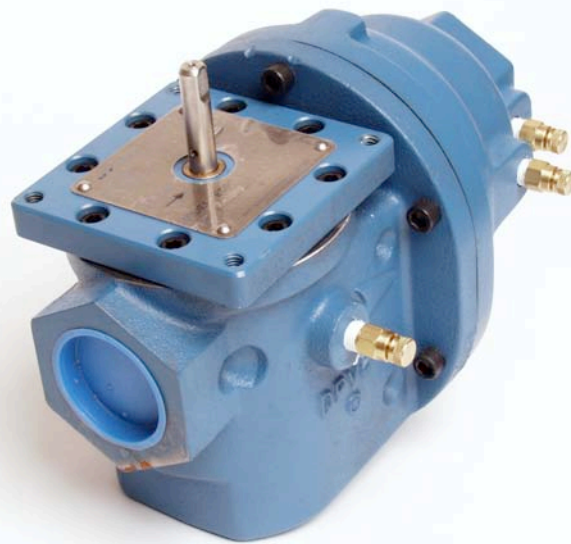


A photograph showing several people's hands and arms gathered around a table, looking at and pointing to architectural blueprints. One person is wearing a yellow hard hat. The scene is brightly lit, and the blueprints are spread out on the table. The text is overlaid in the bottom left corner.

**PRESSURE INDEPENDENT FLOW
CONTROL VALVES
ASHRAE GROUP 8th November 2006**

What are Pressure Independent Flow Control valves



42mm dia PI valve

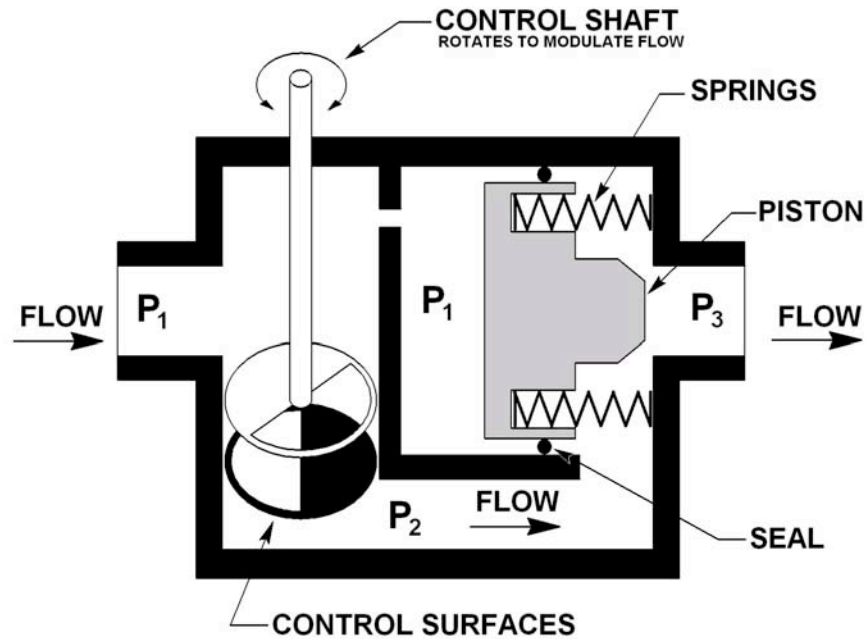


15mm dia PI Valve

What do they do

- They control water flow by volume control very accurately.
- They are unaffected by pressure changes in Heating or Cooling systems.
- Heating or Cooling systems become self balancing under any load condition.
- Fundamental change to the HEVAC industry.
- Reduce Designers risk.
- Minimize Energy use.

New or Old Technology



Invented 1994

**Control by adjusting the
CV rating**

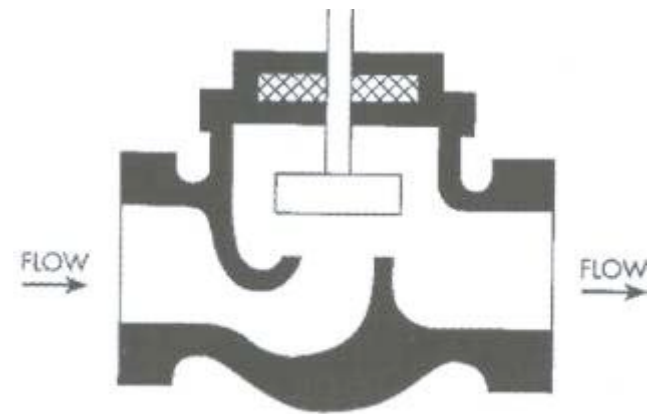
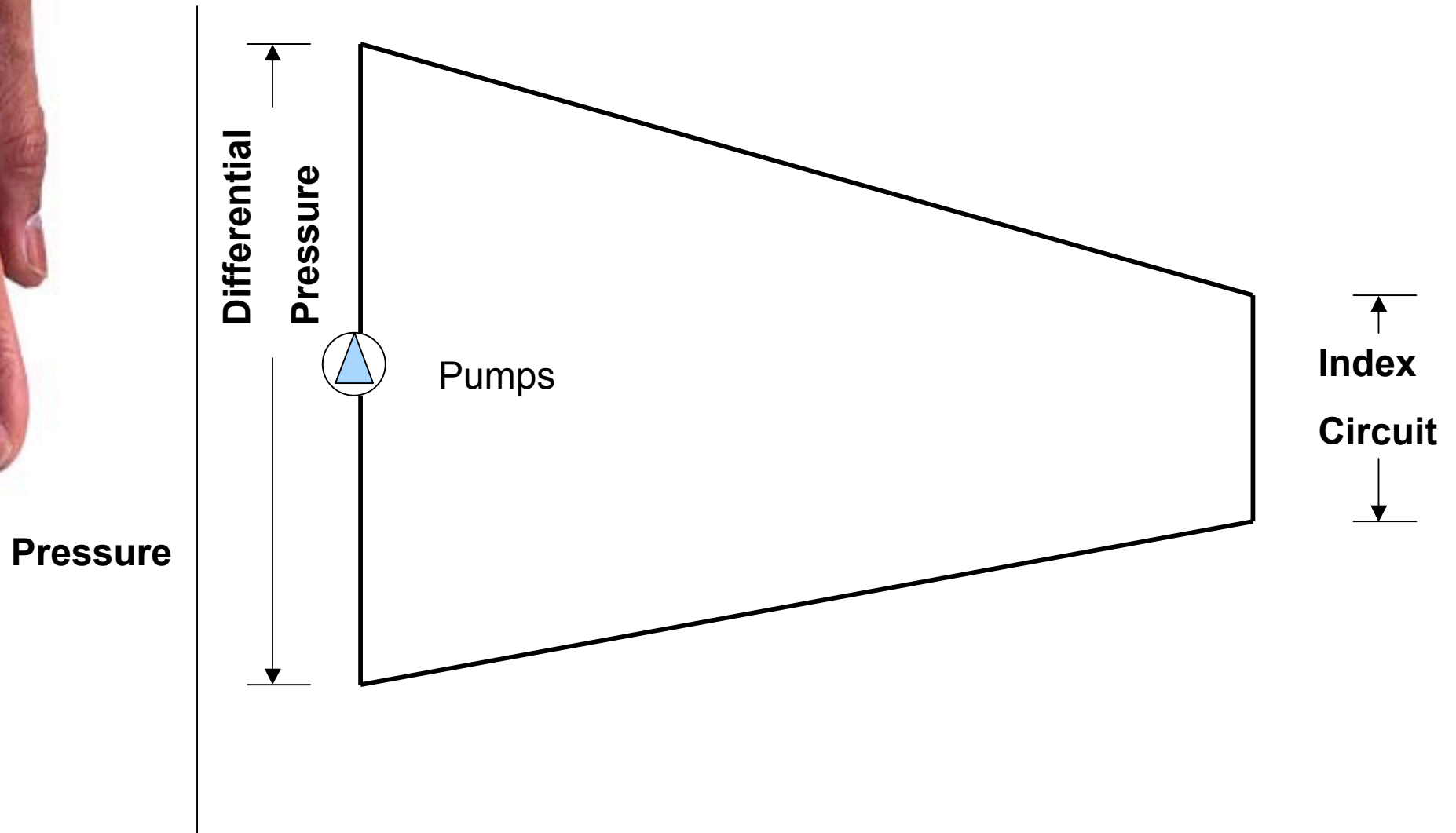


