

Unit 206: Domestic hot water systems

Outcome 4

Design features of showers

Showers

There are a number of different shower mixer valves available:

- Bath/shower mixer tap
- Manual shower mixer valve
- Thermostatic mixer valve
- Pressure balancing mixer valve



Showers

In most cases, the method of installation is very similar, with the requirement for equal (balanced) pressure and flow rates on both hot and cold feeds.

Cistern fed shower

Cistern fed with booster pump shower

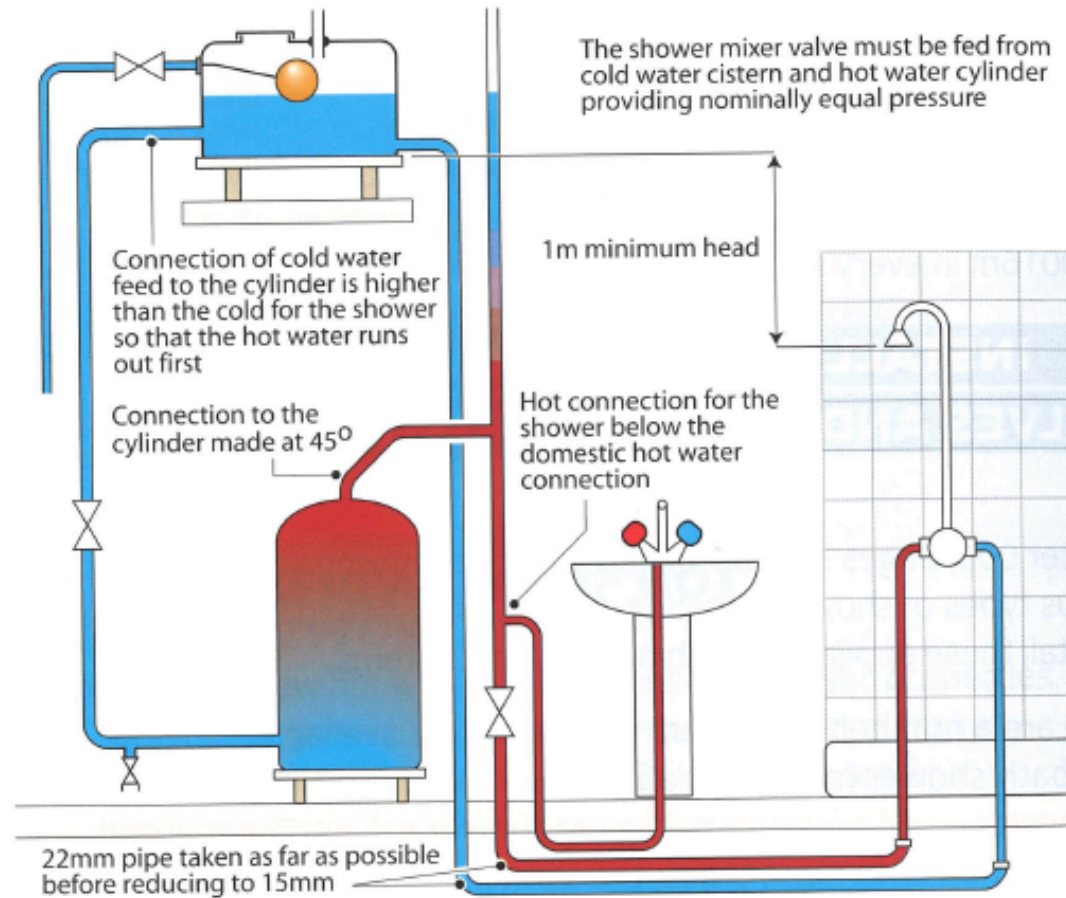
Mains fed hot and cold shower

Unbalanced fed shower

Instantaneous electric shower

Showers

Cistern fed



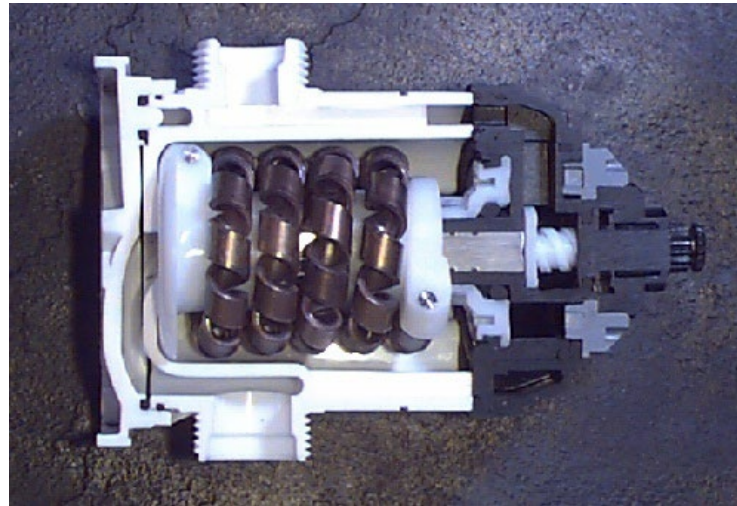
Showers

Cistern fed

- Requires equal pressure
- Both the hot and cold are fed from the CWSC
- Safest valve to use is the thermostatic valve, which will compensate for any temperature fluctuations
