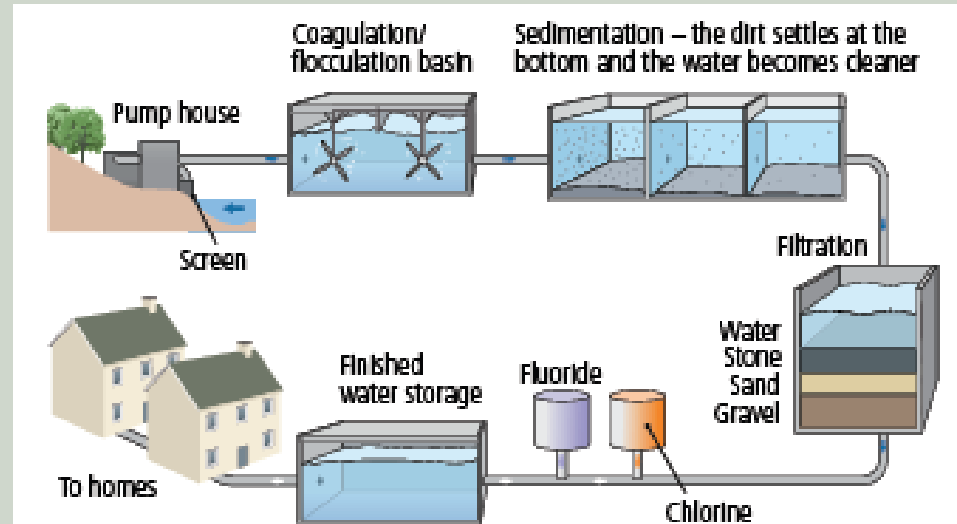


CHAPTER 19
**PLUMBING
AND WATER**



Water Sources

- Rainfall (collection in lakes/reservoirs)
- Groundwater (pumped from wells)
- Treated and pumped to your home

