



TRIFORCE

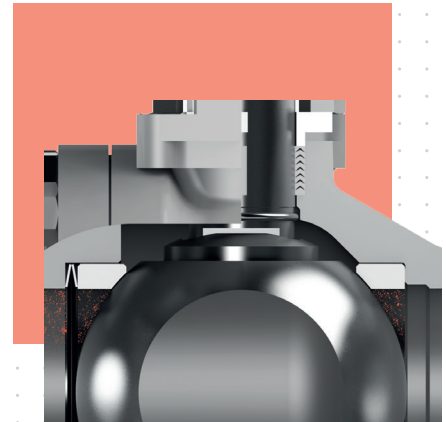
valves and actuators

severe SERVICE

The Tri-Force valve can be operated with the absolute guarantee of a tight seal, even in cases where fluids solidify or crystallize in the body cavity, because the contact surfaces between the ball and seats are lapped together in order to form a perfect match.

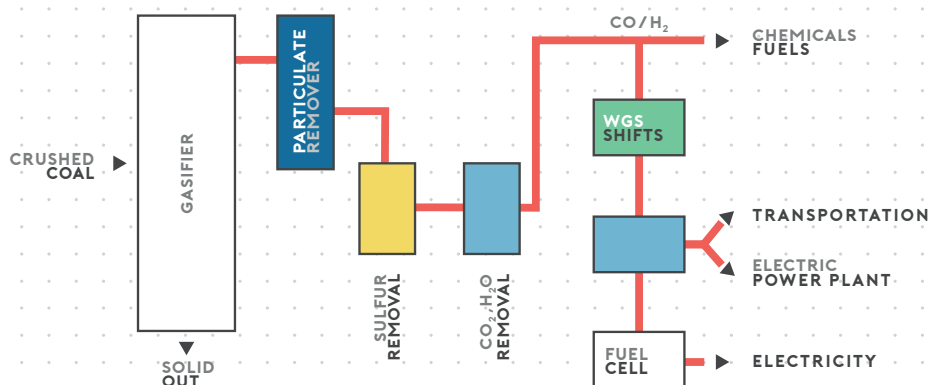
This provides two additional operational benefits, when operating in harsh services:

- ▶ During operation, including valve stroking, no foreign matter can be trapped and/or forced between the seat and ball. There are no components which can become seized.
- ▶ During rotation, the ball and seats are designed to provide a wiping action, removing any foreign matter, thereby preventing any problems occurring with the sealing surfaces.



coal GASIFICATION

This technology allows fuel production by channeling coal, oxidizers, oxygen and water vapor together towards the gasifier where they are then heated. During the reactions, the coal's molecules are partially oxidized and produce a gaseous mixture of carbon dioxide, carbon monoxide and hydrogen. The end product of the process is syngas (synthetic gas), a combination of H_2/CO ; with further refinement, additional hydrogen is produced.

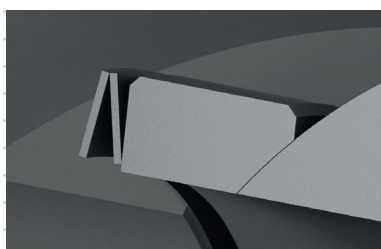


The **TriForce** was developed to operate in the most severe services while ensuring integrity for the most critical applications.

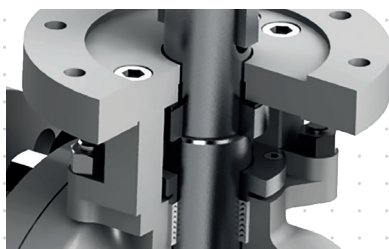
high performance metal floating BALL VALVE

- 1 ▶ Belleville spring flexibility accommodates the thermal expansion of the internal components.

