

### Raw Product Critical Limit Table

**Intended use:** This table is to be used for setting Critical Limits at Critical Control Points (CCPs) for the **raw, ground**, and **raw, not ground** HACCP plans. The CCP in these plans is usually a step(s) at which the product reaches its warmest temperature. Examples include stuffing or packaging for sausage products, cooling for hot-boned pork, cutting for chicken parts.

Seasoned beef is a product which contains phosphate, salt, and spices, but no nitrite.  
Sausage (pork bratwurst mix) contains salt, but does not contain nitrite.

The hazards controlled by employing these Critical Limits are:

- **Pork and Sausage:** *Salmonella* and *Staphylococcus aureus*
- **Beef and Seasoned Beef:** *Salmonella*, *Escherichia coli* O157:H7, *Staphylococcus aureus*
- **Poultry:** *Salmonella* and *Staphylococcus aureus*

#### How to use the table:

- 1) Determine which column to use: pork, beef, poultry, seasoned beef or sausage
- 2) Establish the warmest temperature you expect properly handled product to ever reach.
- 3) From the table, note the **Critical Limit** (in hours and minutes) for the temperature you established. For products that start out cold and warm up, this is the time you have starting with the product leaving refrigeration until the product is chilled back to 41°F or lower. For hot-boned meat, this is time from the completion of slaughter and dressing until the product is chilled to 41°F or lower.

#### Critical Limit (hours : minutes)#

Temperature (°F)	Pork	Beef	Poultry	Seasoned Beef	Sausage
50	54:45	27:00	22:30	13:15^	8:30*
55	17:00	9:00	14:45	13:15^	8:30*
60	8:30	6:00	13:45	13:15	8:30*
65	8:15	3:45	8:15	5:00	8:30
70	5:45	3:30	4:45	5:00	6:00
75	4:15	2:30	3:00	3:00	5:15
80	4:15	2:00	3:00	3:00	3:15
85	1:30	1:30	2:00	2:00	2:30
90	1:30	1:30	2:00	2:00	2:30
95	1:30	1:15	2:00	1:30	1:45
100	1:30	1:15	1:30	1:30	1:45
105	1:00	1:00	0:45	1:00	1:45
110	1:00	1:00	0:45	1:00	2:15

#Critical Limits are based on research done at the University of Wisconsin-Madison. Each value is the **shortest lag phase** (in hours and minutes) among the target pathogens for each product. References for the research are noted below.

^No experiments done at this temperature. Must use Critical Limit for 60°F.

\*No experiments done at this temperature. Must use Critical Limit for 65°F.

References:

Pork (Table 3): Ingham, S.C., M.A. Fanslau, G.M. Burnham, B.H. Ingham, J.P. Norback, and D.W. Schaffner. 2007. Predicting pathogen growth during short-term temperature abuse of raw pork, beef, and poultry products: use of an isothermal-based predictive tool. *Journal of Food Protection* 70(6): 1445-1456.

Beef (Table 4): Ingham, S.C., M.A. Fanslau, G.M. Burnham, B.H. Ingham, J.P. Norback, and D.W. Schaffner. 2007. Predicting pathogen growth during short-term temperature abuse of raw pork, beef, and poultry products: use of an isothermal-based predictive tool. *Journal of Food Protection* 70(6): 1445-1456.

Poultry (Table 5): Ingham, S.C., M.A. Fanslau, G.M. Burnham, B.H. Ingham, J.P. Norback, and D.W. Schaffner. 2007. Predicting pathogen growth during short-term temperature abuse of raw pork, beef, and poultry products: use of an isothermal-based predictive tool. *Journal of Food Protection* 70(6): 1445-1456.

Seasoned Beef. University of Wisconsin-Madison Center for Meat Process Validation. (internal study; unpublished).

Sausage (Table 3): Ingham, S.C., B.H. Ingham, D. Borneman, E. Jaussaud, E.L. Schoeller, N. Hoftiezer, L. Schwartzburg, G.M. Burnham, and J.P. Norback. 2009. Predicting pathogen growth during short-term temperature abuse of raw sausage. *Journal of Food Protection* 72(1): 75-84.

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