- Minimum head of 1 metre is required from the base of the CWSC to the outlet of the shower rose
- The feed pipes will need to be in 22mm until just before the mixer valve where they will reduce to 15mm
- Low pressure system relying on gravity to give the pressure

Showers

The thermostatic valve relies on a sensing device that expands and contracts, maintaining the required temperature.

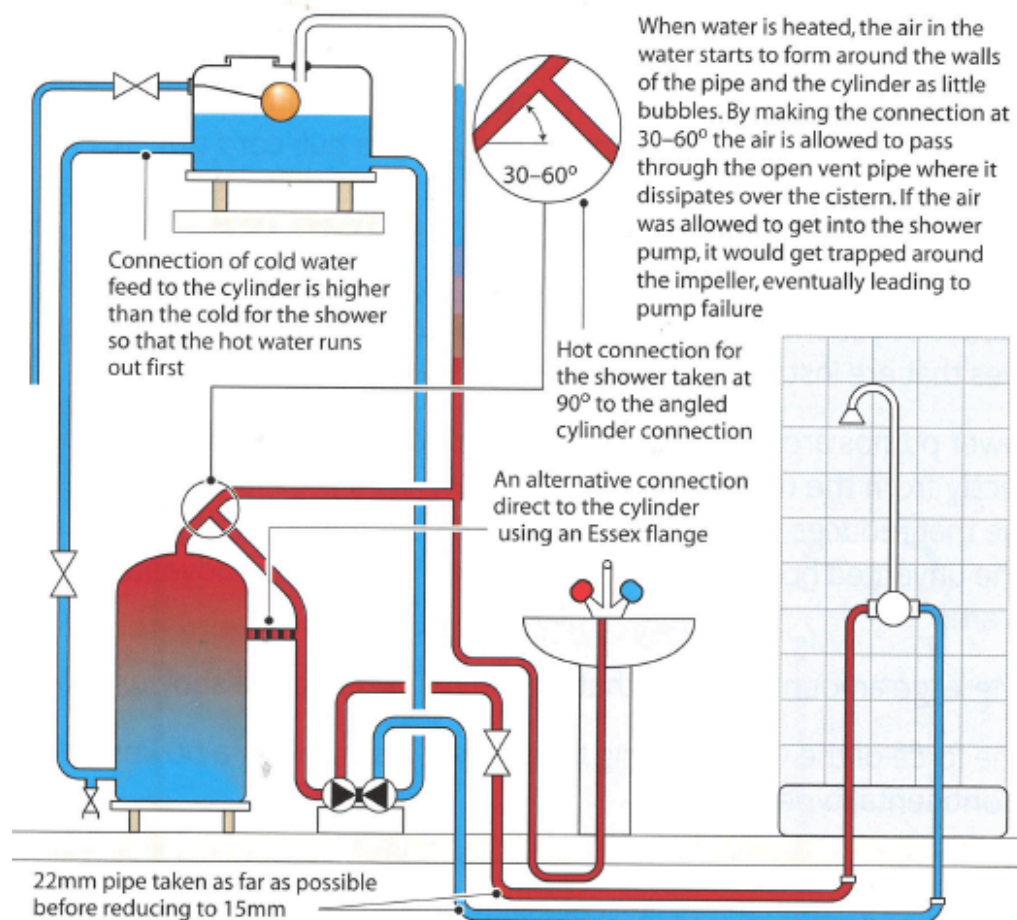


Online resource:

<http://www.aqualisa.co.uk/Our-products/Our-product-videos/>

Showers

Cistern fed with booster pump



Showers

Cistern fed with booster pump

- Twin impellor booster pump increases pressure for both hot and cold feed
- Connect to cylinder via an Essex flange, which avoids any ingress of air
- Connect to cylinder via an angled hot water distribution pipe, which allows air from the cylinder to migrate up to the vent pipe passing the shower feed

