Hanna Instruments' Products and Services

Products that Hanna has developed for the requirements of HACCP compliance span a wide spectrum from pocket meters to sophisticated bench type meters with printing/logging capabilities.

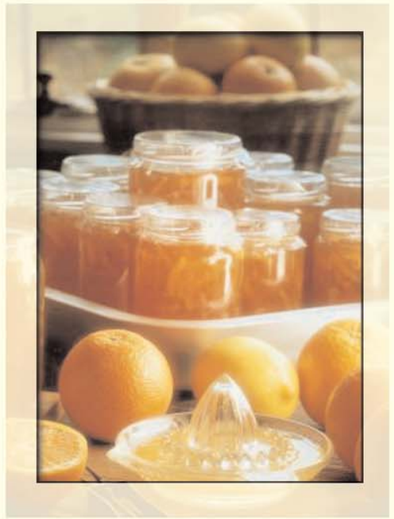
The main families of products are:

- Professional portable meters
- Temperature loggers
- Pocket-sized meters (testers)
- Temperature probes and accessories

All Hanna instruments are CE certified and manufactured to strict ISO 9001 standards. In addition, all **professional meters** come with a two-year parts and labor warranty.

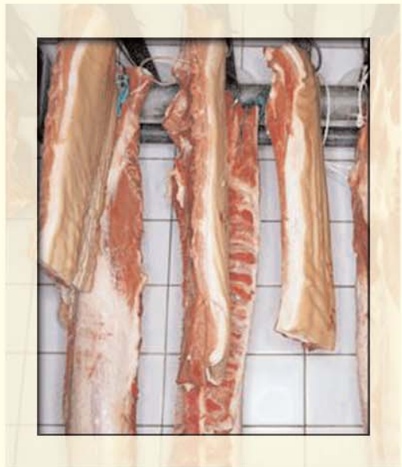
Thermometers with a Factory Calibration Certificate against an NIST Standard are also available upon request.

Hanna provides the most comprehensive and prompt after-sales technical service, thanks to its in house, factory trained technicians.



Practical Guide

for HACCP Procedures and Food Quality



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General Informations

Professional Instruments for HACCP & Food Quality Testing in restaurants and catering facilities.

Food industry professionals need an extensive range of products in order to guarantee the quality of food supplied to the public. Legislation has made such controls obligatory for anyone preparing, manufacturing, distributing or serving food. In order to satisfy this need, we have manufactured an equally vast range of products with the necessary accuracy and reliability to check the quality of food in all phases of preparation and distribution. For example, to satisfy the needs of HACCP (Hazard Analysis and Critical Control Points), we have produced a complete range of thermometers and pH meters to check food at every stage from production and transport through catering and storage.

HANNA instruments® portable and pocket thermometers have become synonymous with accurate temperature control in restaurants and catering facilities. The already wide variety of product has now been further enhanced. You can choose from pocket meters with the features most appropriate for your application. There is also a vast range of shapes and configurations to best fit your needs. For example, some of our thermometers are available with interchangeable or fixed probes, as well as meters with a hinged, folding, or even stainless steel probe for frozen samples. The more professional portable meters offer just as wide a range of measurement scales, fixed or replaceable probes and additional features.

For the harsh measurement conditions found in food production areas, such as high humidity and condensation problems, we have manufactured a wide variety of waterproof meters. For those operators who prefer extra rugged instrumentation, we have added the shockproof series. If documentation is a must as in certain production cycles and important for HACCP programs, you can choose from a wide range of printing and/or logging meters. These are stand-alone meters that can measure, print and log many parameters.

