DURCON

THE RIGHT PRODUCT FOR YOUR APPLICATION

Vice

40 years

# STEAM TURBINE BY-PASS AND STEAM CONDITIONING VALVE

## Benefits

- Savings of up to US$ 200.000 per year in maintenance costs
- Production gains due to superior stability of the temperature control
- Operational and personnel safety
- Exceptional plant operational availability (no stops)
- Minimizes installation costs due to horizontal installation
- Long operational life

## Characteristics

- Designed for low noise continuous duty
- State-of-Art technology with separation of pressure reduction from temperature reduction systems
- 90 years of experience
- Rangeability up to 1:100
- Impressive durability and long useful life
- For turbines up to 1000 MW
- In place commissioning, training and maintenance

ISO 9001 BUREAU VERITAS Certification

FUNDAÇÃO ABRINQ RECONHECE | EMPRESA AMIGA DA CRIANÇA

CE

**Valves**

- Isolation
- Steam turbine by-pass and steam conditioning valves
- Pre-heaters by-pass
- Automatic recirculation control for centrifugal pumps
- Steam turbine extraction isolation and actuated non-return (Check)
- Low Isolation of steam turbine inlet
- Atmospheric vents and boiler start-up
- Medium and low pressure steam pipe relief
- Gate; Globe and Check
- Severe service blocking and draining
- Intermittent and continuous blow-down

**Accessories**

- Two color boiler water level gauge
- Boiler water level electronic alarm and indicator

## A HISTORY OF EXCELLENCE AND GROWTH

**DURCON** is a premium manufacturer of industrial valves in Brazil. It combines high standards in technology, quality and productivity, with tradition, experience and reliability.

Founded in 1974, **DURCON** employs 200 workers in 4 (four) manufacturing plants in Brazil and the EUA. The total plant area is 20 thousand square meters.

The company produces a wide range of high technology valves, with over 2 hundred thousand valves sold, with sizes ranging from ¼" to 120" and pressure class up to 4500#. We are present in Latin America, North America, Europe and Asia.

Our QMS is ISO 9001:2008 certified for design, development, manufacture and service. We are also PED 97/23/EC (Pressure Equipment Directive) certified, (CE Mark).

