



CRANE®

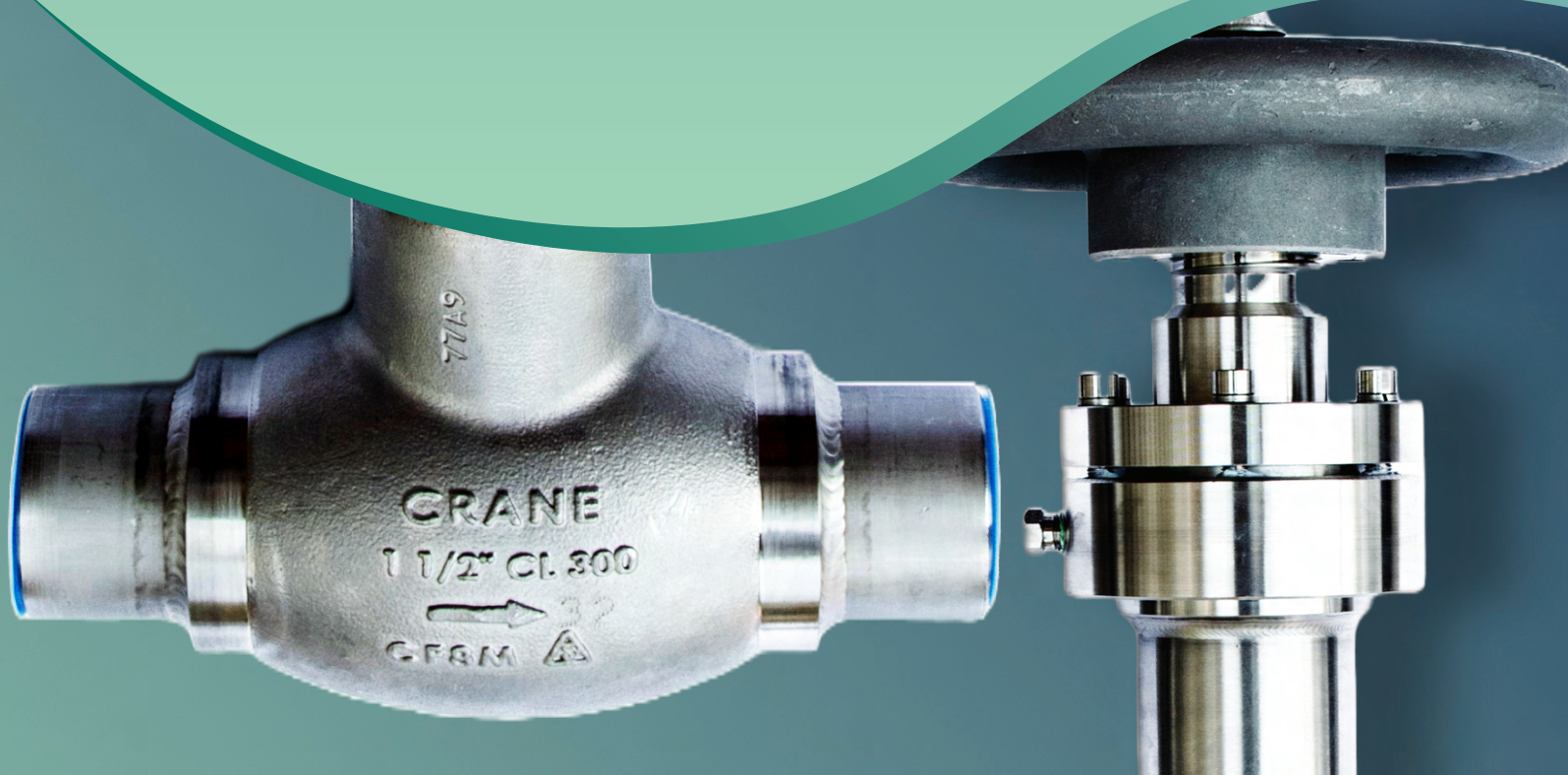
**CRYOFLO** <sup>H<sub>2</sub></sup>

Keeping Cryogenics Cool

# CRYOFLO® Liquid Hydrogen Bellows Seal Globe & Lift-Check Valve

*PIPE, VALVE, AND FITTINGS  
SOLUTIONS FOR HYDROGEN*

[www.cranecryoflo.com](http://www.cranecryoflo.com)



# CRANE® ChemPharma & Energy INTRODUCTION

Crane Co. is a diversified manufacturer of highly engineered industrial products with a substantial presence in a number of focused niche markets. We are dedicated to integrity and honest dealings in all that we do.