Fig 1.

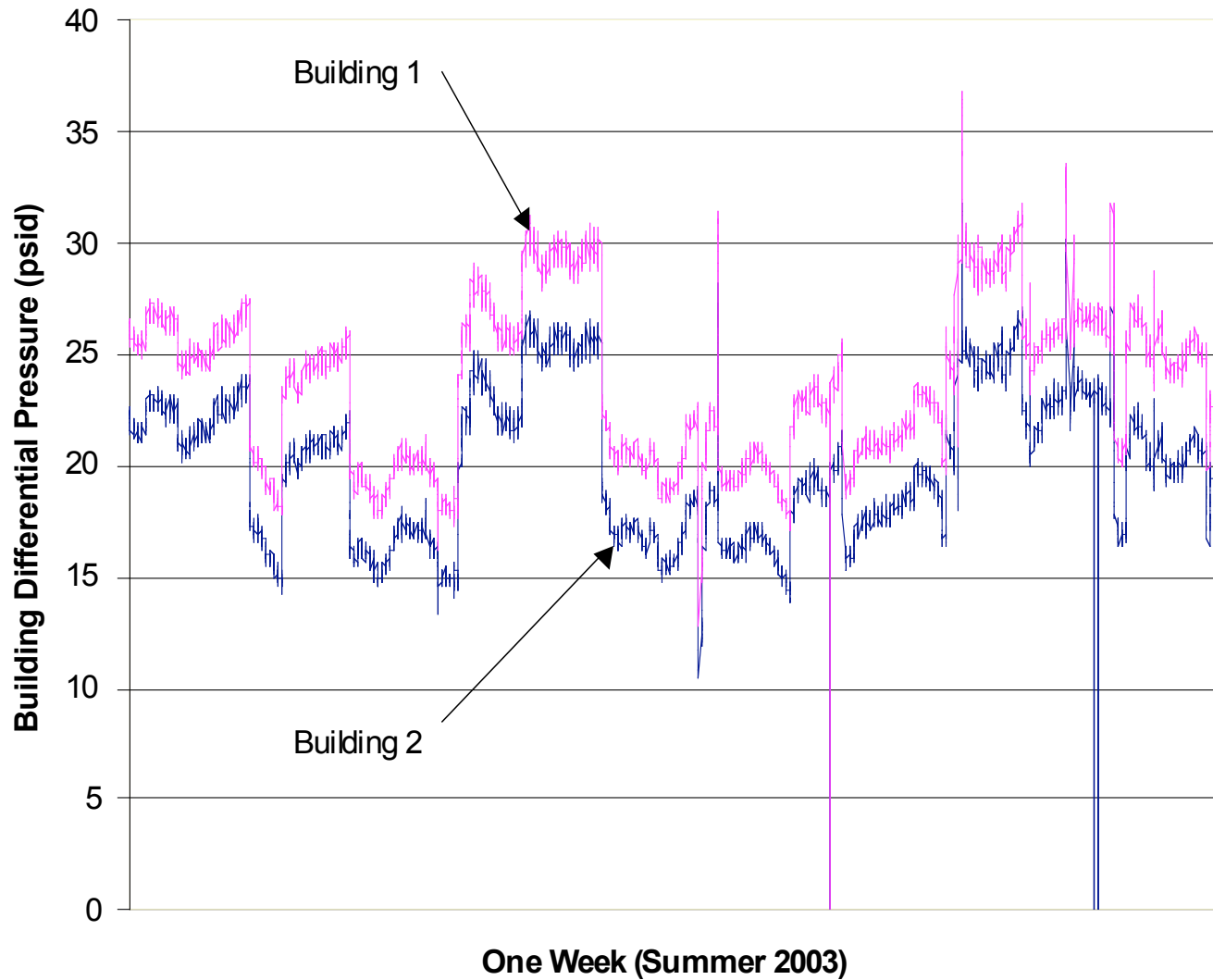
**Invented 1800's for LP
Steam**

**Control by Plunger in a
hole**

System Pressure Distribution Theory

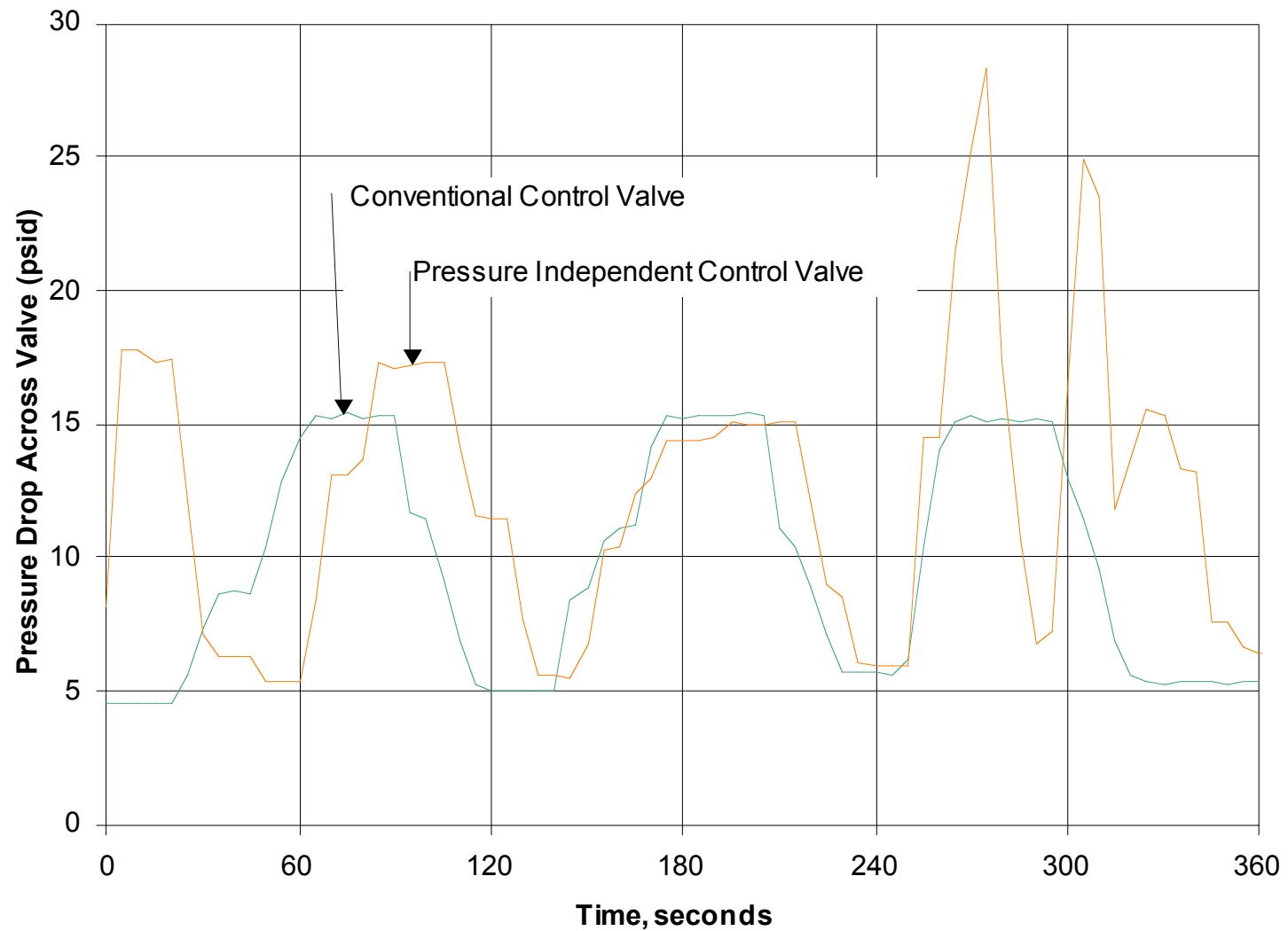