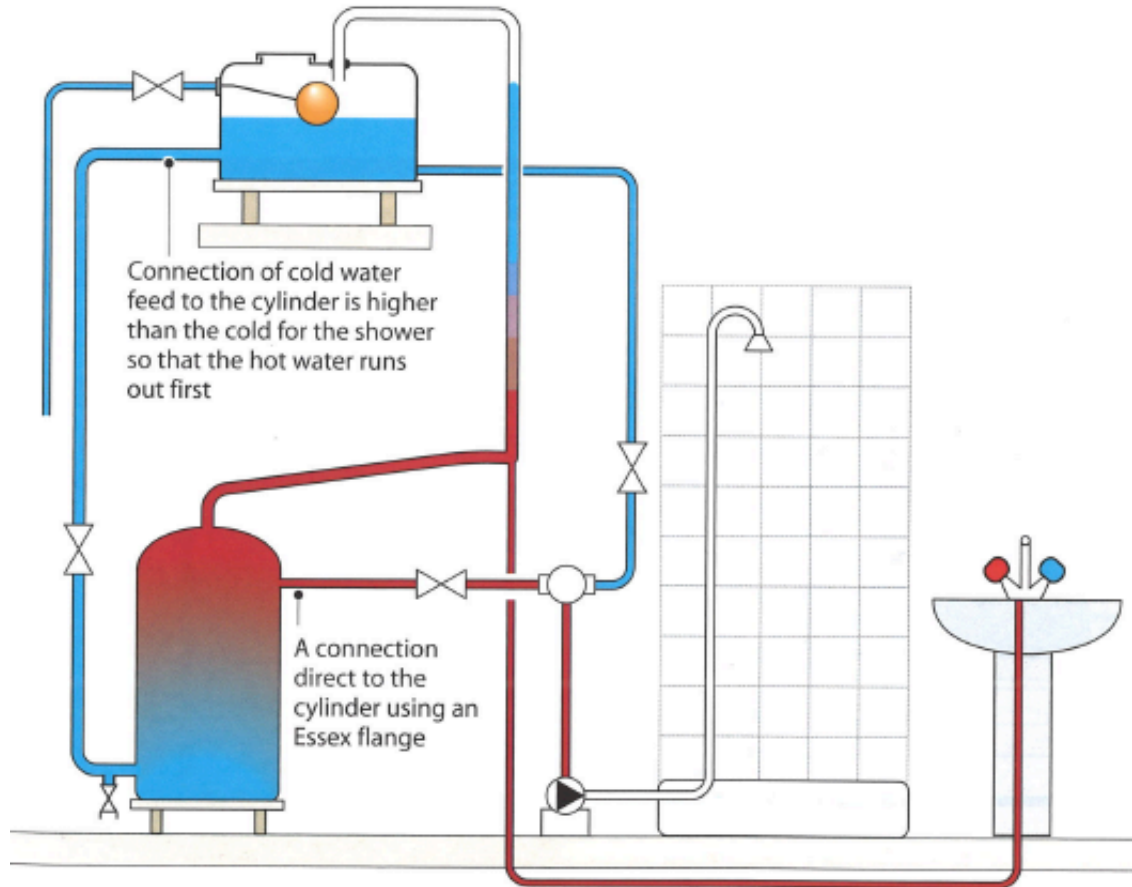


Twin impellor pump



Showers

Cistern fed with booster pump



Showers

Cistern fed with booster pump

- Single impellor booster pump can be used **after** the mixer valve
- Boosts the water pressure to the shower head
- Commonly used on **deluge** or **drench** type shower heads



