Welcome to AntennaSelect™ Volume 16 – November 2014

Welcome to Volume 16 of our newsletter, AntennaSelect™. Each month we will be giving you an "under the radome" look at antenna and RF technology. If there are subjects you would like to see covered, please let us know what you would like to see by emailing us at: info@micronetixx.com

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300 kW microwave cell heats more than food

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In the December 2013 issue of AntennaSelect™, we described our 100 kW, 915 MHz transmitters (pictured to the left). In this issue we will take a look at one type of heating system the transmitter would be connected to. This system is used to make engineered wood products (LVL). The microwave energy is applied to the product in a specially designed and built cell.

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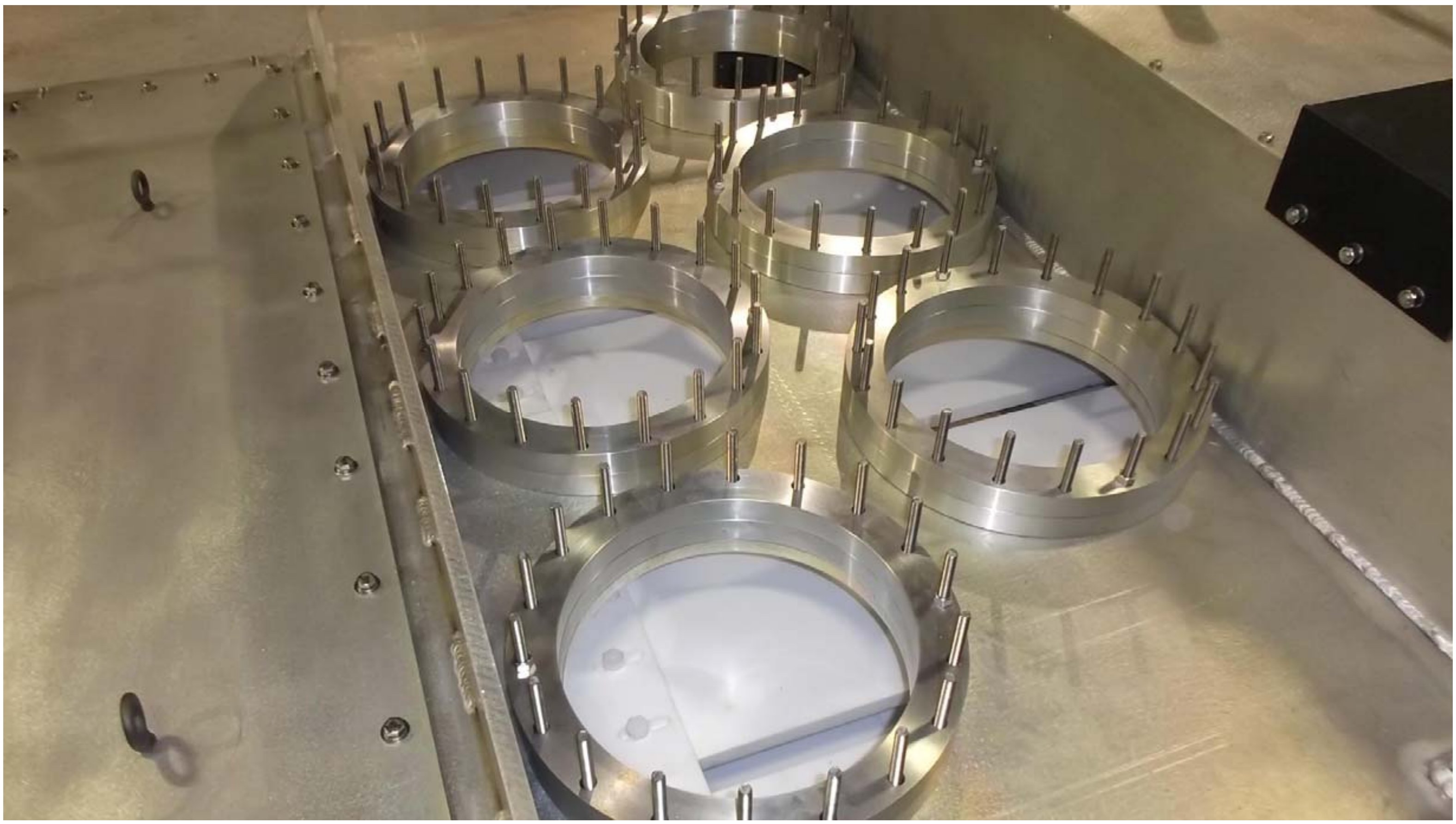
This heating cell processes engineered wood products up to 4 feet wide. This is a side view of the cell. Product is placed on a belt that goes through the cell. The cell is 10 feet long and weighs 3000 lbs.



There are a total of 12 RF inputs on the cell, 6 on the top and 6 on the bottom. They are spaced to provide optimum distribution of RF energy across the width of the cell.

