

Despatch

Thermal Processing Technology

TW EAE

TECHNOLOGY FOR SOLAR PRODUCTION



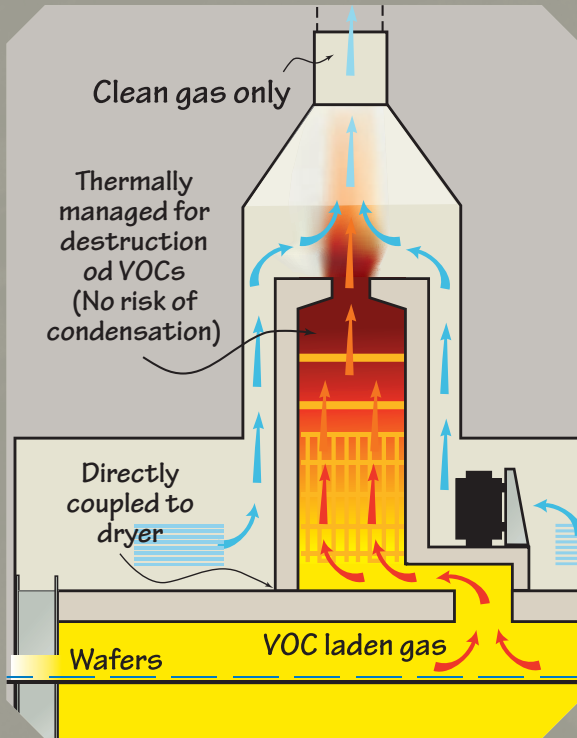
The tools you need for process perfection

Ever since the launch of the CDF, Despatch has offer the world's best-selling metallization firing and drying furnaces for advanced photovoltaic production. Combining Despatch knowledge and experience with that of solar manufacturers inspires flexible, next-generation technology solutions that integrate seamlessly into production lines. Industry leaders rely on Despatch equipment for maximum cell efficiency, industry-best uptime and lowest cost of ownership.

DriTech has revolutionized the art of drying

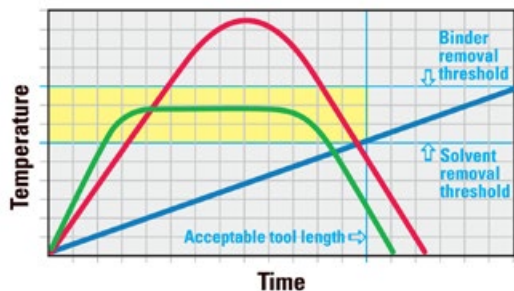
The patented DriTech™ Dryer is designed to decouple the VOC removal and binder burn-off for more efficient drying. Introducing five times the dilution air as conventional furnaces and internal insulation surface temperatures reduces tool contamination. While precise airflow management and a centrally located point-of-generation thermal oxidizer eliminates hazardous waste and facility contamination.

Unlike solely convective or IR drying, which rely strictly on a belt speed and temperature relationship, DriTech's unique hybrid heating with Smart Tube™ technology provides a number of heat delivery mediums to efficiently and effectively remove solvent (VOC) from the paste while safely retaining the binder. The low temperature drying capability will ensure that each step in the drying process is separated with no compensation required downstream. Cell performance and efficiency is improved for current and next generation cell architectures and materials.



EFFECTIVE DRYING

95% Solvent Removal



Safire Firing Furnace with DriTech Dryer

The Safire™ Firing Furnace with DriTech™ Dryer is designed with advanced features and technologies that ensure superior stability, repeatability and cell efficiency in a high capacity platform.

The Safire's twin chamber design features two independently controlled chambers which eliminates the lane-to-lane influence found in traditional dual-lane furnaces. Microzone™ Technology provides the ability to precisely tailor thermal profiles around advanced materials and architectures. Solect-Fire™ enables independent top/bottom temperature control which enables optimized frontside and backside firing. The patented DriTech™ Dryer is designed for a fast peak thermal profile that delivers maximum VOC release at an early stage resulting in maximum paste drying efficiency.

The Safire is available with PowerLock™ technology which suppresses LID on PERC cells from 3-6% down to ~1%. The system is integrated into the Safire resulting in a small footprint and no material handling. PowerLock uses LED light that provides twice the lumens per watt and ten times longer life compared to the arc lamps used in other systems on the market.

