Taylor-Wharton

Equipping The Hydrogen Infrastructure

# MicroBulk Solutions

Next Generation Solutions for Safe and Efficient Delivery for Gas and Liquid Applications

# MicroBulk System

Taylor-Wharton

- Engineered to improve the filling process:
  - Safely
  - Efficiently
  - High Quality
- Suitable for:
  - Manufacturing
  - Laboratories
  - Food processing
  - Health Care
- Minimizes:
  - Handling and Storage
  - Time Loss Change-Over
    - vs. Liquid Cylinders
    - vs. High-Pressure Cylinders

# MicroBulk System

Taylor-Wharton

- On-Site Filling
  - Provides Uninterrupted Gas Supply
    - Piped directly to source of use
  - Eliminates Possible Run-Outs
    - Telemetry options
  - Eliminates Contamination
  - Eliminates Residual Losses
- Automatic Shutoff Devices
  - Safe
  - Efficient
  - Minimal Product Loss

# Mode Change Analysis

Taylor-Wharton

- Microbulk supply can benefit you:
  - ≥ 2 Liquid Cylinders per month
  - ≥ 10 HP Cylinders per month

High Pressure Cylinder

220-300 Size
228-304 Size

Liquid Cylinders

180-240 Liter
48-61 Gallon
4,428-5,658 SCF


MicroBulk

450-7,500 Liter
120-1,981 Gallon
8,676-147,938 SCF


Tube Trailer, Bulk

TT 45,100-181,155 SCF
Bulk 1500-100,000 Gallon
46,500-1.2mm SCF


Note: SCF expressed in Nitrogen volumes

# MicroBulk In Industry

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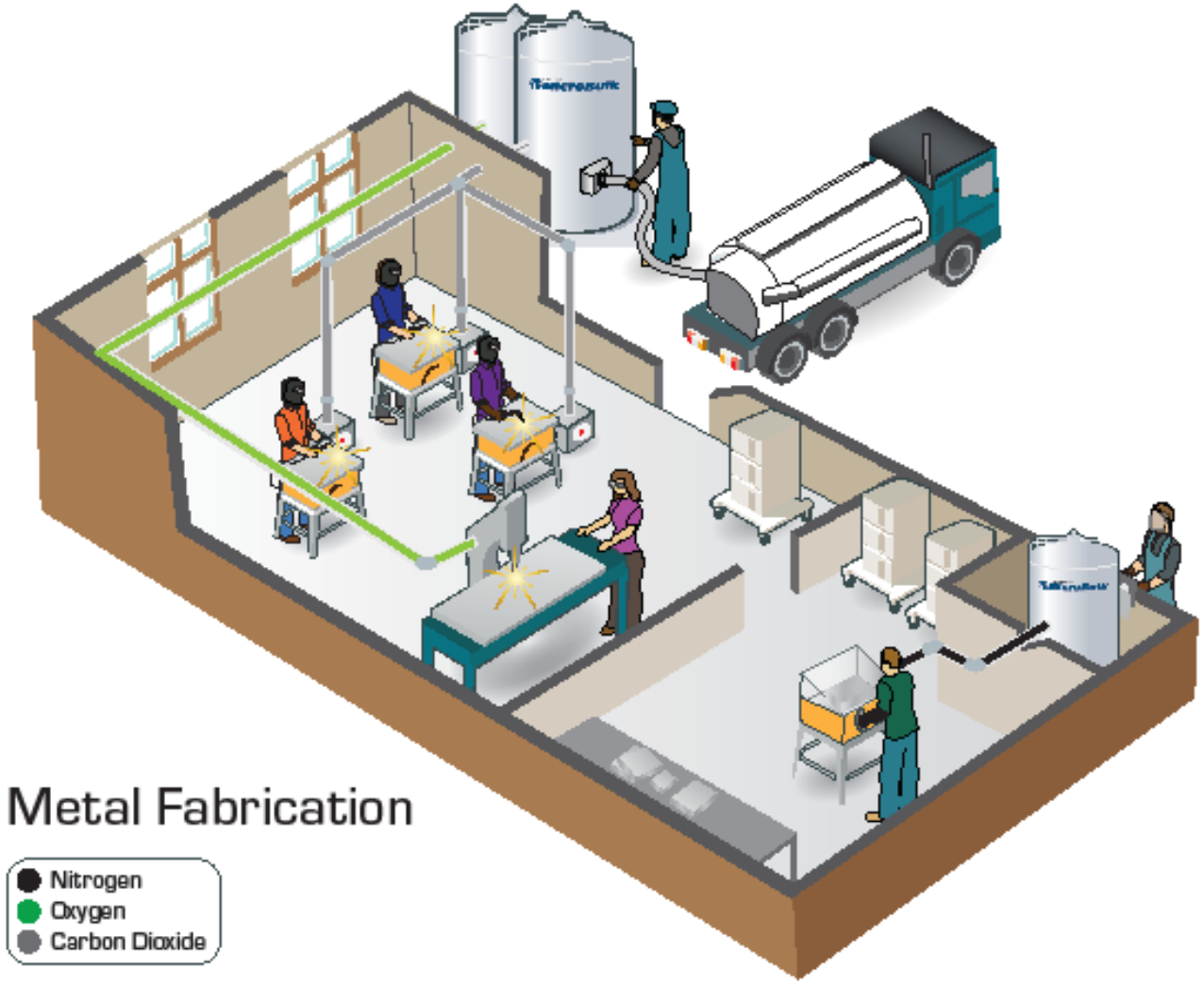


