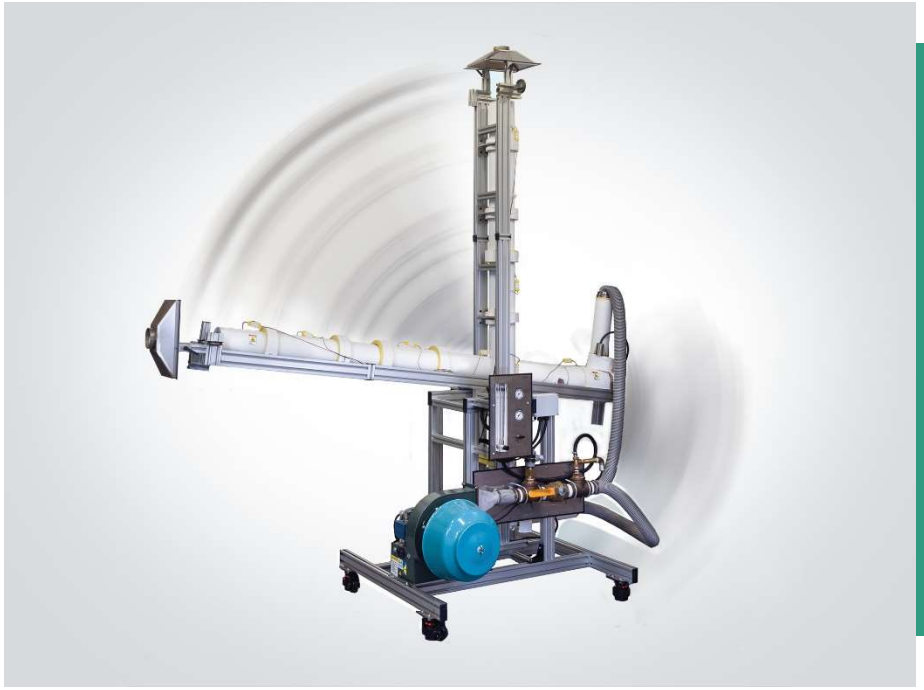
4XMANUFACTURING

CUSTOM LAB EQUIPMENT

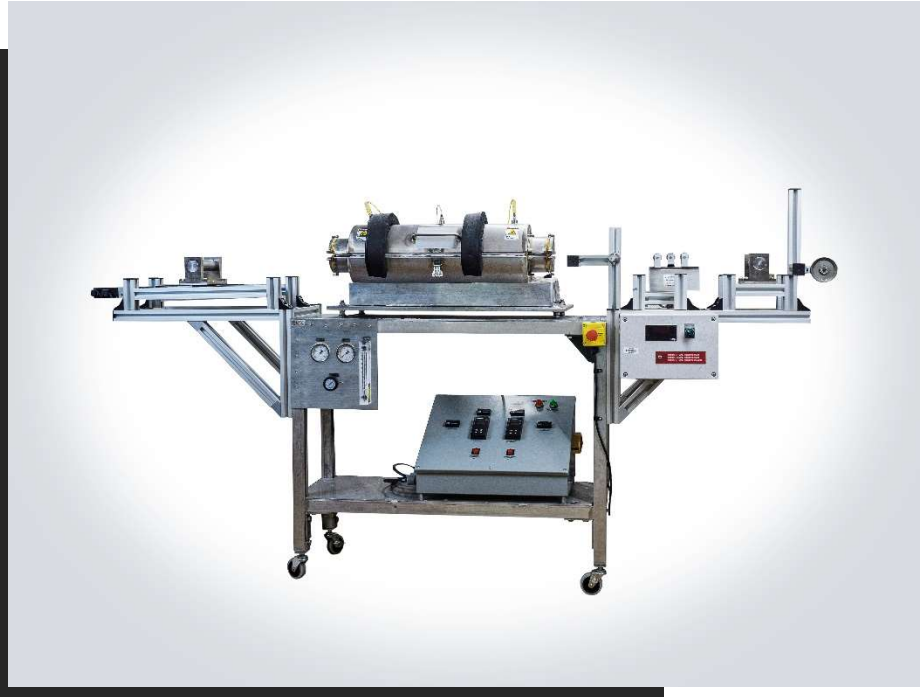


ROTATING FIBER DRYER

Built with flexibility in mind to accommodate both limited space in the process line and variations in the end product, the Rotating Fiber Dryer can be easily adjusted operate horizontally, vertically, or any angle in between. Even the overall drying length can be customized per process with a removable heating section. The dryer can be fed by the included blower system or the integrated compressed gas feed system for injecting nitrogen or other inert drying gases. The blower flow rate and dryer temperature can be adjusted. Overall process length is adjustable and features a removable heating section.

