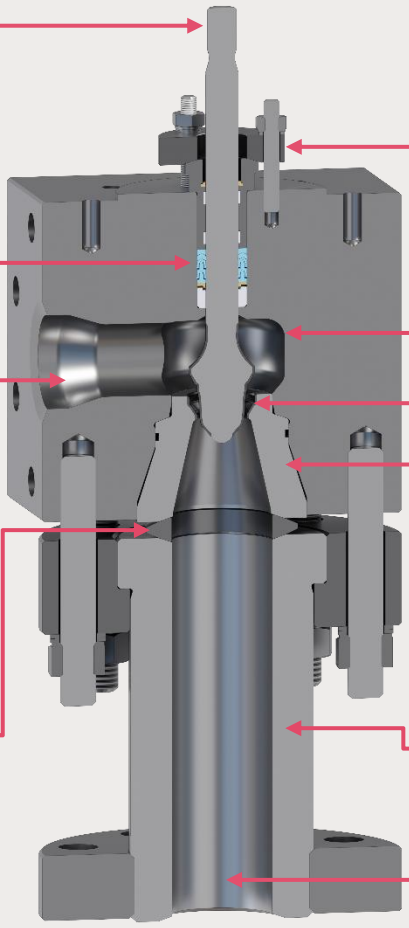
# Process Automation

## IMI CCI

Urea+

Valve for Urea fertilisers

Breakthrough engineering for a better world




# BEU Valve

# IMI Urea+

IMI manufactures high-performance urea valves designed specifically for the demanding conditions of urea process control and production. These valves are engineered to withstand the highly corrosive nature of carbamate solutions and ammonia, which are key components in urea synthesis. IMI's urea valves typically feature high-alloy stainless steels, such as Duplex and Super Duplex materials, to ensure superior corrosion resistance and extended service life. Their designs prioritise zero leakage, using tight shut-off trims and specialised sealing technologies to prevent contamination and ensure operational efficiency in high-pressure and high-temperature environments.

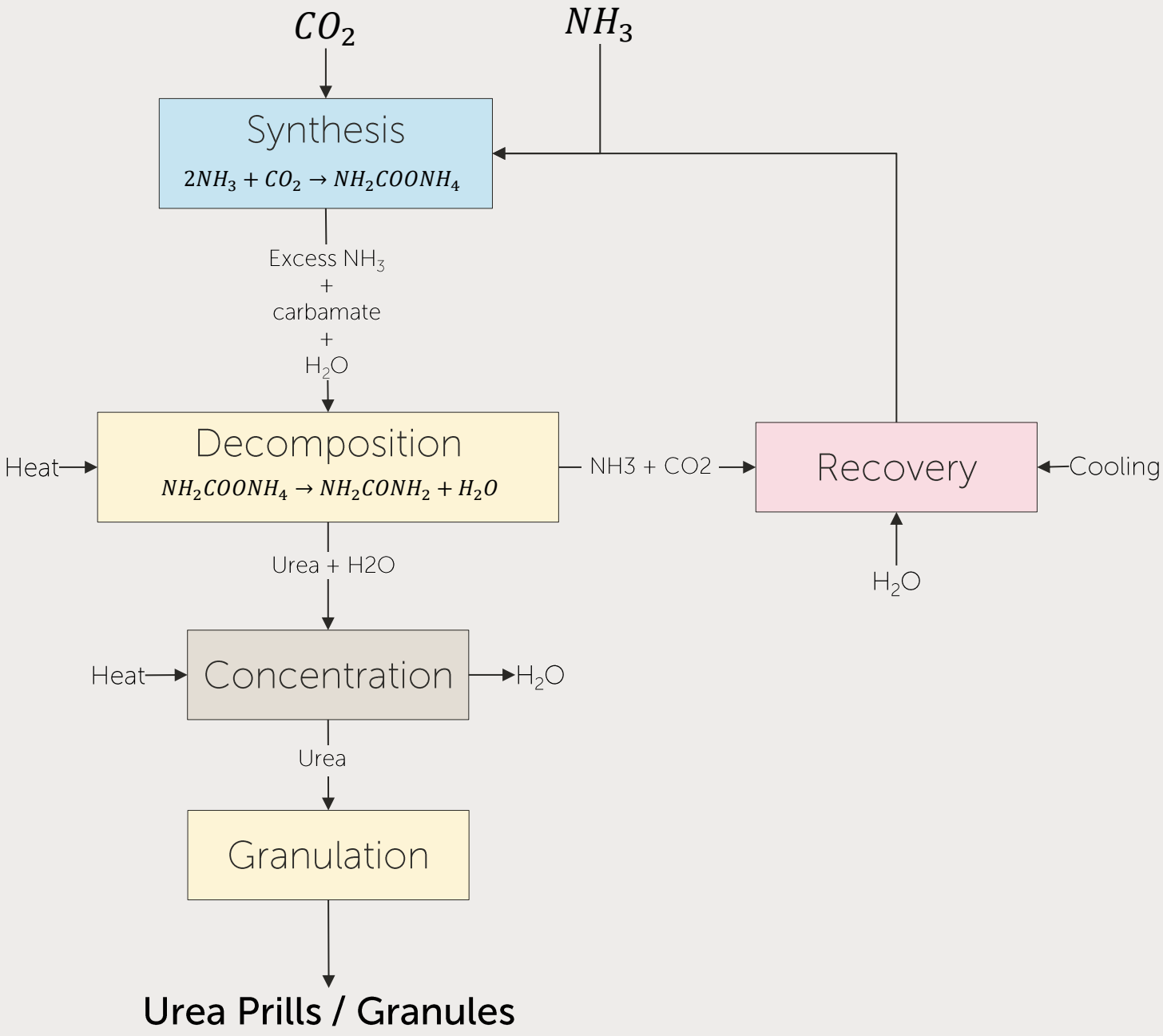
## BEU Valve Series - Engineered for Reliability

