Type IV COPVs for Space Launch and Satellite Applications

Custom Geometries
& Off-The-Shelf

HyPerComp
Engineering, Inc.

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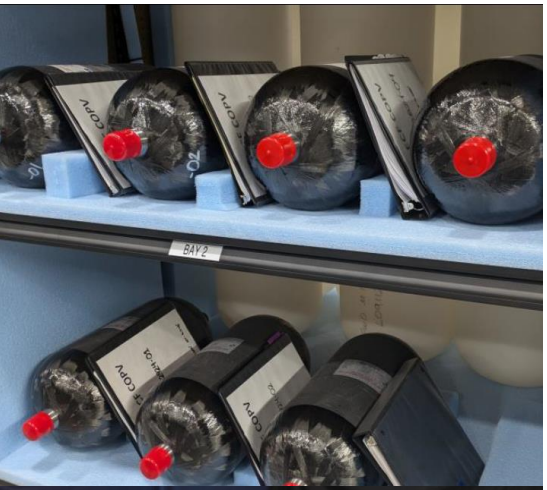


COPV Fabrication, Testing, and Qualification per G-082 Guidelines

World leaders in light-weight, high-performance COPVs

AS9100 Certified Aerospace Quality Management System

HyPerComp Type IV COPV Applications in Space Launch:

- Nitrogen Gas storage for Reaction Control Systems (RCS)
- Hydraulic system accumulators (N2) for high-pressure actuation
- Helium storage for propellant pressurization
- Nitrogen storage for inerting or purge systems
- Propellant tanks for upper stages or satellite transfer vehicles
- High-pressure gas storage for stage separation or satellite deployment mechanisms

10+ Geometries on Orbital and Suborbital Spacecraft

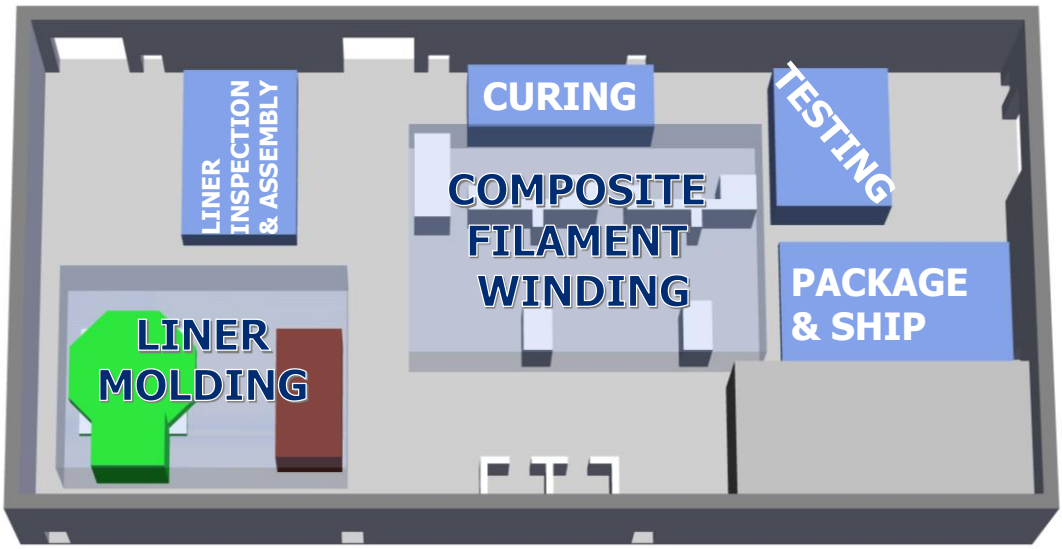
Vertically Integrated
Development, Fabrication, Testing, and Production

Critical Processes in-house.

