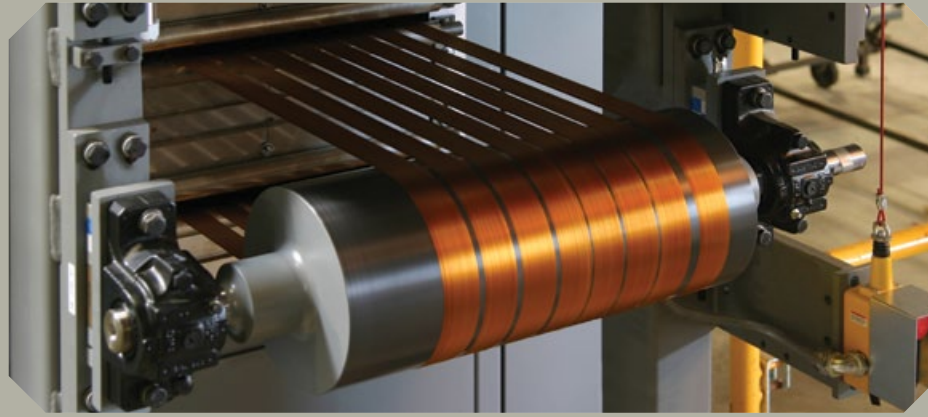


INSPIRED INNOVATION

Despatch
INDUSTRIES

**PROCESS AND TECHNOLOGY SOLUTIONS
FOR CARBON FIBER PRODUCTION**



INSPIRED INNOVATION

Despatch Industries has specialized in thermal processing for over 100 years and is actively using this technical expertise to provide innovative solutions to critical applications in a broad range of markets and cutting edge technology worldwide.

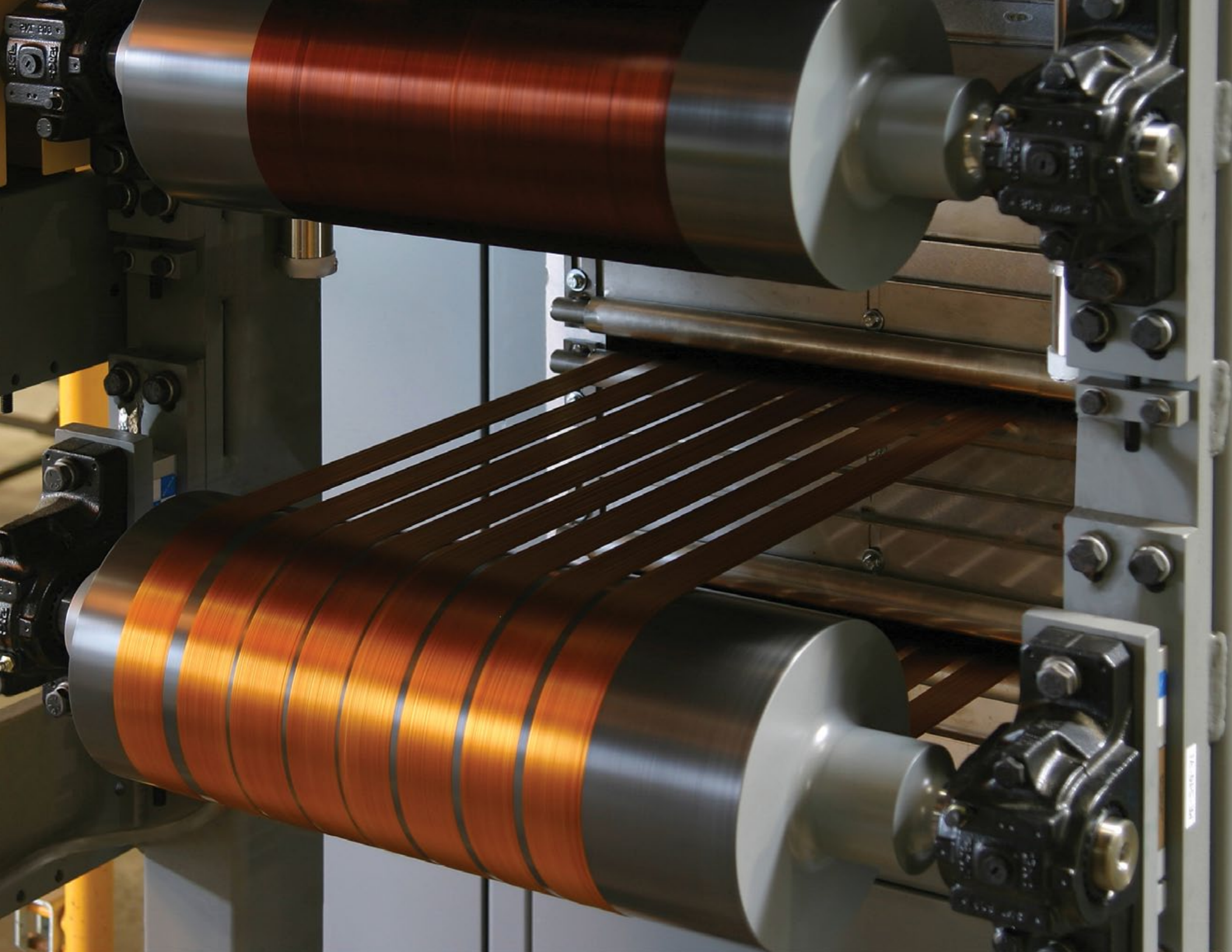
Our innovations are inspired by our customers. Through collaboration in design and engineering, we observe how our technology can best be applied to your needs, giving you a unique competitive advantage.