Crane CP&E designs and manufactures a variety of high performance products including: highly-engineered check valves, sleeved plug valves, lined valves, process ball valves, high performance butterfly valves, bellows sealed globe valves, aseptic and industrial diaphragm valves, multi/quarter-turn valves, actuation, sight glasses, lined pipe, fitting and hoses, and air-operated diaphragm and peristaltic pumps. Its trusted brands are in use worldwide in many industries, including Oil & Gas, Oil Refining, Petrochemical, Power Generation, Chemical Processing, Biotechnology, and Pharmaceutical.

**CRANE** is committed to delivering efficient service and local technical expertise. Crane is built on quality principles and practices to achieve the best safety, quality, performance, delivery, service and total cost.

Our vision as a global provider is to be the Supplier of Choice for on/off process valve solutions in chemical, power and refining, known for best-in-class customer responsiveness.



Quick access to high-demand stock



Engineering support



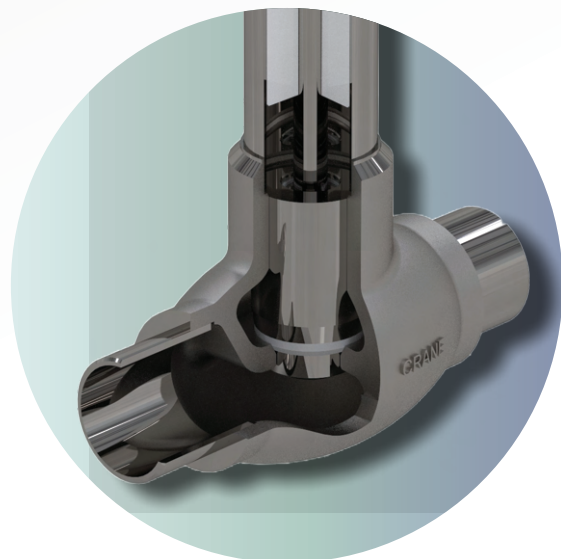
System design and drawings



MRO services



Training and testing



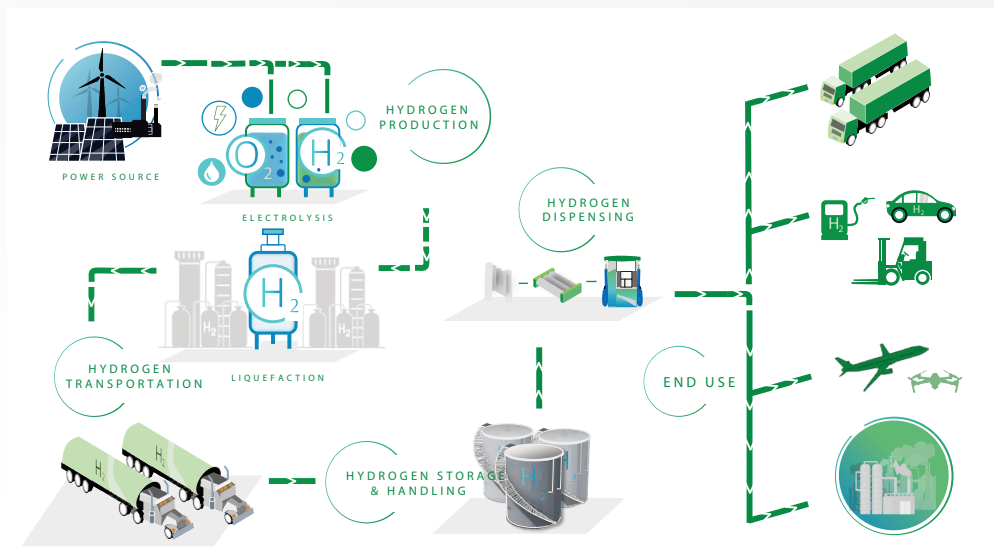
# CRANE CRYOFLO<sup>®</sup>

## INTRODUCTION

For hydrogen energy to be an effective and efficient alternative to fossil fuels, liquefaction plants, storage facilities, transportation methods and pipelines must be outfitted with state-of-the-art PVF (Pipe Valves and Fittings) components. Crane<sup>®</sup> CRYOFLO<sup>®</sup> will be focused on solving Customer's toughest challenges within the Hydrogen Industry backed by decades of field experience in severe service applications.