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Each of the 12 inputs are equipped with forward and reverse waveguide couplers that feeds a PLC. This PLC then controls 12 waveguide tuners found in each of the inputs. This maintains the optimum RF impedance match as well as the evenness of the RF heating profile. The PLC makes changes to the couplers in real time to reflect the changes of dielectric properties of the LVL product being fed through it.

The RF directional pattern inside the cell is so accurate, that the RF induced heating across the LVL billet is held to extraordinary tolerances.

The PLC control system also controls the height of the infeed and outfeed systems of the heating cell in order to adjust for different thicknesses of LVL that the factory is manufacturing at that particular time. The PLC does this by controlling two synchronous motors that raise or lower the cell height. The motors drive four jackscrews, that raise or lower the cell height as needed. The jackscrew drives are connected together by a drive rod system, so they operate in exact tandem.

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This is the input to the cell. The teeth like structures are called image plane monopoles. They are designed to keep RF inside of the cell structure. The LVL product feeds under the array of monopoles. A similar monopole array is also located on the output to the cell.

The engineers at Micronetixx have several patents on this cell and its design. LVL processing is one of the many high power microwave technologies found under the roof at Micronetixx.

When the RF is hooked up to the cell and the product feed system is in place, the system can produce 2 million cubic meters (70,600,000 cubic feet) of product every year. Product comes out much more consistent than what prior processes offered, and also much quicker. And for you in the restaurant business, with a lower RF power level and some adjustments to the belt speed, you could be making 48 inch diameter pizzas. We are not that sure how you would serve it to your customers though. Delivery would be a whole new matter.

In future issues of AntennaSelect™ we will show you some additional innovative uses for microwave energy.

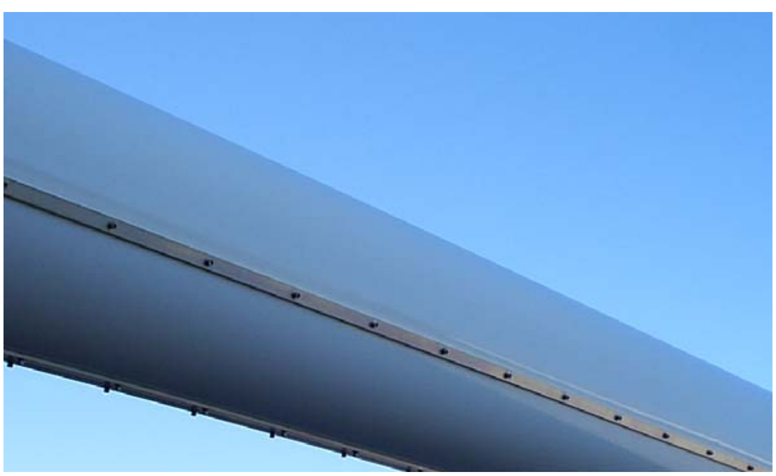
Radomes – part 3

Last month we looked at sectionalized radomes on side mounted slot antennas. These radomes wrapped around the front half or two-thirds of the antenna. The shape of the ends of the radome were formed by radome stops. Now what do we do with an Omni-directional antenna that has no radome tie down strips ? This antenna could be top or side mounted. Depending on antenna is going to be located, and its polarization, the radome would need to be between 3 and 10 inches off the pylon surface.

Top mounted channel 13 Omni-directional antenna

To support the radome system, a series of pegs are mounted on the pylon. The radome is formed around the antenna pylon. The radome is fastened to each of the pegs by a bolt.

Depending on the diameter and wind speed rating of the antenna, there are 3 or 4 columns of these pegs mounted to the pylon. This approach forms a very circular radome system with excellent rigidity.



This UHF slot antenna has a 360 degree radome system. The radome is supported in three places. The radome is attached to the ends of parasitic elements in two places and a strip in the rear of the antenna.

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This antenna is designed for a basic wind speed of 150 M.P.H. and is mounted 9700 feet above sea level. The heavy duty Polyethylene radome system is rugged and resists ice build up.

Sometimes an antenna needs to blend into the background of what it is mounted on. Custom pigmented Polyethylene is available, but getting an exact color match can be problematic. The antenna below needed to have its color matched with the side of the building it would be mounted on, due to being a historic structure. Paint does not adhere to Polyethylene, so the solution was to use a fiberglass radome and paint the radome halves with color matched paint

This is the antenna in final test. The fiberglass arced radome sections have been painted along with the aluminum surfaces of the antenna pylon. Paint applied to a properly prepared fiberglass surface has an excellent service life and can be touched up or repainted if needed. The paint is water based.

Next month we will look at some additional radome designs. Since antennas are used in a wide variety of environments, the radome system must be designed to withstand the worst conditions mother nature can throw at it. At Micronetixx we love solving complex problems. For your next antenna give us a try, you will get a great design that performs well and looks good to.

Be on the lookout for the next volume of AntennaSelect™ coming out in December

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