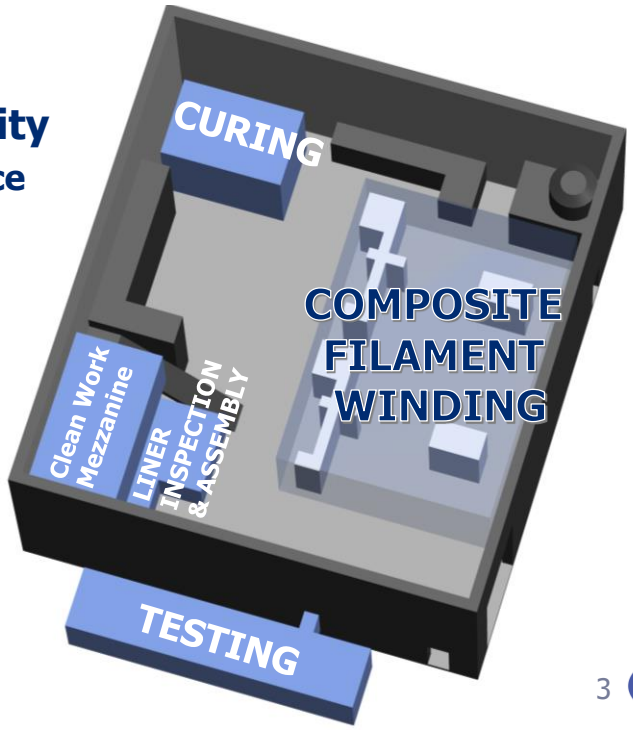
Quick turnaround with custom geometries.

Low schedule risk, tight process control.

HyPerComp P.A.C.E Facility
(Production Aerospace Center of Excellence)



HyPerComp R.A.C.E Facility
(R&D Aerospace Center of Excellence)



In-House Liner Roto-Molding with Direct Tool Heating (DTH)

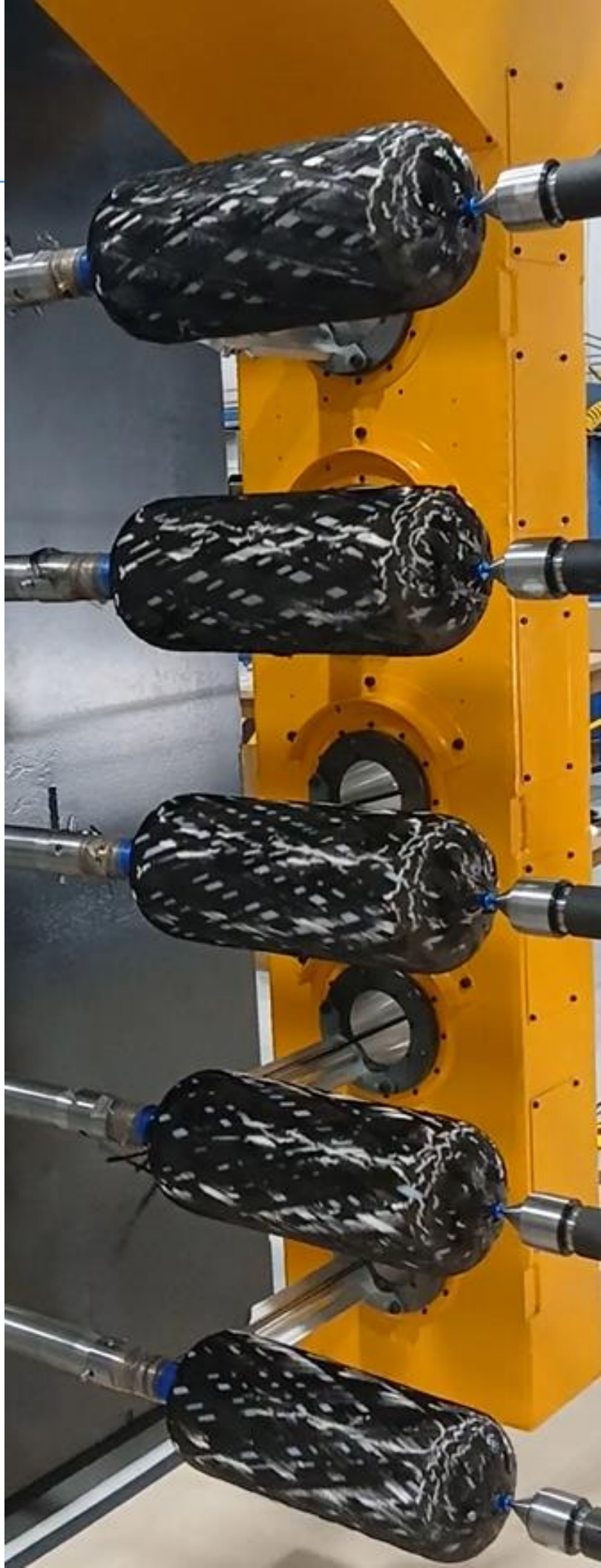
HyPerComp's **Direct Tool Heating (DTH) liner roto-molding process** delivers flight-ready polymer liners with unmatched quality and consistency. By keeping the process in-house, we ensure full control over every variable that impacts performance.