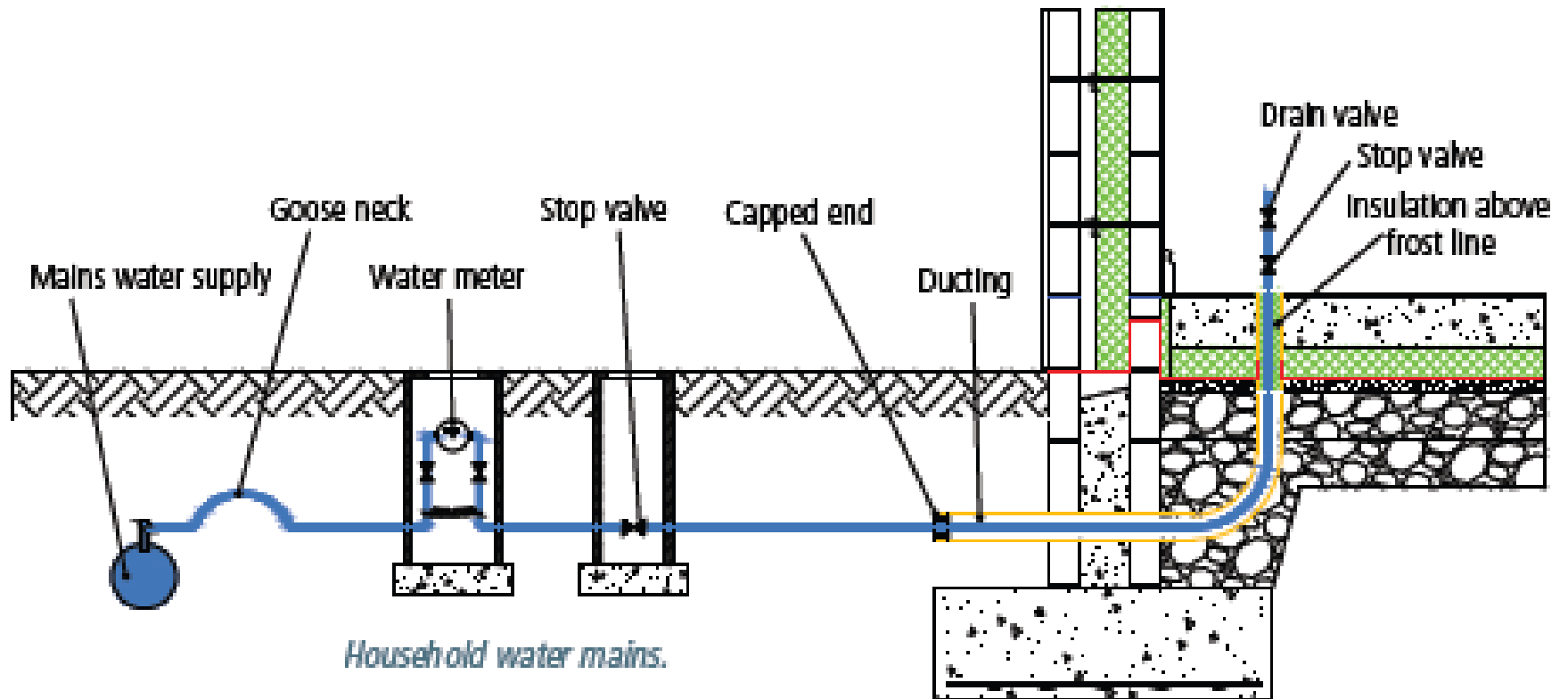


Home Water System Components

- Water meter
- Water Storage tanks
- Cylinder
- Pipework
- Valves
- Fixtures and fittings



