

SPIRAL OVEN

SOLUTIONS



Marlen Advances Spiral Cooking to Enhance Flexibility and Uniformity



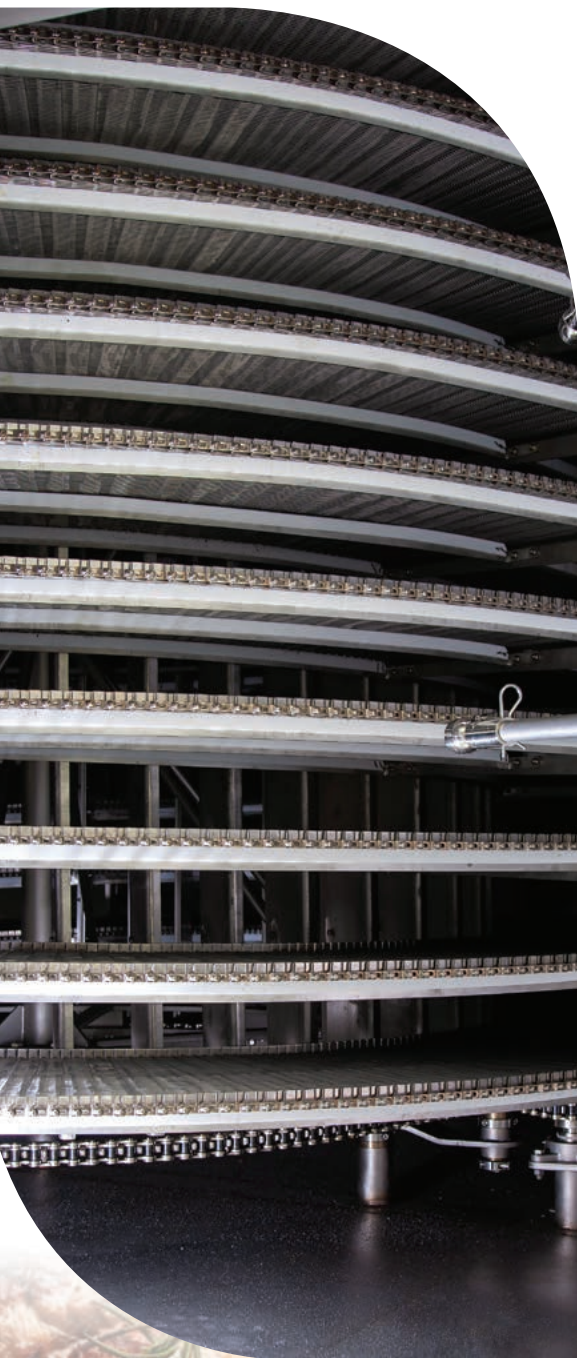
MARLEN

A DURAVANT COMPANY

MAXIMUM DURABILITY, CONTINUOUS COOKING IN A COMPACT SOLUTION.

Marlen advances Spiral Oven solutions by incorporating the latest in sanitary design, optional servo motor technology, intuitive controls with icon-based operator interfaces, and safety features. Our patented forward-reversing airflow and heating delivery methods are at the core of the oven's design, delivering optimum product quality and consistency, while maximizing productivity per square foot. Optimal heat transfer facilitates ability to cook, dry, steam, bake, proof, equilibrate, brown, pasteurize, roast, or combination cook. Our advanced cooking systems are an innovatively compact size, minimizing energy utility requirements, and boosting overall efficiency compared to other spiral cooking systems with massive footprint and utility requirements.

The oven's control system automatically adjusts to operator recipes with precision results on product color, texture, and moisture, so you can yield those juicy, crispy, tender, cooked-to-perfection results. Better Process...Better Food®.





