Trifecta® Systems
Cryogenic Equipment for High Performance Gas Supply

CONSULTING | SYSTEM DESIGN | INSTALLATION | COMMISSIONING | TRAINING

Trifecta Product Catalog
www.chartindustries.com
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Innovative Design, Technology & Reliability

Across Chart, we pride ourselves on designing innovative products with advanced technology and high reliability to enhance customer value. Our understanding of our customer’s business needs and end-use applications has helped us achieve a wide product portfolio of solutions. We provide the right product for the application – driving a competitive advantage for our customer and our company.

**Engineering Design**

Our integrated Trifecta® Gas Supply System incorporates proven innovative technologies. Every component is designed, built and tested to create the safest and most reliable cryogenic high pressure gas supply system available today.

**Installation, Startup & Training**

Certified technicians provide installation and training to assure long-term trouble-free operation. With 14 models to choose from, there is a Trifecta system to meet your needs.

**Quality Manufacturing**

Our experience and code compliant ISO 9001 and 14001 ensures that our Trifecta systems are manufactured to high quality standards and on time.

**Service & Support**

Call us at 1-800-400-4683 with questions, or go to ChartParts.com for 24/7 parts ordering. Keeping your Trifecta system up and running is our top priority.

*When you choose Chart, you get single-source accountability for the entire Trifecta® Gas Supply System.*
What is a Trifecta® X-Series System?

The Trifecta X-Series is the preferred solution for reliable and continuous laser assist gases for delivery pressures up to 550 psig and flow rates up to 15,000 scfh. Drawing liquid from a standard bulk tank, the Trifecta system boosts the liquid pressure by alternately feeding two on-board liquid cylinders equipped with innovative multi-function pressure building vaporizers. The Trifecta solution has no down-time during liquid delivery and minimal losses when compared with other laser assist gas solutions. This convenient solution eliminates high-pressure pumps, compressors, cylinder cradles and surge tanks.

Laser Assist Nitrogen Gas Applications

Four Chart bulk tanks feeding eight Trifecta X15 models and eight Thermax vaporizers supply assist nitrogen gas to 24 lasers at a metal fabrication facility. After the gas supplier investigated every supply system on the market for their customer’s high-output factory, they ultimately chose Chart’s Trifecta X-Series. The gas purity from liquid coupled with the latest technology made Trifecta the clear winner.

Product Highlights

- System utilizes standard low-pressure bulk tank to lower investment and use existing assets
- No downtime – system maintains pressure and flow when bulk tank is filled and eliminates excessive product losses associated with high-pressure bulk tanks
- Cylinders switch by pressure instead of level to further reduce product loss and protect against pressure decay
- Robust design features streamlined all stainless steel piping with only five control valves and one integrated electronic control system (PLC) for increased durability and reliability
- Computer-controlled design simplifies installation, start-up and continuous operation
- Frame assembly features a protective top cover in a compact footprint with an elevated base for improved ventilation
- Available for Oxygen (350 & 500 MAWP), or Nitrogen and Argon service (500 & 600 MAWP)
- Inconel and copper material used where required on high pressure oxygen models
Trifecta X-Series 500 MAWP

<table>
<thead>
<tr>
<th>Service</th>
<th>MAWP (psig)</th>
<th>MAOP (psig)*</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIN</td>
<td>500</td>
<td>450</td>
<td>X</td>
</tr>
<tr>
<td>LAR</td>
<td>500</td>
<td>450</td>
<td>X</td>
</tr>
</tbody>
</table>

*Maximum Allowable Operating Pressure

Regional and operational conditions will affect performance.