| Primary Applications | Gas | Typical State |
|---|---|---|
| Cryogenic Cooling & Freezing | Nitrogen | Liquid |
| Purging / Inserting | Nitrogen | High Pressure |
| Cutting | Oxygen | High Pressure |
| Oxidation Process | Oxygen | High Pressure |
| High Speed Cutting | Nitrogen | High Pressure |
| Laser Cutting / Welding | Argon | High Pressure |
| Laser Cutting / Welding / Blanketing | CO2 | High Pressure |
| Laser Cutting | Nitrogen | Very High Pressure |
| Carbon emission control; Foundry process control | CO2 | Very High Pressure |
| Specialty Steel & Metal Processing | Argon | High Pressure |
| Specialty Chemical Production | Nitrogen | High Pressure |

# MicroBulk In Laboratories

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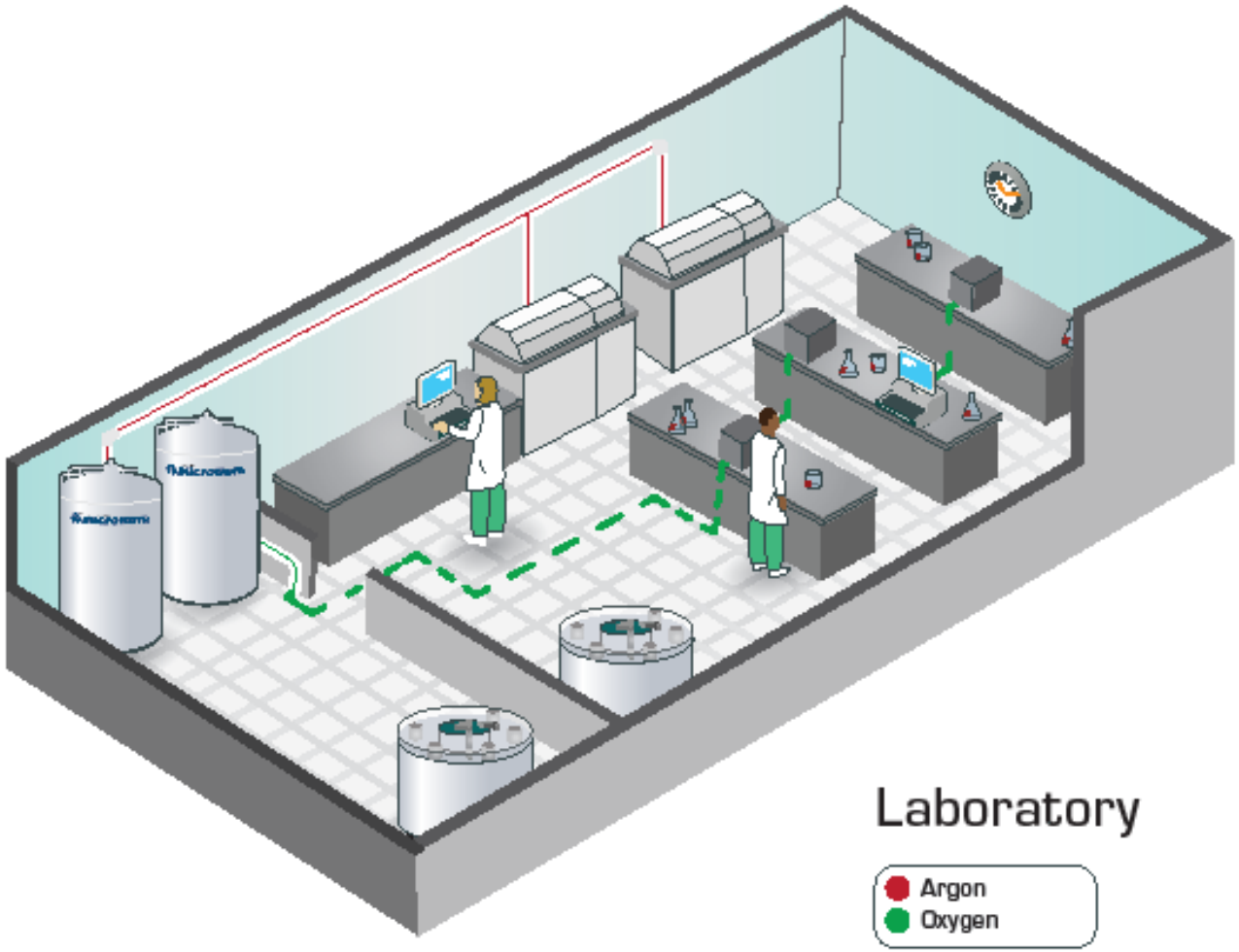