System Pressure Actual

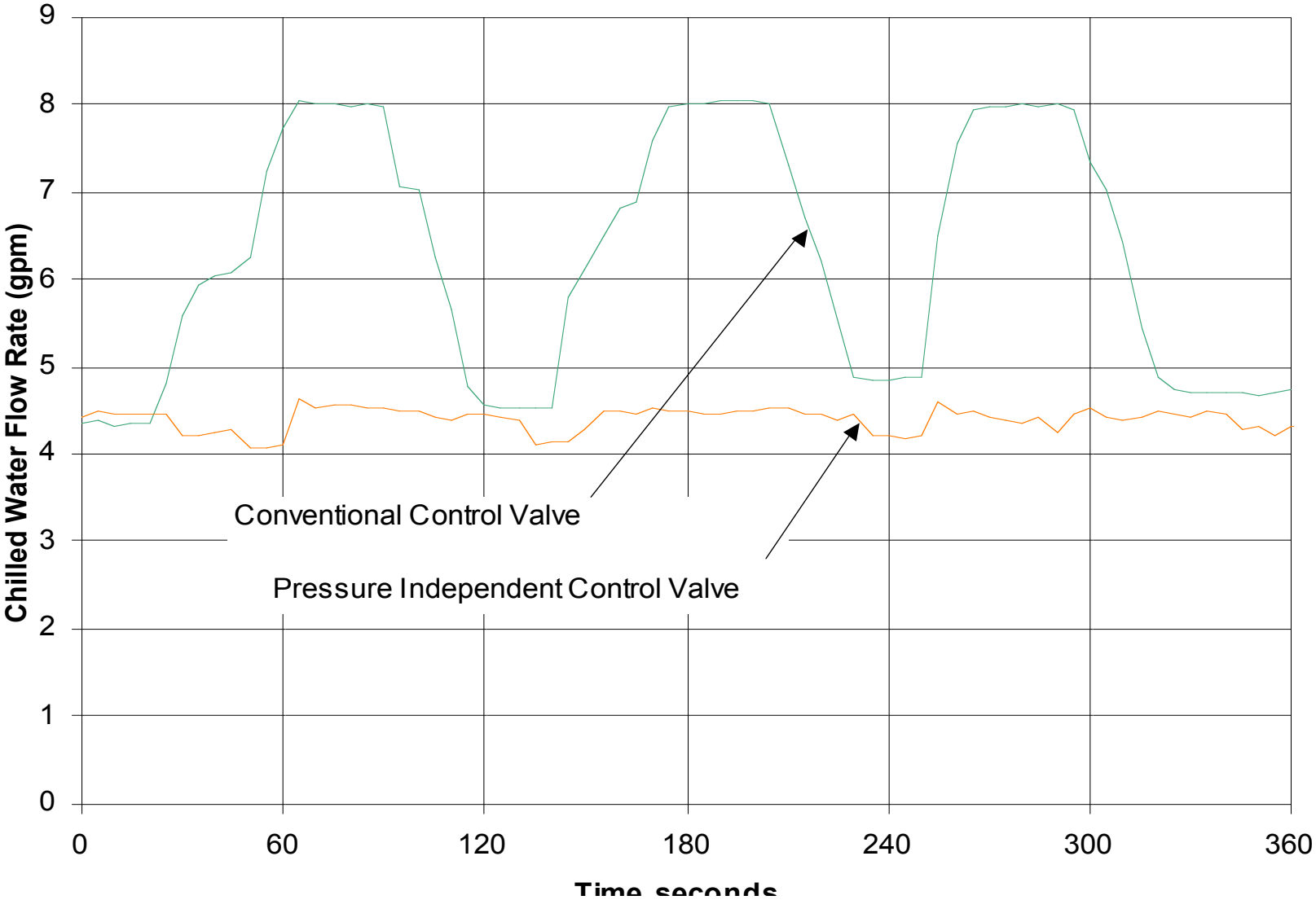


it takes time
for a typical
valve to stroke
to respond to
unavoidable
changes in
system pressure

