Case Study: METFAB Fabricates Large-Scale Roll-to-Roll Lamination System for Advanced Manufacturing

Project Overview

A leading advanced materials manufacturer partnered with METFAB to fabricate a large-scale roll-to-roll lamination system used to bond specialized films and engineered materials in a continuous production process. The project required a fabrication partner capable of delivering a highly precise, structurally robust system that could support critical alignment requirements while maintaining reliability in a demanding manufacturing environment.

Drawing upon its expertise in precision fabrication, machining, welding, and complex mechanical assemblies, METFAB successfully delivered a custom-engineered solution that became a critical component of the customer's production operation.

Customer Challenge

The customer was developing a high-performance roll-to-roll process used to laminate multiple layers of advanced materials into a single finished product. The success of the process depended on maintaining precise alignment and tension throughout the system.

The project presented several challenges:

- Large overall system dimensions
- Tight roller alignment requirements
- Structural rigidity to prevent deflection during operation
- Integration of multiple drive and support systems
- Complex assembly requirements
- Aggressive project schedule
- High cosmetic and quality expectations

Even minor dimensional inaccuracies could negatively impact product quality, making precision fabrication essential to the success of the project.

Engineering Collaboration

METFAB worked closely with the customer's engineering team from the early stages of the project to review fabrication requirements and optimize the design for manufacturing.

Design for Manufacturability

Through collaborative design reviews, METFAB identified opportunities to improve manufacturability while maintaining all functional requirements. These improvements reduced fabrication complexity, improved assembly efficiency, and shortened overall production time.

Structural Analysis and Fabrication Planning

Special attention was given to the structural framework supporting the roller assemblies. The system required exceptional rigidity to maintain critical alignment tolerances and ensure repeatable process performance.

METFAB developed a detailed fabrication strategy that included:

- Precision-machined mounting surfaces
- Controlled weld sequencing
- Dimensional verification checkpoints
- Assembly fixture development
- Final alignment verification procedures

Manufacturing Solution

The system was fabricated utilizing a combination of METFAB's advanced manufacturing capabilities.

Key Processes Included

- CNC laser cutting
- Precision metal forming
- CNC machining
- AWS-certified welding
- Structural fabrication
- Mechanical assembly
- Quality inspection and dimensional verification

The finished system incorporated:

- Heavy-duty welded structural frames
- Precision-machined roller mounting interfaces
- Integrated equipment supports
- Access panels and maintenance features
- Cable and utility management provisions
- High-quality industrial finish

Throughout the fabrication process, METFAB's quality team performed dimensional inspections to verify critical tolerances and alignment requirements.

Results

METFAB successfully delivered a roll-to-roll lamination system that met the customer's demanding performance and quality requirements.

Key Outcomes

✔ Precision alignment of critical roller assemblies

✔ Robust structural performance under operating loads

✔ Successful integration of customer-supplied process equipment

✔ Improved assembly and maintenance accessibility

✔ High-quality workmanship and finish

✔ On-time project completion

✔ Reliable long-term production performance

The completed system enabled the customer to efficiently laminate advanced materials while maintaining the process consistency required for high-value manufacturing applications.

Why METFAB Was Selected

The customer selected METFAB based on its ability to provide:

- Precision fabrication expertise
- Complex mechanical assembly capabilities
- AWS-certified welding
- In-house machining and fabrication
- Engineering support and problem solving
- Proven quality systems
- On-time project execution

By combining engineering collaboration with advanced manufacturing capabilities, METFAB provided a complete fabrication solution from concept through final assembly.

Conclusion

This project demonstrates METFAB's ability to fabricate large, complex manufacturing equipment for demanding industrial applications. Through precision fabrication, skilled craftsmanship, and close customer collaboration, METFAB delivered a roll-to-roll lamination system that met stringent performance requirements and helped support the customer's advanced manufacturing objectives.

Core Capabilities Demonstrated

- Large Equipment Fabrication
- Precision Machining
- AWS-Certified Welding
- Mechanical Assembly
- Design for Manufacturability (DFM)
- Quality Assurance & Inspection
- Structural Fabrication
- Custom Manufacturing Solutions

METFAB continues to support customers across advanced manufacturing, semiconductor, energy, nuclear, and industrial markets by delivering engineered fabrication solutions where quality, precision, and reliability matter most.