Custom-made and Specialty Valves
Cajamar - SP - Brazil

Serial-made Valves
Cajamar - SP - Brazil

Specialty Valves
Three Rivers - Michigam - USA

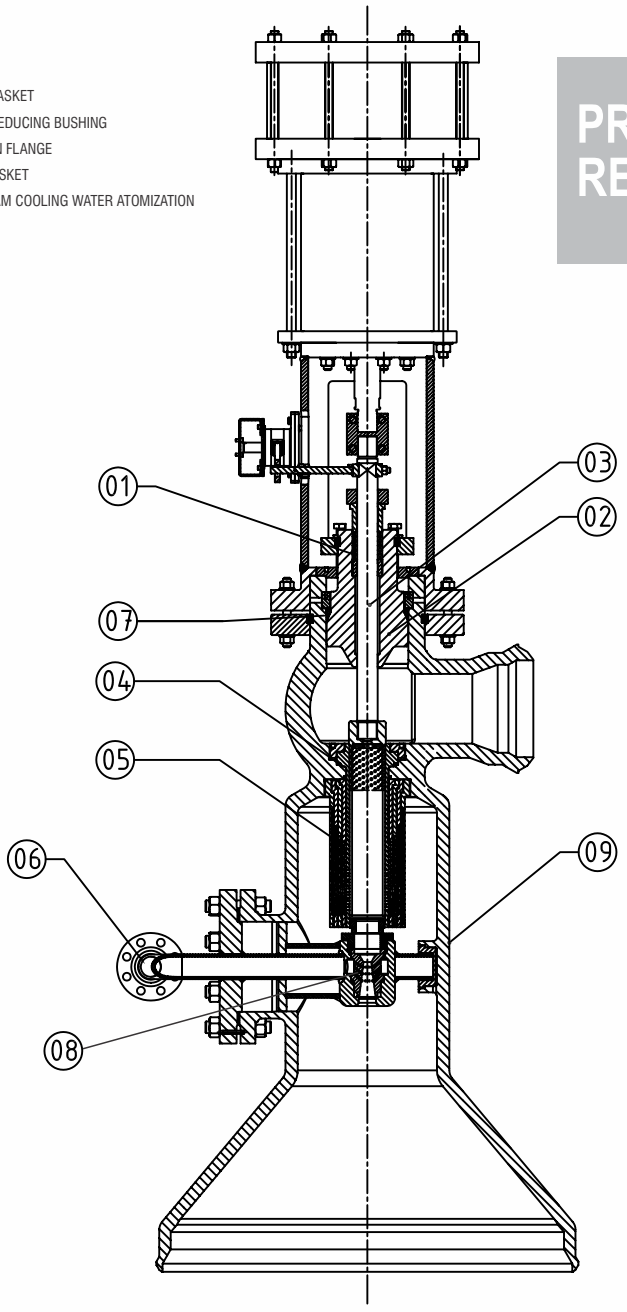
Steel Foundry
Caieiras - SP - Brazil

Under construction
Franco da Rocha - SP - Brazil

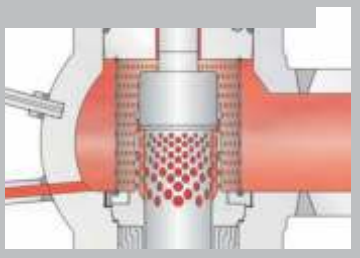
Most important characteristics of Durcon´s Steam Conditioning and Turbine by-pass valves

- Designed for continuous operational duty
- Exceptional rangeability
- Multi-stages pressure reduction for low noise (? 85 dBA) and low vibration sub-critical decompression, throughout the operational load range
- Replaceable internals without removing the valve from the line
- Cooling water injection after and separated from pressure reduction system eliminates pipeline cracking
- Spherical body to reduce tensions
- Customized designs
- Cooling water atomization with motive steam with special two-component nozzle located in the center of the pipeline prevents heath-shock cracks and excess of cooling water injection
- Superior temperature control of outlet steam due to cooling water atomization with motive steam
- Uniform cooling water atomization throughout the operational load range reduces vaporization distance and eliminates excess water in the pipeline

01 - STEM PACKING
02 - BONNET
03 - STEM AND SPINDLE
04 - BODY-BUSHING SEALING GASKET
05 - MULTI-STAGE PRESSURE REDUCING BUSHING
06 - COOLING WATER INJECTION FLANGE
07 - BODY-BONNET SEALING GASKET
08 - NOZZLE WITH MOTIVE STEAM COOLING WATER ATOMIZATION
09 - BODY