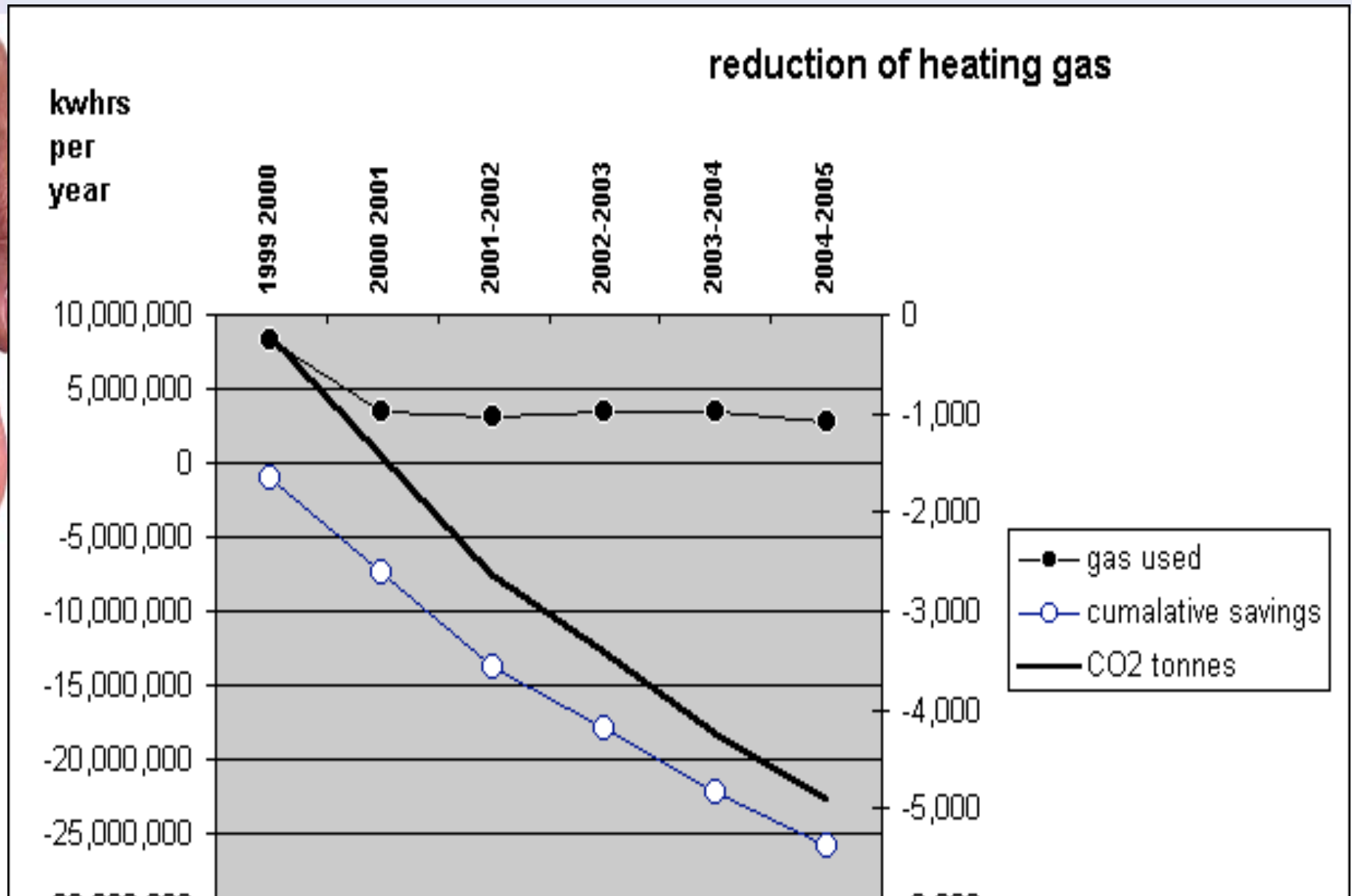
Pressure at control valves



Flow through control valves



48% Gas Reduction at British Library



	Isolation	Manual flow regulation	Automatic flow regulation	Pressure regulation	Flow measurement	System Self Balancing
Isolating valve	Yes	No	No	No	No	No
Regulating valve	Yes	Yes	No	No	No	No
Double regulating	Yes	Yes	No	No	No	No
Venturi - nozzle	No	No	No	No	Yes	No
Fixed orifice valve	No	No	No	No	Yes	No
Fixed - orifice fitting either integral or close - coupled to a double regulating valve	Yes	Yes	No	No	Yes	No
Variable - orifice valve	Yes	Yes	No	No	Yes	No
Constant - flow controller	No	No	Yes	No	No	No
Differential - pressure control valve	No	No	Yes	Yes	No	No
Automatic flow - controller	No	No	Yes	No	No	No
Delta P valve	Yes	Yes	Yes	Yes	Yes	Yes

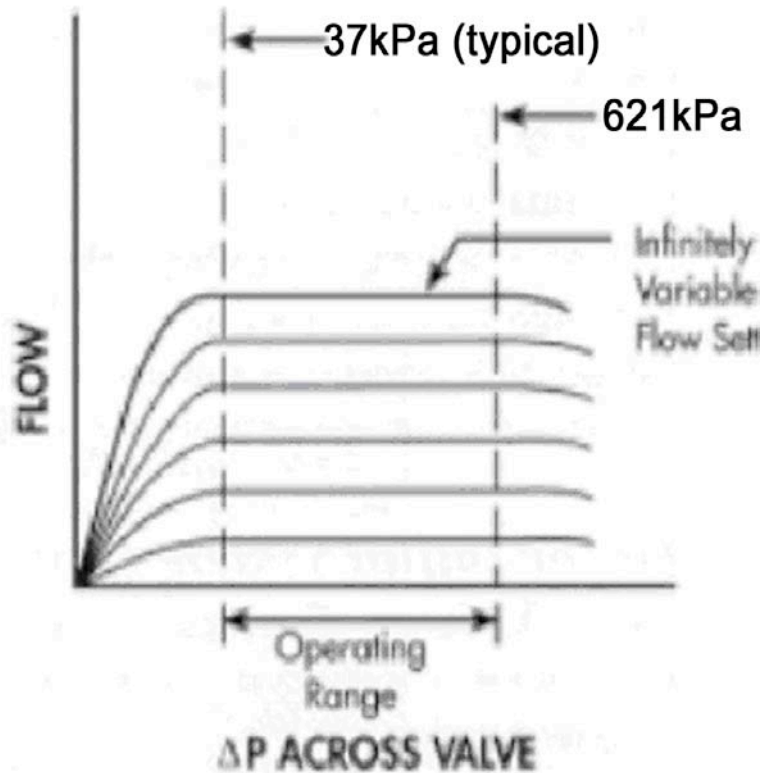
CONTROL VALVE SELECTION

- How do Engineers select control valves
- Ask someone else
- One pipe size smaller
- CIBSE & ASHRAE
- Must have a pressure loss



THE PIFC VALVE

- $Q = C_v \sqrt{\Delta p / Sg}$
- $\Delta p = 37 \text{ kPa (5psi)}$
- Change C_v



