

# White Oak Frozen Foods

## Process Lethality Determination

### Objective:

The purpose of the Process Lethality Determination (PLD) is to provide a science-based validation tool that can be used to demonstrate the effectiveness of our SHS heat process to destroy microorganisms of concern.

Specifically, the PLD allows input of actual in-process data from our SHS process and determines if the process achieves the required log reduction for the microorganism of concern.

### Information:

Twenty in-process, continuous time (sec) and cumulative / temperature (°F) data from the process is used. This information is gathered via a DataTrace™ time/temperature measuring devices. The temperature is the core product temperature.

### Definitions:

**Thermal Death Time** - This is the time, in minutes, necessary to kill a given number of organisms at a specified temperature.

**D Value** - This indicates the time, in minutes, required to destroy 90% of a population of cells at a given reference temperature.

**T ref** - The reference temperature used when establishing the D and z values.

**z Value** - This is the temperature increase required to reduce the thermal death time by a factor of 10.

**F Value** - The process lethality. The time, in minutes, at a specified temperature required to destroy a specific number of viable cells having a specific z-value.

### Example: Red Bell Pepper PLD 10-14-03 (attached).

• Organism of concern	<i>Listeria monocytogenes</i>
• z value =	10° F
• T-ref =	145 °F
• Computed cumulative F value =	42.78
• Required F value (to achieve a 4 log reduction) =	4.8
• Is process adequate?	YES, 42.78 is greater than 4.8
• Log reduction calculation $42.78 / 1.2 =$	51.34

### Summary:

The PLD is used as a tool to determine if the SHS process has provided sufficient time and temperature to achieve a required log reduction for the microorganism of concern. If the computed F value exceeds the required F value for the organism of concern, the data and graphs provided are used as a component of the HACCP validation materials. If the SHS process does not provide a computed F value that exceeds the required F value, the SHS process needs to be re-evaluated and additional time and or temperature may need to be applied to the process.

### REFERENCE:

J.R. Fain, AR, J.E. Line A.B. Moran, L.M. Martin, R.V. Lechowich, J.M. Carosella and W.L. Brown. 1991. Lethality of Heat to *Listeria monocytogenes* Scott A: D-Value and Z-Value Determinations in Ground Beef and Turkey. J. Food Prot. 54:756-761. J. Scott and L. Weddig. 1998. Principles of Integrated Time-Temperature Processing. Meat Industry Research Conference proceedings.