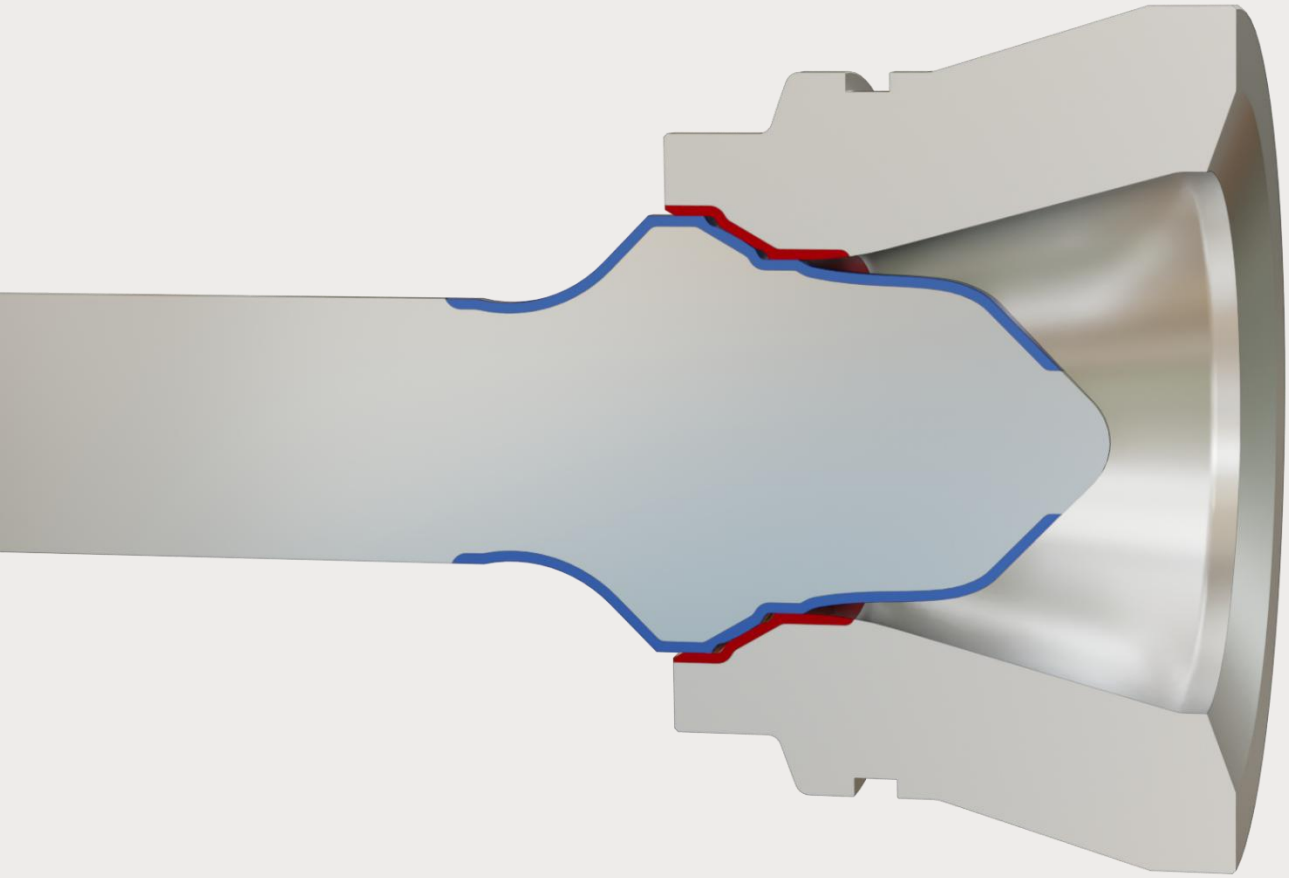
The BEU control valve series is specifically developed to provide unmatched performance in handling aggressive, corrosive, and crystallising fluids typical in Urea processing applications. Thanks to an optimised internal flow path and the strategic use of forged duplex and super-duplex materials, BEU valves exhibit superior resistance to erosion and corrosion, even under extreme pressures (up to 260 barg) and elevated temperatures (up to 230°C).