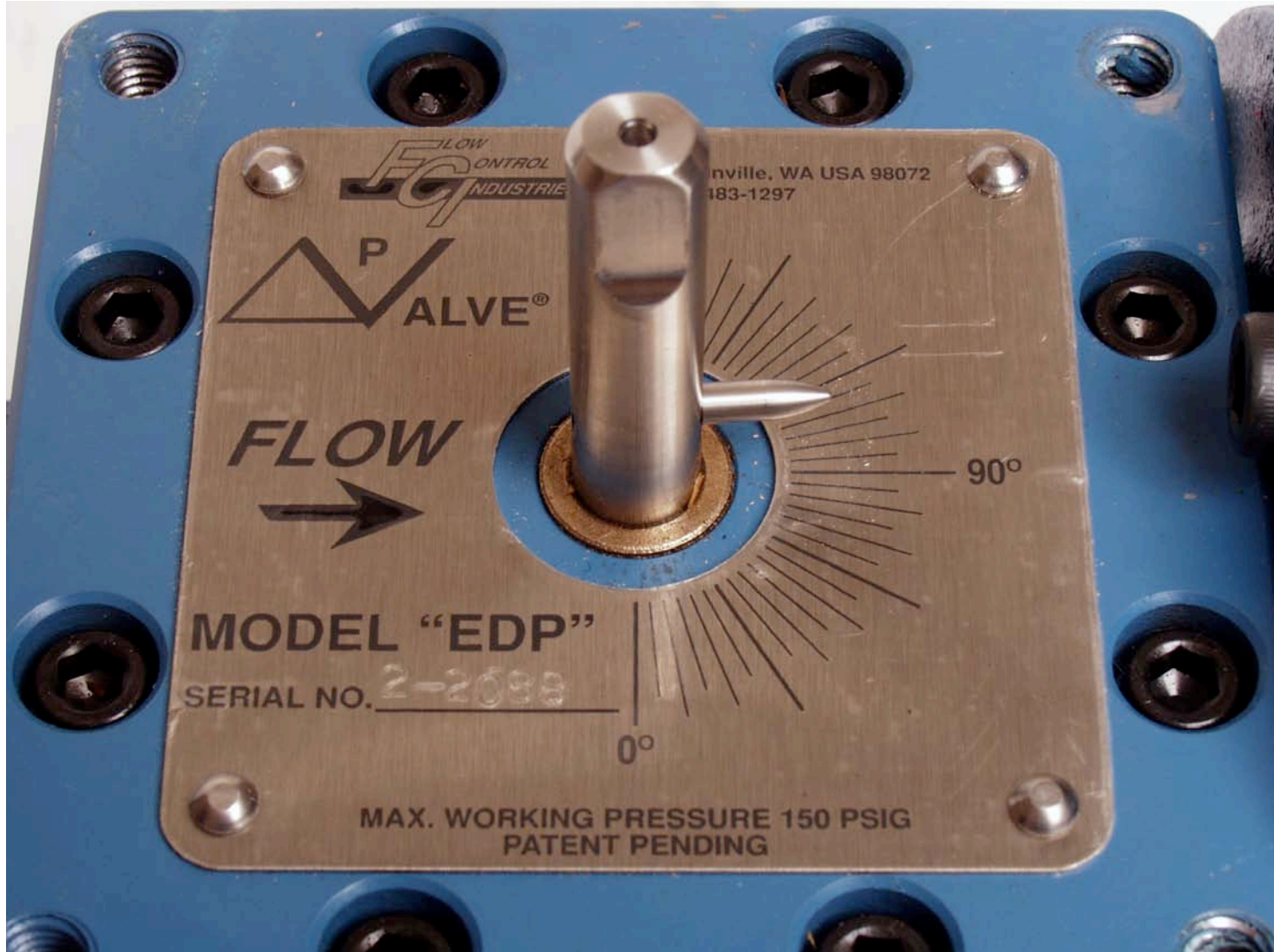
P I VALVE SELECTOR

VALVE SELECTOR L/s with min 35kPa to 414kPa Differential pressure	SIZE mm dia	SERIES
0.0 to 0.06	15	FDP/DASH1
0.06 to 0.13	15	FDP/DASH2
0.13 to 0.19	15	FDP/DASH3
0.19 to 0.25	15	FDP/DASH4
0.25 to 0.32	15	FDP/DASH5
0.32 to 0.38	20	DDP/DASH6
0.38 to 0.51	20	DDP/DASH8
0.51 to 0.69	20	DDP/DASH11
0.69 to 1.11	32	DDP/DASH18
1.11 to 1.5	32	DDP/DASH24
1.5 to 2.0	32	DDP/DASH32
2.0 to 3.5	50	EDP/DASH1.10
3.5 to 4.7	50	EDP/DASH1.25
4.7 to 5.4	50	EDP/DASH1.4

Individual Valve Calibration Certificate

SERIAL No 1.25 – 1348	MODEL 1.25 DDP – 18 - T
DEGREES OPEN	DESIGN FLOW 0.82 l/s
0	0.00
10	0.03
20	0.12
30	0.19
40	0.35
50	0.45
60	0.76
70	1.01
80	1.20
90	1.33
Valve Location	AHU No L7 Cooling Coil