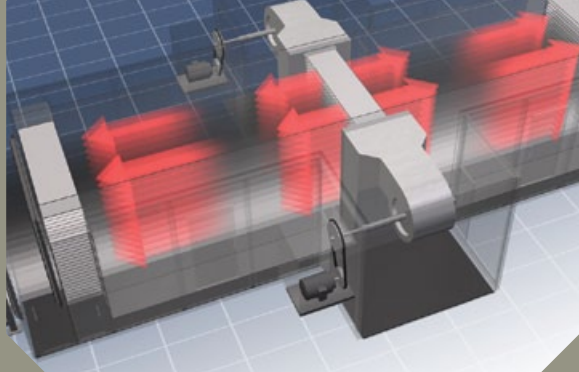
Despatch has three dedicated business groups to meet the demands of the rapidly expanding thermal, solar and carbon fiber markets. This focused commitment has allowed us to become experts in these industries.

Process and technology solutions for carbon fiber production

For more than 40 years, carbon fiber manufacturers have utilized our world-leading oxidation technology to produce the highest quality and most uniform fiber. We offer the experience and knowledge to provide fully integrated lines for small and large tow. Recent Despatch advancements enable our global customers to achieve the lowest cost per kilogram of fiber produced.

An expansive global support network allows Despatch to provide service and technical expertise to customers on a local level.





THE WORLD'S LEADING OXIDATION TECHNOLOGY

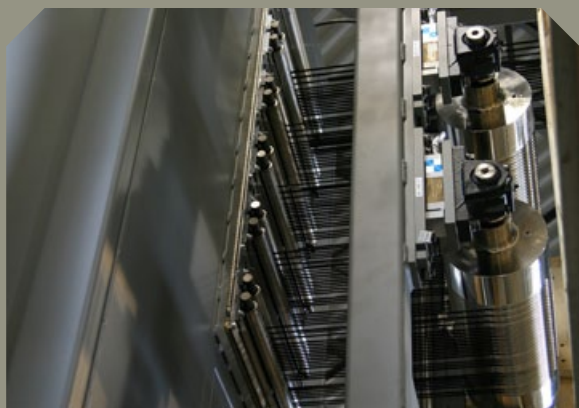
Oxidation is considered to be one of the most important process steps, yet is also considered the process step that still has the greatest improvement potential.

As oxidation is primarily an exothermic reaction, consistent and uniform air flow is essential to successfully remove energy from each filament across the web. The Despatch oxidation oven with center-to-ends air flow delivers uniform densification across the entire tow band that exceeds most carbon fiber manufacturer's expectations. Airflow turbulence is minimized to prevent cosmetic damage to fiber tows. Consistency of process results in no skinning (uncured core) and more uniform densification across the entire tow band. Center-to-ends airflow provides up to 30% faster rates of oxidation than conventional cross flow or vertical down flow oven designs.



