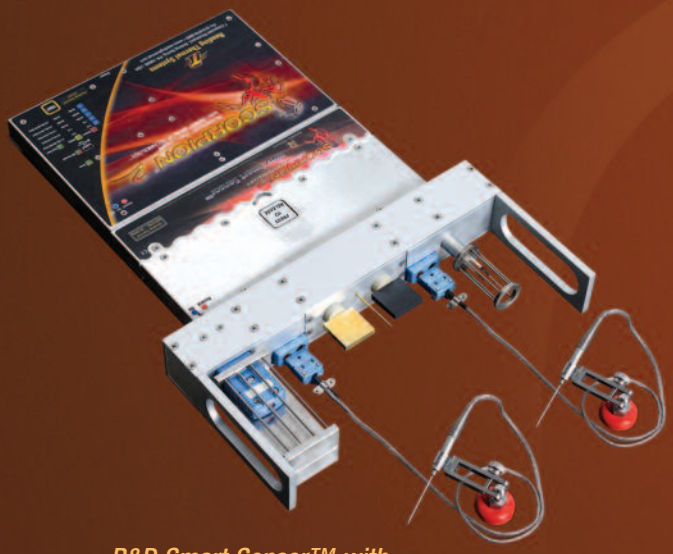
READING THERMAL

Food Safety



R&D Smart Sensor™ with Product Probes

THE SCIENCE BEHIND FOOD SAFETY

Scientific research on foodborne pathogens (e.g. salmonella) provides the basis for the amount of time @ temperature required to kill or render a specific pathogen harmless. Health officials utilize this research along with studies on specific outbreaks of food borne illness and decide how much a pathogen count should be reduced to render it harmless. This reduction is commonly referred to as % Kill. Killing 90% of the pathogens in a specific food sample is called a 1D reduction (where D stands for "decimal" or a factor of 10). Killing 99% of the pathogens is called a 2D reduction (a factor of 100). Killing 99.9% of the pathogens is called a 3D reduction (a factor of 1000), and so forth. Pathogen reduction level is highly controversial but many food safety experts recommend a 5D (99.999% Kill) to 6D (99.9999 % Kill) reduction.

MEASURING PERCENT KILL

The SCORPION® 2 Data Logger, coupled with a Temperature Sensor Array containing Product Probes, provides a simple solution for measuring environment temperature and product core temperature and understanding their relationship under specific process conditions. Once data is recorded the SCORPION® Software (SV8) is used to calculate and display the % Kill / pathogen reduction level.

Pathogen reduction levels can be achieved by baking a product at a specific temperature for a specific length of time (time @ temp). If a 1D reduction requires 3 minutes at 200°F (93°C), then a 5D reduction, at the same temperature, would take five times as long or 15 minutes. Achieving a high D level typically requires a longer baking time at a specific temperature or a shorter baking time at a higher temperature. Both scenarios are detrimental to production efficiencies. Longer baking time translates to reduced throughput and higher temperature translates to increased energy consumption

SCORPION® 2

Data Logging Measurement System with SMART SENSOR TECHNOLOGY™

DATA COLLECTION AND ANALYSIS

Controlling the internal temperature of food products is critical for attaining the degree of safety demanded by today's marketplace. Using the proprietary SCORPION® Software (SV8) to analyze product core temperature data, collected with SCORPION® 2, allows the user to determine the degree of safety achieved in a specific process.

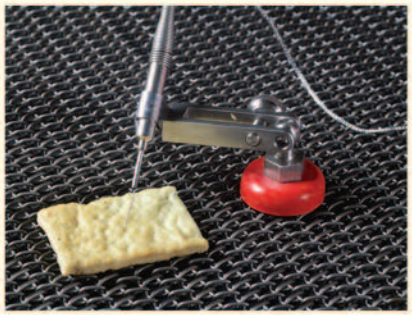
PROCESS OPTIMIZATION

Understanding the relationship between Environment Temperature, Product Core Temperature, Process Time and % Kill enables process optimization:

- Process temperature can be adjusted to meet Product Core Temperature requirements and minimize energy consumption
- Process time can be adjusted to meet required pathogen reduction specifications and maximize throughput

Determining % Kill requires 3 simple steps:

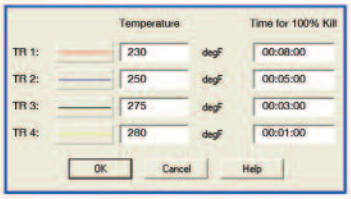
1) Measure the product core temperature through a specific process. Reading Thermal supplies two types of Product Insertion Probes for this purpose.



Standard Product Insertion Probe with Probe Fixture

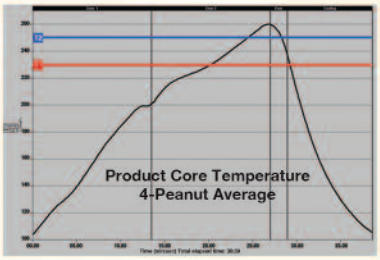
Hypodermic Product Insertion Probe with Probe Fixture

2) Set the time @ temp specification to achieve the desired pathogen reduction level. SV8 allows four time @ temp reference points (TR1 - TR4) to be entered. Each reference point is entered with the assumption that 100% Kill occurs if that time @ temp specification is met.



3) The time @ temp reference points will automatically appear on the profile graph as lines (T1 - T4) visually displaying the specifications entered.

T2 = 100% Kill @ 250F for 5 min
T1 = 100% Kill @ 230F for 8 min



A summary of the measured time @ temp for each of the reference points is displayed and the % Kill is calculated.

Temperature Reference Lines	T1 (230.0) - T2 (250.0)		T2 (250.0) - T3 (275.0)		T3 (275.0) - T4 (280.0)		Above - T4 (280.0)		% Kill
	Time	Ave	Time	Ave	Time	Ave	Time	Ave	
Avg 1: All Temperatures (degF)	00:05:09.0	240.0	00:03:45.0	256.0	00:00:00.0	----	00:00:00.0	----	139.4

The calculation for % Kill includes solving a set of ratios between the amount of time specified and the amount of time measured. SV8 performs these calculations for each of the four reference points entered.

Calculating % Kill:

$$T1\text{-}T2 \quad \frac{8min}{100\%} = \frac{5.15min}{X\%} = 64.38\%$$

$$T2\text{-}T3 \quad \frac{5min}{100\%} = \frac{3.75min}{X\%} = \frac{75.00\%}{139.4\%\ kill}$$

Contact us for pricing.

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