in mind.

GLASS COLUMN THERMOMETERS

These thermometers feature a food-safe fluid sealed in a glass tube. Plastic is used as a glass substitute in some inexpensive competitive models. A reservoir, or bulb, at the bottom of the column contains the bulk of the fluid, which expands or contracts as the temperature changes. A temperature scale is printed on or near the column, and the temperature is read from the scale.

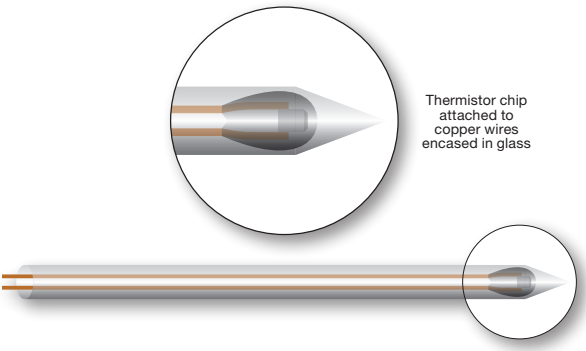
Glass column thermometers are among both the most expensive, and the least expensive, thermometers available. The difference is in the quality of glass and the fluid, and the care with which the thermometer is calibrated when it is manufactured. All CDN glass column thermometers are individually calibrated at the factory for accuracy.

Advantages: Most are very economical, easy to understand

Disadvantages: Glass can break. It is common for the liquid in these thermometers to separate. The column can be recombined by using a cooling or heating method.

DIGITAL THERMOMETERS – THERMISTOR

The most popular style of digital thermometer features a thermistor, a thermally sensitive object about the size of a head of a pin that is located in the thermometer's tip. It exhibits a change in electrical resistance with a change in its temperature. The resistance is measured by passing a small, measured direct current (dc) through it and measuring the voltage drop produced.



CDN's ProAccurate® Quick-Read® pocket thermometers use thermistor sensors with new and innovative technology. The sensor is located in the tip. When inserted only one half of an inch, it will provide an unusually accurate and stable response in 6 seconds or less.

Some thermistor thermometers feature simple, one-button field calibration, easily recalibrating the thermometer in just two seconds. Other thermistor thermometers are calibrated at the factory and cannot be calibrated by the end user. CDN has eight Quick-Read® thermistor thermometers that have thin and reduced tips for easy insertion and also have NSF® certification and BioCote® protection.

Advantages: Thermistor digital thermometers are much less expensive than digital thermocouple thermometers.

Disadvantages: Speed of response compared to a thermocouple electronic thermometer.

Note for Induction Cooktops
Sometimes, the induction cooktop magnetic field may interfere with digital thermometers. If there is interference, briefly turn off the induction cooktop to get a digital thermometer reading or use an analog/bimetal thermometer.

* Quick-Read® thermometers provide an accurate reading in 6 seconds or less.

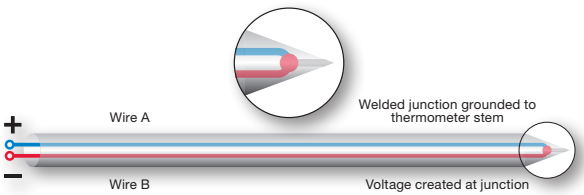
DIGITAL THERMOMETERS – THERMOCOUPLE

Thermocouple technology makes these digital thermometers the fastest on the market, showing temperature readings as quickly as 3 seconds, with high accuracy and a high temperature range. Because of this, thermocouple digital thermometers are by far the mostly widely used for industrial and foodservice purposes.

Thermocouple digital thermometers are designed to check for final cooking temperatures. They can be used to quickly check temperature in a number of places, which is especially helpful with large food items such as turkeys or roasts. Their thin probe also facilitates use with thin foods such as hamburgers and pork chops.

The thermocouple is a device that generates electricity when heat is applied to its tip.

It consists of two different types of metal wires that are both electrical conductors, joined together at one end and connected to a voltage-measuring device at the other end. When the junction of the two metals is heated or cooled, a voltage is created that can be correlated to temperature.



Thermocouples are available in different combinations of metals or calibrations. The most common calibrations are J, K, T, and E, each of which measures a different temperature range. The maximum temperature changes with the diameter of the wire used.

CDN's ProAccurate® Quick-Read® thermocouple thermomters also have NSF® certification and BioCote® protection.

Advantages: Speed of response (2-5 seconds) and accuracy, field calibration, good for high temperature readings.

Disadvantages: Much more expensive than bimetal or digital thermometers using thermistor technology.