FEATURES AT A GLANCE

- ◆ Center-to-ends airflow
- ◆ Industry's finest airflow and temperature uniformity resulting in uniform oxidized density across the entire tow-band.
- ◆ Maximized heated zone size provides for increased fiber production.
- ◆ Air velocities up to 4 meters per second
- ◆ Insulated vestibules for capture of process and potential fugitive emissions.
- ◆ Fire mitigation systems
- ◆ Scalable designs
- ◆ Vertical stacking (up to 3 high)
- ◆ Easy access for periodic cleaning.
- ◆ Filter removal while in operation
- ◆ End louvers to reduce the inward migration of cold air and egress of the heated process chamber.
- ◆ Optional automated end louvers
- ◆ Energy efficient design
- ◆ Latest PLC and DCS control platforms



Energy efficiency

Energy efficiency is improved by preheating fresh air and recapturing heat exchange through abatement. Patented, automated adjustable end louvers close to significantly reduce heat loss and open for fast and easy threading. The Despatch design eliminates direct process chamber exhaust which significantly improves energy efficiency. With these designs, our customers achieve significant cost savings per kilogram of material output.

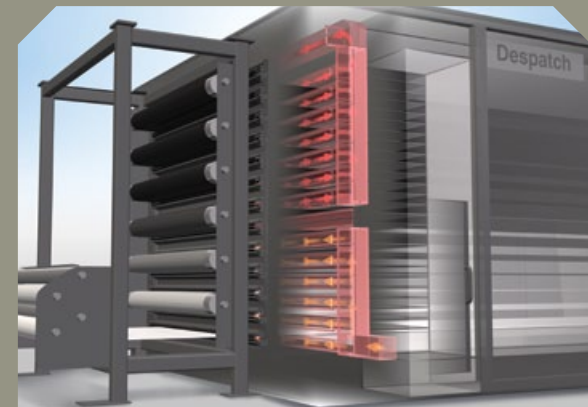
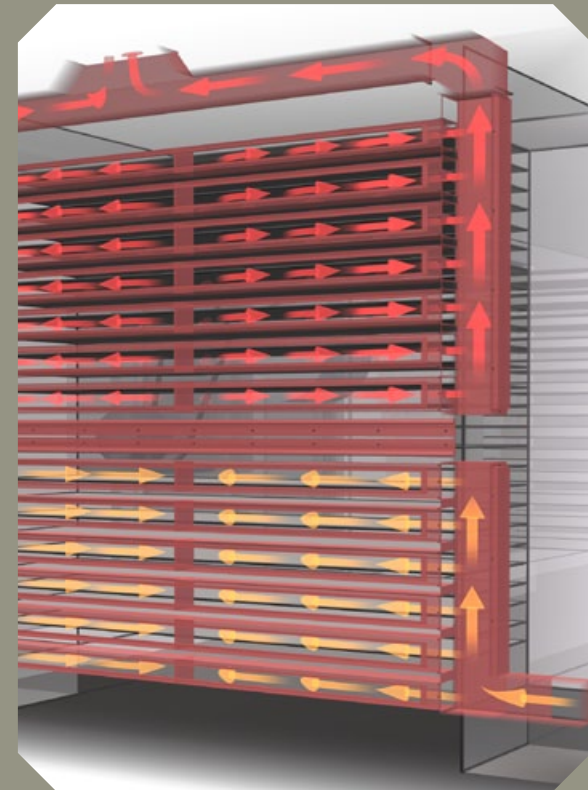
Atmosphere Control, Energy Reduction Technology

Despatch has introduced a new option for its oxidation ovens, patent-pending Atmosphere Control, Energy Reduction Technology. ACER Technology™ features two separate airflow systems that function simultaneously. The first system captures emissions at the point of natural egress from the process chamber, and transports them to abatement through an installed duct and exhaust system. At the same time, the second system introduces pre-heated fresh air into the chamber, through an in-feed system, at the point where the oven naturally draws air from outside the process chamber.