Trifecta X-Series 600 MAWP

<table>
<thead>
<tr>
<th>Service</th>
<th>MAWP (psig)</th>
<th>MAOP (psig)*</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIN</td>
<td>600</td>
<td>550</td>
<td>X</td>
</tr>
<tr>
<td>LAR</td>
<td>600</td>
<td>550</td>
<td>X</td>
</tr>
</tbody>
</table>

*Maximum Allowable Operating Pressure

Regional and operational conditions will affect performance.
Oxygen Service

Trifecta X-Series 350 & 500 MAWP

### System Requirements

- 15 amp, 110 VAC power, dedicated circuit (230 VAC panel also available)
- Bulk storage tank with 100 psig minimum pressure
- External vaporizer, minimum 600 psig working pressure (700 psig for 600 MAWP model), sized for maximum flow rate per model
- Two piping connections to bulk storage tank (liquid withdrawal and pressure)
- High-flow pressure regulation
- Gaseous nitrogen source for pneumatic actuators (600 MAWP model)

### All Models

#### Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Length</th>
<th>Width</th>
<th>Height</th>
<th>Weight X5</th>
<th>Weight X10</th>
<th>Weight X15</th>
</tr>
</thead>
<tbody>
<tr>
<td>X5</td>
<td>53”</td>
<td>55”</td>
<td>96”</td>
<td>1700 lbs</td>
<td>1750 lbs</td>
<td>1800 lbs</td>
</tr>
<tr>
<td>X10</td>
<td>53”</td>
<td>55”</td>
<td>96”</td>
<td>770 kg</td>
<td>795 kg</td>
<td>815 kg</td>
</tr>
<tr>
<td>X15</td>
<td>53”</td>
<td>55”</td>
<td>96”</td>
<td>1347 mm</td>
<td>1400 mm</td>
<td>2440 mm</td>
</tr>
</tbody>
</table>

#### Weight

- X5: 1700 lbs (770 kg)
- X10: 1750 lbs (795 kg)
- X15: 1800 lbs (815 kg)

### Service MAWP (psig) & MAOP (psig)

<table>
<thead>
<tr>
<th>Service</th>
<th>MAWP (psig)</th>
<th>MAOP (psig)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOX</td>
<td>350</td>
<td>300</td>
</tr>
<tr>
<td>LOX</td>
<td>500</td>
<td>450</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>X5</th>
<th>X10</th>
<th>X15</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAWP</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

*Maximum Allowable Operating Pressure

Regional and operational conditions will affect performance.

### Flow Rate scfh (Nm³/H)

- LOX 350 (27.6)
- LOX 500 (20.7)
- LOX 1000 (14.2)
- LOX 1500 (10.0)
- LOX 2000 (6.9)
- LOX 2500 (4.8)
- LOX 3000 (3.4)
- LOX 3500 (2.7)
- LOX 4000 (2.2)
- LOX 4500 (1.8)
- LOX 5000 (1.5)
- LOX 5500 (1.3)
- LOX 6000 (1.1)
- LOX 6500 (0.9)
- LOX 7000 (0.8)
- LOX 7500 (0.7)
- LOX 8000 (0.6)
- LOX 8500 (0.5)
- LOX 9000 (0.4)
- LOX 9500 (0.3)
- LOX 10000 (0.2)
- LOX 10500 (0.1)
- LOX 11000 (0.1)
- LOX 11500 (0.1)
- LOX 12000 (0.09)
- LOX 12500 (0.08)
- LOX 13000 (0.07)
- LOX 13500 (0.06)
- LOX 14000 (0.05)
- LOX 14500 (0.04)
- LOX 15000 (0.03)
- LOX 15500 (0.02)
- LOX 16000 (0.01)
- LOX 16500 (0.01)
- LOX 17000 (0.009)
- LOX 17500 (0.008)
- LOX 18000 (0.007)
- LOX 18500 (0.006)
- LOX 19000 (0.005)
- LOX 19500 (0.004)
- LOX 20000 (0.003)
- LOX 20500 (0.002)
- LOX 21000 (0.001)
- LOX 21500 (0.001)
- LOX 22000 (0.0001)
- LOX 22500 (0.0001)
- LOX 23000 (0.0001)
- LOX 23500 (0.0001)
- LOX 24000 (0.0001)
- LOX 24500 (0.0001)
- LOX 25000 (0.0001)