P I Valve Cv Cover Plate

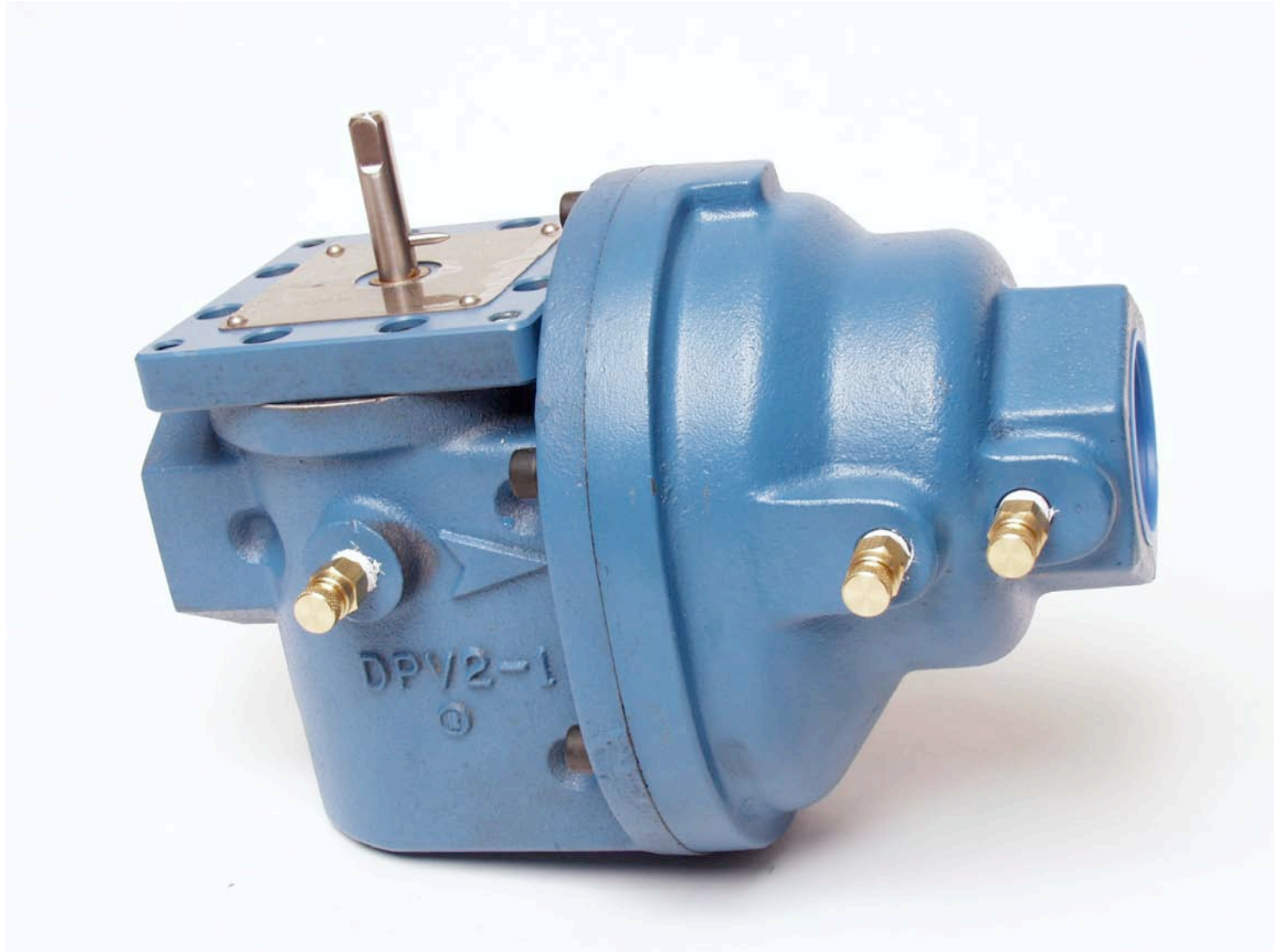


COMMISSIONING & MAINTENANCE

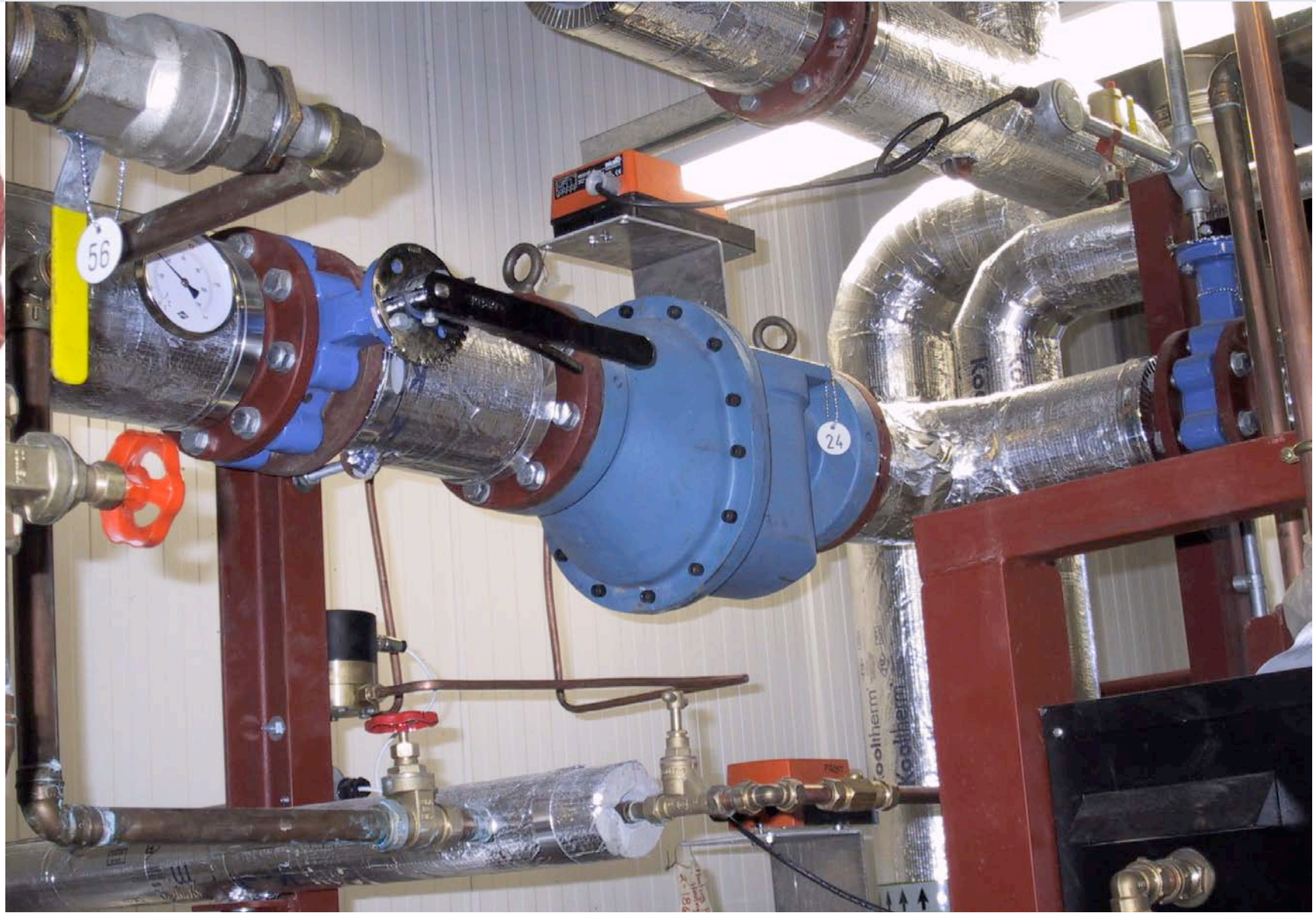
- Flush system
- Set Valve calibration
- Pressure test ports
- Calibration tags
- Major refurbishments
- Change seals & diaphragms

SALES ORDER	So2011
Series No	1.25 – 1348
Model	1.25 DDP 18 T
DEGREES OPEN	DESIGN FLOW 0.82 L/s
0	0.00
10	0.03
20	0.12
30	0.19
40	0.35
50	0.45
60	0.76
70	1.01.
80	1.20
90	1.33