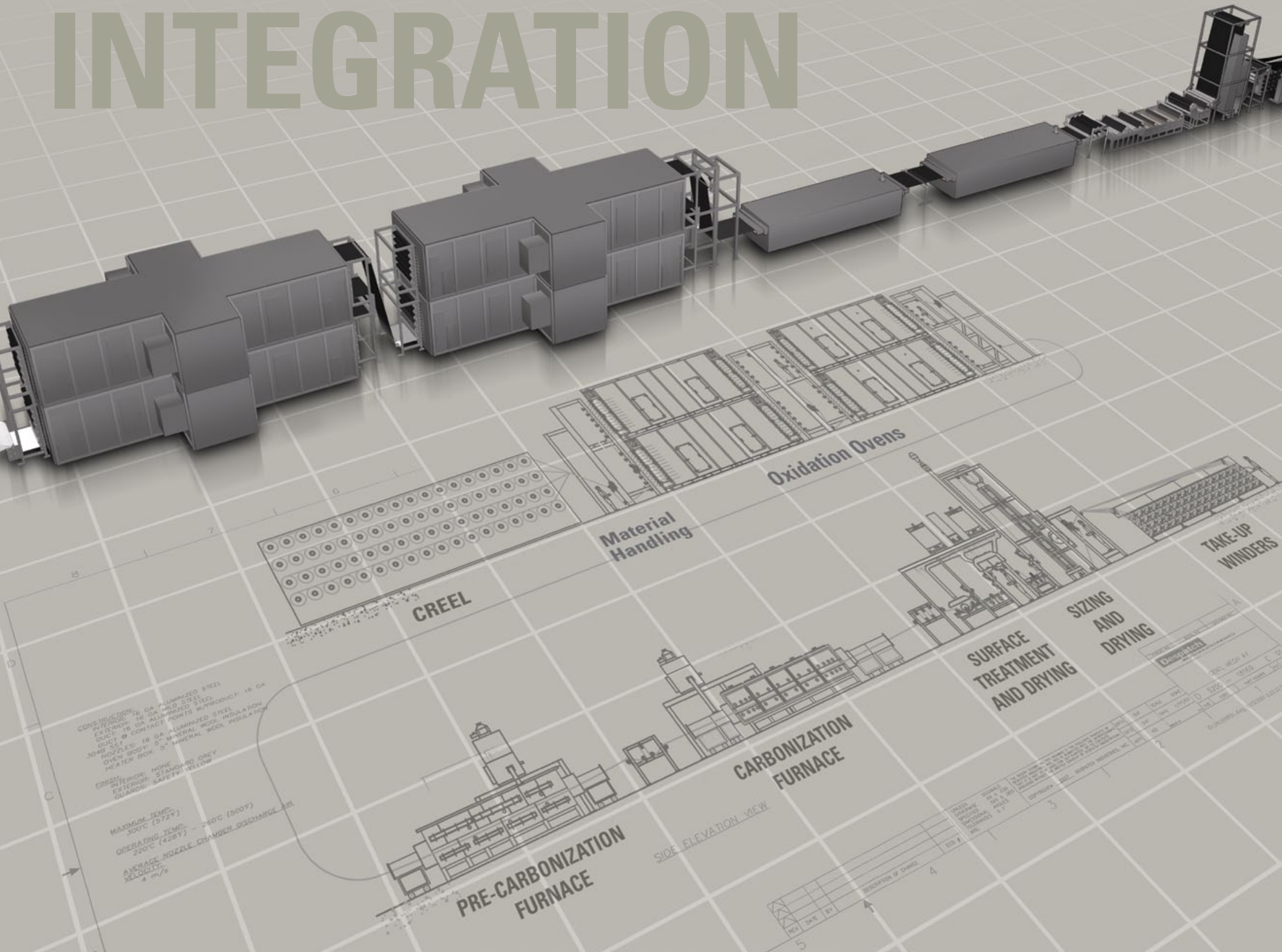


FEATURES AT A GLANCE

- ◆ Controlled, balanced air in the process chamber
- ◆ Improved operator safety through elimination of fugitive emissions – no external hoods required
- ◆ Dramatically reduced tar contamination
- ◆ Direct process chamber exhaust eliminated
- ◆ Increased effective heated length in process chamber
- ◆ Improved fiber quality
- ◆ Size of abatement system can be greatly reduced



INTEGRATION



CONSTRUCTION: 18 GA ALUMINIZED STEEL
 INTERIOR: 18 GA ALUMINIZED STEEL
 EXTERIOR: 18 GA ALUMINIZED STEEL
 DUCT: 18 GA ALUMINIZED STEEL
 JOISTS: 18 GA ALUMINIZED STEEL
 NOZZLES: 18 GA ALUMINIZED STEEL
 OVEN BODY: 8" MINERAL WOOL INSULATION
 HEATER BOX: 5" MINERAL WOOL INSULATION

FINISH:
 INTERIOR: NONE
 EXTERIOR: STANDARD GREY
 GUARDS: SAFETY YELLOW

MAXIMUM TEMP: 300°C (572°F)
 OPERATING TEMP: 260°C (500°F)
 OPERATING TEMP: 220°C (428°F)
 AVERAGE NOZZLE CHAMBER DISCHARGE: 4 FT/S