- High Quality & Repeatability – Precision molding for reliable liners every time.
- Thickness Optimization – Independently controlled heating zones allow fine-tuned wall thickness distribution for weight reduction.
- Improved Material Properties – Mold vacuum and nitrogen purge eliminate voids and optimize polymer crystallinity.
- Proprietary Boss-Liner Interface – HyPerComp's patented design ensures robust polymer-to-metal bonding for maximum structural integrity.

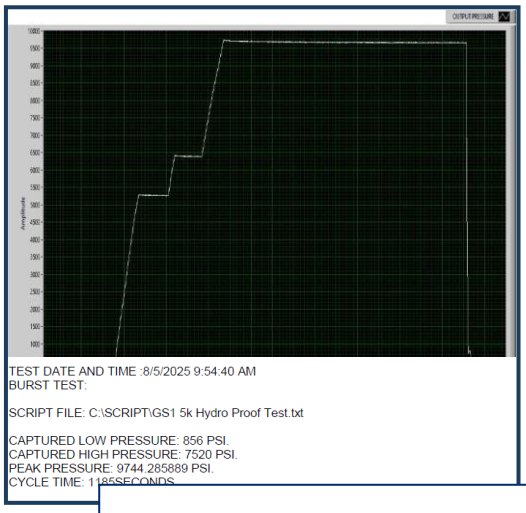
Filament Winding Expertise

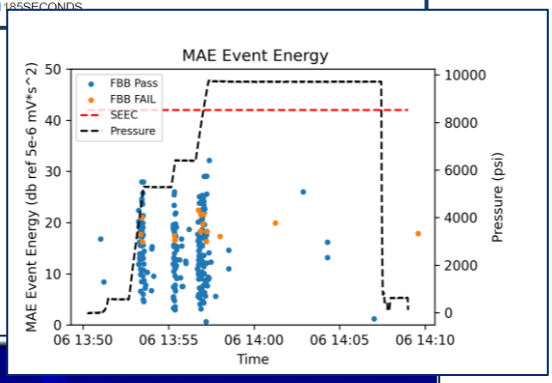
HyPerComp Engineering has decades of experience designing and producing high-performance composite overwrapped pressure vessels (COPVs) using both **tow-preg** and **wet winding** processes. By combining advanced engineering analysis with the practiced "art" of filament winding, we deliver the highest-performing, most repeatable vessels in the industry.

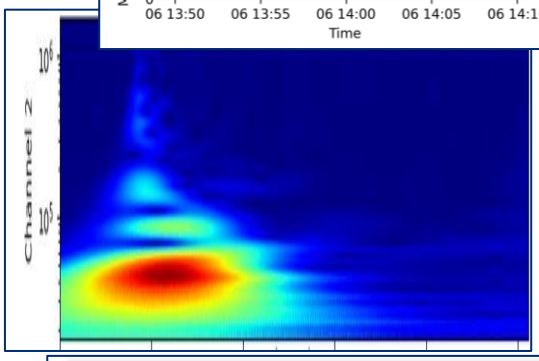
- High-Fidelity FEA Analysis – minimize design iterations and accelerate qualification while improving confidence in performance margins.
- Tow-Preg & Wet Winding – Expertise in both resin-impregnated tow and in-situ resin application allows us to select the right process for weight, performance, and cost targets.
- Engineering + Art – Decades of hands-on winding experience provide insight into subtle process variables that cannot be captured by models alone.
- Repeatability & Performance – industry-leading pressure vessels with optimized pressure-to-weight ratios, superior fatigue resistance, and consistent dimensional accuracy.

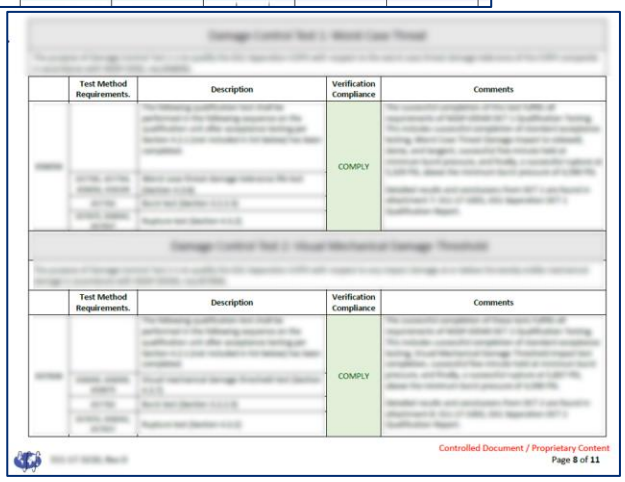


Testing & Non-destructive Evaluation









Every HyPerComp pressure vessel is validated to the highest aerospace standards through a full suite of destructive and non-destructive evaluation methods. Our test programs are designed for both qualification and production assurance, with flexibility to meet customer-defined system requirements.