Home Water Supply



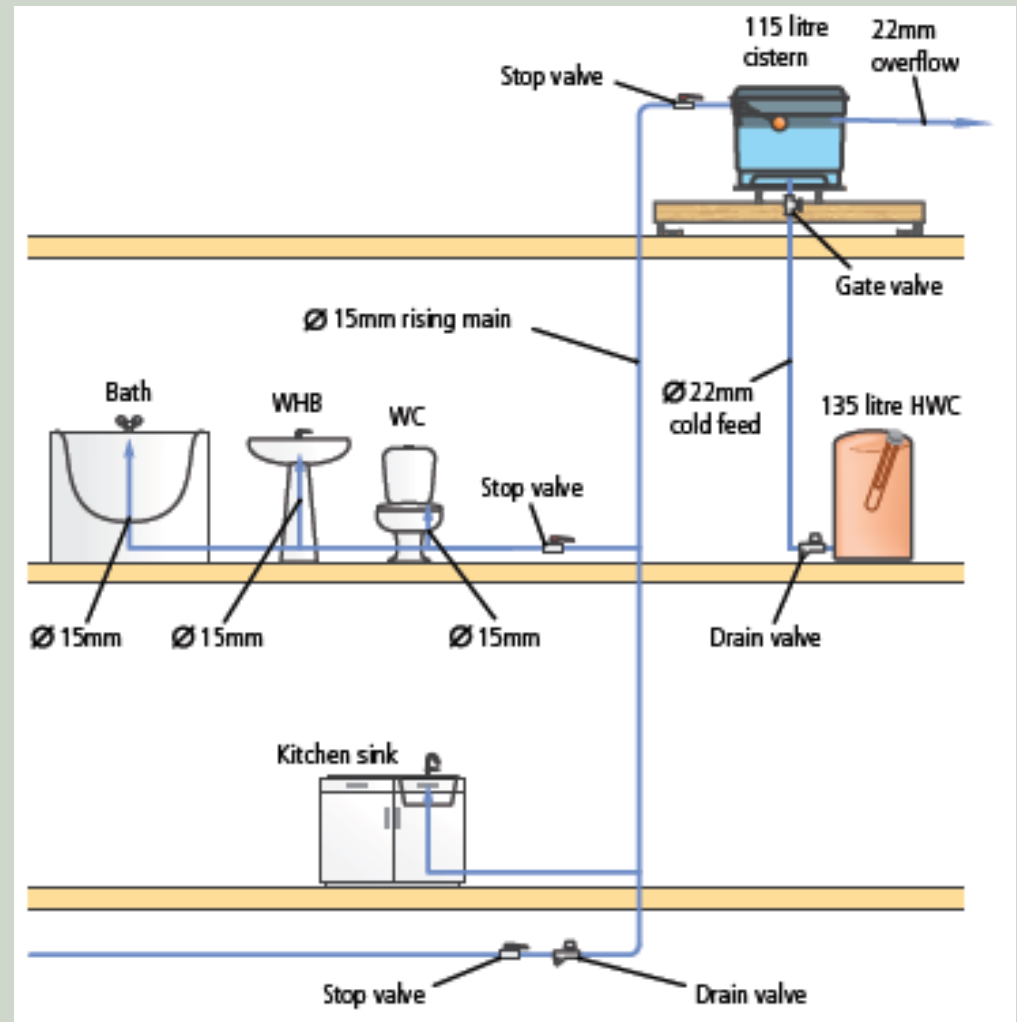
Cold Water Supply

- Two systems for delivering cold water in a home:
 - **Direct Cold Water Supply System:** goes direct to fixtures from the mains supply
 - **Indirect Cold Water Supply System:** Goes to storage tank first then to the fixtures



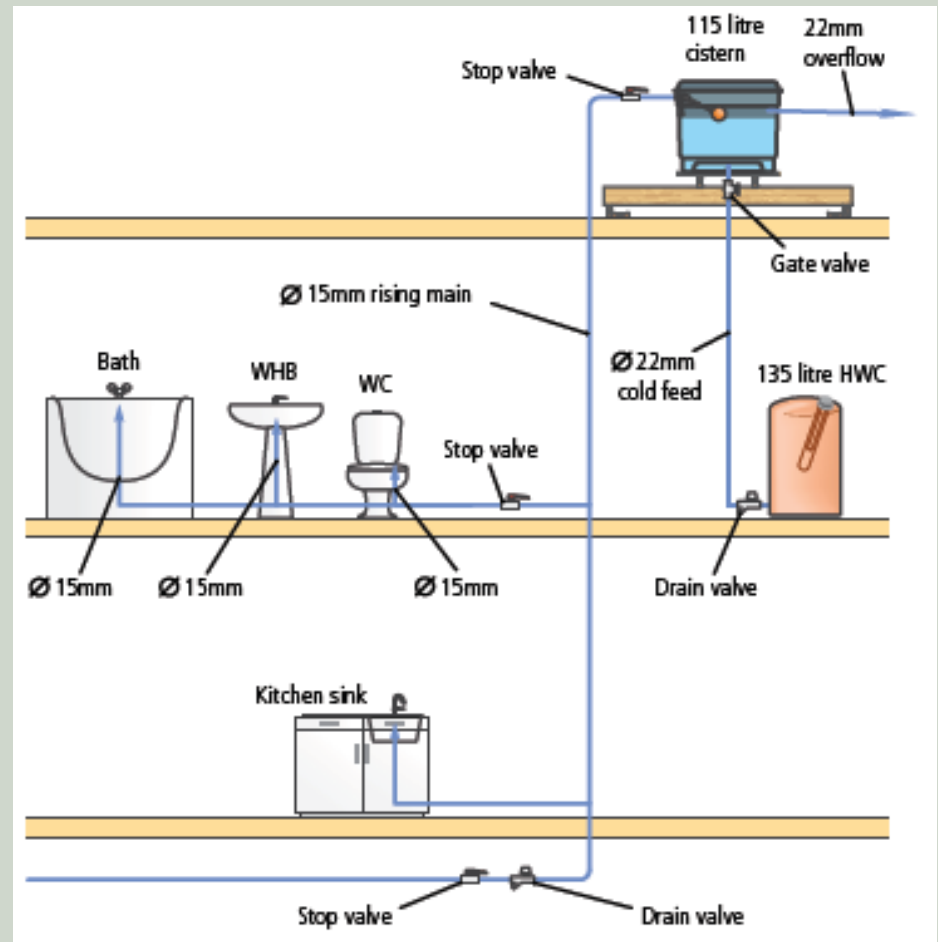
Direct Cold Water Supply Advantages

- Ease of installation
- Low cost
- No large water cistern (attic)
- Drinking water at all taps
- Less pipe work