# Urea Production Process

## The Urea Production Process in Detail

Urea ($CO(NH_2)_2$) is an essential nitrogen-based compound used primarily as a fertiliser and in industries like chemical manufacturing, pharmaceuticals, and resins. It is produced industrially through the Haber-Bosch process (for ammonia synthesis) followed by the urea synthesis process. Below is a step-by-step breakdown of how urea is manufactured:





# Key Features

### High-Performance Corrosion-Resistant Materials

High-end duplex and super duplex alloys, with proven corrosion resistance even in low oxygen environments.

### No Dead Zone Design

Eliminates stagnant areas to prevent crystallisation, clogging, and accelerated corrosion. Design is optimised to limit the amount of internal crevices.

### Cavitation Resistant Trim

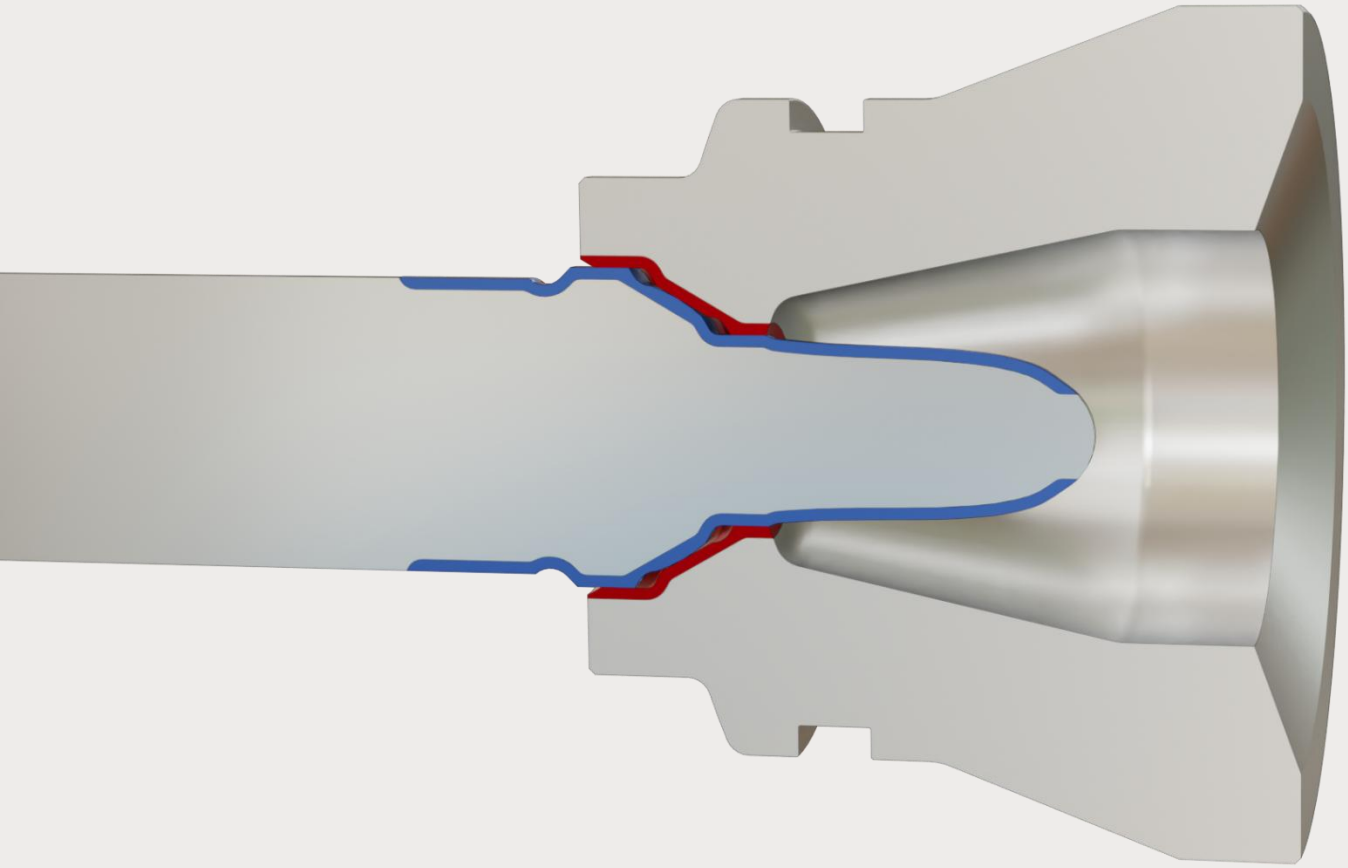
Utilising proven IMI cavitation resistant technology, the contoured plug geometry significantly reduces the risk of cavitation damage, enhancing valve longevity. Ideal shape of the Control element characteristics provides so much needed reliability of the leakage-free valve operation.