INFRARED THERMOMETERS

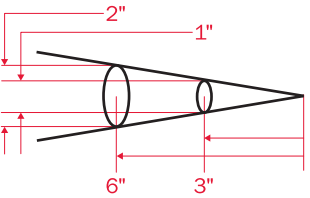
These specialized thermometers can quickly measure the surface temperature of an object without touching it. Infrared thermometers are used to measure surface temperatures only, not internal temperature. Since they operate remotely, they are helpful when it is not possible or practical to physically contact the object being measured (which may be very hot, small or distant). Remote operation also eliminates any possibility of cross-contamination.

This technology uses infrared light rays (between microwave and ultraviolet radiation) to measure this temperature. All objects give off radiation (emissivity). We cannot not see infrared radiation but we have all experienced it, whether from a campfire or the inside of a car on a hot day.

CDN's model IN482 provides handy infrared technology while the IN1022 provides a very wide temperature range with a large distance:spot ratio of 12:1. Both the INTP662 and INTP626X are NSF® and BioCote® certified and combine non-contact infrared and thermocouple technologies in a single innovative tool to ensure the best culinary results and food safely. All CDN's infrared thermometers belong to the Quick-Read® line as well.

Distance to Spot Ratio

Distance:Spot=3:1



Advantages: Fast and accurate surface temperature measurement.

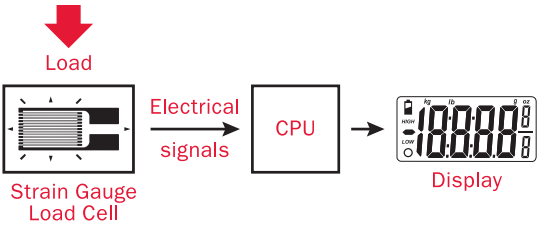
Disadvantages: Does not take internal temperature (except combination unit). Does not do well measuring shiny surfaces or gold.

HACCP

Hazard Analysis Critical Control Points (HACCP) is a guideline that can minimize the actual risk of acquiring a food-borne illness. It was developed by NASA to keep astronauts from getting sick in space. Most Health Departments are requesting restaurants and food processors to comply with HACCP guidelines.

DIGITAL SCALES

Digital (or electronic) scales offer fast weighing results, high accuracy and multiple units of measure. A favorite feature of digital scales is the tare funtion which zeros out the scale to account for the weight of a container or additional ingredients. Instant one-button unit conversion is also popular. Digital scales use electricity, batteries or a combination of both.



Digital scales use strain gauge load cells to measure the applied weight of an article by converting the applied force to electrical signals. As the load cell measures electrical resistance change, it transmits a signal to the CPU, which converts it into input for a display board, which then shows the result on a digital screen.

Advantages: Fast, accurate, fast tare feature, instant unit conversion, multiple units of measure, some have backlit displays.

Disadvantages: Electricity or batteries required.

Waterproof Rating – IP Code

Published by the IEC, The *International Protection Marking* code (or *IP Code*) is a standard for rating enclosures based on their ability to protect their electronic components from intrusion by accidental contact, dust or water. The IP Code consists of the letters **IP** followed by two digits.

First Digit: Solids

LEVEL	EFFECTIVE AGAINST
X	No data available
0	No protection
1	> 50 mm
2	> 12.5 mm
3	> 2.5 mm
4	> 1 mm
5	Dust protected
6	Dust tight

Second Digit: Liquids

LEVEL	EFFECTIVE AGAINST
X	No data available
0	No protection
1	Dripping water
2	Dripping water up to 15°
3	Spraying water up to 60°
4	Splashing water any direction
5	Water jets
6	Powerful water jets
6K	Powerful water jets – pressure
7	Immersion, 15 cm ~ 1 m (30 min)
8	Immersion, 1 m ~ 3 m
9K	High pressure & temp. water jets

Scale Terminology

Calibration – setting or correcting the scale

Capacity – The maximum weight measureable by the scale on its platform.

Divisions – defines the amount of scale increments; *d* is the symbol for the minimum division that can be indicated or recorded.

Drift – when outside influences, such as ambient temperatures, impact the scale's performance, the weight number can shift continuously

Resolution – the smallest fraction of a unit of measurement that a scale can detect in the quantity that it is measuring. The smallest difference in mass that can be displayed on a scale (commonly signified as *d*) also called readability, divisions or increments.

Stabilization Period – the time required to display a stable weight value depending on the scale's environment, software filters, etc.

Strain Gauge Load Cell – converts the applied weight or force into an electrical signal.

Tare – resets the scale display to zero in order to measure only the weight of an item. It is frequently used to subtract the weight of an item.

MECHANICAL SCALES

Mechanical (or dial) scales require no electricity or battery power, and many are lightweight and portable.

Mechanical scales use a platform mounted on a heavy spring, which manually activates a pointer to measure weight.

Advantages: Most are very economical, easy to understand, no electricity or batteries required.

Disadvantages: Speed. Usually only have a maximum of two units of measure.

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