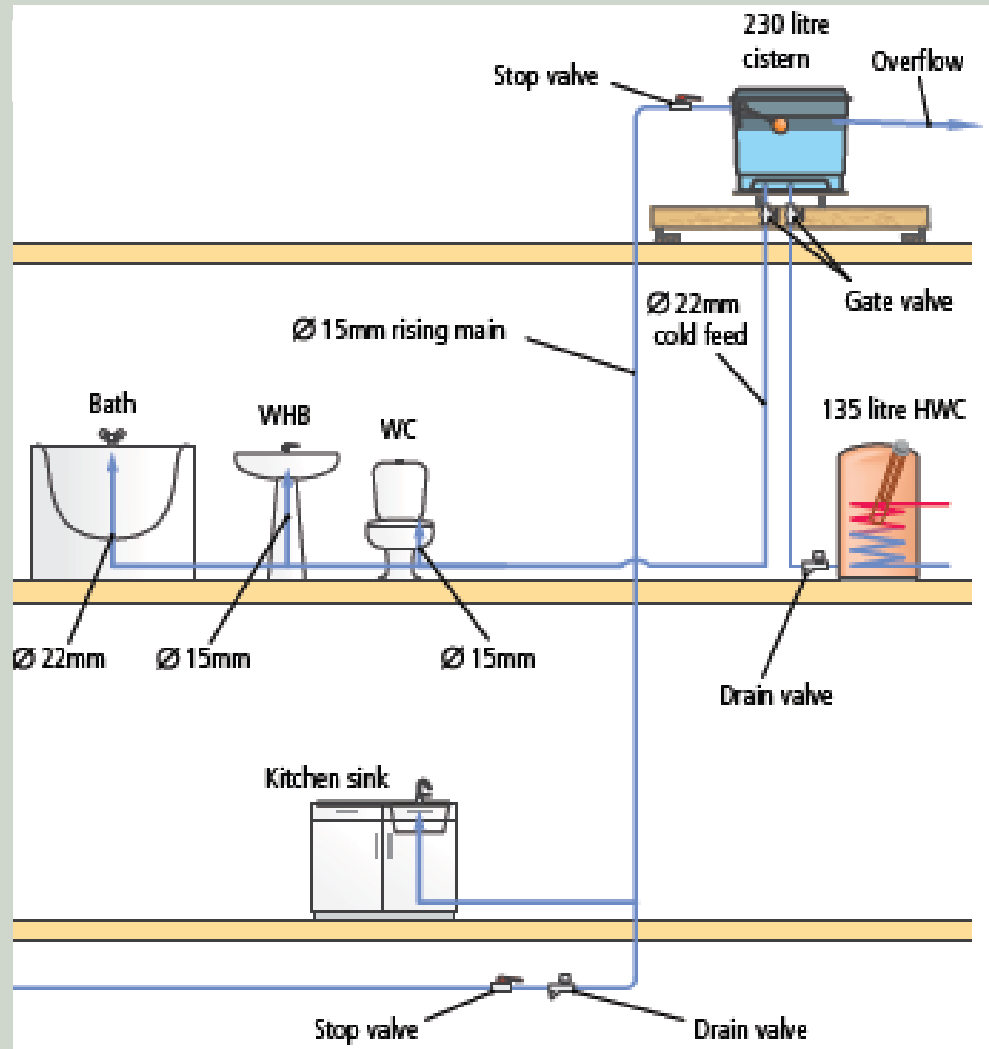
Direct Cold Water Supply Disadvantages

- Reduced pressure at peak times
- High failure rate of fittings due to pressure
- No reserve if mains fails