- **Flight-Ready Validation** – Comprehensive destructive and non-destructive tests performed per **G-082 guidelines**
- **Customizable Test Regimens** – Programs tailored to meet specific system requirements as defined by the customer.
- **Requirements Traceability** – Each test result is linked directly to system and customer-level specifications.
- **Data Archival & Accessibility** – Full test packages, including test pressure profiles, NDE data, and inspection reports, archived and delivered in customer-required formats.
- **Compliance Matrix** – Clear documentation demonstrating verification against applicable standards.
- **Streamlined Program Acceptance** – Requirements-driven reporting that simplifies certification and Flight Readiness Reviews.

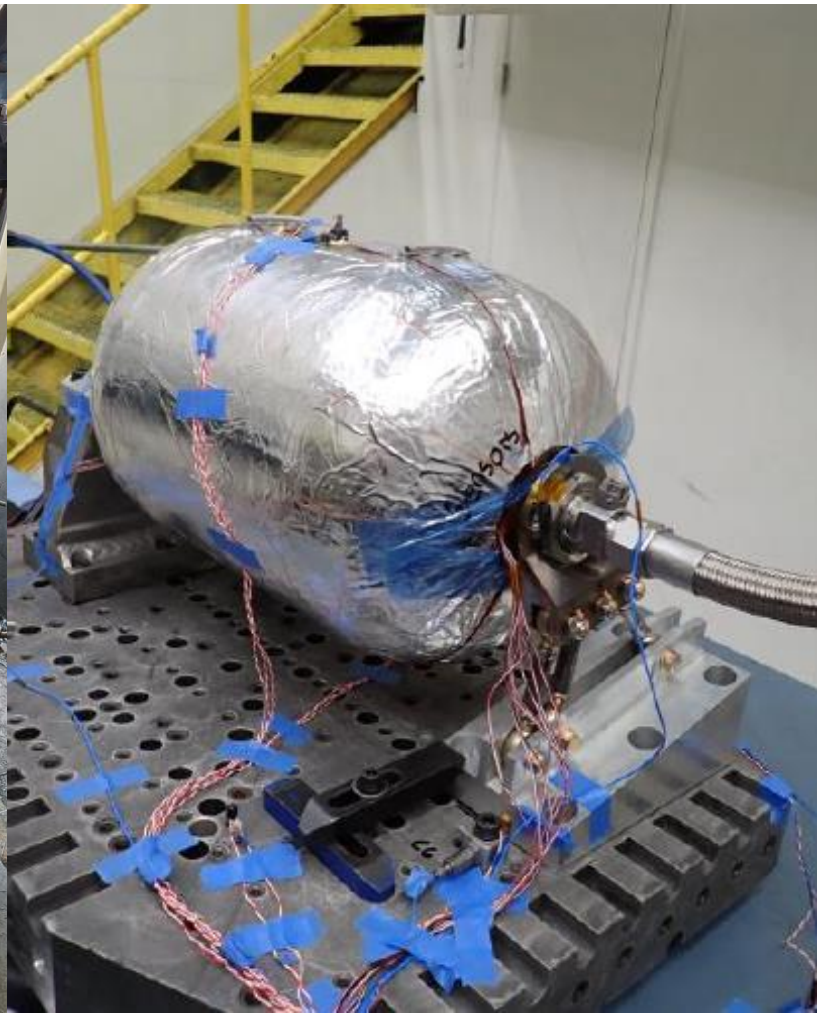
Testing & Non-destructive Evaluation (cont.)

Qualification / Batch Acceptance Testing

- Fatigue life pressure cycling
- Shock and Vibration Testing (off-site)
- Damage Tolerance Life (DTL) testing
- Gunfire Testing
- Bonfire Testing

Production Acceptance Testing and NDE

- Hydrostatic Proof Test
- Leak test
- Modal Acoustic Emissions Testing
- Boss-Composite interface testing
- X-ray Computed Tomography (CT) Scanning of critical areas or full composite.



Packaging and Delivery

Custom Protective Packaging

Available Delivery at Level 300 visual cleanliness (VC-300)

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World leaders in design, analysis, qualification, and production of light-weight composite pressure vessels.

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