| Primary Applications | Gas | Typical State |
|---|---|---|
| Oxygen Enrichment | Oxygen | High Pressure |
| ICP-MS, ICP-OES | Argon | High Pressure |

# MicroBulk In Food Production

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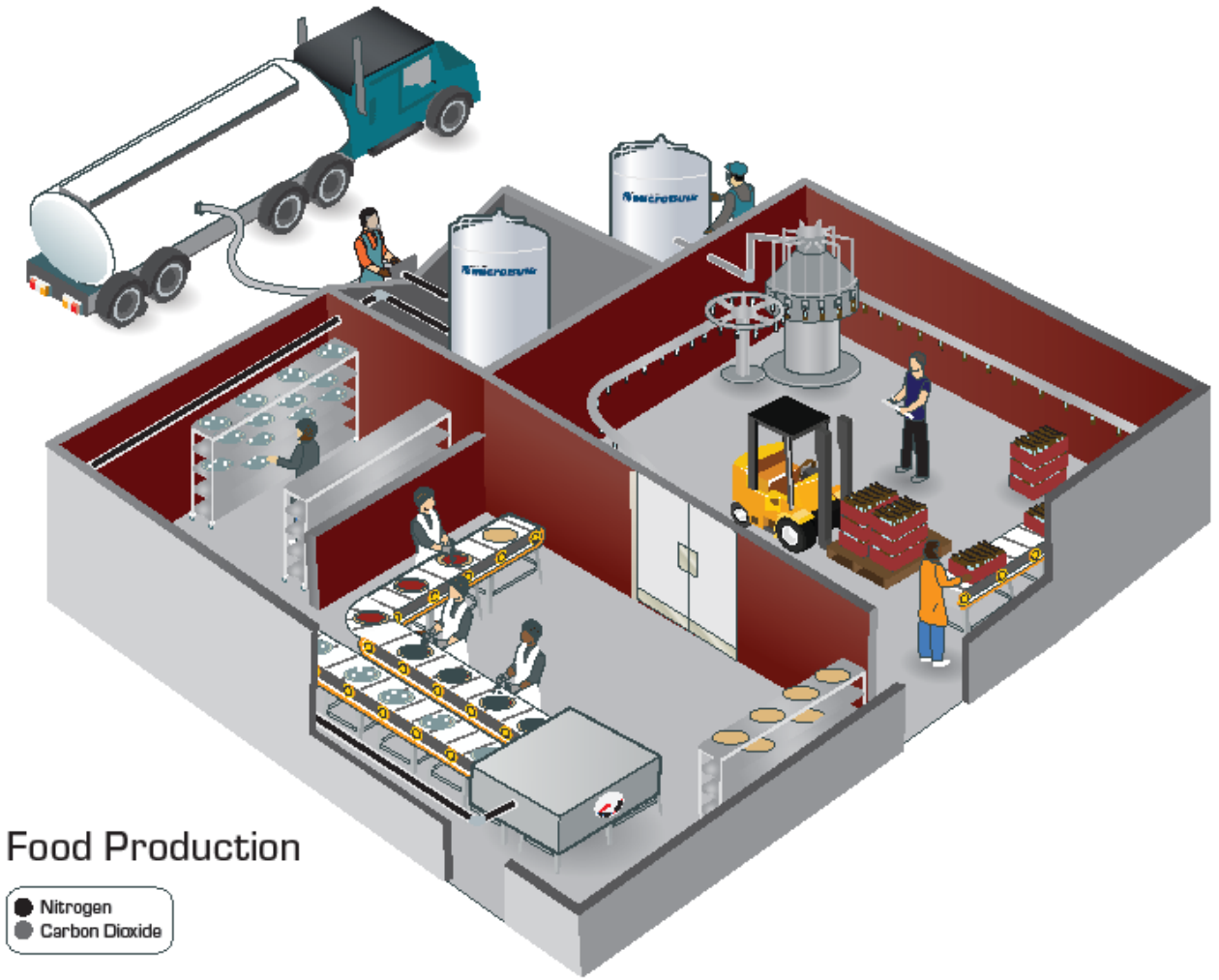


