
FSIS DIRECTIVE

7370.1
Amendment 2

4-26-94

INSTRUCTIONS FOR VERIFYING INTERNAL TEMPERATURE AND HOLDING TIME OF MEAT PATTIES

I. PURPOSE

This directive clarifies the method to be used by FSIS personnel to determine the minimum internal temperature and holding time of cooked meat patties. On September 1, 1993, the regulation "Heat-Handling and Storage Requirements for Uncured, Meat Patties" became effective. Applicable products include items such as cooked hamburger, salisbury steaks, breaded and battered chopped veal steaks, and pork sausage patties. In addition, this directive will assist inspection personnel when performing the appropriate interim Inspection System Guide temperature/time tasks specified in FSIS Notice 55-93, Performance-Based Inspection System (PBIS) Tasks for Heat-Processed, Uncured Meat Patties. As described in this directive, only thermocouple thermometers should be used to verify cooked patty temperatures.

II. [RESERVED]

III. [RESERVED]

IV. REFERENCES

MPI Regulation, Section 318.23
FSIS Notice 55-93, dated 9/28/93
FSIS Directive 8820.1, Rev. 1

V. BACKGROUND

A. Patties, by the very nature of their shape, present a challenge in determining the internal temperature, especially of the "just-cooked" patty. Most patties are cooked as they travel on a conveyor belt through a broiler or fryer. Heat is transferred from the cooking medium (i.e., gas flames, hot oil) to the meat patty. The surfaces of the patty become the hottest and the heat transfers from the exterior of the patty to the interior by conduction. That is, the surface particles of meat get hot and transfer some of that

heat to the neighboring cooler particles and so on, until eventually, the entire patty would be of the same temperature. This process is cut short by removing the patty from the heat source. However, the outer, extra hot particles of meat continue to transfer some of their heat to the cooler interior portions of the patty and may continue to increase the internal temperature of the patty by 3 degrees F or more over what it was when first removed from the heat source.

B. The typical dial thermometers used by many of the FSIS field personnel are designed to operate with the entire lower portion of the probe inserted into the meat product. The 2-inch "sensing" portion of the probe gives a reading that is an average of the temperatures along its length. This is not much of a significant problem when verifying the temperature of a sauce or a roast. However, the temperature gradient in a patty can be from >200 degrees F on the surface to <140 degrees F in the interior. Averaging the temperature gradient results in a faulty reading for the "internal temperature" of the patty and may indicate a fully-cooked patty when, in fact, one does not exist. There are newer, more accurate temperature sensing devices available.

C. Thermocouple thermometers will be used to verify the temperature of cooked meat patties. The thermocouple thermometer is used in the same manner as the traditional thermometer; however, the sensitive portion is restricted to the very tip of the probe. The probe itself is a smaller diameter (1/16") allowing easier insertion into the center of a thin patty. The dial is replaced by a hand-held digital read-out device. These thermometers are also more fragile and much more expensive than the dial thermometers. The inspectors receiving a thermocouple thermometer will also receive instructions for care and maintenance. The instrument and probe must be kept clean. Regular wiping with a damp cloth will usually suffice. If extra cleaning is necessary, only mild soaps should be used; never any form of solvent.

VI. RESPONSIBILITIES

A. Establishment Responsibilities: Controlling the process through process monitoring and assuring that the finished product is in compliance with the requirements of MPI Regulation, Section 318.23.

B. Inspector Responsibilities:

1. Monitoring the compliance of cooked meat patties with the regulatory requirements for heat-processing procedures, cooking instructions, and cooling, handling, and storage requirements, as directed through PBIS.
2. Taking appropriate action when results indicate non-compliance with the regulations, as specified in FSIS Directive 8820.1, Rev. 1.

VII. INSTRUCTIONS

When verifying cooked meat patty temperatures, the inspector should:

A. Verify the Accuracy of the Thermocouple Thermometer.

1. All thermometers require calibration to be accurate. Thermocouple thermometers contain electronic components that are not accessible to the user. These thermometers are calibrated at the factory against an instrument traceable to the National Institute of Standards and Technology. If properly used, the thermocouple thermometer should stay correctly calibrated for 2 to 3 years.
2. Calibration of the thermometer should be checked at 32 degrees F, the freezing temperature of water. A freely draining, melting ice bath may be used for medium at 32 degrees F. It is important that the probe of the thermometer not be allowed to rest on the bottom of the container of freezing water. Allow the thermometer to remain in the water bath for 1 minute before taking the reading. It is best to compare the reading of the "test" thermometer with the reading of a mercury-in-glass thermometer that is of known accuracy.
3. Calibration of the thermometer should be checked at 212 degrees F, the boiling temperature of water. Boiling water is used for medium at 212 degrees F. Water boils at a simmer; it need not be a rolling boil. It is important that the probe of the thermometer not be allowed to rest on the bottom of the container of boiling water. Allow the thermometer to remain in the water bath for a minute before taking the reading. It is best to compare the reading of the "test" thermometer with the reading of a mercury-in-glass thermometer that is of known accuracy.
4. If the reading on the thermocouple thermometer is off by more than 1 degree F, then it should not be used. Contact your immediate supervisor for a replacement and return the inaccurate unit for servicing. Contact the regional office for shipping instructions.