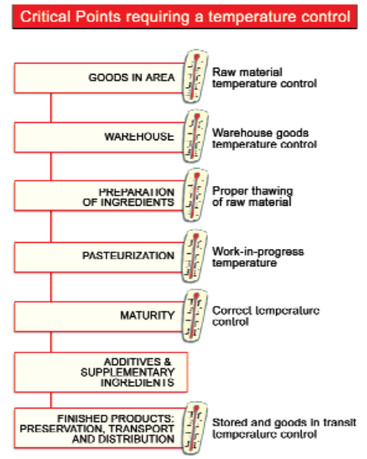
Where pH is concerned, legislation is making pH control just as important as temperature. For example, the European Community's Directive 89/397/CEE sets the pH level as the most crucial factor together with water activity and temperature for safe storage of perishable food. To satisfy these demands, we offer a variety of specifically-designed portable and bench pH meters. These products cover all the basic needs of operators in the food sector, from accuracy to ruggedness and specially-made electrodes for meat and milk to the latest in GLP (Good Laboratory Practices) microprocessor technology.

Practical Guide
for HACCP Procedures and Food Quality

Identification of the Critical Control Points

From the arrival to the storage

Identifying the Critical Control Points (CCP) constitutes the stepping stone in drafting the HACCP action plan. CCP represents those phases of the production or transformation that have to be kept under strict temperature control due to the high risk of contamination by microorganisms or toxic material. A practical example of CCP can be the type of control one is to undertake when perishable goods are kept in a chill unit. For every critical point, a check list needs to be completed with these informations: Critical point, hazard, alarm threshold, type of control, steps to take in case of alarm, responsibility and documentation. Upon identification of the Critical Points, it is recommended to put together a manual outlining forms of control and corrective action. The purpose of the manual is to prescribe, for every critical point in the production or distribution cycle, the type of instrumentation to be used as well as methods to measure and record the temperature.



PRODUCT	RECOMMENDED T° GOODS ON ARRIVAL
Meat	≤ 7°C
MInced meat	≤ 4°C
Innards	≤ 3°C
Frozen chicken	≤ –12°C
Deep-freeze chicken	≤ –18°C
Delicatessen	≤ 7°C
Fresh fish	≤ 2°C
Frozen food	≤ –18°C
Dairy products	≤ 7°C
Desserts	≤ 7°C

PRODUCT	RECOMMENDED STORAGE T°
Meat	≤ 7°C
MInced meat	≤ 4°C
Innards	≤ 3°C
Frozen chicken	≤ –12°C
Deep-freeze chicken	≤ –18°C
Fresh fish	≤ 2°C
Smoked fish	≤ 7°C
Frozen food	≤ –18°C
Dairy products	≤ 7°C
Fruits/vegetables	≤ 10°C
Eggs	≤ 8°C
Dried food	≤ 25°C

PHASE	RECOMMENDED T°
Cooking/reheating	> 70°C
Thawing	≤ 13°C
Distribution hot food	≥ 65°C
Distribution cold food	
Delicatessens/fresh vegetables	≤ 7°C
Salads/dressings/desserts	≤ 7°C
Ice creams	≤ –10°C
Preservation cooked meals after buffet	
Food with conservatives	≤ 7°C
Food without conservatives	≤ 4°C

PRODUCT	RECOMMENDED TRANSPORTATION T°
Meat	≤ 7°C
MInced meat	≤ 4°C
Innards	≤ 3°C
Fresh chicken	≤ 4°C
Delicatessens	≤ 7°C
Frozen chicken	≤ –12°C
Fresh fish	≤ 2°C
Frozen food	≤ –18°C
Dairy products	≤ 10°C
Fruits/vegetables	≤ 10°C
Eggs	≤ 8°C
Dried food	≤ 25°C
Desserts	≤ 3°C

Goods on arrival

For the entire food sector, from the manufacturers of semi-finished products to restaurants and bars, incoming goods represent the first critical point that necessitates a temperature control. The cold chain that guarantees the proper preservation and acceptable quality of edible goods should never be disrupted. Goods on arrival that do not meet the appropriate temperature criteria should be rejected and discarded. To take a measurement, it is recommended to use a professional thermometer with a fast response time so that goods are not unnecessarily held up. In addition, it might be desirable to have a printout of the measurerd values right away. In this case, a portable meter with a built-in printer should be used to avoid errors in writing down the temperature, date and time.