| Primary Applications | Gas | Typical State |
|---|---|---|
| Packaging | Nitrogen | High Pressure |
| Beverage Carbonation | $CO_2$ | High Pressure |
| Freezing | Nitrogen, $CO_2$ | Low/Medium Pressure |
| Packaging | Nitrogen, $CO_2$ | Medium Pressure |

# MicroBulk In Health Care

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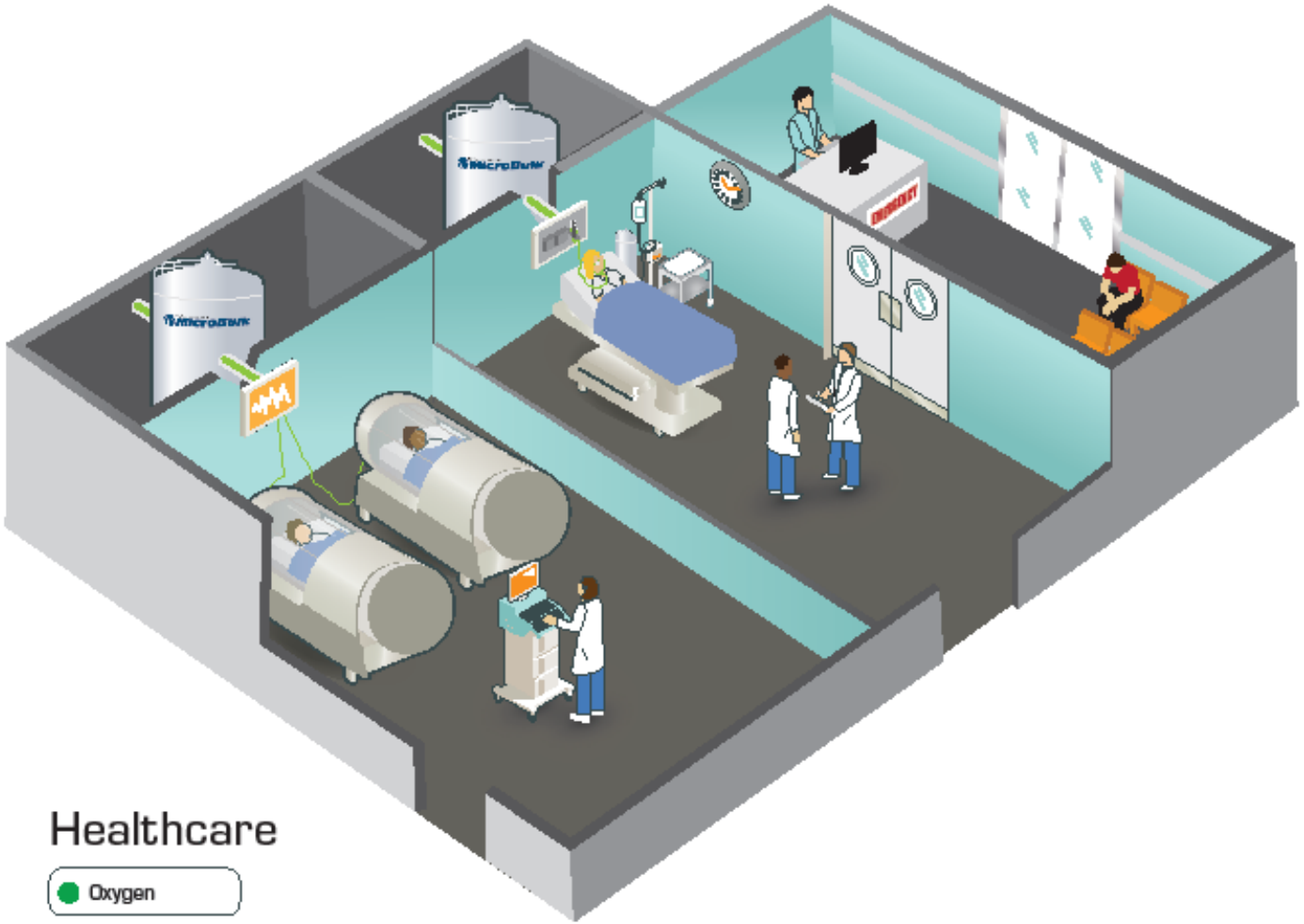