Commissioning for Flow Rate



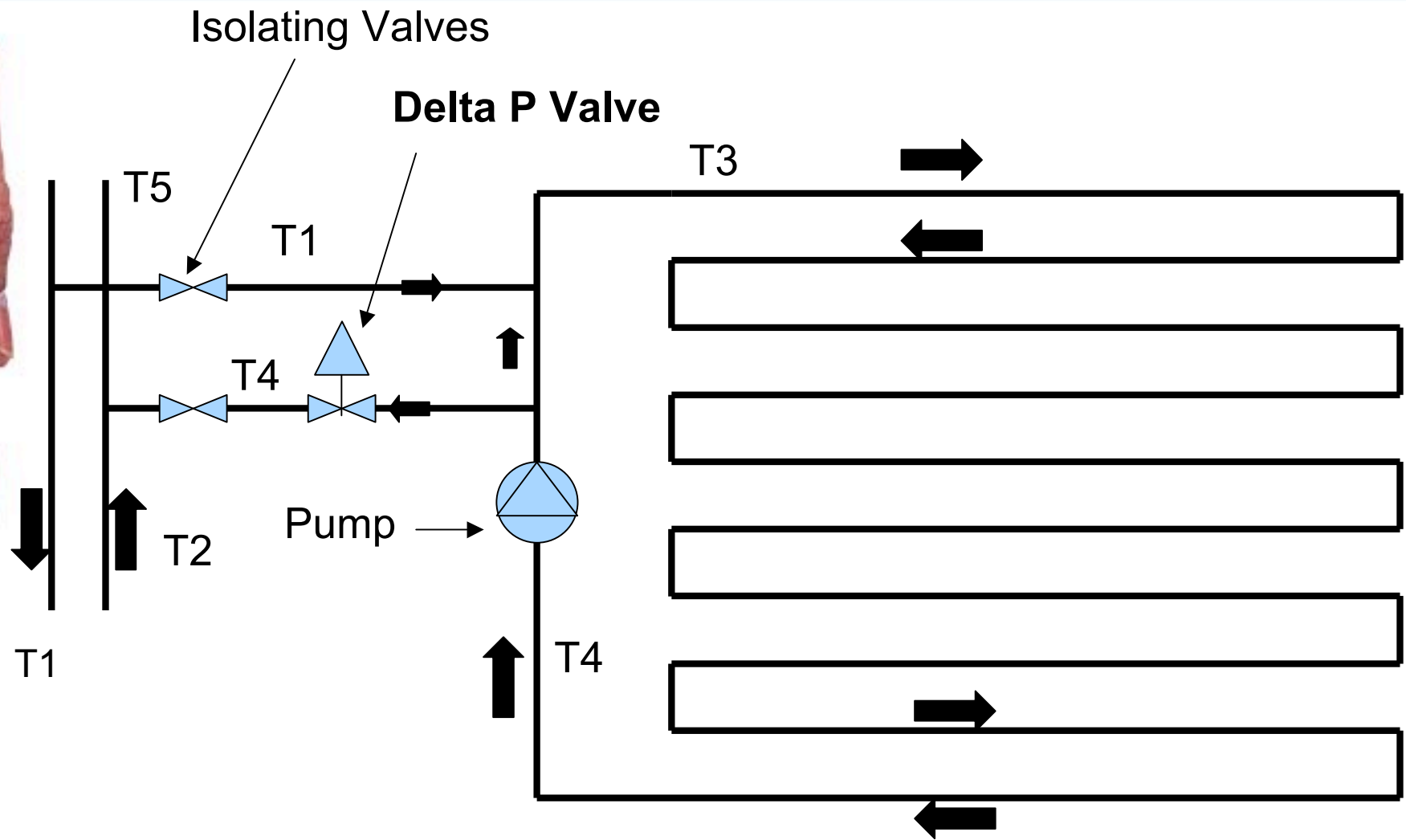
Installed DeltaP Valve



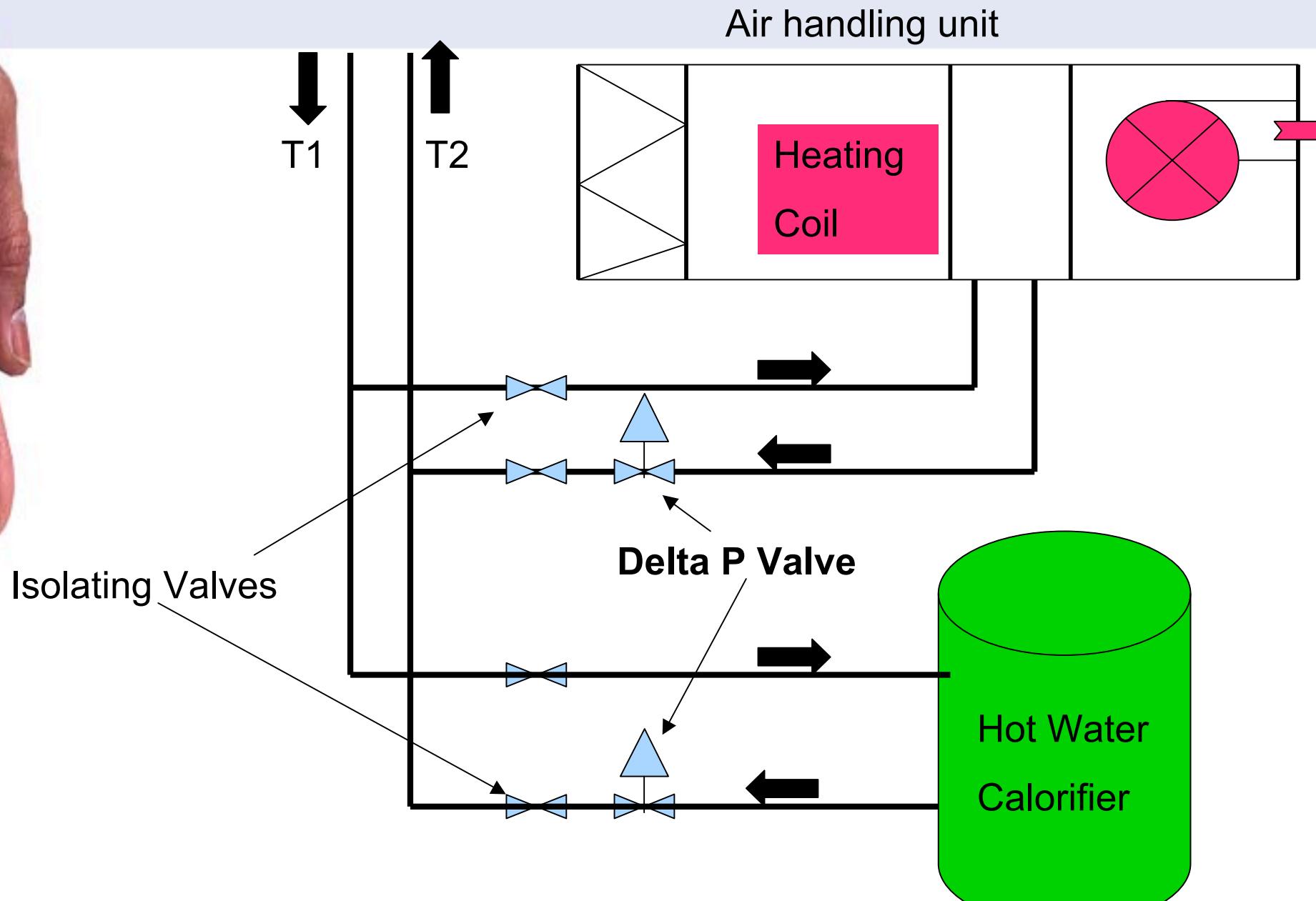
SYSTEM DESIGN

- Base on normal pipeline pressure losses
- Pump selection
- No Balancing Valves
- Larger temperature drops, less water circulating
- Simple pipework circuits
- Valve selection
- Differential Pressure