### Dead Strokes and Flushing Pockets

Strategically integrated to minimise urea/ammonia impingement and protect critical sealing surfaces, thus extending maintenance intervals.

### Innovative Spray Coating (Optional)

Coatings significantly increase the service life of flashing and cavitation exposed areas. Our spray coating is based on superalloys providing corrosion resistance under high pressures and temperatures in erosive environments.. High end spray technology permits the deposition of highly homogenous layers with unique microstructures that resist cavitation and minimise the corrosive efects of working media, including flashing or outgassing of urea/ammonia.



# Key Features (cont.)

### EEEasy-Seal™ Technology

Our state-of-the-art packing systems ensures you achieve leakage-free operation. EEEasySeal features self-energising spring technology combined with a scraper system that ensures simplified maintenance, superior sealing performance and extended valve life.

### Live-load Seal Technology

Robust braided yarn packing, externally loaded by belleville spring system. Minimal loss of pre-compression is ensured over time, thus providing leakage free operation. Suitable for operation under extreme vibration and/or for optional flushing / preheating of packing.

### Actuation

Our SC/V actuator is the urea industry standard for critical high-pressure control valves. When used in combination with IMI's SHP positioner it enables real-time valve health monitoring, predictive diagnostics, remote access and fast failure identification while operational. It comes ready for IoT ecosystems including offline dynamic frequency tests as well as prememptive maintenance.

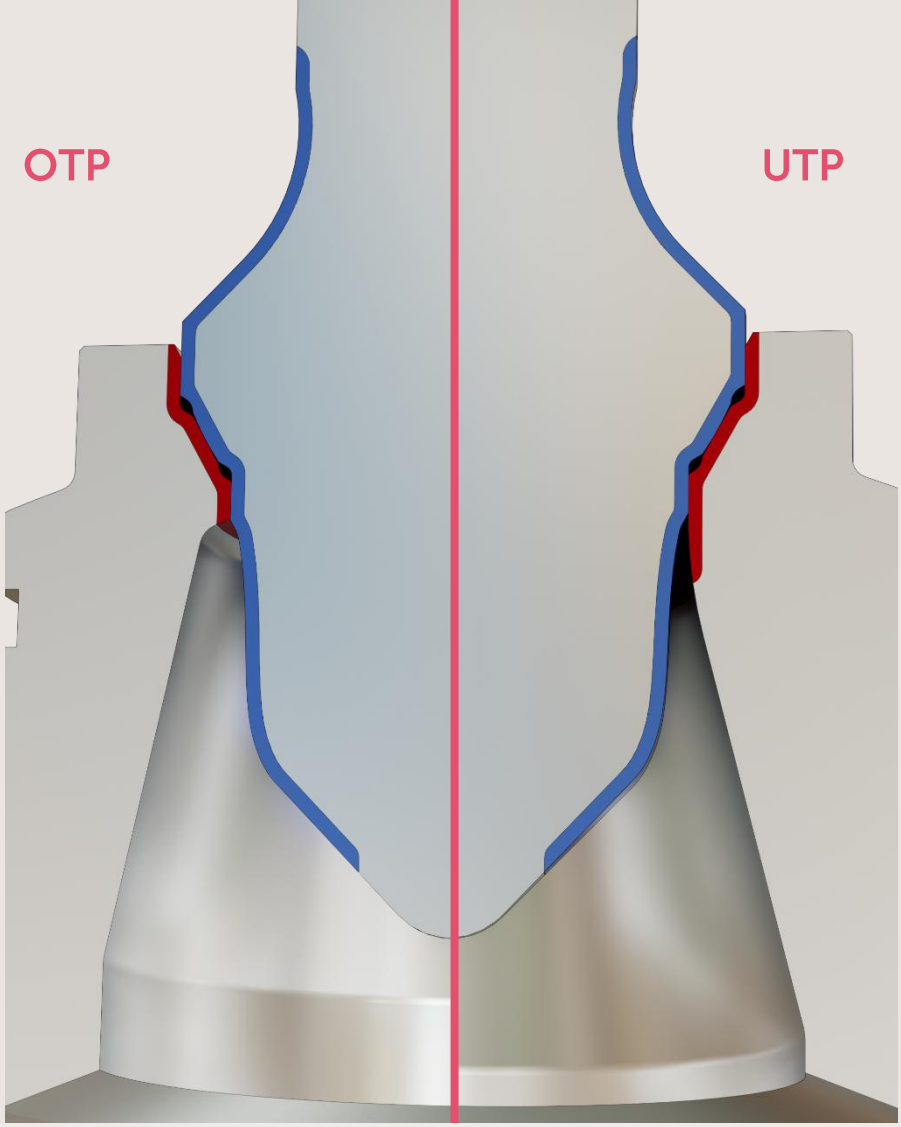
## Optional:

### Electrical Heat Tracing

Available upon request, electric tracing ensures optimal operational temperatures, validated through advanced CFD and FEM analyses.