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**Schematic**

- Application
- Liquid Out to Vaporizer
- Vaporizer
- Trifecta X15
- Bulk Tank
- Gas Recovery from Trifecta
- Liquid In from Bulk Tank
- Pressure Gauge
- Relief Valve
- Spring Check
- Div. Ball Valve
- Flapper Check
- Control Valve
- Rupture Disc

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**Dimensions**

- Length 53” 1347 mm
- Width 55” 1400 mm
- Height 96” 2440 mm

**Weight**

- X5: 1700 lbs (770 kg)
- X10: 1750 lbs (795 kg)
- X15: 1800 lbs (815 kg)
Engineered for Efficiency — Built to Last

A Turnkey Approach
Chart works closely with our customers to ensure the total system is designed properly, making the Trifecta system as effective as possible. Our turnkey approach ensures consistent, quality liquid to keep your system operating at peak efficiency. Built for long-term integrity and industry leading design, these systems give customers the highest performance at the lowest operating cost — all while providing a single point of contact for efficient project management.

![Typical Trifecta Installation](image)

**VS-01 Series Bulk Tank Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>Gross Capacity Gal</th>
<th>Net Capacity Gal</th>
<th>MAWP* psig</th>
<th>Flow Capacity** SCFH</th>
<th>Diameter in mm</th>
<th>Height in mm</th>
<th>Weight*** lbs.</th>
<th>NER %/day in O₂ / Ar</th>
<th>NER %/day in N₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS 1500SC</td>
<td>1,640</td>
<td>1,580</td>
<td>250</td>
<td>9,000</td>
<td>66</td>
<td>1,676</td>
<td>6,200</td>
<td>2,818</td>
<td>.35</td>
</tr>
<tr>
<td>VS 3000SC</td>
<td>3,150</td>
<td>3,030</td>
<td>175</td>
<td>12,184</td>
<td>86</td>
<td>2,184</td>
<td>11,104</td>
<td>4,990</td>
<td>.25</td>
</tr>
<tr>
<td>VS 6000SC</td>
<td>6,010</td>
<td>5,770</td>
<td>175</td>
<td>18,000</td>
<td>228</td>
<td>5,791</td>
<td>19,909</td>
<td>9,026</td>
<td>.15</td>
</tr>
<tr>
<td>VS 9000SC</td>
<td>9,380</td>
<td>8,990</td>
<td>175</td>
<td>24,000</td>
<td>363</td>
<td>9,728</td>
<td>29,400</td>
<td>13,364</td>
<td>.10</td>
</tr>
</tbody>
</table>

* Nominal flow rate is based on 8 hours continuous service between defrosts, an ambient temperature of 70°F, relative humidity of 70%, and a 20°F Approach temperature. Please consult your Thermax, Inc. sales person for ratings for other conditions.

** Stainless steel lined - .40 required for 600 MAWP Trifecta model.

** Vaporizer Specifications**

<table>
<thead>
<tr>
<th>Trifecta Model</th>
<th>Flow Rate* SCFH, Nitrogen</th>
<th>Thermax Vaporizer Model Number</th>
<th>MAWP (psig)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trifecta 5K</td>
<td>7,800</td>
<td>SG70HF</td>
<td>600</td>
</tr>
<tr>
<td>Trifecta 10K</td>
<td>11,700</td>
<td>SG110HF</td>
<td>600</td>
</tr>
<tr>
<td>Trifecta 15K</td>
<td>19,400</td>
<td>SG180HF</td>
<td>600</td>
</tr>
<tr>
<td>Trifecta 15K</td>
<td>18,600</td>
<td>SG215HF</td>
<td>4000**</td>
</tr>
</tbody>
</table>

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