ADVANTAGES OF MARLEN SPIRAL OVENS

- Superheated vapor cooking environment creates 263 kcal/m³ more energy versus convection cooking, reducing cook times and improving yields.
- Integrated heat source with up to 22 air exchanges in cooking chamber per minute allows for fast startup and improved responsiveness during on-the-fly recipe changes.
- Impingement zone adjacent to heat source blows 500° F (260° C) air at speeds of up to 2,000 ft/min (610 m/min) upon product to maximize rapid color development for finishing.
- Configurable airflow components for multi-directional heating featuring Up, Down, Horizontal, and Oscillating for inside/outside belt temperature balance.
- Reduced profile internal supports and belting optimize airflow control and velocity enabling balanced air temperatures across the belt.
- Multiple probes located near the product, resulting in precise oven conditions and optimal finished product.
- Optimal heat transfer facilitates ability to cook, dry, steam, bake, proof, equilibrate, brown, pasteurize, roast, or combination cook.
- PID controlled temperature range from 203° F (95° C) to 450° F (232° C) with air temperatures as high as 500° F (260° C) in the impingement zone and up to 500° F (260° C) in the heat exchanger.
- Optional servo motors rotate at 1,000 times per second to maintain accurate, smooth belt speeds. Servos also support extreme tolerances under weights of full product loads.
- Voice of customer lead development of an intuitive icon-based touchscreen for recipe selection, maintenance, and sanitation including multi-language options.
- Ewon for remote monitoring, login for maintenance, and data logging capabilities for the ever-evolving IIoT and Industry 4.0.
- Safety design features meet CE compliance and include UL Panel Certification.
- Sanitary and compact design reduces surface area for cleaning. Large doors enable full access for inspection without any additional height needed for hood lifting.
- Optional no-leak patented sealed electrical boxes withstand 1,350 PSI direct spray to edge of silicon seal.
- Equipped with hygienic cable management system and IP69K rated stainless steel 8-port block with push lock plugs and I/O indicators for the harshest environments.
- Fully integrated CIP system uses a combination of high-volume rinse, recirculated wash, belt/brush contact, and chemical application to clean the oven. Time and temperature settings are controlled via the HMI.
- Scalable modular concept with plug-and-play utilities, and configurable belt options based on your products like number of belt tiers, usable width, and length.
- Multiple zones achieved with optional modular descending design and/or in combination with Afoheat™ Surface Treatment solutions.
- Independent inline modular spirals provide unique time and temperature flexibility.

SIMULATED HEAT TRANSFER STUDIES HAVE BEEN CONDUCTED BY MARLEN ENGINEERING TO OPTIMIZE AIRFLOW AND THROUGHPUT CAPACITY.

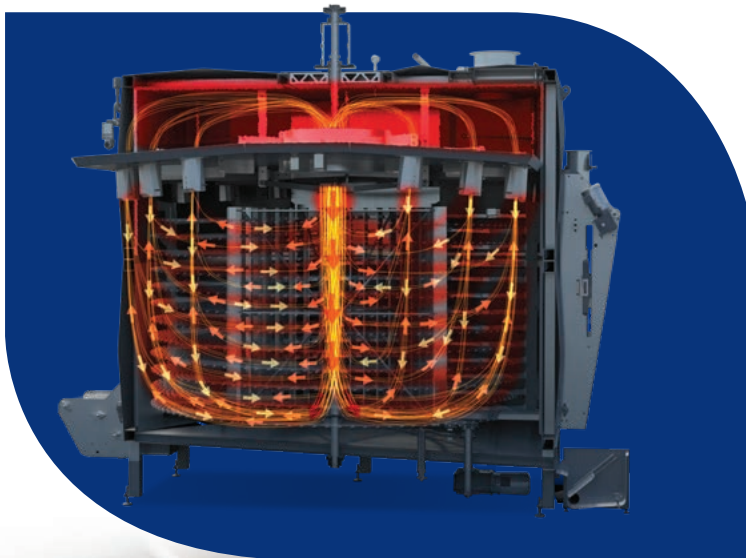


FORWARD-REVERSING AIRFLOW:

- Patented bi-directional airflow allows maximum flexibility with balanced airflow across the belt ($<5^{\circ}\Delta T$ Air) to create thermoclines within process air ($>30^{\circ}\Delta T$ Air).
- Controls enable adjustment of the proportion of time each airflow occurs within the cook cycle and the fan speed. A braking resistor enables quick changes between full-forward and full-reverse directions.
- The fan velocity can vary so that the speed of the first airflow is different from the speed of the second airflow.
- Product cooks more evenly across the belt, making the Marlen spiral oven ideal for boneless chicken breasts, meatballs, wings, roasted vegetables, pizza toppings, and more.