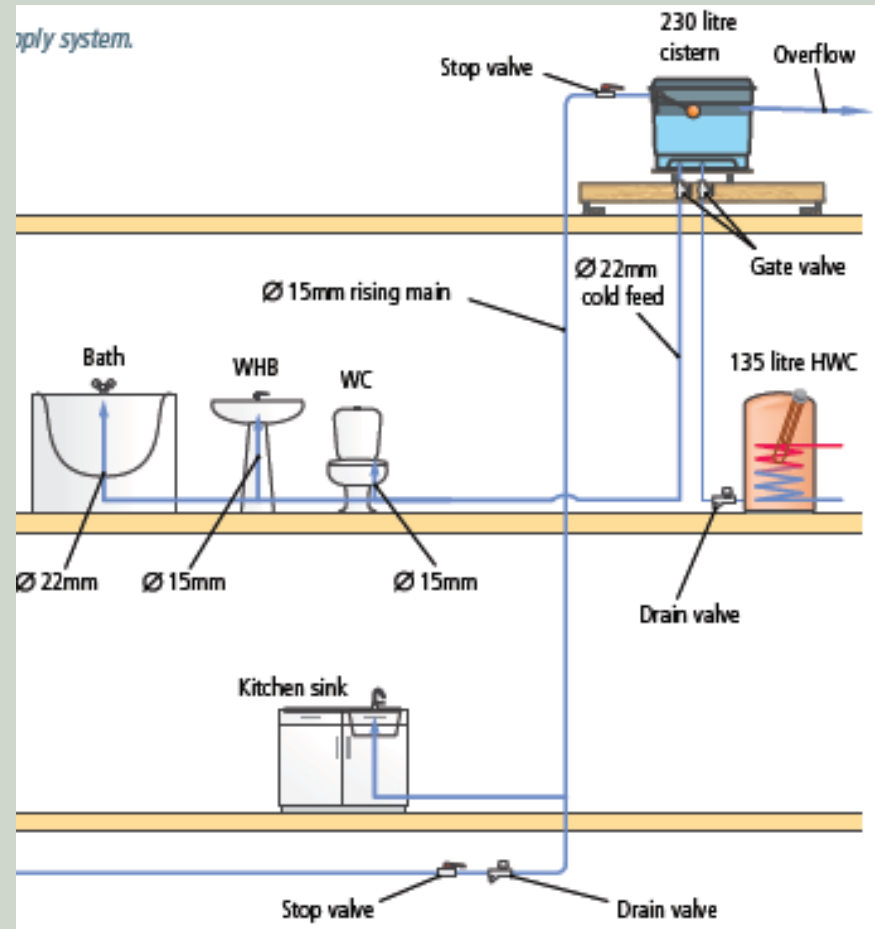
Indirect Cold Water Supply Advantages

- Reserve of water
- Constant pressure on all taps
- Overflow prevention



Indirect Cold Water Supply Disadvantages

- Higher cost
- Large water tank required (attic)
- Drinking water only in kitchen