SIDE ELEVATION VIEW

NO.	DATE	BY	DESCRIPTION OF CHANGE
1			
2			
3			
4			
5			

PROJECT NO.	1001-1000-11
CLIENT	Desmetrol
DATE	10/15/00
SCALE	1" = 10'-0"
DRAWN BY	J. J. [unreadable]
CHECKED BY	[unreadable]
APPROVED BY	[unreadable]
DATE	10/15/00

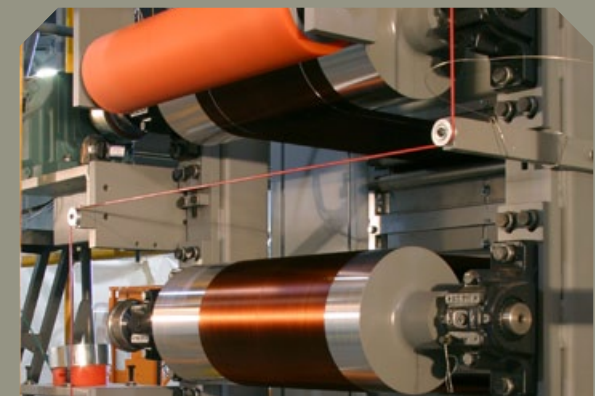
Integration and optimization of the small and large tow production lines

Through our experience and expertise in the carbon fiber industry, we have built connections and relationships that offer us the ability to facilitate the installation, set-up and optimization of a complete manufacturing line through one point of contact. Our team of experts from around the world has over 40 years of carbon fiber processing experience.

Despatch provides integrated solutions for 1k to 320k tow manufacturing lines. We provide the equipment and optimize your processes for the highest quality fiber and lowest cost per kilogram of fiber produced.

EQUIPMENT

- ◆ Center-to-ends oxidations ovens
- ◆ Abatement systems
- ◆ Input creel
- ◆ Rolls, stands and drives
- ◆ Pre-carbonization furnace
- ◆ Carbonization furnace
- ◆ Surface treatment equipment
- ◆ Contact drying system
- ◆ Sizing equipment
- ◆ Non-contact drying system
- ◆ Take-up winders
- ◆ 20 to 2700 metric tonne capacity
- ◆ 1K to 320K tow
- ◆ Integrated control system with SCADA interface
- ◆ Installation, commissioning and optimization of the entire line





A complete carbon fiber production line in a micro-scale package



EQUIPMENT PACKAGE

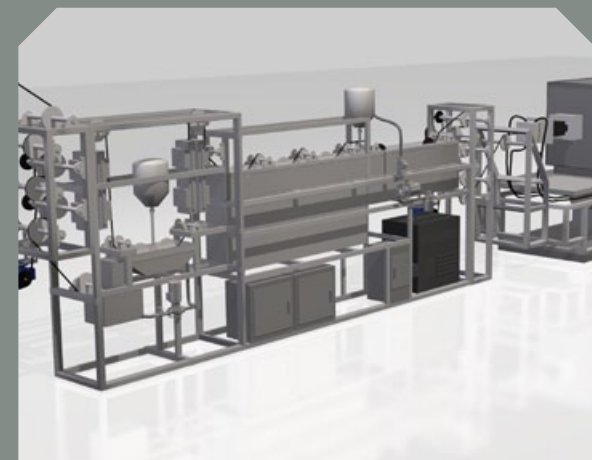
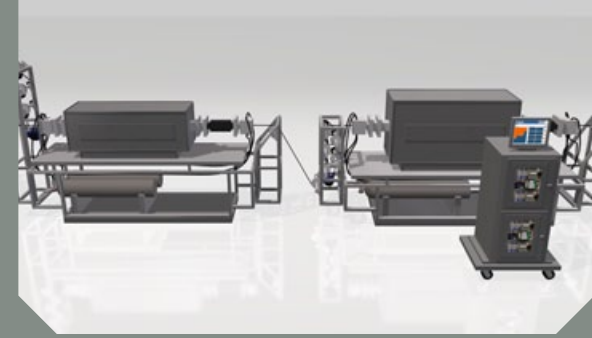
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- ◆ Integrated control system with
- ◆ SCADA interface

Carbon Fiber Research

The Despatch CFR Series is a complete carbon fiber production line in a micro-scale package. Designed for universities and laboratories the CFR Series allows you to study and test fibers and processes with the same quality of a full production line at a fraction of the cost.

The CFR is available as a complete line or as independent pieces. The line includes the same quality equipment offered in our production scale lines at a smaller scale. Despatch offers world leading center-to-ends oxidation ovens, energy efficient LT and HT furnaces designed for ease of operation with quick access to the muffle interior for easy cleaning.