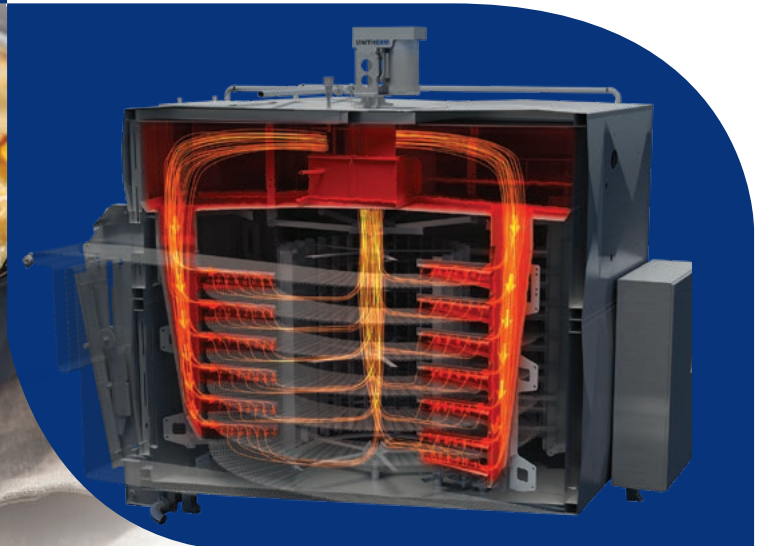
SUPERHEATED VAPOR COOKING:

- Rapid expanding vapor volume expels oxygen and reduces risk for fire.
- Accommodates higher cooking temperatures while achieving faster cook times, increased capacity and improved uniformity over dry air cooking.
- Incorporated heat exchanger with optimal location for direct steam injection (DSI $>3\text{bar}$) improves efficiency by 2.02 kJ/gC vs 22.61 kJ/gC needed for a phase change.
- Accurate humidity control above 212° F (100° C) is achieved by using an Oxygen probe vs Wet-Dry bulb methods used for R.H. measurements at lower cooking temperatures.



IMPINGEMENT SPIRAL COOKING:

- Speeds up the cooking time for products that require browning.
- Significantly reduced footprint compared to linear cooking solutions.
- Recommended for flat surfaces or when the air can be driven into the product.
- Air can be impinged to the top or bottom of product.
- Perfect for cpet trays, lasagne, gratin products, biscotti, pies, quiche, and more.



ULTRA-HYGIENIC DESIGN



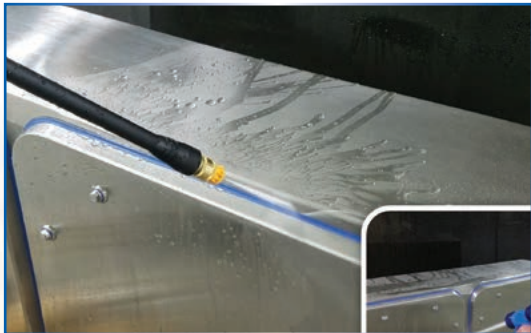
8-PORTR STAINLESS STEEL BLOCK



ICON-BASED HIGHLY INTUITIVE HMI



HYGIENIC CABLE MANAGEMENT



PATENTED NO-LEAK SEALED ELECTRICAL BOX



SPIRAL OVEN

SPECIFICATIONS



MICRO



MINI



MEDIUM



LARGE

MODEL	BELT WIDTH	FOOTPRINT	THROUGHPUT CAPACITIES
Micro	12-in (300 mm)	7.8-ft (2.39 m) L x 5.67-ft (1.73 m) W x 8-ft (2.44 m) H	225-450 lbs (100-200 kg)/hour
Mini	16-in (400 mm)	13.5-ft (4.11 m) L x 7.58-ft (2.31 m) W x 10.33-ft (3.15 m) H	750-1,800 lbs (350-800 kg)/hour
Medium	24-in (600 mm)	17.08-ft (5.21 m) L x 20.5-ft (6.24 m) W x 16.75-ft (5.10 m) H	3,000-5,000 lbs (1,350-2,250 kg)/hour
Large	40-in (1,000 mm)	21.25-ft (6.48 m) L x 16.33-ft (4.98 m) W x 16.42-ft (5 m) H	7,000-11,000 lbs (3,175-4,990 kg)/hour
XLarge	40-in (1,000 mm)	26.21-ft (7.99 m) L x 20.5-ft (6.25 m) W x 19.75-ft (6.02 m) H	11,000-17,000 lbs (4,990-7,711 kg)/hour



MARLEN

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