Short-Time Holding of Raw Beef, Pork and Poultry at Warm Temperatures

**Category:** Raw meat and poultry  
**USDA HACCP Category:** Raw, not ground; Raw, ground  
**Processing:** Low-temperature holding  
**CCP:** warmest processing step, e.g. stuffing, patty-making, fabrication  
**Validates:** Critical Limits needed to ensure no growth of *E. coli* O157:H7 and *Salmonella* on raw meat and poultry exposed to non-refrigerated conditions for short periods of time

**CCP:** Commercial processing often involves exposure of raw meat or poultry to non-refrigerated conditions for short periods of time, e.g. stuffing, patty-making, fabrication. A step designated as a CCP likely will have Critical Limits of either product temperature or room/environment temperature and time. These Critical Limits can be monitored by periodic temperature measurements.

**Study Design:** Small pieces (< 1 ounce) of beef, pork, chicken white meat, and chicken dark meat, and 1-ounce ground beef “mini-patties” were inoculated with multiple strains of *Salmonella* spp. and *Escherichia coli* O157:H7, refrigerated at 41°F for 1 day, and then held at 50°F for up to 8 hours or at 72°F for two hours. Commercial amounts of meat products, beef rounds (58 lbs), beef brisket or pork (9 lbs), boneless chicken breasts (1.4 lbs), and 3-lb chubs of ground beef were also inoculated, refrigerated, and subsequently exposed to warm temperatures.

**Results and Discussion:** There was no significant growth of *E. coli* O157:H7 or *Salmonella* on any meat samples exposed to 50°F for 8 hours, or to 72°F for 2 hours, and none at all on commercial products. Internal temperatures of large meat cuts (beef round, ~58 lbs) warmed from 41°F to 47°F during 8 hours at 50°F, and required 5.5 hours to chill back to 41°F (in a 41°F room). In 72°F trials, beef round temperature did not exceed 56°F during the 2 hour exposure, and cooled back to 41°F in 1.5 hours. This represents a worst case scenario with exposure of large-volume product to warm temperatures with limited subsequent cooling capacity. Processors must ensure that products exposed to warm temperatures are rapidly chilled back to 41°F or colder during the allotted time.

**Validated Critical Limits** based on study results:
- Product not warmer than 50°F and chilled back to 41°F or lower within 8 hours, or
- Product not warmer than 72°F and chilled back to 41°F or lower within 2 hours.

**NOTE:** USDA regulations prohibit poultry products from exceeding 55°F during processing. These Critical Limits may be useful in evaluating CCP deviations involving poultry products.