### Flexible Connection Options

Valves can be equipped with flange connections compliant with DIN, ASME, EN, or customised lens-type flanges based on Licensors requirements.




# Valve Specification

## Available Configurations

- High Pressure Drop (High Δp)
- Low Pressure Drop (Low Δp)
- On-off Valve (Minimum Δp)

## Valve Trim Size*

- DN10 to DN100 ~ 3/8" to 4" (High Δp)
- DN100 to DN250 ~ 4" to 10" (Low Δp)
- DN25 to DN250 ~ 1" to 10" (On-Off)

## Flow Direction

- Over The Plug (OTP) = „Flow Over"
- Under The Plug (UTP) = „Flow Under"

## Leakage Classification per ANSI/FCI 70-2 and EN 60534-4

- Class IV (standard)
- Class V

*** Available body sizes:**

- Body size can be modified as per specific customer demands based on application needs and piping recommendations.

## Packing Arrangement

- EEEasy-Seal™ technology
- Live-load Technology

## End Connection Styles

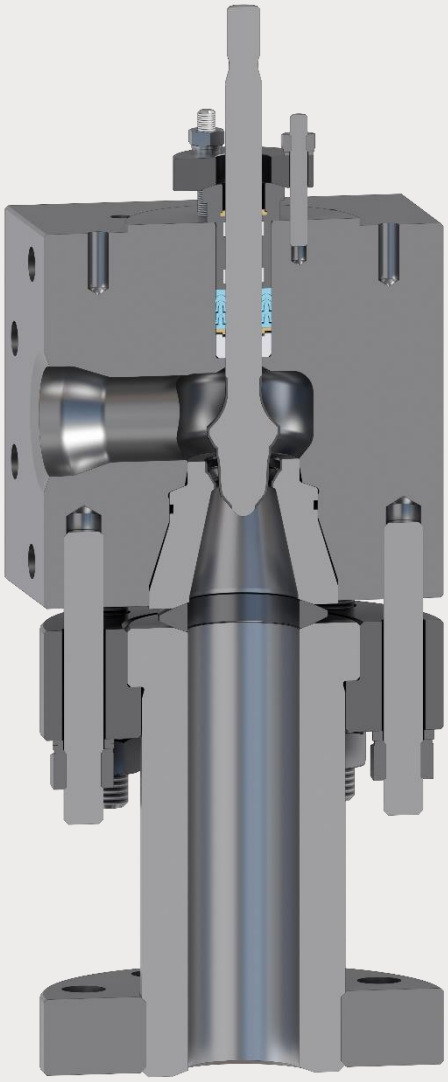
- Lens Ring Gaskets acc. DIN 2696 or custom
- Flanged Ends according to ASME B16.5 or EN 1092-1:
- Other connections on request

## Flow Characteristic

- Hybrid (for flashing and cavitating – High Δp)
- Equal Percentage (Low Δp)
- Quick Opening (On-off)

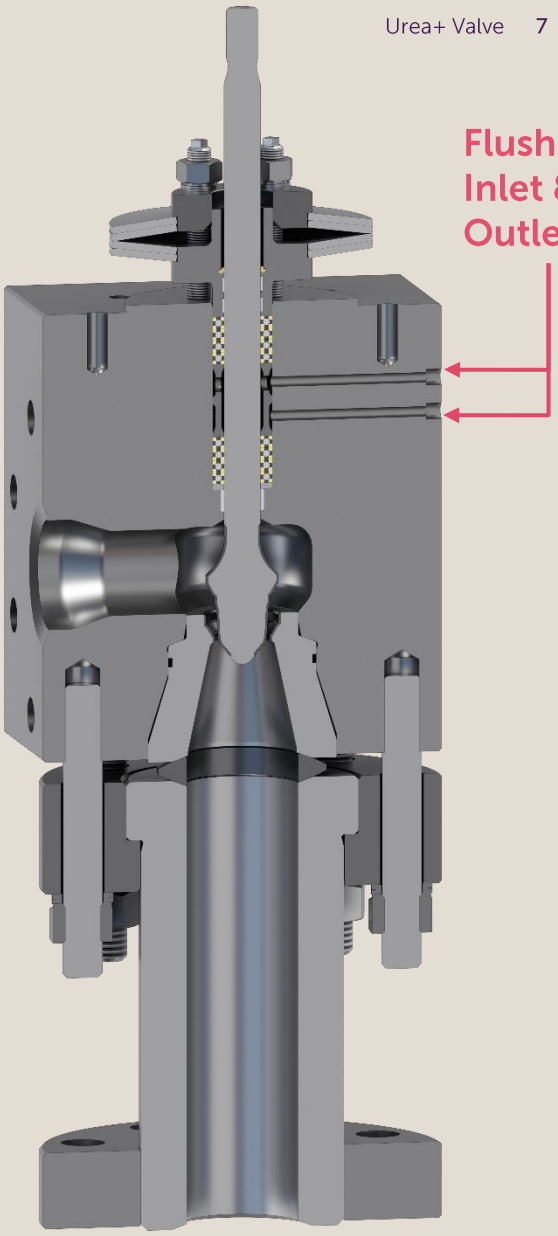
## Maximum Inlet Pressures and Temperatures