Crane<sup>®</sup> CRYOFLO<sup>®</sup> Solutions for Hydrogen:

- Production
- Liquefaction
- Transportation
- Transfer
- Storage



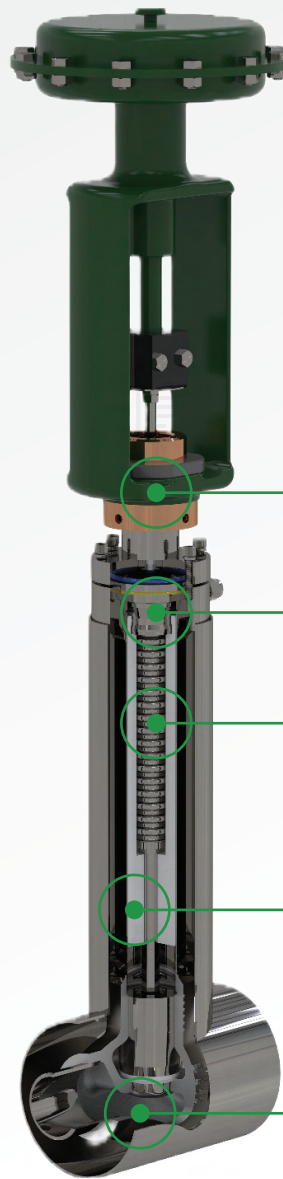
Learn More Here:



# CRANE CRYOFLO® BELLOWS SEAL T-GLOBE

CRANE CRYOFLO® Bellows Seal T-Globe Valves stop Hydrogen loss by minimizing heat transfer rates, reducing pipeline latency in liquid transfer applications and leveraging bellows zero-leak design.

- ✓ **Size Range**
  - ½" to 6" NPS
- ✓ **Pressure Ratings**
  - 300 psi MAWP
- ✓ **Assembly Configurations**
  - Vacuum Jacketed and Non-Jacketed
  - Extended bonnet/stem per MSS-SP-134
  - Custom extended bonnets/stems available
  - Cold-box Cuff option
- ✓ **Typical Applications**
  - Production, transportation, transfer, and storage of Hydrogen and other cryogenics.



Easily convert from manual handwheel to actuation.

Unique cartridge replacement system for efficient in-line maintenance

Proven bellows design for high life cycle

Vacuum barrier and Improved design minimizes heat leak and media boil-off.

Innovative valve internals deliver improved CV while maintaining highest industry bubble-tight shut-off standards.

*\*Technical details applicable to both valves.*

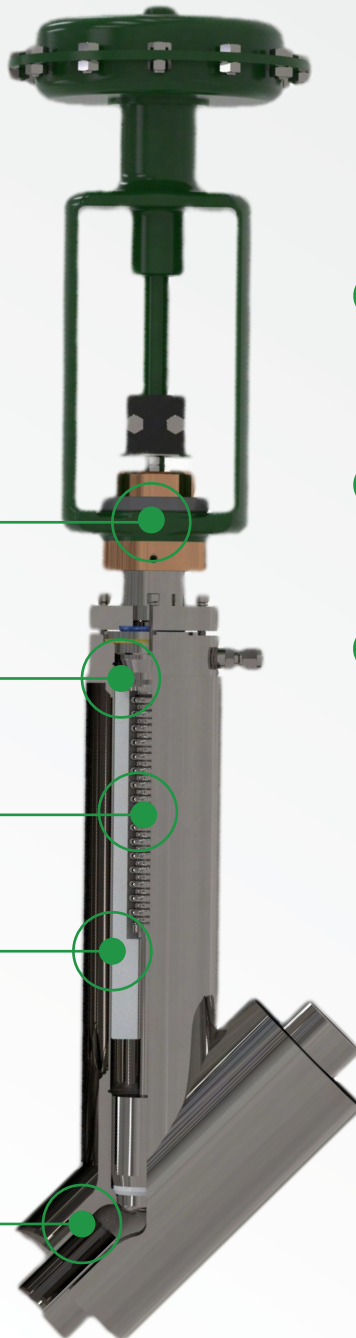
**Designed for LH2 and other key industrial gases such as LIN, LOX, LAR, LHe, and LNG. Rated to -253°C (-423°F)**

Targeting 6-8 week lead times for standard configurations.



