

CASE STUDY

Disposable Tubing Assembly for CO₂ Monitoring



Medical Condition/Clinical Need:

Non-invasive capnography by measuring end-tidal carbon dioxide (EtCO₂) through Sidestream sampling.

Common medical indications include:

- Respiratory conditions, procedural sedation, emergency care

Key clinical needs addressed:

- Continuous EtCO₂ monitoring in non-intubated patients (via nasal or oral sampling cannulas)

The Challenge:

To improve cost competitiveness and operational efficiency, customer initiated a strategic transfer of its product lines to Arterex's Tijuana site. The objective was to streamline the supply chain and lower production costs by relocating core manufacturing processes to a more cost-effective region.

Project Scope:

- Phase I: Transfer of CO₂ sensor assembly from Customer's USA site to Tijuana, Mexico, targeting reductions in labor and packaging costs through nearshoring and local vendor engagement.
- Phase II: Relocation of tubing set assembly from Customer's China site to the same Tijuana facility, addressing high freight costs, extended transit times, and customer responsiveness challenges.

Key Challenges Addressed:

- High labor costs at the U.S. manufacturing site, elevated international freight and logistics expenses, long lead times for material delivery, creating inventory and supply risks, and Inefficient legacy assembly processes

The Design/Manufacturing Solution:

- Labor Cost Reduction: Achieved substantial cost savings by shifting assembly operations to a region with more competitive labor rates.
- Supply Chain Localization: Enabled faster procurement cycles and reduced material costs by partnering with local suppliers for packaging materials.
- Freight & Lead Time Optimization: Transferring tubing set production from China eliminated international shipping delays and significantly reduced logistics costs.
- Design Optimization:
 - Replaced UV-cured Dymax adhesive with cyclohexane, simplifying the bonding process.
 - Resulting in lower material costs, faster production cycles, and decreased labor.

Results:

This two-phase transfer initiative delivered measurable improvements in key operational and strategic areas:

- Increased manufacturing cost efficiency across all transferred processes.
- Reduced lead times and improved agility in responding to market demands.
- Enhanced supply chain resilience and scalability to support future growth and volume expansion.