

In-Line Microwave Planar High Moisture (HM) Heating and Drying System

When necessary to pre-heat moisture to evaporative temperature prior to entering a conventional dryer, post-dry materials to optimize final moisture uniformity, or purely for stand-alone drying, Industrial Microwave Systems (IMS) offers an efficient solution to many challenging heating and drying processes. Our patented High Moisture (HM) Applicators eliminate hot spots by uniformly heating thick materials of high moisture content that easily absorb microwave energy. Benefits include:

- Increased production throughput as high speed microwave heating reduces drying times.
- Rapid power adjustments and on/off capabilities eliminate lengthy warm up and cooldown times.
- Microwave energy is increasingly absorbed in areas of high moisture content, yielding more uniform moisture gradients throughout the product.
- An IMS planar heating or drying system has no Nitrogen Oxide (NOx) or Sulphur Oxide (SOx) emissions associated with gas-fired dryers.
- Patented choke designs insure that any electromagnetic emission is substantially less than that specified in federal regulations.



Applications

A HM Applicator consists of a cavity or oversized waveguide structure with variable attenuation capabilities. Its modular construction allows an electric field orientation that is perpendicular to the material passing through the applicator on a microwave inert belt. The result is greater absorption of power by the material. A range of loose granular to continuous sheet materials has been successfully heated or dried, and includes:

- Agricultural Grain Products
- Biodiesel Products
- Biomass
- Carpet
- Cereals
- Peanuts
- Pulses and Seeds
- Textiles



IMS

Industrial Microwave Systems

ABOUT IMS

Industrial Microwave Systems, L.L.C., (IMS) is a wholly owned subsidiary of Laitram, L.L.C., a private company based in Harahan, Louisiana with over 70 years of success in the innovation, design, and construction of food and industrial material processing equipment. IMS is also partnered with AMTek and SELO to provide additional access to its technology in both the USA and Europe.

IMS PRODUCTS

IMS offers a series of modularized laboratory scale and commercial in-line heaters and dryers, available with control systems as well as 915 or 2,450 MHz microwave generators or transmitters. These modules can be combined in specific customized configurations to match the required process specification as well as fitting the available production footprint. To maximize heating or drying efficiency, the patented single-mode High Moisture Applicator insures microwave energy field is uniformly distributed so that the target material achieves desired results.

CONTACT

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OPERATING PARAMETERS PER MODULE

Single Module Process Specification	Laboratory Scale	Commercial
Max. Throughput	132 - 396 lb./hr. (60 - 180 kg/hr.)	1,980 - 2,640 lb./hr. (900 - 1,200 kg/hr.) for a 100 kW system
Max. Moisture Removal	11 - 33 lb./hr. (5 - 15 kg/hr.)	Approx. 300 lb./hr. (144 kg/hr.) for a 100 kW system
Max. Temperature	Limited by product and belt material	Limited by product and belt material
Operating Pressure	Atmospheric at 14.7 psig (1.0 Barg)	Atmospheric at 14.7 psig (1.0 Barg)

Design Options	Laboratory Scale	Commercial
Generator Frequency	915 and 2,450 MHz	915 MHz
Applicator Material	Aluminum, Stainless steel available upon request.	Aluminum, Stainless steel available upon request.
Max. Product Height	1" (25.4mm)	2.5" (63mm)
Belt Material	Teflon coated fiberglass. Other materials available upon request.	Modular Polypropylene. Other materials available upon request.
Belt Speed	0 - 100 ft./min. (0 - 30 m/min.)	0 - 134 ft./min. (0 - 40 m/min.)
Belt Width	Variable to 4" (0.10m)	1' 8" (0.51m)
Electric Air Heater	Optional for drying application.	Optional for drying application.

Generator, Control Panel & Applicator Dimensions	Laboratory Scale	Commercial
Length	3'4" (1.03m) 1'7" (0.48m) 22'4" (6.81m)	6'0" (1.83m) 2'8" (0.81m) 25'6" (7.77m)
Width	1'9" (0.54m) 0'11" (0.27m) 2'4" (1.31m)	2'6" (0.76m) 0'9" (0.23m) 3'6" (1.07m)
Height	5'9" (0.76m) 1'7" (0.48m) 3'10" (1.21m)	9'3" (2.82m) 4'0" (1.22m) 5'0" (1.52m)

Utilities	Laboratory Scale	Commercial
Power Output	5 - 15 kW	75 - 200 kW
Electricity including Belt Drive Motor	7 - 20 kW	90 - 240 kW
Magnetron Cooling Water ⁺	3 - 5.4 GPM (11 - 20 LPM)	20 - 27 GPM (75 - 100 LPM)

Actual Process Performance and Specifications will depend on the throughput, properties, and heating range of product.

⁺ To eliminate the need for once through cooling water, IMS strongly recommends the use of a closed circuit chiller package for commercial applications.