The Despatch surface treatment process provides uniform electro-chemical etching across the fiber web. A minimum amount of fresh water and base electrolyte is used due to effective recirculation systems. A sizing system provides uniform and constant distribution of size on the fiber. Fluid concentration and levels are PLC controlled and size fluid is continually circulated and filtered while in use. After sizing, a non-contact dryer delivers uniform low velocity airflow with a filtration system to capture fibrous debris.



Integrated Carbon Fiber Line Control System

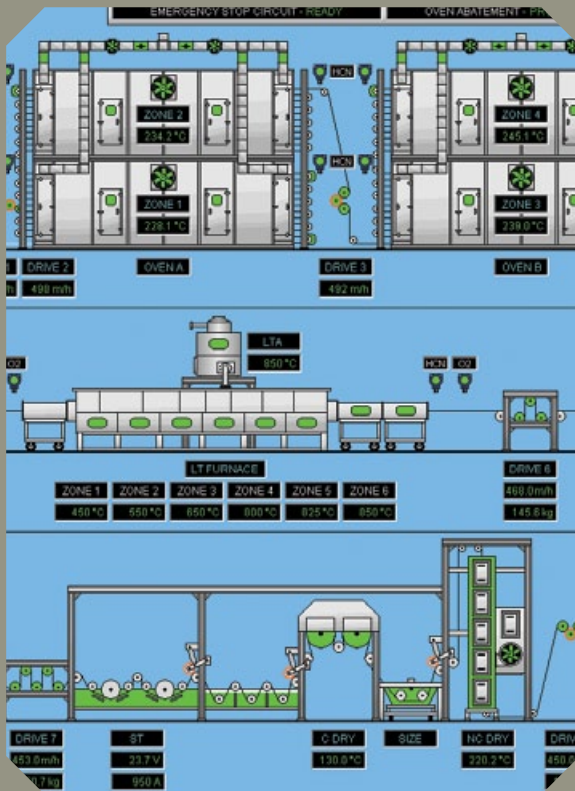
Centralized Control of the Entire Production Line

Through our experience and expertise in carbon fiber Dispatch offers an integrated control system for full production lines. This control system allows for accurate, centralized control of temperature and transport drive speeds, higher levels of automation, and increased flexibility. The integrated control system also includes full data-logging and trending and enables the line to run at peak performance with maximum production output.

Fire Mitigation System

A new Fire Mitigation System is now available. The control system reduces the likelihood of fire occurring in the process chamber. This optional package consists of a series of sensors and monitors that are connected to a dedicated PLC and software system.

If deviations from the programmed process parameters occur in the process chamber, the FMS engages an automatic shut off of all non-essential systems and, if necessary, turns on a controlled atomized water suppression system.



SERVICE

Service and support: global presence, with local expertise

As an integrated solution provider Despatch is able to install, set up and optimize your complete carbon fiber line for peak performance. We provide expert technical service and an extensive parts inventory to all of our customers worldwide. Despatch is backed by over 100 years of experience in thermal process application along with a team of carbon fiber experts from around the world. At Despatch, we believe in exceeding customer expectations and going above and beyond what other equipment manufacturers provide. Worldwide service, installation, parts and advice – we have you covered!

WE'RE HERE FOR YOU

Rest assured that when you call our Service Help line, you will be speaking with experienced, knowledgeable personnel, fully capable of assisting you with any equipment questions you may have.

Our network of Certified Service Representatives is spread out across the globe to provide technical support and service to Despatch customers worldwide.

Contact the Service Department : USA 1-800-473-7373
Internationally 1-952-469-8230

Contact us via email: service@despatch.com

VALUE-ADDED OPTIONS:

On-Site and Factory Training.

Process Optimization. As new equipment or process steps are added we can optimize your tools to achieve maximum efficiency.

Equipment modifications.

We provide modifications and upgrades to bring your equipment up-to-date with current technology and operating at peak efficiency.



INNOVATION

A unique competitive advantage: Despatch Innovation Resources

Despatch provides a unique opportunity for process and product development and evaluation with a simple, singular focus: To provide customers with cost-effective solutions up front—before equipment design begins or purchase commitments are made.

Our clients enjoy direct access to highly skilled Despatch scientists and engineers who are experts at process optimization and helping customers solve complex problems. The Despatch Innovation Center is equipped with process tools needed for analysis and validation of equipment.

This proven approach significantly reduces purchase risk, speeds production, ensures process integrity and saves customers time and money.

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