SAFIRE FEATURES

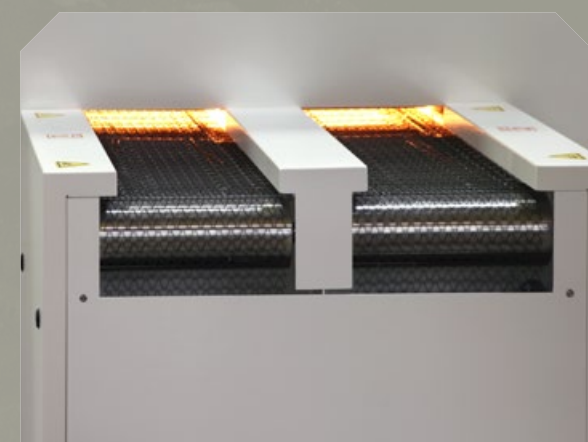
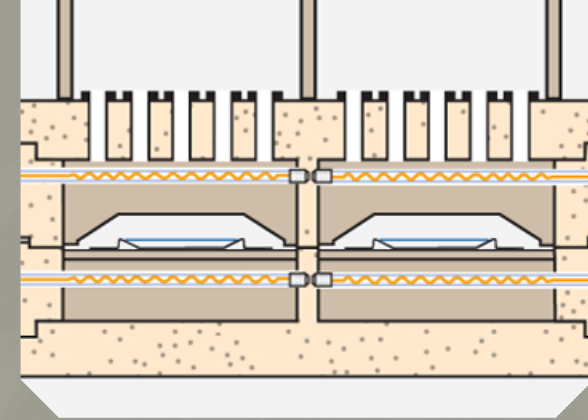
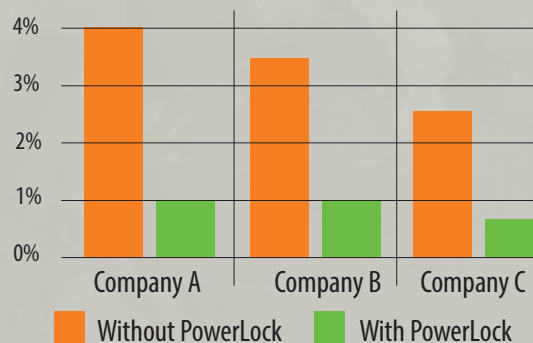
- ◆ Uniform, stable and repeatable cavity temperature (+/- 2°C)
- ◆ Dual independent chambers with no lane to lane influences
- ◆ Rapid thermal ramping (up to 250°C/sec)
- ◆ Enhanced thermal cooling (up to 140°C/sec)
- ◆ Up to 900 cm/min belt speed
- ◆ Enhanced Microzone™ Technology for precise thermal profile control
- ◆ Enhanced SolectFire™ Technology for top/bottom temperature control
- ◆ DriTech™ Dryer with integrated VOC Thermal Oxidizer
- ◆ Hot swappable lamps on furnace
- ◆ 99% uptime (highest in the industry)

OPTIONS

- ◆ Profiling systems
- ◆ CE compliance
- ◆ PowerLock LID prevention



PowerLock™ LID Prevention minimizes the effect of light induced degradation.



| | SAFIRE FIRING | DRITECH DRYER |
|--------------------------------------|------------------------------|------------------------------------|
| PRODUCT CONFIGURATION | | |
| Overall length | 658 cm (259 in) | 295 cm (116 in) |
| Overall width | 175.2 cm (69 in) | 167 cm (65.8 in) |
| Overall height (without oxidizer) | 247 cm (97.2 in) | 193 cm (76 in) |
| Net weight | 3,000 Kg (6,613 lbs) | 1,600 kg (3,460 lbs) |
| ELECTRICAL REQUIREMENTS | | |
| Voltage | 380-480 V/3 Phase/ 50-60 Hz | 400 V -10%, +15% /3-Phase/50-60 Hz |
| Connected load | 122 amps (85 kVA) | 100 amps (69 kVA) |
| Typical operating load | 85 amps (59 kVA) | 65 amps (45 kVA) |
| WATER REQUIREMENTS | | |
| Typical flow | 28 lpm | NA |
| Pressure (maximum) | 4 Bar (60 psi) | NA |
| pH level | 7.2-7.6 | NA |
| Recommended inlet temperature | 10-20°C (50-68°F) | NA |
| EXHAUST | | |
| Process exhaust | 1 connection | 1 connection |
| VOC Oxidizer exhaust | NA | 34 m3/m (1200 scfm) |
| Cabinet exhaust | 8.5 m3/min (300 scfm) | NA |
| PROCESS ATMOSPHERE | | |
| Clean dry air (CDA) (Typical) | 740 lpm | NA |
| PROCESS CAPABILITIES | | |
| Maximum temperature | 1100°C | 400°C |
| Conveyor speed range | 80-900 cm/min (31 - 350 ipm) | |
| Conveyor speed accuracy | ± 0.5% | ± 0.5% |
| Throughput (6x6in/156x156mm wafers * | up to 6,500 wafers/hour | up to 6,500 wafers/hour |

| | SAFIRE WITH DRITECH |
|-----------------------------------|---|
| PRODUCT CONFIGURATION | |
| Overall length | 968 cm (381 in) |
| Width at widest point | 175.2 cm (69 in) |
| Height to top of thermal oxidizer | 284 cm (111.8 in) |
| Standard entrance/exit table | 60.3 cm (23.7 in)/ 99.5 cm ((39.2 in) |
| Open inspection area | 46 cm (18 in) |
| Conveyor type | Lightweight balance spiral weave, friction drive with titanium stand-offs |
| Conveyor height above floor | 93 cm (36.6 in)-100 cm (39.4 in) |
| Conveyor width (x2) | 25.4 cm (10 in) |
| Net weight | 4,600 kg (10,141 lbs) |
| Lane-to-lane pitch | 35 cm (13.8 in) |

SPEC CHANGES WITH POWERLOCK

| | SAFIRE WITH DRITECH |
|--|-----------------------------|
| PRODUCT CONFIGURATION | |
| Overall length (Safire) | 995 cm (392in) |
| Net weight (Safire) | 5,375 Kg (11,850 lbs) |
| Overall length with DriTech | 1311 cm (516 in) |
| Net weight with DriTech | 6,000 Kg (13,228 lbs) |
| ELECTRICAL REQUIREMENTS (ADDITIONAL DROP) | |
| Voltage | 380-480 V/3 Phase/ 50-60 Hz |
| Connected load | 184 amps |
| WATER REQUIREMENTS (ADDITIONAL DROP) | |
| Typical flow | 28 lpm |
| Pressure (maximum) | 4 Bar (60 psi) |
| pH level | 7.2-7.6 |
| Recommended inlet temperature | 10-20°C (50-68°F) |

Notes: Specifications are subject to change without notice. Contact Despatch Industries for the most updated specification. * Front-side printed last. Throughput dependent on belt speed, paste type, solvent load etc.

SERVICE AND TECHNICAL SUPPORT

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