B. Verify Patty Temperature.

1. Sanitizing the probe and patty disposition. The probe must always be cleaned and sanitized prior to performing a temperature verification task. After a temperature is taken of product which does not comply with the time/temperature regulation, as in Paragraph VIII, B., 3., reclean and sanitize the probe. All patties used by inspection personnel to determine compliance with the time/temperature regulation should be returned to plant management for disposition.

2. Tempering. A thermometer at room temperature cannot be inserted directly into a hot patty without having some cooling effect on it. The relative coolness of the probe acts to chill the patty, while the heat of the patty warms up the probe. Insert the probe into several patties successively to warm it up to the desired range before taking a verification temperature.
3. Checking for “cold spots”. If patties exit a cooker in several rows across a conveyor belt, it is necessary to take the temperature of a patty from each row, one at a time, to determine the existence of “cold spots”. For taking verification temperatures, select a patty from the coldest row.
4. Inserting the probe. As quickly as possible, remove the patty from the conveyor, and insert the thermocouple probe. Insert the probe from the side of the patty, putting the sensitive area as close to the geometric center of the patty as possible.

NOTE: It is important not to stack the patties and insert the thermometer through the center of the stack. With the much smaller thermocouple probe, inserting the probe into a very thin patty will not be as difficult as it is with the dial thermometers. Only thermocouple thermometers should be used to verify patty temperatures.

5. Reading the temperature. Allow time for equilibration after the thermometer is inserted into the patty. This should take only a couple of seconds. Do not “help” the thermometer along by tapping the patty or wiggling the probe. Gripping the patty between the fingers should also be avoided. Take note of the highest temperature registered by the thermocouple thermometer. This is the “**minimum internal temperature**” of the patty.
6. Rounding rules. The thermocouple thermometers are calibrated to read in 0.1 degree F increments. These readings may be rounded off to the nearest whole number. Thus, a digital readout of 150.5 to 150.9 degrees F shall be viewed equivalent to 151 degrees F.

C. Verify Holding Time. The heat processing requirement of the patty regulation addresses not only internal temperature, but also holding time. After the patty reaches the “**minimum internal temperature,**” the time must be monitored to assure that the product maintains at least that temperature for the required time. Any timepiece which reads seconds may suffice. This includes stopwatches, wristwatches, and pocket watches. Timing devices that are preset and tripped to begin countdown are acceptable so long as they are incremented in seconds. An establishment may make available to the inspector a timing device identical to the one used by establishment personnel.

VIII. TEMPERATURE/TIME COMBINATIONS

A. The patty regulation allows manufacturers the option of several time/temperature combinations. The establishment should make available which time and temperature combination will be used on each lot prior to the production run.

B. Heating Deviations and Corrective Actions:

1. Example of a heat process in compliance: Assume the manufacturer chooses the time/temperature combination of 16 seconds at 155 degrees F. The thermometer shows a temperature reading of 155 degrees F when first inserted, then travels to 156 degrees F and 157 degrees F before coming back to 155 degrees F. The time interval between the first registered reading of 155 degrees F and then subsequently rising and then falling below 155 degrees F is eighteen seconds. The heat processing is in compliance.
2. Example of a heat process which may require additional monitoring: A deficiency would be documented if the establishment fails to meet their selected temperature/time combination but does not meet another temperature/time combination as shown in Table A of the MPI Regulations, Section 318.23. Although not considered a deficiency, this situation may indicate a lack of process control. Therefore, the inspector may decide to perform additional unscheduled tasks to ensure that one of the temperature/time combinations as provided in Table A is met.
3. Example of a heat process not in compliance: It may be that the product does not comply with any of the temperature/time combinations listed in the regulation. The product is not in compliance and must be handled as specified in §318.23(c)(2), Requirements for Handling Heating or Cooling Deviations of the MPI Regulations. The product may be reprocessed or used as rework in product that is to be heat processed to one of the temperature/time combinations, or relabeled as partially-cooked product.

Any questions regarding this directive should be referred to the next level of supervision.

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for
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