

The National Defense Prototype Center (NDPC), a joint collaboration between Wichita State University's National Institute for Aviation Research and Spirit AeroSystems, provides a secure space for high temperature materials testing, development, prototyping and industrialization. The NDPC encompasses more than 125,000 square feet of manufacturing and lab space with processing and characterization capabilities, including high temperature testing, furnaces for fabricating and processing materials, multi-method non-destructive inspection, robotic automated fiber placement technology and a large autoclave.

PROCESSING

Existing processing equipment includes a hot isostatic press (HIP) for ceramic and metal processing as well as a sintering furnace capable of processing oxide/oxide composites. Processing equipment to be installed over the next year includes furnaces for polymerization and pyrolysis (PIP) processing of ceramic matrix composites (Retort Furnace, Sintering Furnace) and a large autoclave for processing composites.

- € HIP ... Quintus QIH15L, 1500M: Max Operating Temp 1500°C (2700°F), Operating Pressure 207 MPa (30 ksi), Max Payload 500 mm (20 in) height by 186 mm (7.3 in) diameter
- € Oxide/Oxide Sintering Furnace ... 24" x 24" x 48", Temperature up to 2400°C
- € Vacuum Sintering Furnace ... Centorr CVI Sintervac C600-2450°C (Horizontal Vacuum /Controlled Atmosphere Sintering Furnace)
- € PIP Processing Furnace- L&L Model XLC3348 (Atmospheric Retort Furnace)
- € Autoclave ... 13 ft diameter, 26 ft long, max pressure 200psi, Max temperature 800°F

CHARACTERIZATION

Equipment to be installed over the next year includes a multi-unit NDI cell capable of phased array, C-Scan and other ultrasonic methods depending on the robotic head used and a North Star XRay CT system.

TESTING

Multiple load frames capable of various mechanical tests are being installed over the next year including two that will be able to reach 5000°F in an inert environment. These load frames complement existing testing capabilities at other NIAR locations where testing can be performed up to 3000°F in air.

- € MTS Axial Torsional Test Systems, 22 kips (static and fatigue)
- € Testorr Materials Testing Furnace Systems including hot zone of 12 in height and 6.5 in diameter

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