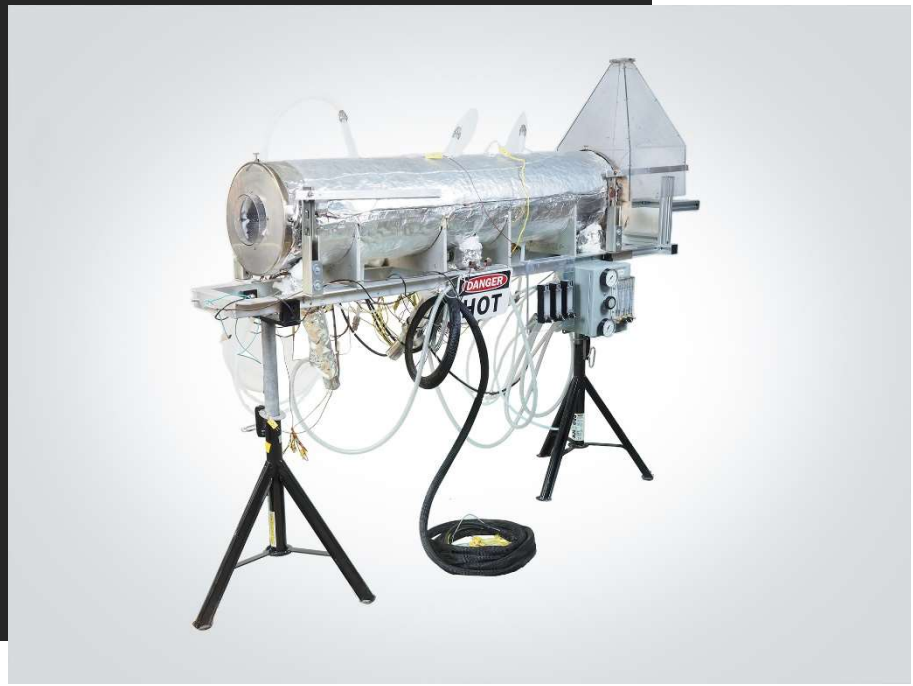
SMALL BATCH OXIDATION OVEN

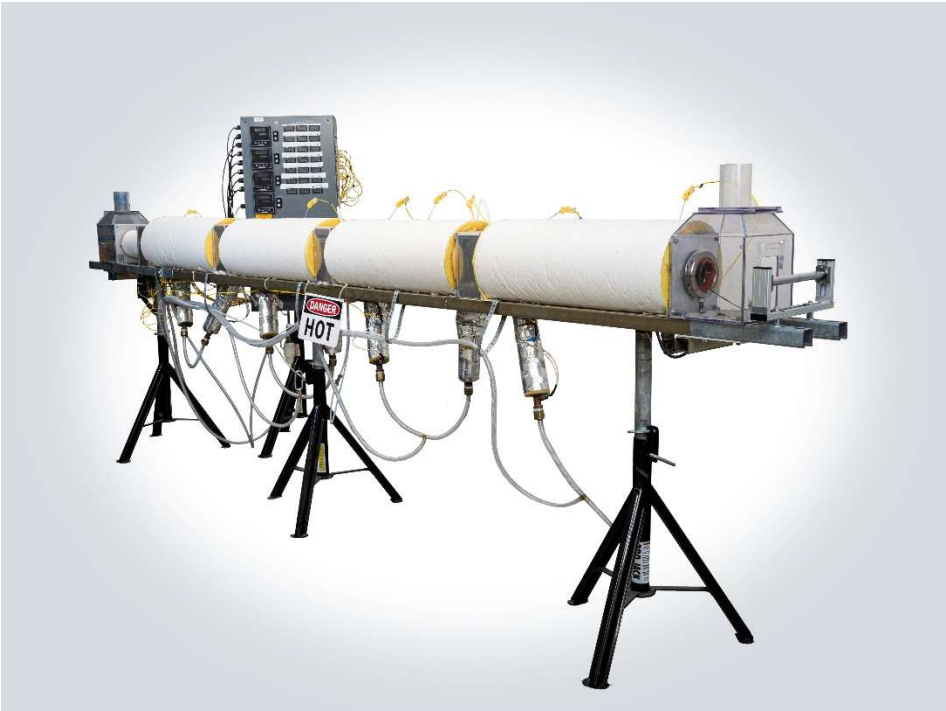
A two-zone batch oxidation oven designed for low filament-count fiber tows. A linear stretcher system provided by Izumi International is integrated for inline tension control. The system can be programmed to automatically increase temperature for a set amount of time and then hold the max temperature as needed. Typical oxidation temperature ranges are achievable. Compressed air is utilized as the air source.