# CRANE CRYOFLO® BELLOWS SEAL Y-GLOBE

CRANE CRYOFLO® Y-Pattern Bellows Seal Globe Valve features lower pressure drop, tight shut-off, and enhanced durability, all contributing to overall improved efficiencies.



## ✓ Operating Option

- Handwheel
- Pneumatic Actuation
- Electric Actuation

## ✓ End Connection

- Pipe stub ends
- Butt-weld

## ✓ Compliance

- Designed and Tested to MSS-SP-134 and ISO-28921
- Korean Gas Safety (KGS) Approval
- Canadian Registration (CRN)
- ISO-15848 Fugitive Emissions
- Oxygen clean option per CGA G-4.1
- Fire Safe Design

*\*Technical details and benefits applicable to both valves and Lift-Check.*

Learn More Here:



# CRANE CRYOFLO<sup>®</sup> LIFT-CHECK VALVE

CRANE CRYOFLO<sup>®</sup> Lift-Check Valves stop product loss by minimizing heat transfer rates, reducing pipeline latency in liquid transfer applications and leveraging bellows zero-leak design.

- ✓ **Size Range**
  - ½" to 6" NPS
- ✓ **Pressure Ratings**
  - 300 psi MAWP
- ✓ **Assembly Configurations**
  - Vacuum Jacketed and Non-Jacketed
  - Extended bonnet/stem per MSS-SP-134
  - Custom extended bonnets/stems available
  - Cold-box Cuff option
- ✓ **Typical Applications**
  - Production, transportation, transfer, and storage of Hydrogen and other cryogenics.
- ✓ **Materials of Construction**
  - 316 Stainless Steel
- ✓ **End Connection**
  - Pipe stub ends
  - Butt-weld
- ✓ **Compliance**
  - MSS-SP-134
  - ISO 15848
  - Fire Safe Design
  - Oxygen clean option per CGA G-4.1



**Designed for LH2 and other key industrial gases  
such as LIN, LOX, LAR, LHe, and LNG. Rated to -253°C (-423°F)**

Targeting 6-8 week lead times for standard configurations.

# KEY FEATURES

Crane CRYOFLO® Valves minimizes Hydrogen loss by improving heat transfer rates, reducing pipeline latency in liquid transfer applications and leveraging a robust zero-leak design.

Thermal performance and the Flow Coefficient are two of the most critical aspects to consider when designing high-efficiency cryogenic valves. Utilizing CFD simulations & analysis integral to the design and development of new products, Crane CRYOFLO® is pushing boundaries in Hydrogen.



## REDUCED HEAT LEAK

Enhanced engineered design offers best-in-class heat transfer, greatly reducing Hydrogen loss.



## IMPROVED CV

Innovative valve internals (standard and jacketed designs) deliver improved CV in your application, improving liquid transfer times.



## IN-LINE REPAIR

Unique cartridge replacement system allows for in-line repair, solving the toughest challenges with minimal down-time.

*\*Technical details and benefits applicable to both valves and Lift-Check.*

Learn More Here:



# CRANE CRYOFLO® VALVE FEATURES



## Standard Features

- ½" to 6" NPS
- Proprietary PTFE insert design to limit bonnet dead volume
- Metal-to-metal secondary seat seal
- Spiral wound bonnet flange gasket for improved sealing



## Actuator Mounting

- Easy conversion between handwheel and actuator
- Fits most common actuator solutions



## Added Applications

- Liquid Hydrogen
- LIN, LAR, LOX, LNG, L-CO2



## CRANE CRYOFLO® vs Competition Cost Savings Per Year

*Model represents the typical liquid hydrogen storage transfer cost and product loss based on a 1.5" BSGV, 4 hours of tank transfer per day with 2 valves involved in each tank transfer assuming a base LH2 price of \$9.00/kg.*

**TYPICAL**  
Cost/Year  
**\$150,000**

*In Media loss and liquid transfer*



**TYPICAL SOLUTIONS**



**CURRENT BEST-IN-CLASS**



**CRANE CRYOFLO® ADVANTAGE**

**NEW!**  
**CRANE CRYOFLO®**  
*Savings/Year*  
**\$24,000/tank**

*Improves CV and heat transfer for enhanced flow & media containment*

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