| Primary Applications | Gas | Typical State |
|---|---|---|
| MRI Magnet Cooling | Nitrogen | Liquid |
| Respiratory Oxygen Delivery | Oxygen | Liquid |
| Hyperbaric Chambers | Oxygen | Low Pressure |
| Cryosurgery | Nitrogen | Liquid |

# Product Features

Taylor-Wharton

- Quality Materials
  - Durable stainless steel
  - Super insulation
  - Digital gauges
- Automatic Fill Shut-Off
  - Compatible with most delivery trucks
- Reliable
  - Five-year vacuum warranty
- Telematics Ready
  - Plug into your network
  - Build-to-suit
  - Programable digital liquid level gauge
    - Enables you to manage inventory and guard against run-outs
- Flexible Site Options
  - Outdoor or indoor installation
  - Engage qualified piping suppliers
  - Optional wall box for remote filling
- Standard Sizes
  - 450, 1000, 1500, 2000, 3000, 5000, 7500-liter
    - Medium pressure (250 psi), high pressure (350 psi), or very high pressure (500 psi)

# Specifications

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| Industries | Applications | Gas | Typical State |
|---|---|---|---|
| Bio-Technology | Sample Freezing | Nitrogen | Liquid |
| Electronics | Circuit board & component test chambers | Nitrogen | Liquid |
| Electronics | Semiconductor cleaning | $CO_2$ | High Pressure |
| Food | Packaging | Nitrogen | High Pressure |
| Food | Beverage Carbonation | $CO_2$ | High Pressure |
| Food | Packaging/Freezing | $CO_2$ | High Pressure |
| High Technology | Instrumentation | Nitrogen | High Pressure |
| Hotels/Institutions | Beverage Carbonation; Controlling Pools' pH Levels | $CO_2$ | High Pressure |
| Industrial | Cryogenic Cooling and Freezing | Nitrogen | Liquid |
| Industrial | Purging / Inerting | Nitrogen | High Pressure |
| Industrial | Cutting | Oxygen | High Pressure |
| Industrial | Oxidation Process | Oxygen | High Pressure |
| Industrial | High Speed Cutting | Nitrogen | High Pressure |
| Industrial | Laser Cutting/Welding | Argon | High Pressure |
| Industrial | Laser Cutting/Welding/Blanketing | $CO_2$ | High Pressure |
| Industrial | Laser Cutting | Nitrogen | Very High Pressure |
| Industrial | Carbon emission control; Foundry process control | $CO_2$ | Very High Pressure |
| Industrial | Specialty Steel & Metal Processing | Argon | High Pressure |
| Laboratory | ICP-MS, ICP-OES | Argon | High Pressure |
| Laboratory | Oxygen Enrichment | Oxygen | High Pressure |
| Medical/Health Care | MRI Magnet Cooling | Nitrogen | Liquid |
| Medical/Health Care | Respiratory Oxygen Delivery | Oxygen | Liquid |
| Medical/Health Care | Respiratory Oxygen Therapy | Oxygen | High Pressure |

# Optional Acessory

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- Wireless Two-Way Communication
- Integral Tank Level Display:
  - Transmits daily – alarms and fills
  - Programmable alarm set points
  - Alarm reporting options
  - 24-hour internet data access
- Telemetry Benefits:
  - Eliminates process interruptions
  - Eliminates product monitoring
  - Eliminates emergency deliveries
  - Reduce delivery costs
  - Eliminates phone orders
  - Predict delivery schedules
  - Forecast future needs

Uninterrupted Gas Supply –
Optional Telemetry Monitoring


Compatible with DataOnline
C-STIC and Others

# Economic Benefits

Taylor-Wharton

- **Grow your Business**
  - Gain new accounts by replacing competitors' cylinders.
  - Diversify your base with engaging additional industry segments.
- **Protect your Accounts**
  - Implement microbulk to reduce cylinder handling.
  - Lower inventory and order administration time.
- **Grow your Volume**
  - Increase liquid volume through your operation.
  - Improve distribution efficiency.
  - Cut delivery costs.

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Equipping The Hydrogen Infrastructure

# Thank You