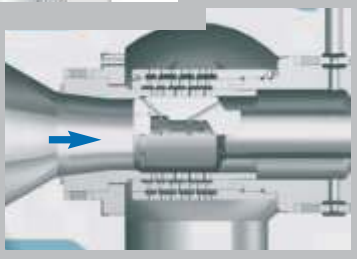



# PRESSURE REDUCTION SYSTEM:



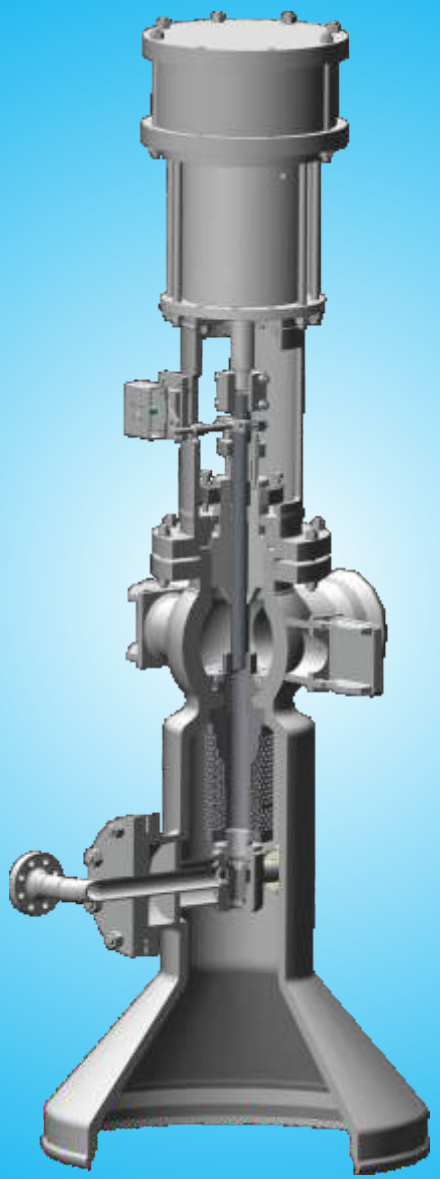
Angular or Z construction

Pressure reduction and Steam flow in line with outlet



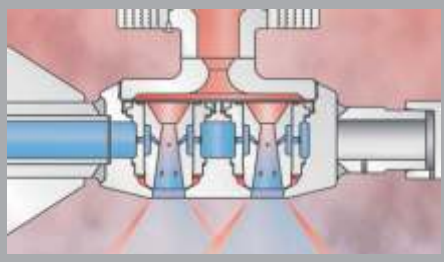
- Robust construction and integral low noise and low vibration systems assures silent operation
- Available lined version as optional Customized design for each specific application
- “Bolted” or “Pressure Seal” body-bonnet connection

| | | Inlet | Outlet |
|---|---|---|---|
| Nominal diameter | | DN 80 to 500 / 3” to 20” | DN 100 to 1600 / 4”to 64” |
| Nominal pressure | | PN 16 to 630 / ANSI 150# to 4500# | PN 16 to 630 / ANSI 150# to 4500# |
| Materials | Forged | 1.0460/A105 - 1.5415/A182 F1 - 1.7335/A182 F12 - 1.7380/A182 F22 - 1.4903/A182 F91 – 1.4901/A182 F92 | |
| | Cast | ASTM A216 Gr WCB – ASTM A217 Gr WC6 – ASTM A217 Gr WC9 – ASTM A217 Gr C12A | |
| Connections | | Welding ends or flanged in all possible design | |
| Control characteristic | | Equal Percentage / Linear / Modified linear / Customer-specific | |
| Seat-Spindle tightening | | Metallic - according to FCI 70-2 class IV and V | |
| Throttling element | | 3 (three) stages fully controlled with additional up to 6 pressure reduction stages with hole bushes | |
| Rangeability ratio | | up to 1:100 | |
| Actuator | | Pneumatic – Electrical multi-turn – Electric linear – Hydraulic – Customer specified | |



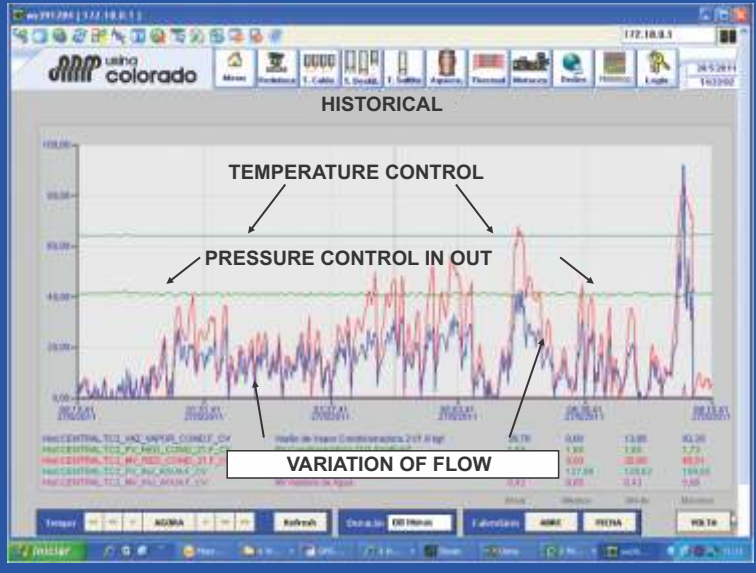
# STEAM TEMPERATURE REDUCTION SYSTEM:

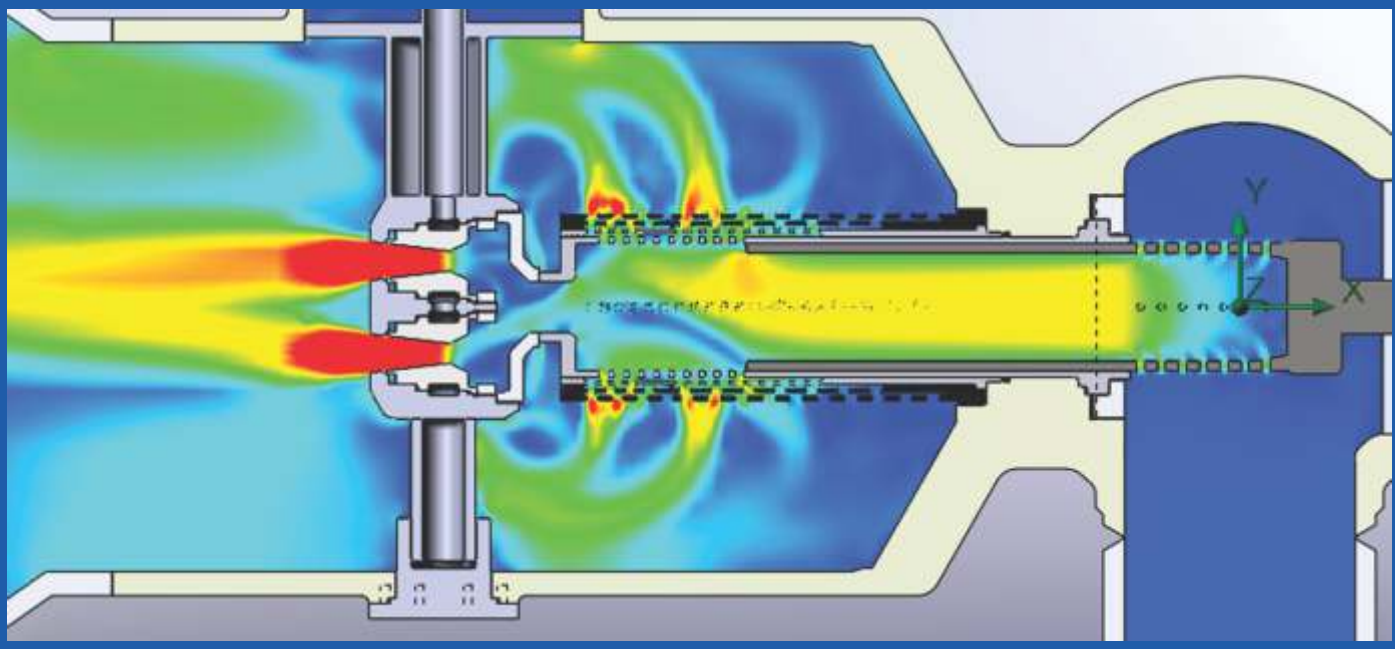
Center-line cooling water atomization with high velocity motive steam in Venturi type two-components nozzles



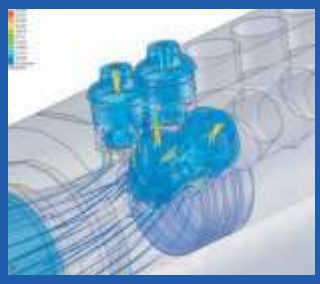
- Superior steam cooling throughout the operational control range with sequencial operation of the nozzles
- Optimized spray angle and cooling water atomization
- Cooling water atomization with motive steam assistance for rapid vaporization
- Two-components nozzles with internal motive steam mixing
- Thermal protection prevents the formation of heath-shock cracks in the pipeline and assures long operational life
- Steam assisted vaporization prevents excess of cooling water inside the outlet pipeline