- As specified for the Valve Application. Valves can be rated in accordance with various ASME and EN rating classifications



## EEEasy-Seal™

- Space-saving design
- Cost-effective
- Self-energised no pre-compression
- Low friction
- Well-proven design in O&G industry
- Low fugitive emissions ready

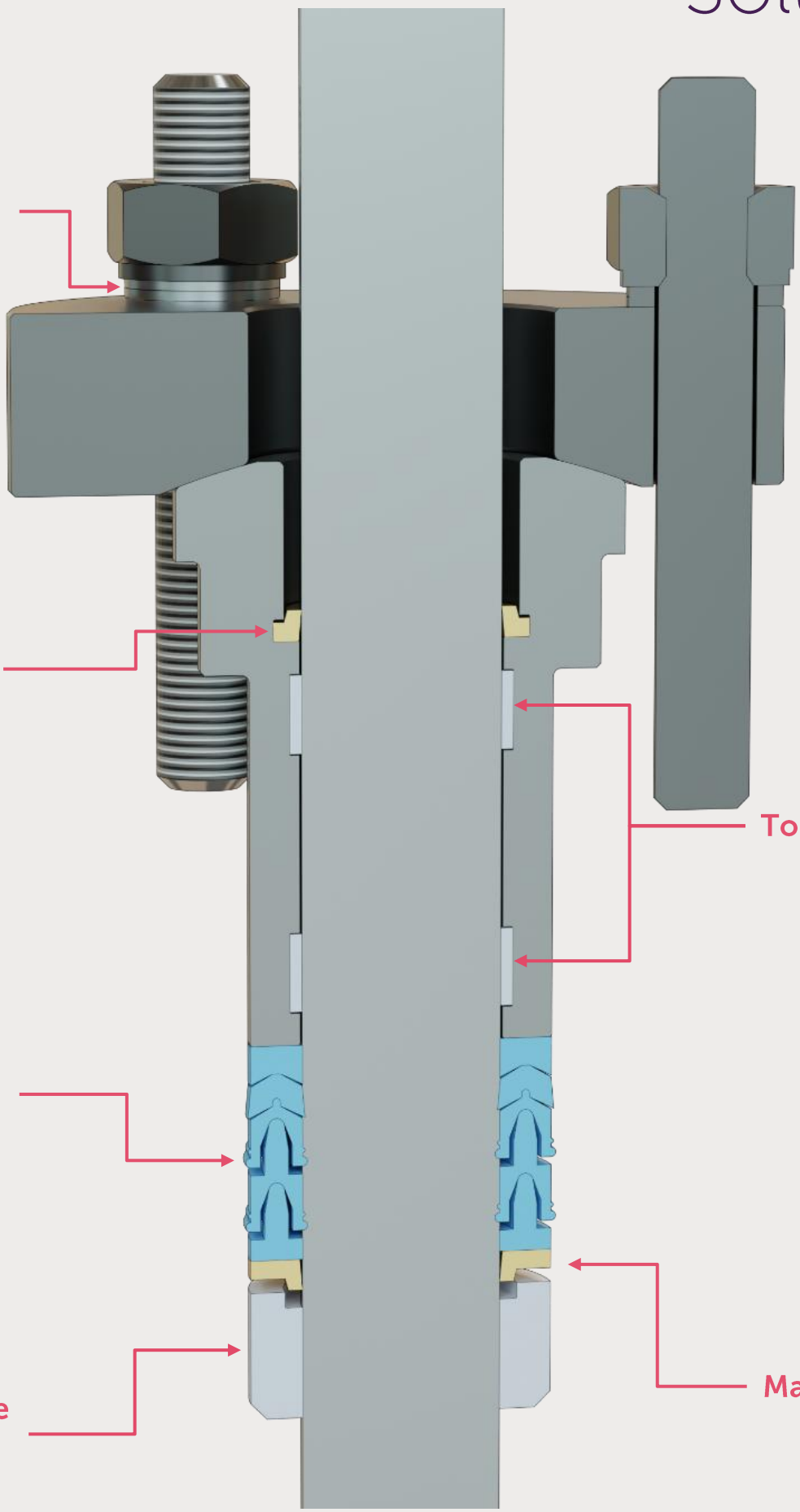



## Live-load

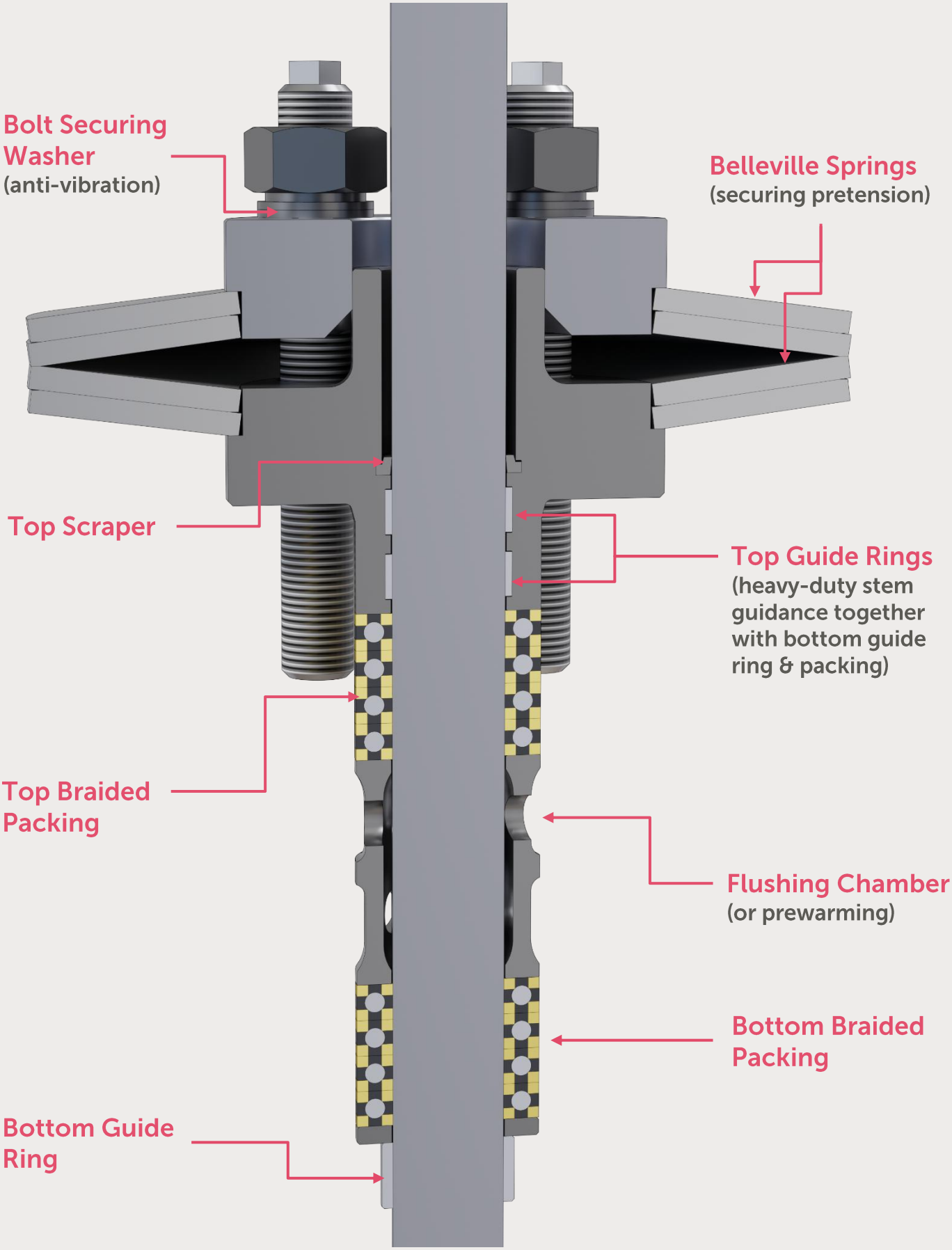
- Single stack (standard)
- Dual stack (flushing / prewarming)
- Robust design
- Enhanced vibration resistance
- Limited loss of pre-compression
- Supress of crevice corrosion

## Configuration Efficiency: Stem Packing vs. Friction Force

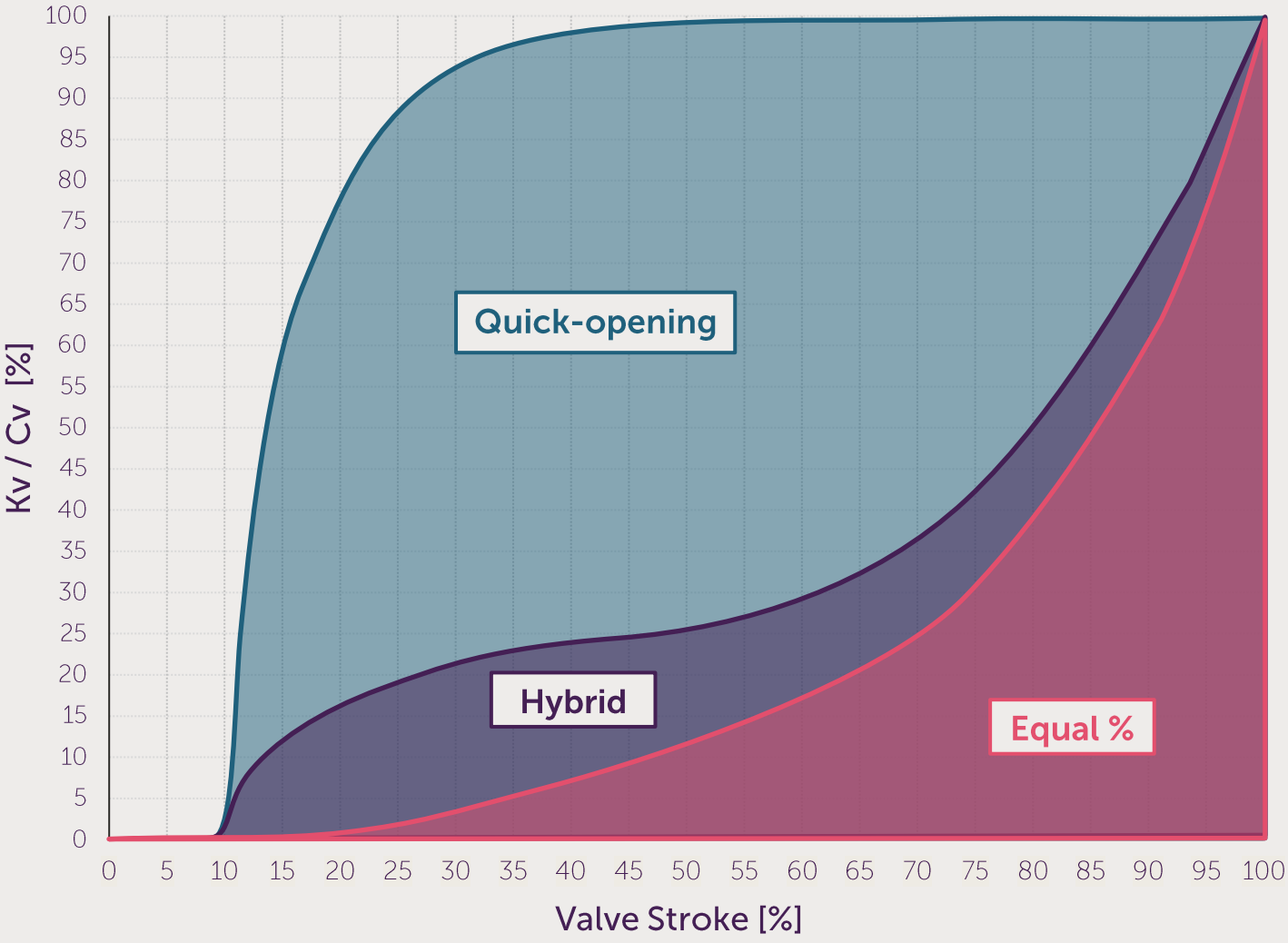
# EEEasy-Seal™ packing Solution



# Live-load packing Solution



# Kv/Cv vs. Stroke Curves




# Flow characteristics

Valve trim designs are optimised based on pressure drop (Δp) requirements to ensure effective energy conversion and flow control.

## Hybrid = High pressure drop

- Used for high Δp applications requiring controlled energy dissipation with enhanced erosion protection.
- The hybrid curve combines linear and equal percentage behaviour to guarantee the protection of seating surfaces (stem/plug) with dead stroke region and valve controllability.

## Equal percentage = Low pressure drop

- Applied where moderate Δp is present and accurate flow control is needed.
- The equal percentage curve provides fine control at small openings, i.e.: increased valve rangeability.

## Quick-opening (on-off) = Minimum pressure drop

- Used in isolation or on-off valves or systems requiring minimal pressure loss.
- The quick-opening Kv/Cv curve enables rapid full open/close with negligible throttling.

# Photo of a manufactured BEU Valve from the completed project

# Process Automation



## IMI CCI

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