Warehouses, displays and refrigerators

The refrigerated displays and chilled units of restaurants and supermarkets typically hold food for a relatively short period of time prior to consumption. To ensure proper conservation, it is important that the temperature of the units close to the air inlet points (the warmest areas) are periodically checked. On the other hand, warehouses may store food for longer periods, necessitating a continuous monitoring of the temperature even when the operators are absent. In this case, it may be more appropriate to be able to document the measurements and provide warnings of abnormal conditions.

Bars, restaurants and catering

There are many Critical Points in restaurants, bars and catering concers that necessitate temperature control. Temperature in the center of the product during cooking has to reach 70°C in order to ensure the complete destruction of pathogenic microorganisms. During distribution of hot food, temperature has to be maintained above 65°C, whereas it needs to be between 12 an 18°C for cold food catering. For obvious reasons, these type of controls have to be performed rapidly. Food must be thawed at 13°C. On the other hand, meals to be served at buffets should be preserved at the right temperature before and afterwards.

Transport

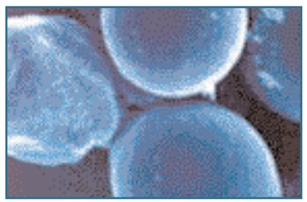
Transportation of food represents one of the most critical phases of keeping the cold chain intact. Even with cooked food, certain minimum temperatures must be maintained (normally 65°C). For each category of lets say chilled, raw and cooked food, it is important to ensure that the predetermined temperature limits set by HACCP procedures are never exceeded. This can only be achieved through a continuous monitoring and recording of temperature inside the means of transport. The continuous measurement together with spot checks can guarantee that temperature had remained within acceptable threshold throughout the journey, including stops and off-loading.

Sanitization Processes

In water and food industry

Sterilization of water

According to WHO (World Health Organization), chlorine is the most widely used disinfectant for water, but it needs to be monitored due to its harmfulness at high concentrations. It is used in the sterilization process of many application. In water treatment (wastewaters, drinking waters, industrial waters, cooling systems, etc.), chlorine can be used during the entire treatment or just certain steps of sterilization. The proper concentration is very important for an efficient disinfection. Factors like pH, temperature and hardness can greatly influence disinfection.



Chlorine is the most used disinfectant for water.

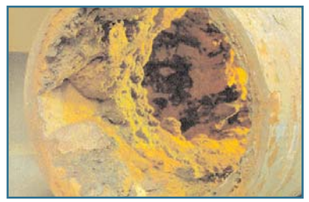
Wastewater plants

In the past, wastewater could be returned directly to surface and ground waters without being treated. Population growth and industrial activities around cities increased the quantity of pollution discharged into these waters. To solve this health and environmental problem, new regulations state being developed that all wastewater needs to be treated before being discharged. Treatment consists of a multi-phase process to reduce or remove suspended solids, organic substances, nutrients, micro-organisms, and other pollutants. In some of these phases, chlorine needs to be monitored for effectiveness.

In the past, waste waters were left directly in natural waters, without treatments.

Boilers and cooling plants

The presence of micro-organism deposits and metals, caused by corrosion of water used in heating and cooling plants can cause damage and malfunctioning of the plants themselves. A high presence of micro-organisms created residues that can block nozzles and pipes and interfere with heat exchange in the cooling system. To monitor these problems, water must be treated with disinfectants. In this case, the most common disinfectant is chlorine.



Limestone: it damages pipes and accelerates corrosion.

Fresh fruit, vegetables and meat are washed with chlorine-enriched water to inhibit growth of pathogens and micro-organisms and prolong their shelf life.