MULTI-PROCESS FIBER REACTOR

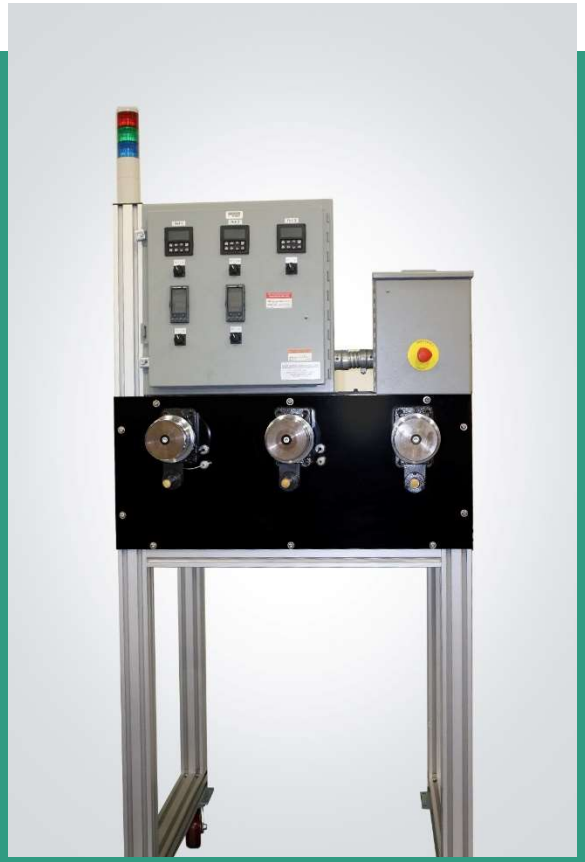
In an R&D lab, each person has to be ready to wear multiple hats. The same can often be said for the equipment. This flexible device can function as a fiber dryer, fiber oxidation oven, or fiber gas treater. Three independent thermal zones allow a customized temperature profile. For situations in which the processing gas stream must be isolated from the environment, a removable inner processing tube is included.





LARGE FIBER REACTOR

The Large Fiber Reactor expands on the capabilities of the Multi-Process Fiber Reactor with an additional thermal zone, as well as a multi-port precision gas injection system to provide independent reaction chemistry control at each zone. The system is convection-heated with compressed air for even heating.

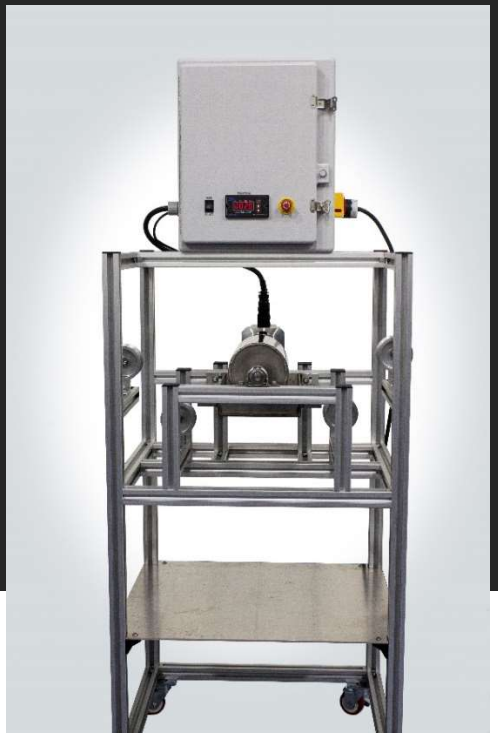


HEATED GODET ROLL SYSTEM (MODIFICATION)

As designers and builders of equipment, we at 4XManufacturing have the skills and expertise to analyze, modify, and enhance existing equipment to fit your changing capability need. In this case, an existing heated godet system was updated with modern controls for enhanced performance.

DRUM ROLLER TREATMENT SYSTEM

This system was designed for a specific surface chemistry application to limit the amount of applied fluid. Fiber is moved across the top of the drum roller, applying only what fluid has been carried upward by the roller. The applied amount is further controllable by adjusting the wrap angle over which the fiber is in contact with the roller. For particularly thick fluids, an additional urethane squeeze roller removes excess, with pinch force adjustable by fractions of a gram.



ABOUT US

Located in beautiful east Tennessee, 4XManufacturing has been a specialist in the custom design and fabrication of prototype and process lab equipment since 2011. Our experience in the carbon fiber, textile, and gas chemistry sectors has made us the go-to equipment manufacturer for the Oak Ridge National Laboratory. We work closely with our clients to develop project specifications around the critical parameters and control points for a project.

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