Forbes Marshall

Pressure Reducing and Desuperheating Valve

A Solution to every PRDS problem

Specialists in Process Efficiency and Energy Conservation

ARCA

AEROSEAM™
Forbes Marshall Arca ranks amongst the world’s leading suppliers of Combined PRDS valves. We specialize in designing and manufacturing such equipment for power, process and co-generation plants. Forbes Marshall Arca has supplied more than 6000 combined PRDS's since 1990.

How is it different from conventional pressure reducing and desuperheating?

Conventional method for pressure reducing and desuperheating of steam calls for pressure reducing valve followed with desuperheater.

Forbes Marshall Arca brings the most advanced method to reduce pressure and temperature of steam in a single unit called 'Combined PRDS'. During the process of pressure reduction in the valve water is being injected simultaneously into a highly turbulent zone called the 'Vena Contracta' zone. This causes instantaneous evaporation of water for complete desuperheating.

PRDS Valve Series

- Water entry from top of PRDS (540 series): For high steam pressure drop and high spray water quantity requirement.
- Water entry from bottom of PRDS (520 series):
  a. Through stem: For low steam pressure drop and high or low spray water quantity requirement.
  b. Through nozzle: For high steam pressure drop and low water quantity requirement (Available only in valve sizes 1" and 2").

Features

- Pressure reduction and desuperheating in a single valve
- Compact unit
- Immediate response to flow changes
- No waterhammer
- No water carryover problems
- Efficient mixing of spray water
- Compact design.
- Reduces need for separate desuperheater which simplifies your system.
- Reduces length of piping because of elimination of separate desuperheater.
- Available in various types like water entry from top or bottom as per water quantity and pressure available at site.
- Water is injected at the 'Vena Contracta' point which is the most turbulent zone causing complete atomization.
- High turndown ratio possible.
- Improved rate of heat transfer.
- Easy maintenance.
- Some designs don't contain a nozzle which avoids possibility of choking.

PRDS Process (Enthalpy - Entropy Chart)
## Dimensions and Weight of Combined PRDS Valve

### Combined PRDS Valve - water entry through top

<table>
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<tr>
<th>Sr</th>
<th>Ansii Class</th>
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<td>337 182 266 90</td>
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<td>470 157 283 129</td>
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### Notes:
- Dimensions are in mm.
- Weight is in kgs.
- Mentioned weight is of subassembly of PRDS. To calculate total weight please add actuator's weight from 'Actuator Catalog'.
- Bottom entry through nozzle design is available only in 1" and 2" sizes.
Recommendations for efficient working of PRDS Valves

- Minimum straight length at outlet should be 4 mtrs.
- Minimum distance of Temperature Sensor from the point of water injection should be 10 to 12 mtrs.
- Minimum distance of Pressure Sensor from PRDS Valve should be 1.5mtrs.
- It is recommended to install a strainer of 0.8 mm mesh before water control valve.
- Spray water should be very clean (equivalent to boiler feedwater).
- Instrument quality air is required.

Minimum water pressure requirement for Combined PRDS:

- Top entry: \( P_w = \frac{(P_1 + P_2)}{2} + 7 \text{ BAR} \)
- Bottom entry through stem: \( P_w = P_2 + 7 \)
- Bottom entry through nozzle: \( P_w = \frac{P_1}{2} + 7 \text{ BAR} \)

Notes

1. Minimum controllable temperature is Saturation Temperature + 7°C.
2. The above are based on a specific set of parameters. These guidelines may change.
Specifications

Body Material: Carbon steel, Alloy steel, others on request
Trim Material: SS 410 Nitrited, SS 431 Nitrited, SS 321 Nitrited
Trim Form: Parabolic, Perforated
Standard Characteristics: Linear, Equal %, modified on request
End Connections: Flanged to ANSI Standards, Butt weldable, Socket weldable
Bonnet: Standard, Extended (Cooling Finned), Water Cooled
Packing Material: Graphite
Rangeability: 40:1

Ordering Information

Process parameters needed for PRDS
Valve Sizing (min/max)
- Steam Flow (Inlet) (kg/hr)
- Inlet Pressure [bar(g)]
- Outlet Pressure [bar(g)]
- Inlet Temperature (°C)
- Outlet Temperature (°C)
- Water Pressure [bar(g)]
- Water Temperature (°C)

Typical Applications

- Turbine Bypass
- Condensor Dump
- Main Steam Line
- Turbine Extraction
- Auxiliary PRDSH
- Deaerator Pegging
- Ejector and Gland Sealing

Reference List

OEMs
BHEL
Isgec John Thompson
Cethar Vessels Private Limited
Thermax Limited
Siemens
BHPV
TDPS
Triveni Engineering
Ansaldo Caldia
Larsen and Toubro

Actual Users
Rastriya Chemical and Fertilisers
HPCL
Grasim Industries
IPCL
Action Ispat and Power
Jindal Steel
Mawana Sugar
Maratha Cement
Bhushan Steel and Power
Aarti Steel
Dwarikesh Sugar
Renuka sugar
Ugar Sugar
Devipriya Paper
Andhra Pradesh Paper Mills

CONSULTANTS
Engineers India Ltd
Toyo Engineering Limited
Avant Garde Engineers and Consultants
Jacobs Engineering
Desin Power Consultants
Mecon
Development Consultants Private Limited (DCPL)
SPB Projects and Consultants
Fichtner Consulting Engineers (I) Pvt. Ltd.
Modern Manufacturing Facility

New Puma 400 CNC machine: for better accuracy and finish

Vertical Turning Lathe: for machining of bigger size valve bodies

CNC Machine Shop

Hydrotesting Rig
Aerosea will be happy to provide you with any help and advice you might need for Forbes Marshall Products.

The data in the catalog may change based on various design parameters. Dimensions may change based on models selected. For more details contact your nearest branch office.

AEROSEA EXPORTS PVT. LTD.
405 Tardeo Airconditioned Market, P.O. Box 7935,
Tardeo, Mumbai - 400034. INDIA
Tel : +91-22-23523025 / 23521429  Fax : +91-22-23510558
Email : aerosea@vsnl.com  Web : www.aerosea.co.in