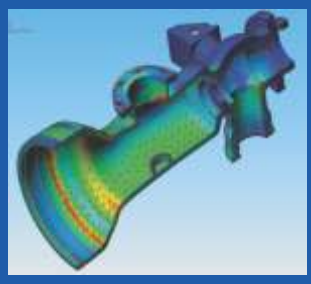
Actual graphic showing the result of a Durcon Steam Conditioning valve during a period of 8 hours with perfect outlet steam pressure and temperature control throughout the flow a variations of 1:100 rangeability ratio

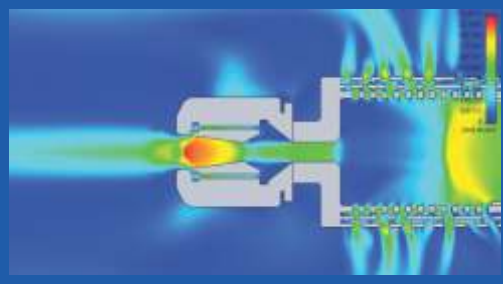





## Technical **Simulation**







## SEQUENTIAL PRESSURE REDUCTION CAPABILITY OF FLUID (STEAM) IN ALL STAGES

Key feature of DURCON´s Steam Turbine By-Pass and Steam Conditioning valves is the separation of the pressure and temperature reduction systems
The pressure reduction is obtained through multi-sequenced decompression stages ensuring sub-critical pressure reduction in each stage. The spindle is designed to the specific requirement of pressure differential and flow conditions.
The seat is formed of various perforated flow restrictor bushes with sequential sub-chambers

The design of the perforated bushing stages forces the steam to change direction and each stage is fastened to avoid the turning out of position
The separation in sub-chambers ensures sub-critical decompression in each stage making it possible the extremely high rangeability in the control ratio.

## MATERIAL (STANDARD DESIGN)

| | |
|---|---|
| Seat and splindle / Stem | ASTM A182 F9 |
| Perforated bushing | ASTM A217 Gr WC9 |
| Packing | Pure graphite |
| Body-Bonnet sealing | Pure graphite |

# Data sheet for selection of Steam Conditioning and Steam Turbine By-pass valve

## 1 Customer data and reference

**Customer name:**
**Reference:**
**Contact:**
**Phone:**
**Address:**
**Prepared by and Date:**

## 2 Units used in filling

**Pressure:** ☐ kgf/cm² g ☐ bar g ☐ PSI g ☐ kPa g ☐ Other _____ g
☐ kgf/cm² a ☐ bar a ☐ PSI a ☐ kPa a ☐ Other _____ a

**Temperature:** ☐ °C ☐ °F

**Steam flow:** ☐ t/h ☐ kg/h ☐ kg/s ☐ Other: _____

## 3 Operating conditions

| | Inlet | | Outlet | | Cooling water(1) | | Flow |
|---|---|---|---|---|---|---|---|
| **Conditions** | Pressure | Temperature | Pressure | Temperature | Pressure(2) | Temperature | ☐ Inlet ☐ Outlet |
| **1 - Maximum** | | | | | | | |
| **2 - Normal** | | | | | | | |
| **3 - Minimum** | | | | | | | |
| **4 - Other** | | | | | | | |
| **5 - Other** | | | | | | | |
| **6 - Other** | | | | | | | |

?? Valve?inlet
**Max. Project pressure:** _____
**Max. Project temperature:** _____

?? Valve?outlet
**Max. Project pressure:** _____
**-Max. Project temperature:** _____

?? Cooling?water
**Inlet pressure of injection control valve (1):** _____
**Inlet pressure of steam conditioning valve (2):** _____
**Max. Project pressure:** _____
**Max. Project temperature:** _____

## 4 Inlet connection and piping

### Steam

**Material:** ☐ ASTM A 335 P11 ☐ ASTM A 335 P22 ☐ ASTM A 335 P91 ☐ Other _____
**Type:** _____
**Nom. Size:** _____
**Schedule:** _____
**Max. Vel.:** 50 m/s (3)

### Cooling water

**Material:** ☐ ASTM A 106 ☐ ASTM A 105 ☐ ASTM A 335 P11 ☐ Other _____
**Connection:** ☐ Flange ☐ BW
**Nom. Size:** _____
**Schedule:** _____

## 5 Outlet connection and piping

**Material:** ☐ ASTM A 335 P11 ☐ ASTM A 335 P22 ☐ ASTM A 335 P91 ☐ ASTM A 106 ☐ ASTM A 36 ☐ St. Steel: _____ ☐ Other: _____

**Connection type:** ☐ Flange ☐ Butt Weld ☐ Other _____

**Nominal size:** _____ **Schedule:** _____ **Maximum steam velocity:** 50 m/s (3)

## 6 Valve body and bonnet material

| Forged | Cast |
|---|---|
| ☐ ASTM A 182 F11 | ☐ ASTM A 217 WC6 |
| ☐ ASTM A 182 F22 | ☐ ASTM A 217 WC9 |
| ☐ ASTM A 182 F91 | ☐ ASTM A 217 C12A |
| ☐ Other forged material: _____ | ☐ Other cast material: _____ |

## 7 Characteristics of the valve construction and orientation

**Type:** ☐ → B ☐ C

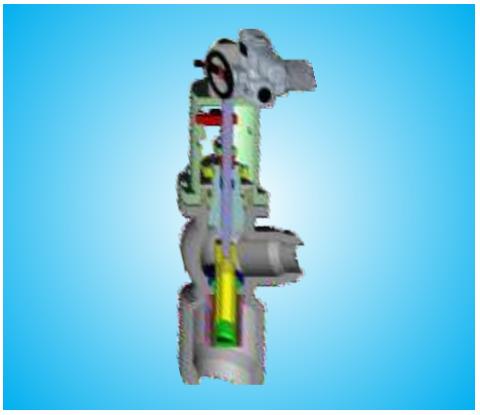
## 8 Actuator

**Actuator:** ☐ Double action pneumatic cylinder with spring return
☐ Single action pneumatic cylinder with spring return
☐ Hydraulic ☐ Other _____

**Actuator supply pressure:** **Minimum:** _____ **Maximum:** _____
**Fail safe pos. Press. Failure:** _____ **Fail safe position with electrical supply:** _____

## 9 Additional information and requirements

# Other products for boilers and steam turbines

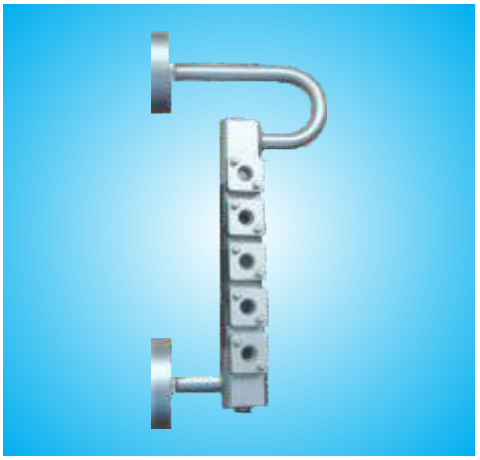


## ATMOSPHERIC VENT AND BOILER START-UP VALE

- Low noise ? 85 dBA throughout the control range
- Eliminates the additional cost of silencers
- Allows opening in any increment
- Long operational life
- Seat leakage class VI (shut-off)
- Rangeability ratio of 1:100
- State-of-Art technology
- 90 years of experience

## FAST CLOSING, PNEUMATICALLY ACTUATES STEAM TURBINE EXTRACTION CHECK VALVE

- Immediate forced closing in case of steam turbine trip to avoid return flow of steam or condensate avoids possible damage to the turbine blades
- Maximizes the power efficiency
- Closing time of less than 1 second (suggested)
- State-of-Art technology
- 90 years of experience



## TWO COLOR BOILER STEAM DRUM WATER LEVEL GAGE MODEL DUALCOLOR

- Indication in TWO COLORS: Easy reading, Green for water, Red for steam
- Transparent elements PORT type: Increased safety, Long useful life
- Minimum maintenance: Special spring cones compensate for thermal expansion and maintain the correct compression of the sealing gasket of the transparent element.
- Specially designed for boilers that operate up to 207 bar (3000 psi) of pressure
- Meets ASME Boiler Pressure Code for direct reading of the Steam Drum water level . Paragraph 60.1.1 requires two gauges for direct reading, in each boiler that operate at pressure above 28 bar (400 psi)

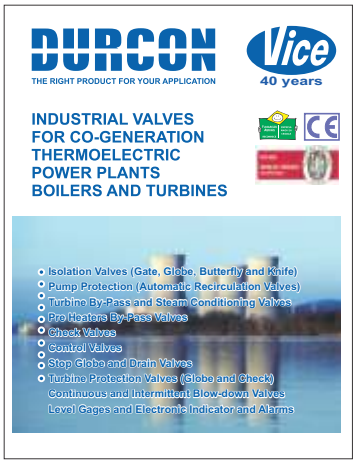
## AUTOMATIC RECIRCULATION CONTROL VALVE FOR CENTRIFUGAL PUMP PROTECTION AGAINST LOW FLOW OPERATING CONDITIONS

- The best solution for MINIMUM FLOW control in medium and low pressure centrifugal pumps
- A complete system with 5 Characteristics and Benefits

1) Check valve to prevent reverse flow – Simple and economic installation
2) Operation based on flow from pump to process - Ensures best protection of pump against operation below minimum flow
3) Throttling control of the recirculation flow – Avoids sudden flow variation through the pump
4) Multi-stage pressure reduction in the by-pass element – Avoids cavitation and noise
5) Self-actuated and compact – Assures immediate response and eliminates the need for external power supply

# Durcon Vice Products Line

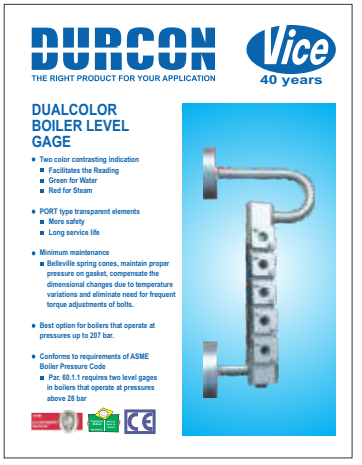

Institutional Durcon Vice



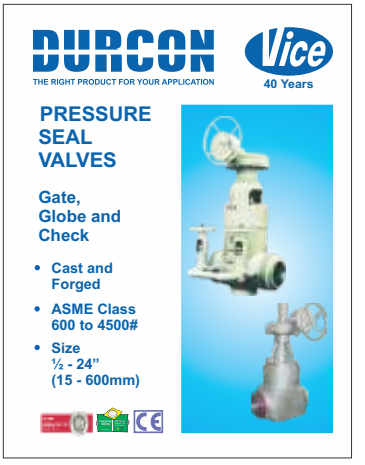

Thermoelectric Power Plants


Stop and Drain Globe Valve for Severe Service – Durblock


Trieccentric Butterfly Valve




Dualcolor Boiler Drum Level Gauge




Globe, Gate and Check Valves Pressure Seal


Automatic Recirculation Control Valve for Low Pressure Centrifugal Pumps Protection - NVL


Automatic Recirculation Control Valve for Medium Pressure Centrifugal Pumps Protection - NVM


Automatic Recirculation Control Valve for High Pressure Centrifugal Pumps Protection – VRM-HPM

## The right product for your application.

Phone: + 55 11 4447-7600 - Fax: + 55 11 4447-4164
Av. Pedro Celestino Leite Penteado, 500
07786-480 - Cajamar - SP - Brazil
E-mail: sales@durcon-vice.com.br
Web-page: www.durcon-vice.com.br

BPING - 02/15