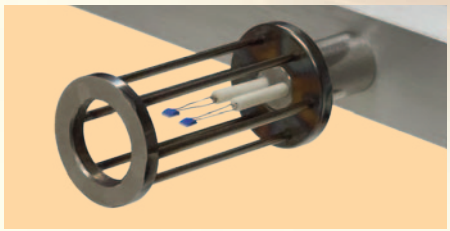
SCORPION® 2

Data Logging Measurement System with SMART SENSOR TECHNOLOGY™

Digital Air Velocity Sensor Array

Even distribution of airflow is vital in maintaining the quality of product delivered by any oven system. In a radiant oven, (e.g. ribbon burners) the airflow comes from the moving conveyor, the exhaust system, and natural combustion air currents. In a convection oven, (e.g. air recirculation) the airflow comes primarily from the air distribution plenums. In this case, airflow is of particular importance because it directly controls the amount of heat delivered to the product.



Digital Air Velocity Sensor

The Process

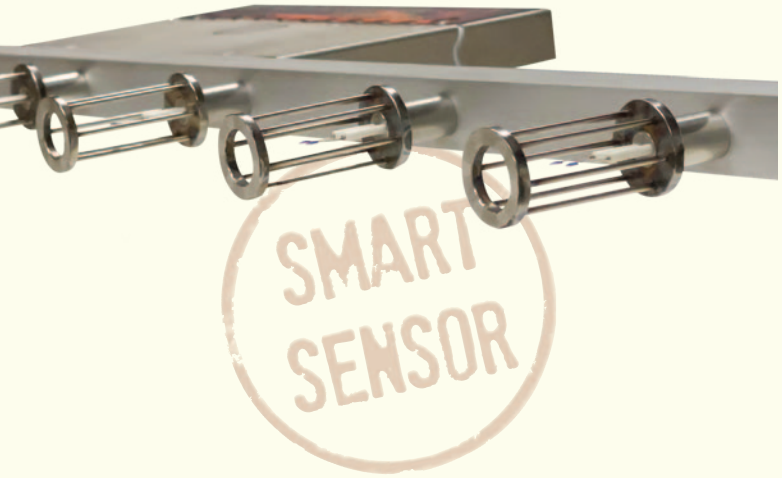
The SCORPION® 2 Digital Air Velocity Sensor Array delivers a precise picture of airflow patterns inside the thermal environment of an oven, dryer or cooling tunnel, from side-to-side and entrance-to-exit.

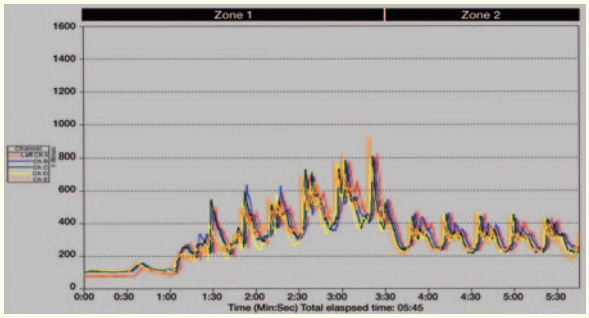
Physically, Air Velocity is measured from thin-film platinum RTD pairs operating as hot-wire anemometers. Proprietary Smart Temperature Compensation maintains sensor accuracy through varying process temperatures.

The Air Velocity Sensors are evenly spaced across the array width, which is selected to match the width of the conveyor. The fixed position sensors collect data, at product level, as the array passes through the process and displays the results in m/sec or ft/min. The number of sensors varies with the width of the array/conveyor.

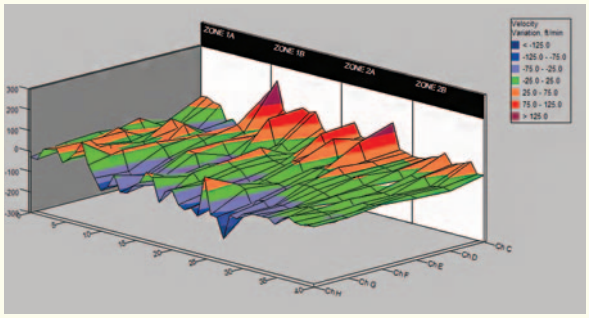
Standard Array Configurations

Conveyor Width mm (inch)	Array Width mm (inch)	Sensors (#)	Sensor Spacing mm (inch)
300 (11.80)	250 (9.80)	3	99 (3.88)
500 (19.70)	450 (17.70)	5	100 (3.94)
800 (31.50)	750 (29.50)	7	116 (4.56)
1000 (39.38)	950 (37.38)	9	112 (4.44)
1200 (47.25)	1150 (45.25)	11	110 (4.31)
1500 (59.06)	1450 (57.06)	13	117 (4.56)
2000 (78.75)	1950 (76.75)	15	136 (5.31)





2D Line Graph



3D Mesh Graph

Analyzing the Results

Each sensor output is the sum of air velocity components from all directions, and can be displayed as a line (channel) in a **2D Line Graph**. Side-to-side airflow variation is directly related to side-to-side variation in product bake, like color or texture, and represents a critical measurement displayed by this sensor array.

The tighter the pattern of lines, the more even the air distribution is across the width of the process. Visually, side-to-side variation is better displayed in a **3D Mesh Graph**, which in this example is showing greater than 1.2 m/sec (250 ft/min) airflow variation in several areas of the oven. Thin-film RTD technology minimizes sensor variation across channels, allowing more granular data collection.

The Digital Air Velocity Sensor Array can help you spot airflow differences between baking zones, concentrated air velocities on isolated parts of the conveyor, and unwanted air currents at the entrance or exit of the oven. Air Velocity Profiles are helpful in adjusting your process to maximize quality and reduce waste.

Technical Summary*:

- Number of Sensor Elements (channels): up to 15
- Sensor Type: Miniature hot-wire anemometer using thin-film platinum RTD
- Direction of measurement: Omnidirectional
- Range: 0.6-10 m/sec (120-2000 ft/min)
- Operating Temperature Range: -50°C (-58°F) to 350°C (662°F)
- Resolution: < 0.01m/sec
- Accuracy: ±5% of full scale
- Response Time: t60 = 3.5 sec in air at 5 m/sec (200ft/min)
- Battery running time:

Array Width	*NEW Digital AV*
300 mm	9:00 hrs.
500 mm	7:30 hrs.
800 mm	6:15 hrs
1.0 m	5:30 hrs.
1.2 m	4:45 hrs.
1.5 m	4:15 hrs
2 m	3:45 hrs.

**Not rated for condensing environments*

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