Sterilization in the food industry

Meat

The quality of water used in many food processes is important in order to guarantee consistency of the end-product. Where water is treated or filtered to obtain clarity, it is crucial to check the turbidity to ensure it is within the acceptable range, usually around 1 NTU.

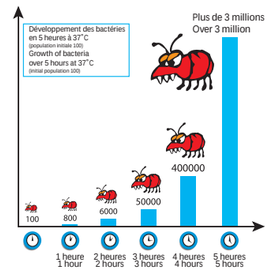
Fruit and vegetables

As the meat, fresh fruit and vegetables are washed and rinsed with chlorine-enriched water for hygiene and conservation purposes. The chlorine concentration should be closely monitored since too high a level can become a health hazard.

Temperature

To control the growth of pathogens and micro-organisms

Temperature of food is constantly monitored to keep growth of pathogens and micro-organisms under control. These checks and controls during different production cycles have been put in place to ensure that food remains edible and its quality as well as its value is enhanced. In fact, foodstuff needs to be kept at the correct temperature while stored, displayed and on the move. The table to the right shows the rate of bacterial growth over 5 hours at 37°C.



Meat

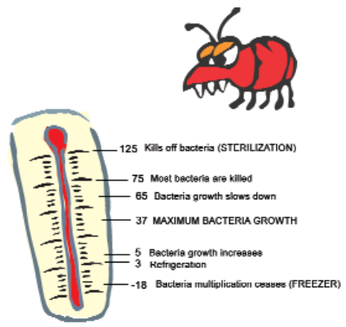
The temperature of meat at slaughterhouses needs to be monitored as a very important test for quality. Fresh meat should be stored at around 2°C (35.6°F). If the meat is deep-frozen, the storage temperature and the temperature at the center should be around -22°C (-7.6°F) with the surface temperature reaching -35°C (-31°F). In order to thaw the meat properly, the surrounding temperature should be 7°C (44.6°F).

Ham and Sausages

The temperature of salted meat stored for several months is around 2°C (35.6°F). Afterwards, the product is rinsed and dried at around 25°C (77°F) prior to maturing at a preset temperature for a particular product. As far as sausages are concerned, the mixed ingredients are cooked at a certain temperature and then cooled at around 5 to 15°C (41 to 59°F).

Drinks

Temperature of spring or deep well water extracted for making drinks must be continuously monitored to ensure purity. During the production of soft drinks, syrup is pasteurized before being added, to prevent bacteriological problems and as a result, its temperature must be closely monitored. In order to prepare fruit juices, fruit pulp is heated to just below boiling point for a few seconds to reduce micro-organisms. Once the mash is cooled, the vessel is heated above boiling point to prepare the mash for a strainer and later the mash is heated to up to 120°C (248°F) for a few seconds to pasteurize it. Temperature control also plays a crucial role in beer production. For example, malt has to be heated to 75°C (167°F) during the mash process. The type of yeast used for fermentation is also temperature-dependent. By controlling the fermentation temperature, one can determine the period needed for the product to fully develop. Temperature is controlled during filtration, in order to remove particles and improve the taste and longevity of beer. In order to remove protein, beer is cooled down to almost 0°C (32°F). As with many other products in the market, beer is also pasteurized at around 60°C (140°F) after it has been bottled to eliminate any presence of infectious organisms.



Milk and dairy products

Milk temperature is checked for mpurities and nfections upon collection. During storage, milk is kept at a temperature below 5°C (41°F). In the processes of homogenisation and pasteurization, the control of the temperature is critical. As far as cheese is concerned, the temperature must be adjusted before and during various processes. Temperature in the maturation chamber also dtermines the pediod of maturation needed. Likewise, temperature has to be monitored in the processes of butter production.

Chocolate

By increasing the temperature to about 50°C (122°F), the fermentation of cocoa beans is started. At different stages of chocolate manufacturing such as crystallization, accurate temperature measurement is a must. Once the chocolate is ready, the storage temperature should be monitored to ensure that it stays in the 15°C (59°F) range.