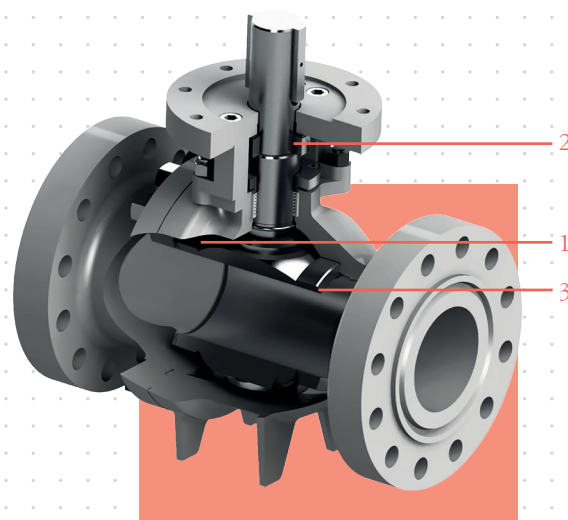
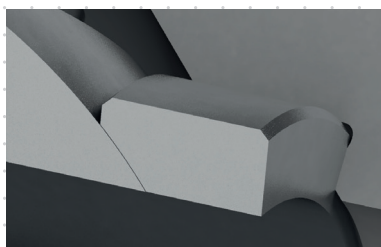
Even in the case of severe temperature fluctuations, the design is such that it prevents thermal lock.



- 2 ▶ Robust stem is designed to accommodate severe services, and is blowout proof.



- 3 ▶ Downstream non-floating seat ring is shouldered into the body. The seat-to-ball contact is fully lapped metal-to-metal, eliminating particle entrapment.



**SEVERE
SERVICE**

(*) For weights and dimensions, contact PetrolValves.

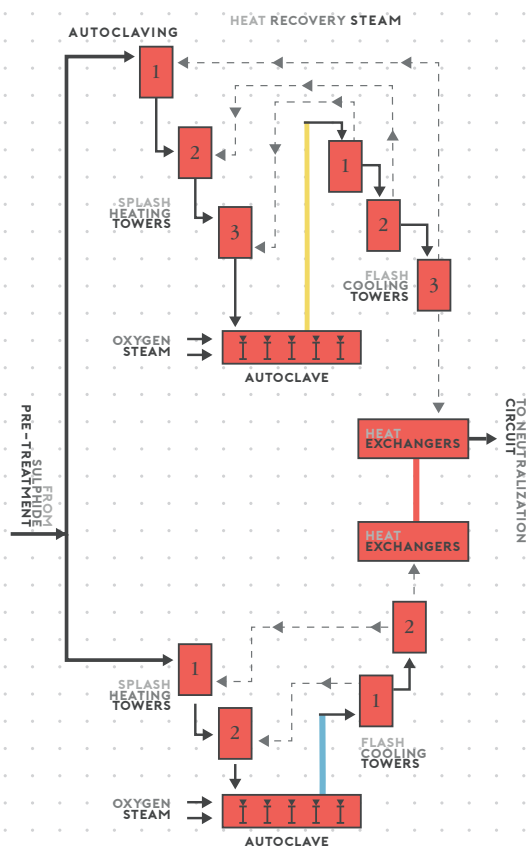
mining

AUTOCLAVE

Gold and nickel extraction involves leaching processes, in which the ores are brought into contact with a lixiviant (sulphuric acid and ammonia are the most common leaching mediums), and by reaction, the desired metal component is dissolved into the aqueous phase.

TriForce ball valves are designed to completely meet the severe operating conditions of high pressure and temperature reached in autoclave processes also taking into account the presence of slurries.

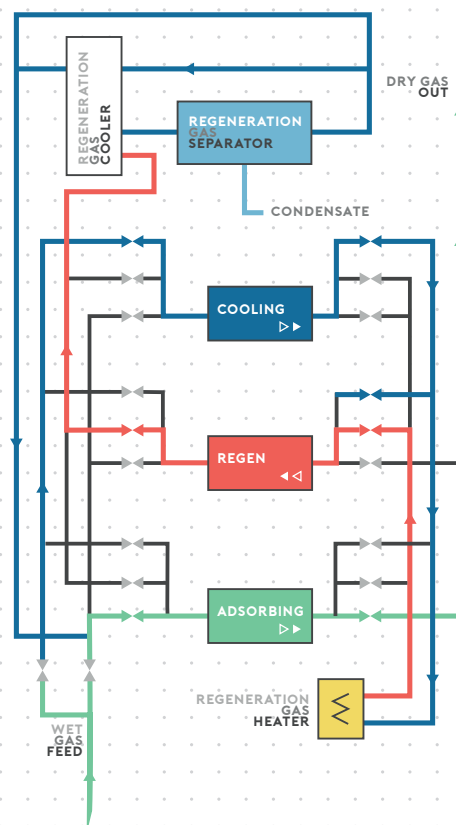
TYPICAL MATERIAL SELECTION		
BODY	Titanium alloy Gr. F-12	
BALL	Titanium alloy Gr. F-12	Ceramic Coating
SEAT RINGS	Titanium alloy Gr. F-12	Ceramic Coating
STEM	Titanium alloy Gr. F-12	
STEM GASKET	Braided/die formed shaped rings	Spring energised