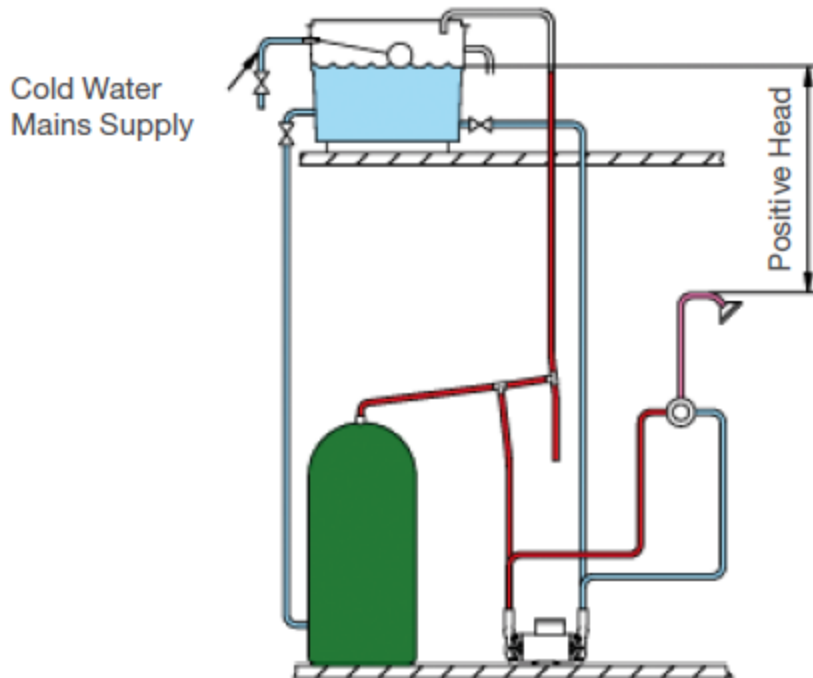
Single impellor pump



Showers

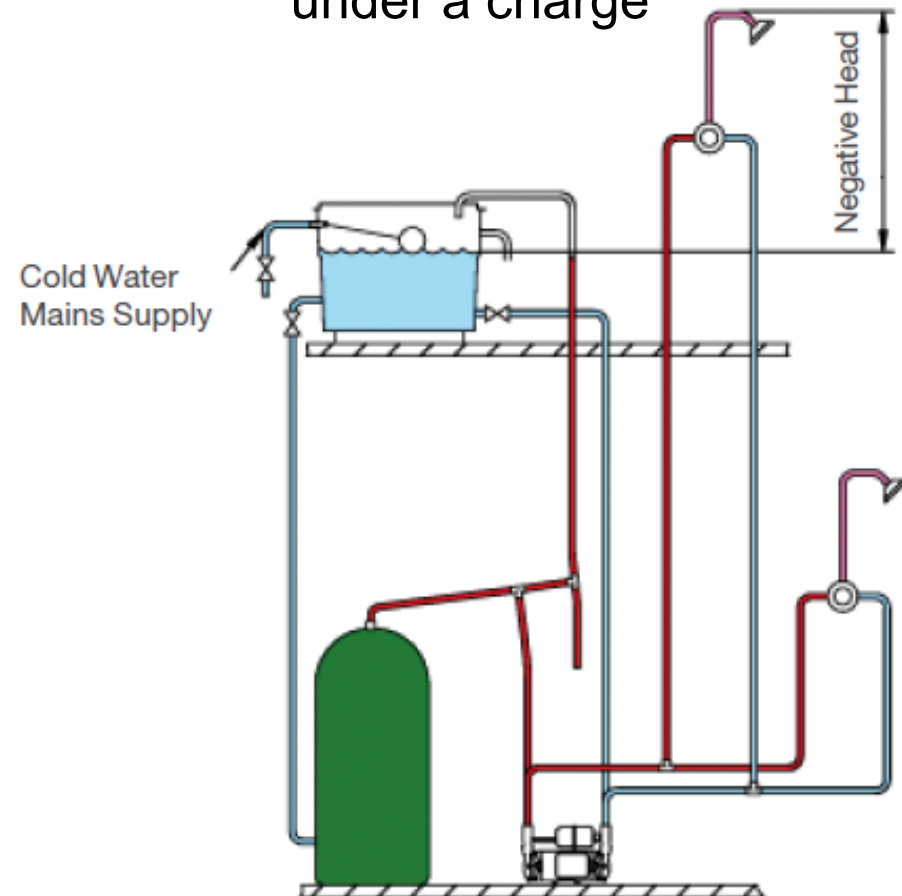
Positive head

Operated by a
flow switch
under natural
flow of water



Negative head

Operated by
a flow switch
under a charge



Showers

When a pump is pumping water to a level that is above the existing CWSC, it is called (suction) **negative head** – used to boost cold water. If the water to be pumped is below the existing CWSC, it is **positive head**.

The pump may be pumping from the base of a tank to a higher level, such as an elevated tank, or it may be pulling water from a tank that is below the pump.



Positive head pump

Negative head pump



Showers

A positive head pump is also known as a **regenerative pump**, as it only paddles the water through. They are slightly noisier pumps and require a natural head or flow of water to activate the pump.

The pump is activated by a magnetic flow switch, which moves due to the flow of water. This in turn lines up a reed switch, which makes the electrical connection.

If the flow rate is not great enough, the switch is not made. This will mean a negative head pump will have to be used.

Showers

A negative head pump is also known as a **centrifugal** pump, as it sucks in water and forces it out under centrifugal force. They can be used in positive head, negative head and whole house situations. They are quieter and do not require a natural head or flow of water to activate the pump: it is activated by a magnetic flow switch. It moves due to the flow of water created by a **charge** in the pipework and vessel, then lines up against a reed switch, which makes the electrical connection.

A negative head starts at 600mm below the CWSC. The outlet valve of negative head pumps have a non return valve to hold the pressure in the pipework.

Online resources:

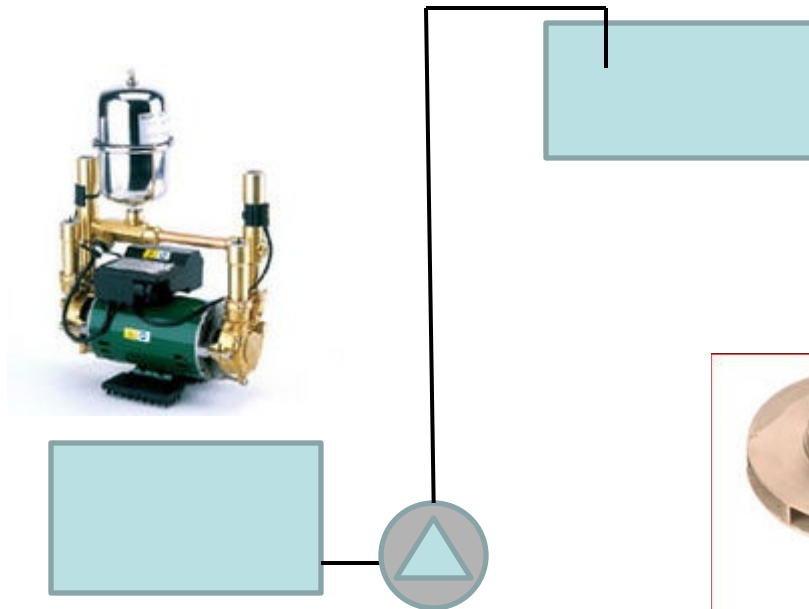
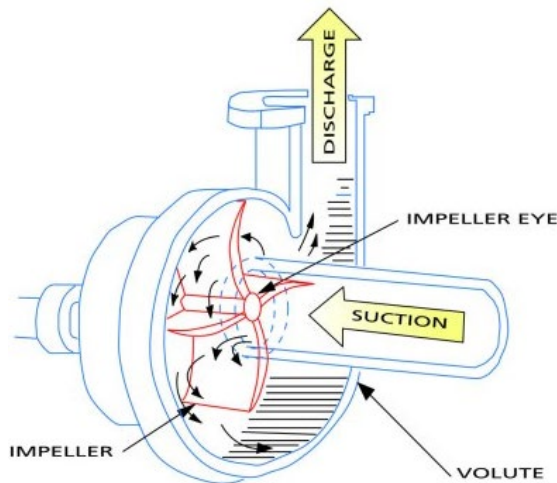
<http://www.youtube.com/watch?v=hZOekFFSoWI> (wall of death)

<http://www.youtube.com/watch?v=Zip9ft1PgV0> (water in vessel)

Showers

The negative head pumps use centrifugal force which sucks the water into the pump and forces the water to a higher level. The only difference between the pumps is the impellor.

Look at the examples in class.



Showers

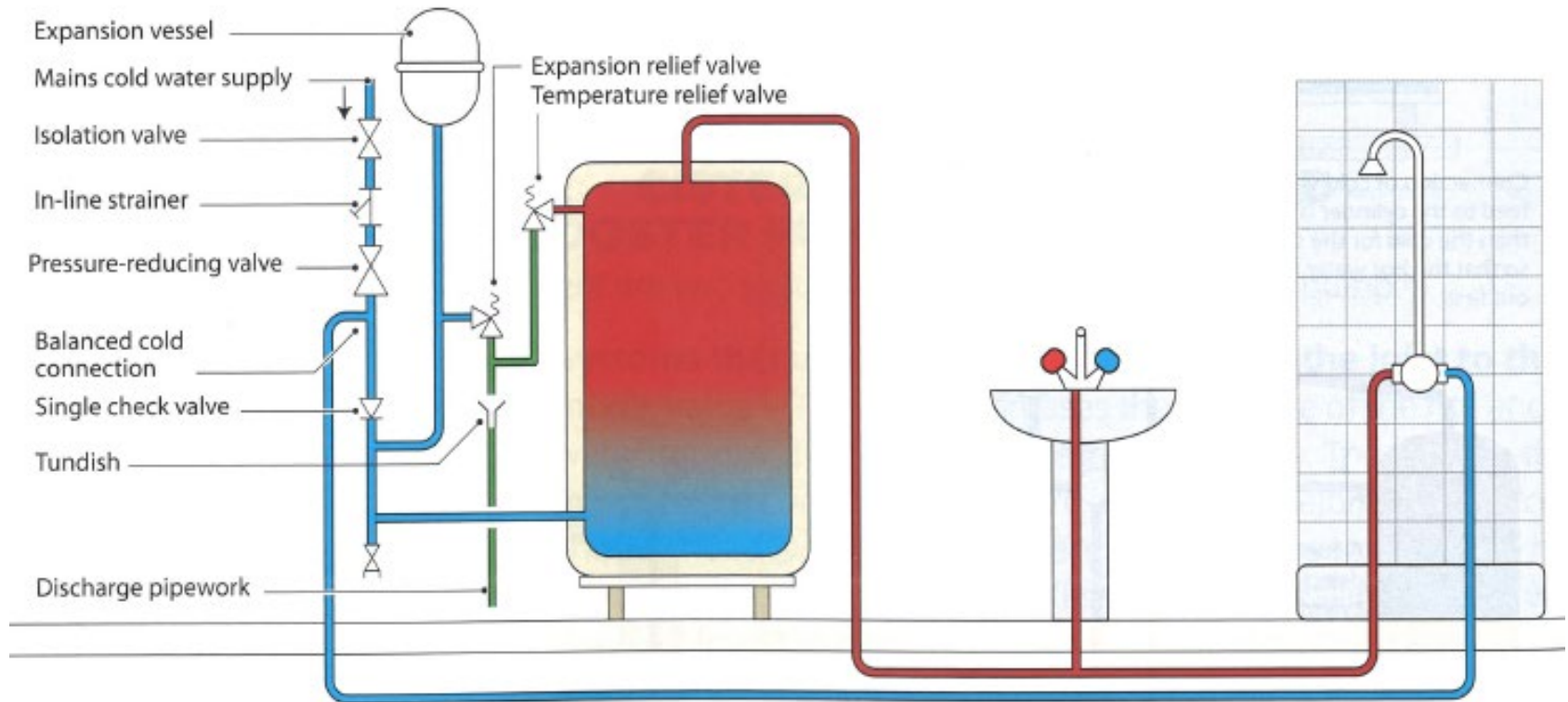
The golden rules

1. CW storage: capacity (don't pump dry); height of CWSC (positive or negative).
2. Pump position: must be as close to the cylinder as possible. A pump must push – not pull – water.
3. Feeding the pump: a dedicated feed – hot and cold; correct pipe size.
4. Flange connection: Surrey or Essex to stop aeration.
5. Temperature control: a pump can only cope with temps up to 65°C max (bypass on whole house).

Safety catch on shower blenders set at 38°C to go up to 42°C.

Showers

Mains fed hot and cold



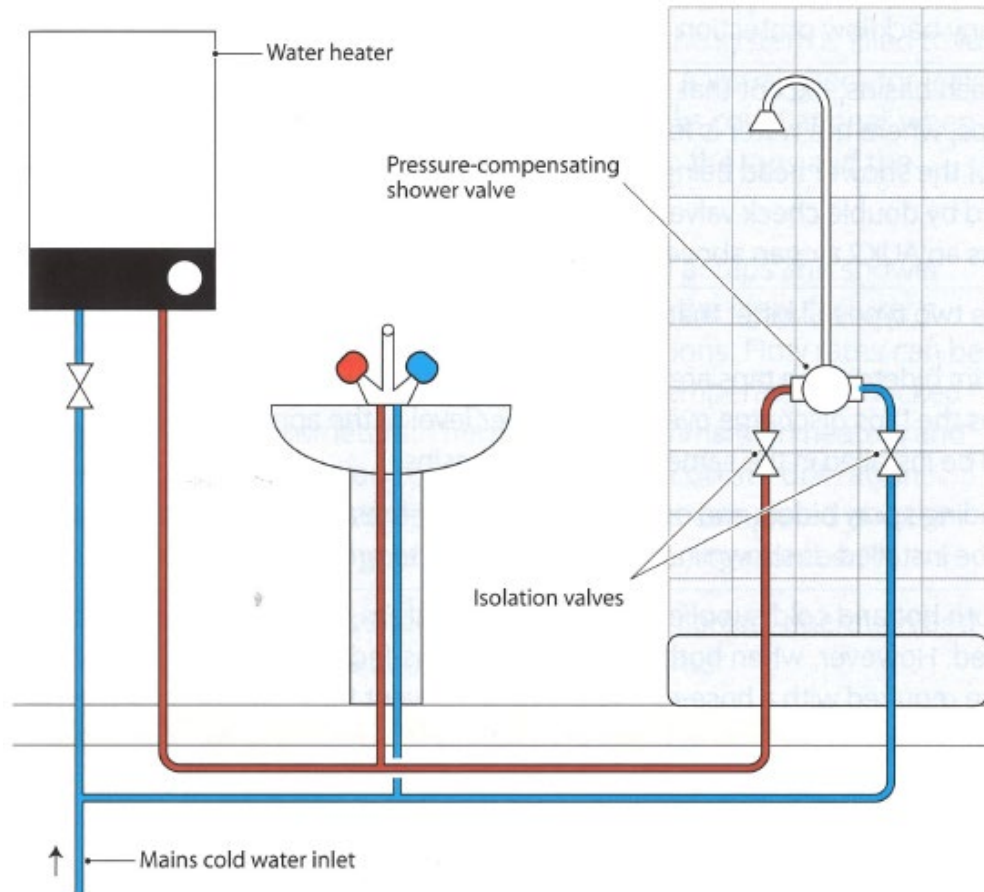
Showers

Mains fed hot and cold

- Fed from an unvented hot water system or a water jacket heater or combination boiler
- High pressure system
- No pump is necessary, as both hot and cold are fed from the mains
- Pressure reducing (regulating) valve is required
- Large amounts of water can be delivered to the shower at a regulated pressure

Showers

Unbalanced feed



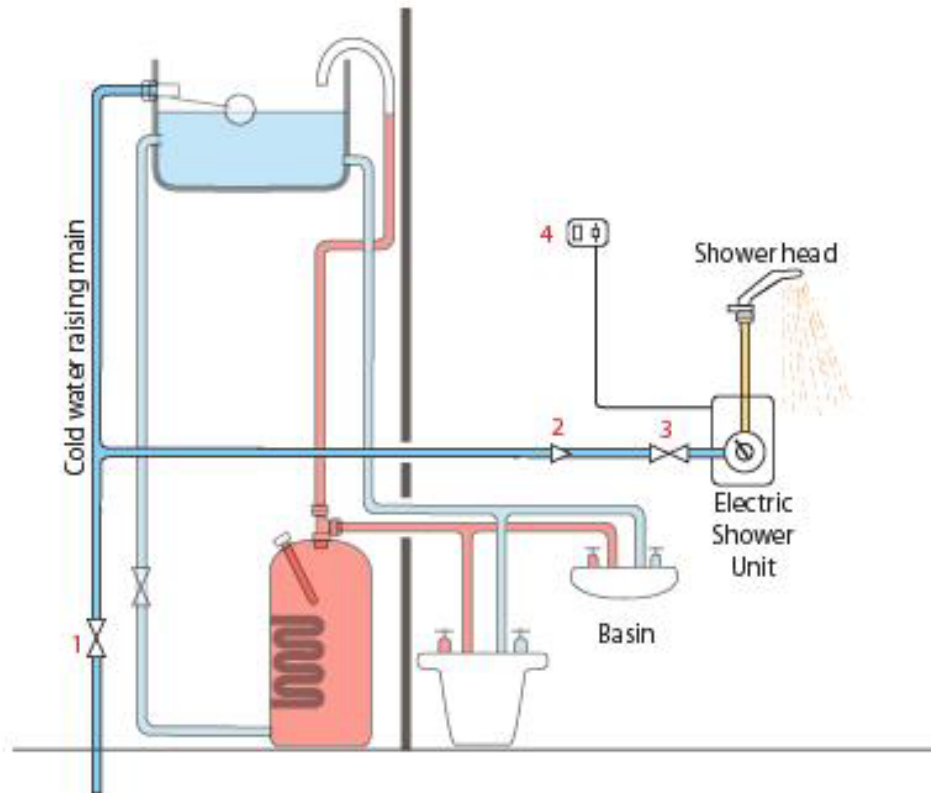
Showers

Unbalanced feed

- Showers fed from a combination boiler or instantaneous water heater
- As the cold water passes through the heater, there is a slight pressure loss
- A pressure compensating shower valve is required

Showers

Instantaneous electric shower



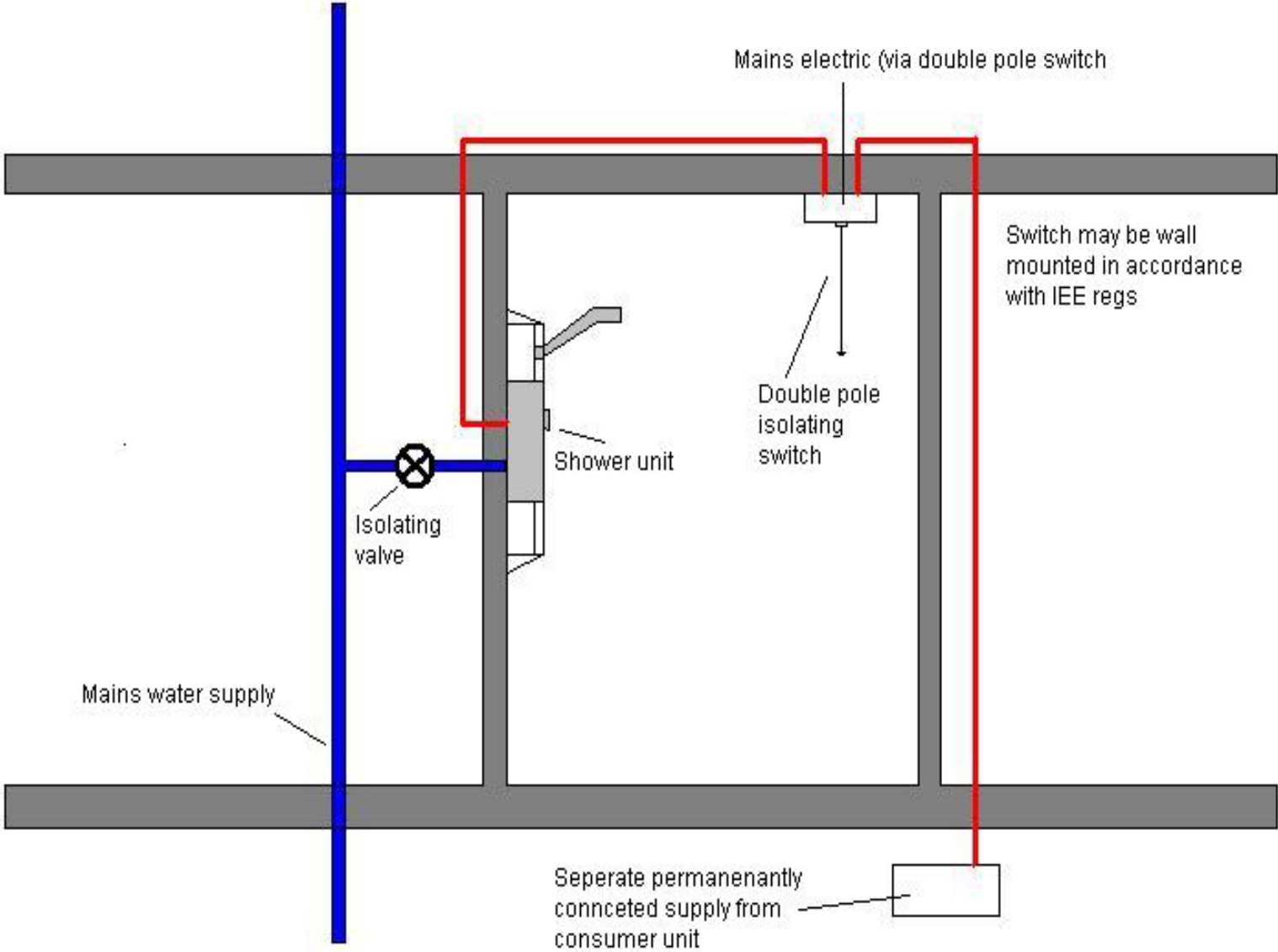
Showers

Instantaneous electric shower

- Fed directly off the incoming mains
- Instantaneously heated via an electric element
- 8.5kW to 11kw – the higher the output the better the flow rate
- Incorporates a low pressure heating element cut off
- Solenoid operation; water can flow if electrics are on
- Protected by double pole pull cord isolator

Online resource:

<http://www.aqualisa.co.uk/Our-products/Aqualisa-Videos/How-Electric-works>



Showers

- De-scale shower head regularly; some use them as an open vent
- A shower requires its own independent feeds
- If mains fed, a single check valve is required to prevent backflow
- The air gap between the shower head and water level must be maintained – restraining ring. If no restraining ring, a double check valve is required to prevent backflow
- Flexible connection on pumps to reduce noise and vibration

Online resource:

<http://www.bristantrainingacademy.co.uk/content/default.aspx>