Coffee

In order to invoke an aroma, coffee beans are heated up to 200°C (392°F). Also during roasting, the temperature is closely monitored. In order to provide a long shelf life, the finished product is frozen at -40°C (-40°F) prior to drying. To produce a good coffee, it is important to ensure that the temperature of coffee machines does not exceed 80°C (176°F).

Bread and Pasta

The temperature of stored grain silos is controlled to ensure that premature fermentation does not occur. Temperature has to be controlled during pasta production, fermentation of dough, baking and cooling. For semi-finished products that can be flash-baked, the dough has to be stored at very low temperatures.

Sanitization of Machinery

The temperature of cleansing agents, together with their concentration, have a sighificant bearing on how effectively the machinery is sanitized. The temperature has to be monitored.

pH

Control of pH for quality and conservation

pH together with temperature rank as the most important indicators of food quality and safety. pH of raw material such as milk and meat is measured to ensure that quality standards have been properly met. pH is also monitored at different stages of food preparation and processing to guarantee safety, improve production and enhance quality. Along with temperature and water activity, pH also determines the shelf life of foodstuff. For example, by bringing the pH value below 4.5, growth and multiplication of pathogens such as clostridium botulinum are inhibited.

Meat

pH of carcasses constitutes an important initial test to determine condition of the animal prior to slaughter, quality of the breeding and any signs of stress during slaughter. The typical pH value, ranging from 5.4 to 7.0, can also provide an indication of whether fresh meat was properly stored as well as presence of lactic acid. Too high a pH value induces a loss of aroma and a visibly darker meat resulting in a lower market value.

Drinks

In making fruit juices, the pH of sugar extracts, as well as those of juices during purification and refining are checked. pH plays a crucial role in the production of beer. For example, the pH value of crushed malt is around 5.8, whereas its ideal value for protein decomposition is around 5.5. To ensure a consistent quality, the pH of brewed beer prior and after bottling is regularly monitored. pH of wine normally ranges from 2.8 to 3.8 with the pH influencing various stages of the process, including fermentation and conservation.

Milk and Dairy Products

pH of milk is around 6.8 and it is tested for impurities and signs of infection upon collection, as well as at point of delivery. In processes such as sterilization, pH is checked, since a lower value helps to speed up the process. Milk used for cheese manufacturing must be of excellent quality and its pH value contributes to whether the cheese will be soft or hard. pH is also checked during cheese preparation, souring of milk and cream maturation. Pathogen multiplication of the fresh and soft variety, is slowed down considerably by ensuring that the pH stays in the 4.1 to 5.3 region. Controlling the pH value is very important in butter manufacturing processes.

Bread and Pasta

A pH value of 4.0 to 5.8 is recommended for baked bread in order to prolong its shelf life. Batter has to be acidified to a pH of 4.1 or less to ensure that pathogens are not multiplying. As well, it must be kept at temperatures below 5°C.

Marmalades and Syrups

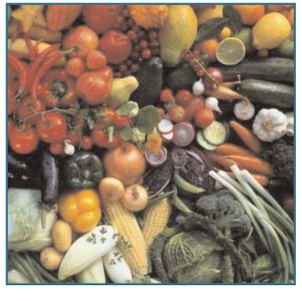
The pH of the finished product influences the length of storage time of these products. For marmalades and syrups, this is around 3.5, whereas for caramel type products, it is in the 4.5-5.0 pH range. pH is also checked during the various processes including the gelatinization of jams and marmalades, as well as purification and refining of juices in pre-separation and saturation phases.

Shellfish

Polluted water can pass on toxins, even fatal ones, to shellfish. The fact that shellfish, especially oysters, are often consumed raw poses a greater health hazard. As a result, farmed or natural shell fish are detoxified with several wash cycles. The pH of the wash water is an excellent indication whether the process has been properly completed.