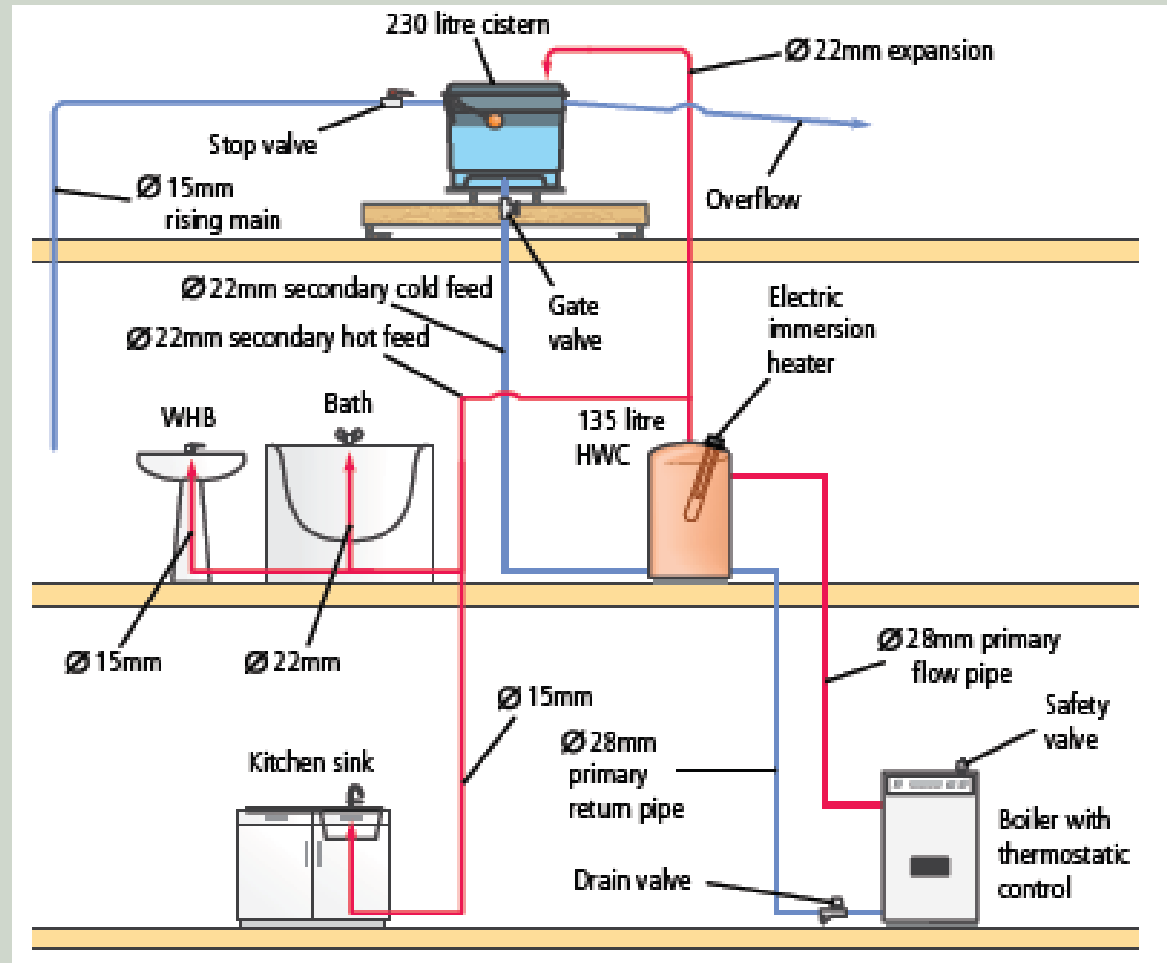
Hot Water Supply

- Water can be heated by appliances most commonly: Boiler, Back Boiler and Immersion
- Two different systems for hot water:
 - **Direct Hot water system:** Water to boiler direct from cistern in attic
 - **Indirect Hot water system:** Water to boiler is fed directly from secondary cistern in attic