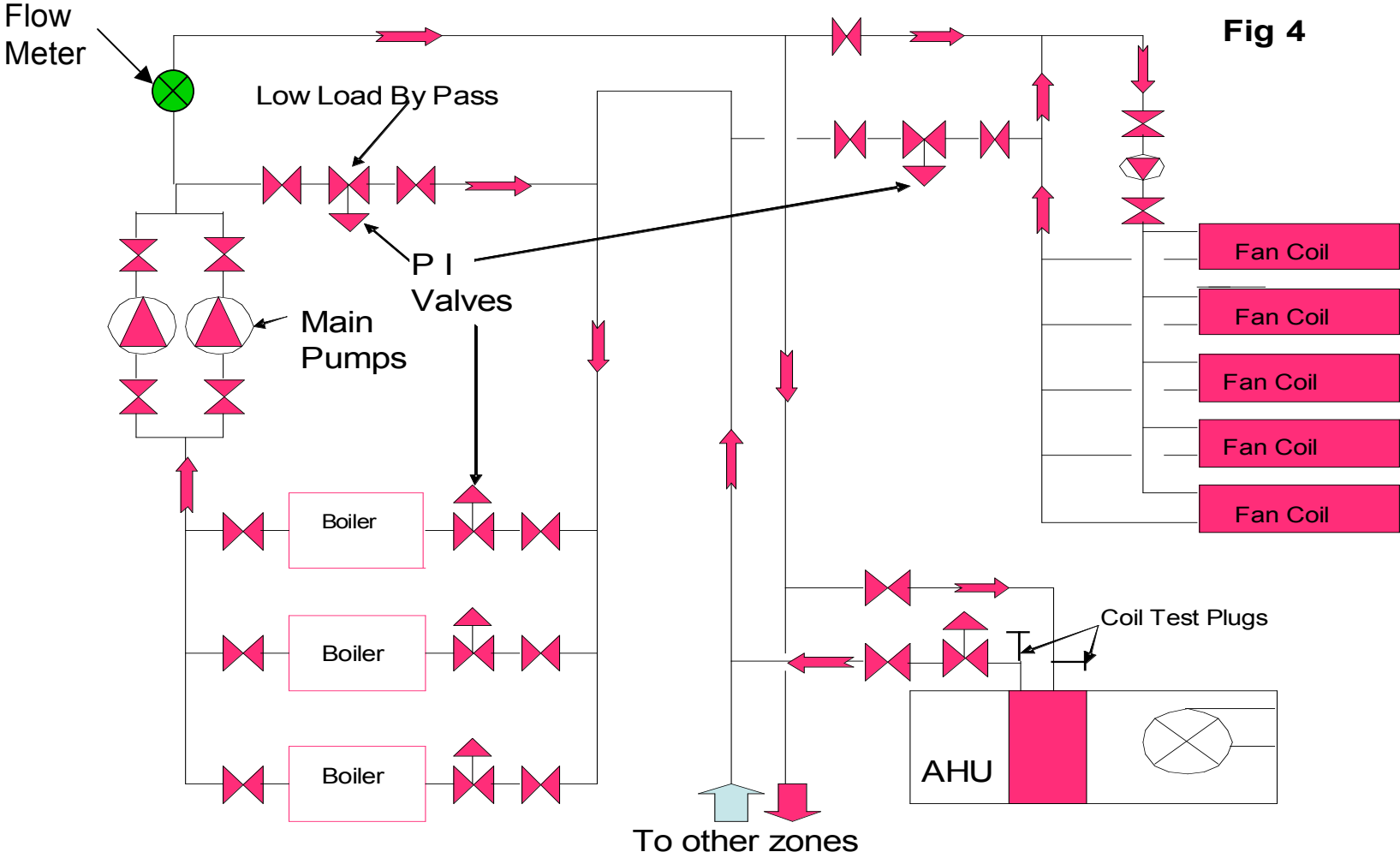
Constant volume variable temperature circuit (typical under floor heating)



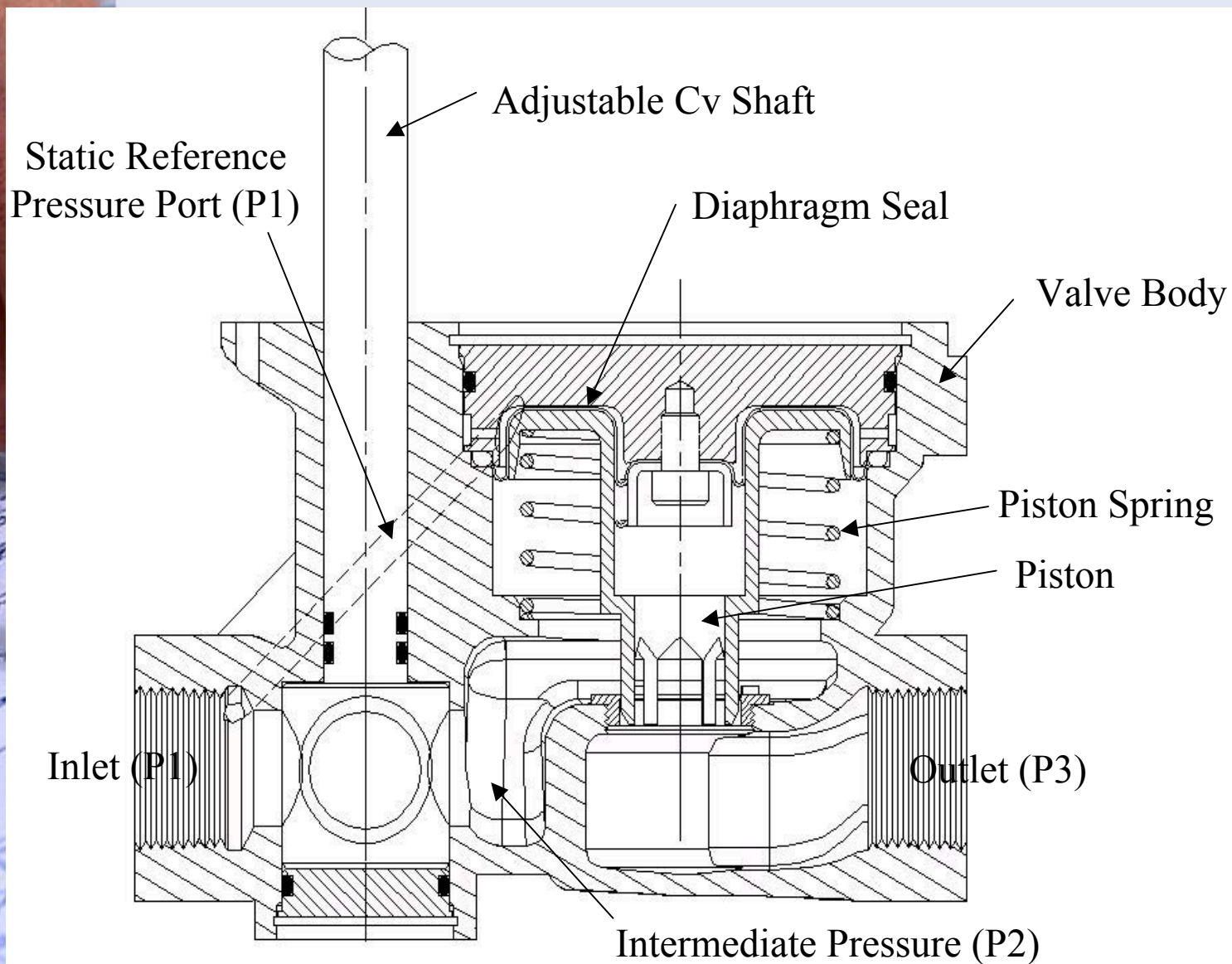
Variable flow constant temperature circuit



Combined heating circuit with single flow & return



PI Valves what to look for



NOT a conventional 2-way control valve and balancing valve in series



More information click on

www.raxcrest.co.uk