Fruit and Vegetables

A pH value of 2.5 to 5.5 tends to prolong the shelf life of fresh fruit and inhibit the multiplication of micro-organisms. The same can be said for vegetables with a more neutral pH in the 4.6 to 6.4 range.



Ready-made Food

A pH value of around 4.5 is the simplest way to ensure the stability of the product.

Sanitization of Machinery

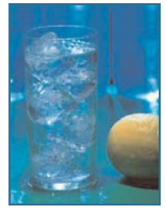
Regulatory bodies such as the departments of health often impose a certain value for the pH of the sanitization solution to be used. For example, the pH should be between 8 and 10 based on the chlorine concentration. Similarly, an iodine solution is meant to have a pH value of 5 or lower.

Conductivity, Salinity, Relative Humidity & Turbidity

During different cycles and quality control phases of food production

Conductivity

Beverages



The conductivity of spring or deep well waters, which are used for bottled water, are continuously monitored to ensure their purity. Moreover, a substantial quantity of water used for soft drinks is municipal or ground water, which means it is pretreated and it's conductivity controlled. In breweries, conductivity is checked to make sure that the filtration system is properly functioning. It is also monitored when mixing salt with yeast. In order to ensure a good and consistent quality for beer and to detect any contamination by micro-organisms, the conductivity of the finished product is constantly controlled.

Milk

Conductivity is checked to indicate the presence of impurities, infections, and for safety reasons upon collection, as well as delivery.

Vegetables and Canned Food

Conductivity is checked in the preservatives added to vegetables, as well as wash water from potato peels. It is also controlled in salt brines, washing and cleaning solutions and refrigeration brines.

Salinity

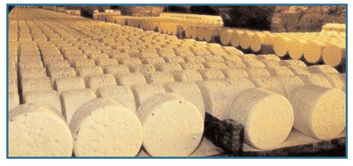
Cheese

The salt content of salt baths after molding is an important factor in cheese production. They vary from 16% to 23% based on type and whether the end-product is a soft or hard cheese.

Relative Humidity

Meat

Relative humidity of meat stored in deep freeze should be around 80%. Likewise, humidity of salted meat used in the production of ham, prosciutto and sausages is kept around 80% for several months. During the transformation and maturation process, predetermined humidity levels, based on finished product, is critical. Humidity control is very important at this stage where humidity is lowered to help with dehumidification, and later raised to generate molds and increase flavors.



Cheese

The humidity of the maturation chamber and time of maturation in cheese production determines the quality of the finished product. Too low a humidity will cause weight loss and is consequently an economically undesirable condition. High humidity, on the other hand, can cause molding on the surface of the cheese, also economically undesirable.

Chocolate

After chocolate is manufactured, it must be stored at a relative humidity of around 60%.

Candy

Humidity can have a detrimental effect on confectionery during coating, cooling and packaging. Humidity is also monitored in the in-going and outgoing air used in the coating process.

Bread and Pasta

Milled flour used for pasta and bread making has to have a 12-13% moisture content for nutritional and commercial purposes. Fresh pasta, on the other hand, can have a moisture content of up to 30%, where the figure for dry pasta is around 12%. During fermentation of dough for bread making, the humidity must be kept under strict control.

Fruit

Fresh fruit should be stored in a strictly controlled environment with a relative humidity typically in the 45-50% region.

Turbidity

Beverage

In mineral water or soft drink production, it is critical to continuously monitor the turbidity of spring or deep well waters. This is to ensure the overall quality, establish limits of suspended solids and to ensure that the turbidity is in the 0.1-0.2 NTU range. During the fermentation process, especially in automatic systems, the turbidity of beer is controlled before and after the addition of yeast, to establish its quality. Furthermore, turbidity of beer is checked to ensure proper functioning of the filtration system.

Oil

Turbidity of cooking oils such as soya and corn are monitored during their production in order to establish their density.