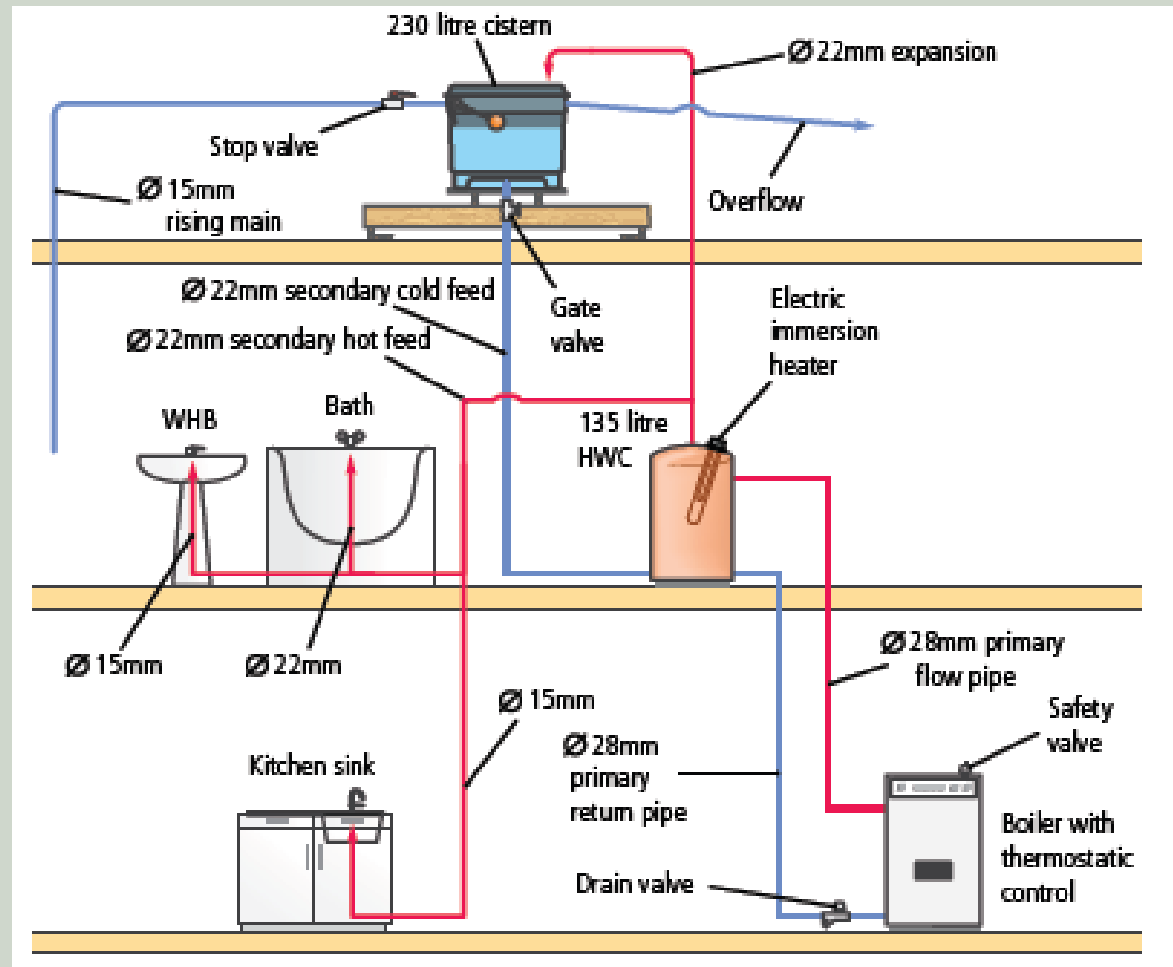
Direct Hot Water System Advantages

- Low cost of installation
- Ease of Installation



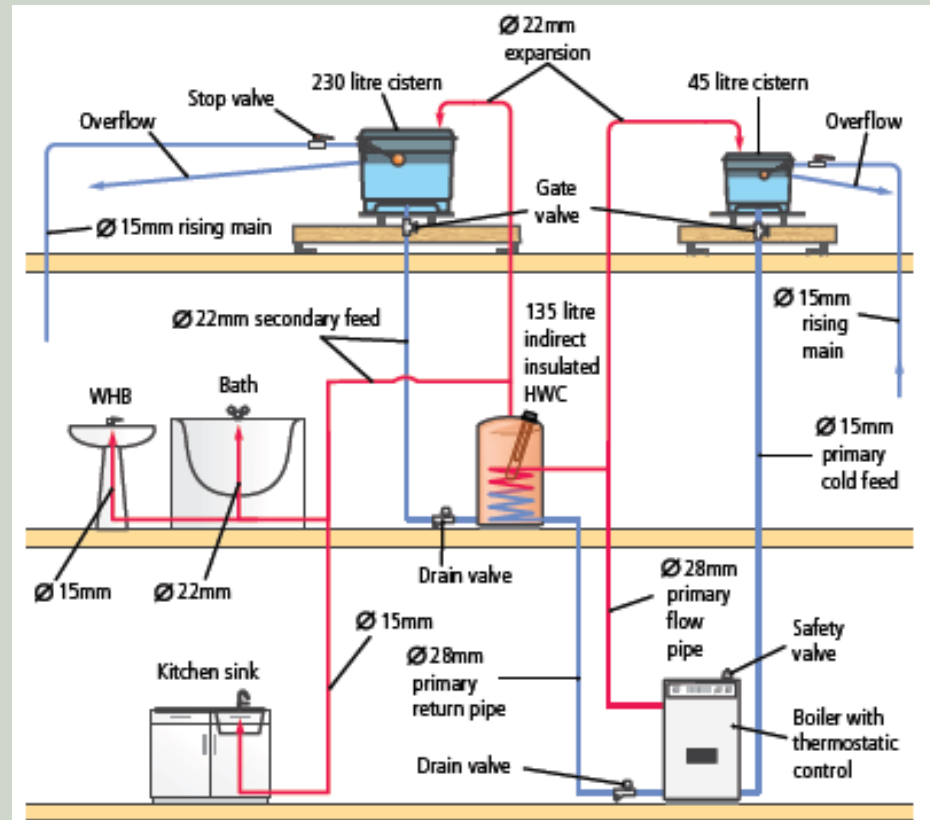
Direct Hot Water System Disadvantages

