

## Purtech Field Service completes coating of 14FT Diameter Kiln

This kiln, the first of its kind, incorporates the latest developments in Thermal Spray Coatings and Purtech's proprietary computer controlled articulating motion equipment. This technology offers significant and exciting opportunities for the coating of large diameters (I.D. or O.D.) in the field and under shop conditions. Already the technology is being considered for large flat and contoured areas such as utility boiler tube waterwalls. Finally, in house automated technology is available to produce uniform field applied coatings.

### Benefits:

- 1 Automated coating process ensures consistent coating properties and uniformity of thickness.
- 2 Hastelloy 'C' coating exhibits excellent resistance to corrosion
- 3 Standard construction materials can be used eliminating many engineering problems including thermal expansion of the kiln shell.

### Results:

Our blasting crew arrived on site January 28, 2002, our coating team on February 4th and we demobilized on March 27, 2002. In all, we completed the job in (56) days including both onsite mobilization and demobilization. Coating inspection included (572) thickness readings that had a standard deviation of 1.818, a variance of 3.305, a mean average of 8.09mils, a median average of 8mils and a minimum value of 5mils.

For more details on this application or to discuss your project needs, please call

**1-800-452-1669**

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TWIN WIRE ARC

PLASMA

HVOF

UHV

This kiln, the first of its kind, incorporates the latest developments in Thermal Spray Coatings into Rotary Kiln design. Through a cooperative effort, significant and exciting opportunities have opened up for those industries employing rotary kiln technology in their processing.

**Background:**

In processing of animal feed, corrosive gases such as HF are released which aggressively attack carbon steel. Purtech engineers in concert with metallurgists from the Kiln supplier proposed applying a HVOF coating to the Kiln I.D. to act as a corrosion resistant barrier. During a number of meetings with the customer, it was agreed that the Kiln length should be coated provided the process of application could be automated in order to ensure consistent coating properties and thickness. A Hastelloy 'C' coating of 0.005" was chosen for further evaluation. Following material and process testing, the customer decided to coat 285FT of the kiln length.

**Laboratory Testing:**

The coating was subjected to mechanical, thermal and corrosion testing. A coated sample was mechanically deformed using a ball peen hammer, thermally cycled from 800F to ambient, and subjected to acid testing. The coating was tested for bonding, hardness and metalography.

**The LBC Articulator:**

The application requirements provided significant engineering challenges. The machine required must be portable and must move the HVOF gun heads uniformly throughout the bore. The gun head must move at a constant speed of 150-225 SFPM in order to deposit the coating with the appropriate per pass thickness. This machine is now referred to as our LBC Articulator. Although a good deal of thought was given to this project during the proposal stage, Purtech engineering moved from design to prototype and prototype to working robot in under (6) months. During this time the Kiln sections were being manufactured. At the time the Kiln sections arrived on site for erection, Purtech was preparing to coat two (2) 10'-0" long x 14'-0" diameter Kiln sections as a proof of concept.

**Process Qualification:**

As part of the proof of concept, Purtech applied the required Hastelloy coating to the Kiln sections at the Kiln manufacturers Plant. Two (2) critical issues were to be addressed:

1. Will the LBC Articulator apply a uniform coating
2. Is the (60) day time schedule realistic for coating over 12,500 SQFT

The following table gives a summary of more than 750 measurements taken after completion of the coating.

Standard Deviation	1.759
Variance	3.092
Average (Mean)	7.95
Average (Median)	7.8
Minimum Value	4
Maximum Value	14

Of the evaluated (776) data points, only (13) were below 0.005" and all were greater than 0.004". Statistically (763/776) or over 98% of the surface evaluated was greater than 0.005" thick, with the average of nearly 0.008".

Based on the above, it was agreed that the coating meets the intent for practical real world application of the Hastelloy material and greatly exceeds the uniformity to be expected by hand application. In addition, our projection that 350-450 SQFT could be coated each day was verified.

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