



## From Spark to Finish.

Ideas don't just jump from the lab to the global marketplace. Let Harper help you get to market faster and more efficiently with our Ignite™ process.

### Altogether brilliant.

We're inspired by our customers' bright ideas, and know that together, we can make them brilliant. The relationships that we form, based on confidence, collaboration, and mutual success, are what have made us one of the world's foremost providers of thermal processing solutions for advanced materials.

But don't just take our word for it – read what real customers have to say about Harper...

*"Harper is very innovative. They have provided excellent, intuitive service, looking ahead into the future as to what we might need."*

**Timothy A. Dye**  
Engineering Manager  
Toho Tenax America

*"Precise temperature controls, precise atmosphere controls and precise dwell times were mission critical. We knew there was only one company that we wanted to deal with, and that was Harper."*

**David Kautz**  
CEO  
US Demil

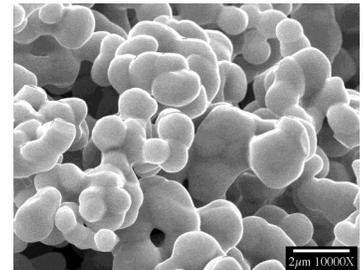


Harper enables companies in the development of advanced materials, from the lab to full commercialization, helping make their innovations a reality. Utilizing our depth and breadth of experience in thermal processing, we partner with our customer to ensure success as they scale up their process operations.

Harper's support to emerging industries begins in early stages of research and development, whether at corporate R&D centers, universities, government institutions, or start-ups. Our mission is to assist these customers in turning the next generation of material innovations into profitable new markets. Just like our experience in the Carbon Fiber market, we help customers develop unique thermal processes and efficiently and effectively progress them into complete production lines. Learn more about our thoughtful process that helps ensure the customer's idea gets out of the lab and into the world.

### Feasibility and Testing

Optimization of process parameters is critical prior to investment in thermal processing equipment to ensure capacity and quality requirements are achieved. At our Technology Research Center, customers utilize Harper's systems and expertise in their process development and process optimization for use in commercial scale-up and for those systems with unique specifications. Harper also provides a variety of additional analytical services such as gas analysis (critical to ensuring compliance with environmental regulations) electron microscopy, XRD, BET, and other thermal and elemental analysis.



### Engineering Studies

Count on our extraordinarily experienced engineering staff to conduct in-depth studies to determine equipment requirements and help define process parameters for optimal plant design to assist with technical and business strategy and financial planning. Our vast capabilities in thermal processing engineering studies include, but are not limited to:

- process cost models
- economics of increased production capacity with current and future state technologies
- analysis of best-suited thermal process technology for new material innovation
- identification of opportunities for improved product quality and cost reduction
- investigation of solutions for transition from batch to continuous processing
- engineering of material handling solutions for unique processing systems



## Pilot Scale Systems

As customers ramp up their operations, Harper offers a range of solutions in thermal regimes beyond what others can, including furnace technologies and oxidation ovens in lab scale and pilot scale sizes. We have the building blocks to design even for the most challenging thermal process, using our years of practice to devise a first-of-a-kind, custom system every time. Harper works to devise a complete thermal solution with our range of offerings, including gas treatment and handling and fully integrated control systems.



## Complete Production Lines

A complete solution for your advanced material process plant. From material handling and pre-treatment to final product collection and everything in between, Harper is focused on helping customers link the process steps to achieve greater efficiencies in reduced operating costs, increased quality and productivity, and strategic risk mitigation. From first point of engagement, Harper rigorously designs thoughtful operations sequences that ensures a comprehensive perspective is maintained.



Harper approaches gas treatment and handling with several objectives. Not only do our designs focus on managing emissions and treatment of off-gas in an environmentally conscience manner, but we also carefully consider opportunities for energy recovery for use within the process. Additionally, our controls group develops sequence of operations (SOPs) that drive simultaneously toward efficiency and enhanced product quality. Our fully integrated systems connect all process equipment to one centralized control system, ensuring operation is that of a cooperative plant all functioning on the same control platform rather than individual and isolated control platforms.

## Customer Support

Harper's dedication to our customers doesn't end at the shipment of a system. Besides an experienced, technical and professional staff capable of providing parts, support and service worldwide, we offer a number of programs and services which can be tailored to your specific needs throughout the entire lifecycle of the system.

- Installation & Installation Management
- Start-Ups
- Replacement Parts
- Rebuilds
- Retrofits
- Repairs & Troubleshooting
- Control, Atmosphere and Material Handling System Upgrades
- Maintenance Management Programs
- Equipment & System Decommissioning
- Equipment & System Relocation Management

Additionally, Harper's team is here to help develop and implement a Maintenance Management Program (MMP) for your thermal processing system that supports your core business plans and strategies. Our programs are developed to proactively monitor, assess, predict and understand equipment performance and impending problems before a failure occurs and achieve a higher level of planned and predicative maintenance activities that ensures a more efficient use of resources.

To start sparking your future today, contact Harper at 716.684.7400 or email us at [info@harperintl.com](mailto:info@harperintl.com).