



The Global Leader in Thermal Technology

# Meridian™

**Built for Today. Ready for Tomorrow.**

**High Throughput,  
In-Line Phosphorus  
Diffusion**



**Back-side and  
topside coating with  
integrated dryer.**

The Meridian In-line Diffusion System combines our latest second generation phosphorus coating technology with our flagship quartz lined diffusion furnaces. The system is comprised of a direct spray phosphorus coater integrated with a conveyor belt diffusion furnace for processing silicon solar cells.

The coater now includes back-side, topside and drying capability which can translate into improved cell efficiency. The system can be configured to achieve up to 1500 wafers per hour (156 mm). The in-line process offers reduced wafer handling and greater through-put than traditional batch processing. Reduced handling translates into lower breakage rates and improved yield.

# Meridian™

## In-line Diffusion System

### Diffusion Process

BTU's in-line diffusion furnace and coater are specifically designed for phosphorus diffusion of silicon solar cells. Silicon wafers are coated with a phosphoric acid solution and diffused in a quartz-lined continuous furnace between 850 and 900C.



**BTU In-line Diffusion Systems produce uniform and repeatable results wafer to wafer, lane to lane and run to run.**

**Dopant Application Control:** Uniform, repeatable and controlled application of the dopant is required to insure consistent results. BTU's phosphorus coater utilizes 3 methods of control to adjust dopant application thickness and uniformity.

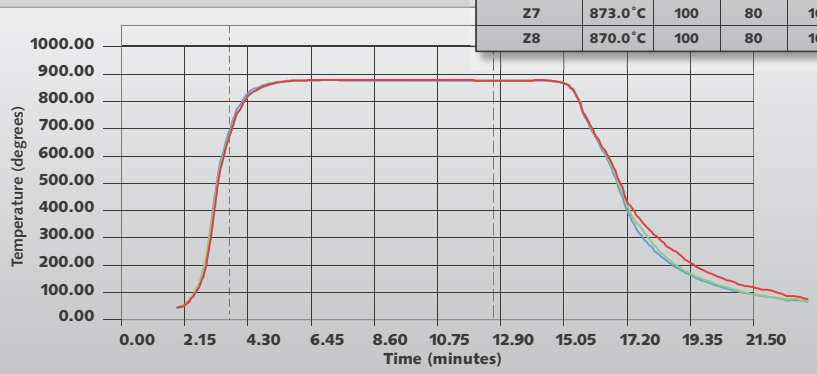
**Temperature Control:** The Meridian diffusion furnace series includes temperature trim controls to maintain and adjust for temperature gradients across the width of the belt. Temperature uniformity across the belt is within +/- 2°C. This tight temperature uniformity is required to achieve uniform sheet resistance values.

**Atmosphere Control:** Tight atmosphere control is required to create a clean continuous flow of atmosphere counter to product travel. This is accomplished by injecting fresh gas at specific inlets of the furnace and exhausting toward the entrance end. It assures a clean processing atmosphere and safe removal of process effluent from the furnace process chamber.

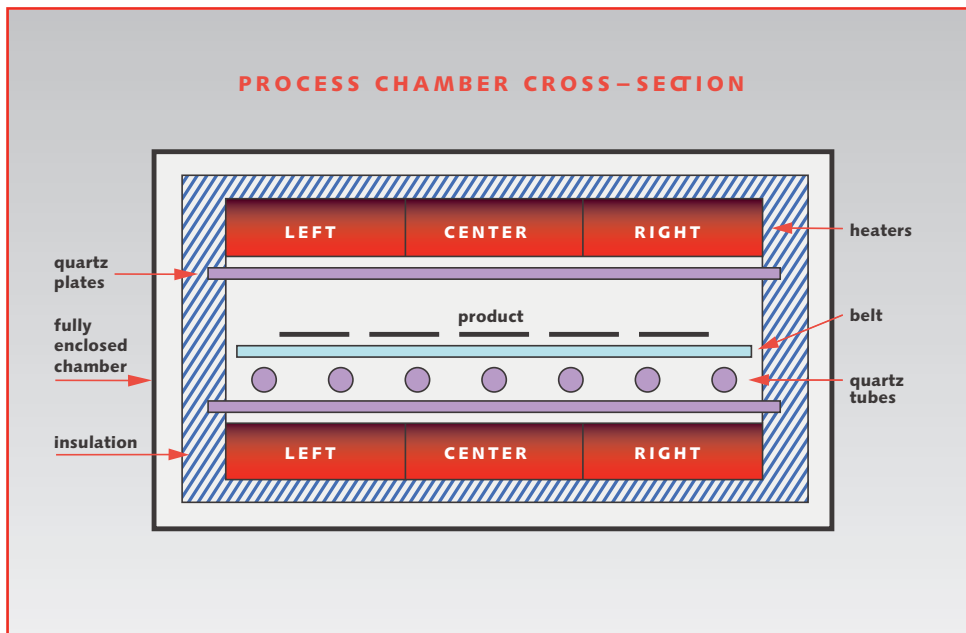
### IN-LINE DIFFUSION PROFILE

870°C Thermal Profile  
 Thermal Uniformity <math>\pm 2^\circ\text{C}</math>  
 Time at Temperature 10 minutes  
 LCR Heater Trim Control

Temperature Control Zone Name	Setpoint	% Power Trim Left	% Power Trim Center A/B	% Power Trim Right
Z1	805.0°C	100	100	100
Z2	809.0°C	100	90	100
Z3	873.0°C	100	80	100
Z4	873.0°C	100	80	100
Z5	873.0°C	100	80	100
Z6	873.0°C	100	80	100
Z7	873.0°C	100	80	100
Z8	870.0°C	100	80	100



**In-line diffusion processing requires tight temperature uniformity and atmosphere control to achieve the best results.**



**Process chamber construction features quartz lining and independent heater trim controls**

## Standard Features

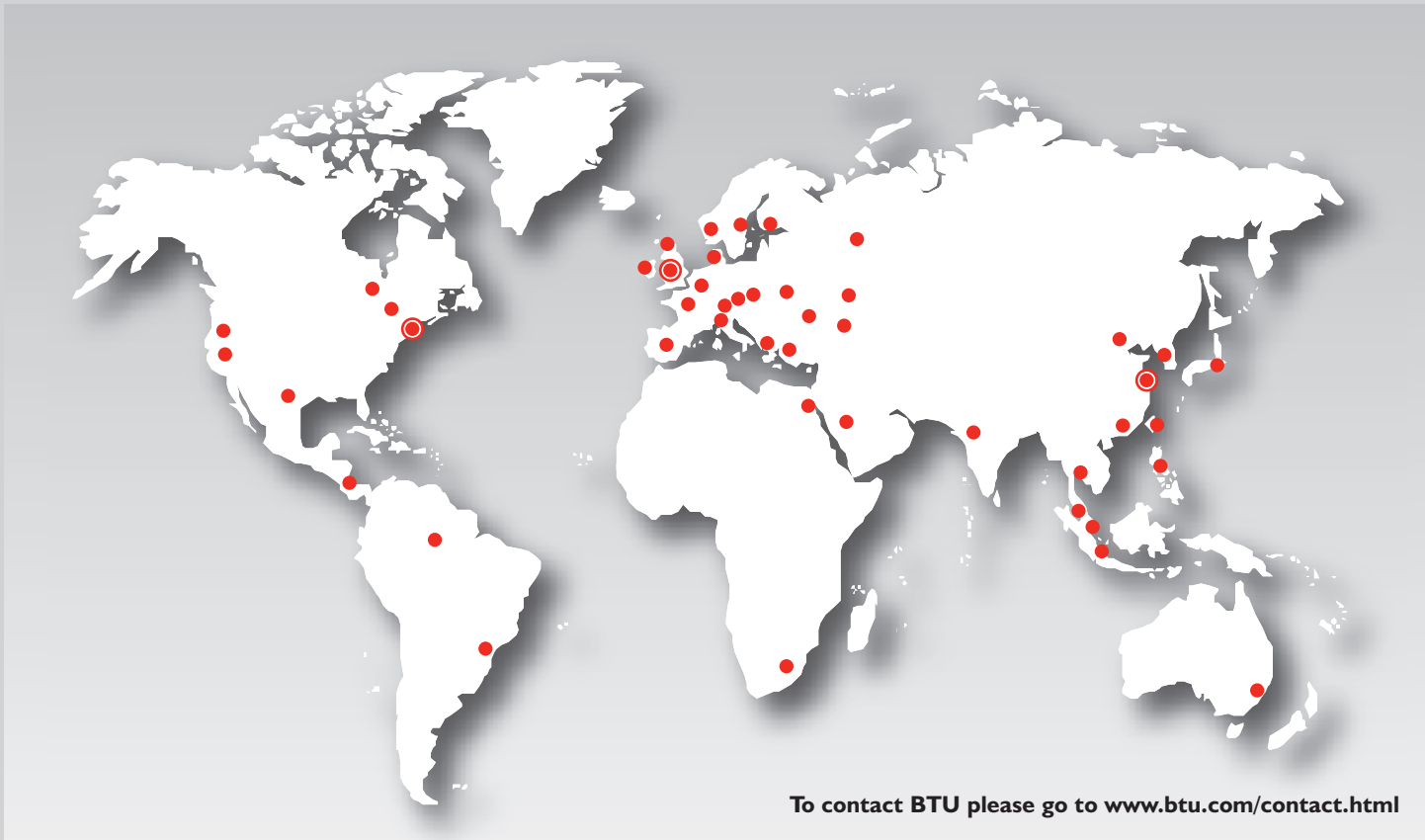
- Topside and Bottom-side Coating
- Precision Coating Control
- Nozzle-less Spray Technology
- Wafer Drying
- Heater Trim Control
- Quartz-lined Process Chamber
- Controlled Atmosphere
- Ultrasonic Belt Cleaner

## Options

- One-shift Dopant Reservoirs
- 6 Lane Operation
- Solvent Safety Package
- Mass Flow Control
- Heater Failure Monitoring
- Uninterruptible Power Supply
- Panel Interlocks
- Remote Diagnostics
- Spares Packages

Specification	Meridian 700	Meridian 900	Meridian 1200	Meridian 1500
Dopant	Phosphoric Acid Solution	Phosphoric Acid Solution	Phosphoric Acid Solution	Phosphoric Acid Solution
Through-put (156mm)	750 wafers per hour	900 wafers per hour	1200 wafers per hour	1500 wafers per hour
Processing Lanes	5	5	5	5
Wafer Size	125- 210 mm (5-8 in.)	125-210 mm (5-8 in.)	125- 210 mm (5-8 in.)	125- 210 mm (5-8 in.)
Wafer Type	Mono, Poly textured	Mono, Poly textured	Mono, Poly textured	Mono, Poly textured
Sheet Resistance	Adjustable	Adjustable	Adjustable	Adjustable
Furnace Max Temp. Rating	1050°C	1050°C	1050°C	1050°C
Furnace Chamber	Quartz Lined	Quartz Lined	Quartz Lined	Quartz Lined
Furnace Heated Zones	8	10	16	18
Furnace Cooling Zones	2	2	3	3
Furnace Cooling Length	213 cm (84 in.)	213 cm (84 in.)	274 cm (108 in.)	274 cm (108 in.)
Conveyor Coater	Roller Transport	Roller Transport	Roller Transport	Roller Transport
Conveyor Furnace	Nichrome V Belt	Nichrome V Belt	Nichrome V Belt	Nichrome V Belt
Furnace Atmosphere	N2/Air	N2/Air	N2/Air	N2/Air
OAL	13 M (42 FT)	13.5 M (44 FT)	17.8 M (58 FT)	19.0 M (62 FT)
OAW	1.4 M (64 in.)	1.4 M (64 in.)	1.4 M (64 in.)	1.4 M (64 in.)

\* All specifications are subject to change without notice



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