molecular
SIEVES

In the oil & gas industry these plants perform the absorption, via a silica gel separator, of free water and contaminants associated with extracted natural gas streams. When the saturation of the sieves is reached, functional regeneration is needed; to this end the gas separator is flushed with hot (280°C) dry gas to remove water, then, before a new operating phase commences, the reactor is cooled by flushing with gas at ambient temperature.

The regeneration process is carried out 1500/1700 times per year for each gas separator. **PV** has supplied severe service valves for each phase of this application.

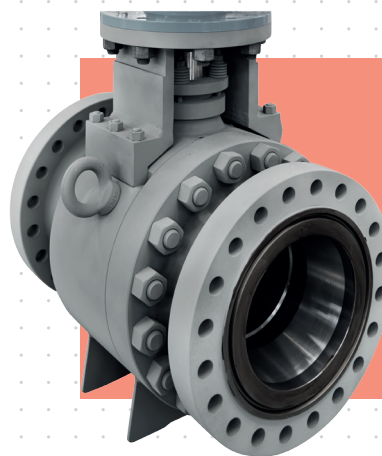
TYPICAL MATERIAL SELECTION		
BODY	A350-LF2	
BALL	A182 F6NM	Chromium carbide Coated
SEAT RINGS	A182 F6NM	Chromium carbide Coated
STEM	A564-TP630	
STEM GASKET	Braided/die formed shaped rings	Spring energised



uses of TRIFORCE

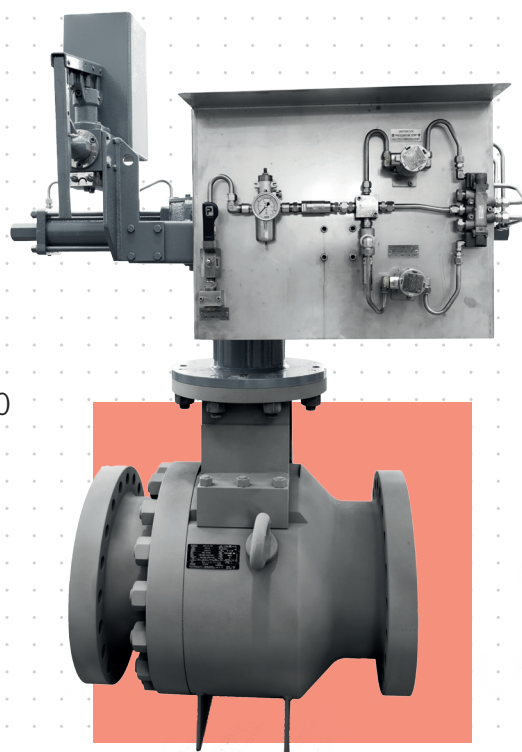
The ideal valve for:

- ▶ Molecular Sieve Service
- ▶ Hot Oil
- ▶ Oil Sands
- ▶ Mining Applications
- ▶ De-Coking Applications
- ▶ Emergency Shutdown
- ▶ Coal gasification



main FEATURES

- ▶ Long life in severe applications and frequent operation
- ▶ Bi-Directional Sealing capability (optional for specific applications)
- ▶ -50°F to +800°F temperature capability as standard
- ▶ Cryogenic and Ultra-High Temperatures design upon request
- ▶ End to End dimension according to API6D/ASME B16.10
- ▶ Bubble tight during standard test as per API 6D





MANUFACTURING PLANT

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