- Radiators cannot be added to this system
- Strain on Boiler
- Expensive to run
- Limescale build up



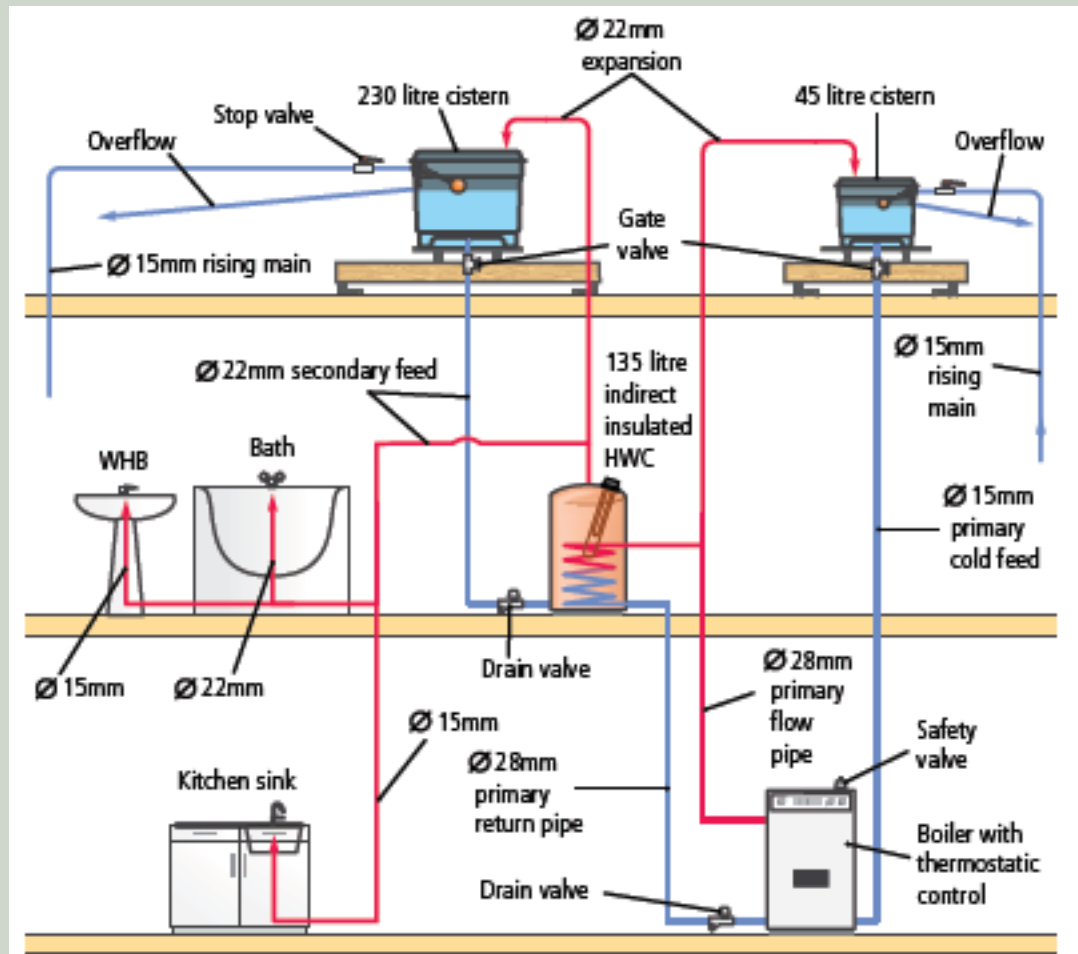
Indirect Hot Water System Advantages

- