PRESSURE & TEMPERATURE CONTROL
Pressure reduction

- Why reduce pressure
- Types of reducing valve & their operation
- Installation
Why reduce steam pressure

1. Preferable to distribute at high pressure
2. To obtain plant operating temperature - steam pressure and temperature are directly related.
3. Boilers work most efficiently when operating at their max designed pressure.
4. Safe working pressure of plant may be lower than distributed pressure.
5. Reduced pressure lowers standing losses.
6. Higher heat content at low pressure
7. Reduced pressure produces less flash steam.
Common types of pressure reducing valve

- Direct acting
- Pilot operated - diaphragm type
  - piston type
- Pneumatically actuated
Direct Acting Pressure Reducing Valves
for Steam, Compressed Air and Other Gases
Direct Acting PRV

Diagram:
- HP (High Pressure)
- LP (Low Pressure)
- Diaphragm
- Valve
Direct Acting Pressure Reducing Valve Operating Characteristic

- Set Pressure
- Control Pressure
- Offset or Droop
- Min. Flow to Open Valve
- Flow
- Rated Max. Flow

Diagram showing the relationship between pressure and flow for a direct acting pressure reducing valve.
PRV “Droop”

Control Pressure

No Load  |  Max Load  |  No Load

2.2 barg

Droop
**PRV “Droop”**

![Diagram showing PRV droop with pressure increase at 2.2 barg](image)
Direct acting reducing valve
Direct Acting Pressure Reducing Valve

- Control spring
- Bellows
- Inlet
- Seat
- Valve
- Valve return spring
- Outlet
Direct acting reducing valve installation
Pilot operated reducing valve
SPIRAX SARCO
DP REDUCING VALVE

CONTROL SPRING

PILOT DIAPHRAGM

PILOT VALVE

MAIN VALVE

MAIN DIAPHRAGM
Pilot operated pressure reducing valve

- High pressure
- Low pressure
- Signal pressure

Diagram showing:
- Pilot diaphragm
- Pilot valve
- Main valve
- Main diaphragm
Pilot operated PRV

Main advantage over direct acting type - gives very accurate control (all sterilizer manufacturers use this type)

Disadvantage - dislikes poor quality steam
Sizing and selection
PRESSURE REDUCING VALVE STATION
SELF ACTING TEMPERATURE CONTROL

Self-acting temperature controls
with 2-port valves
Boiler feedtanks
An essential part of boiler feedwater conditioning is the need to drive out dissolved oxygen. This is an application which is basically simple and seldom, if ever, calls for anything but straightforward cost effective 'set and forget' self-acting controls.
Electrically Actuated Temperature control system

Water/water calorifier diverting application with EL actuated 3-port valve being used for mixing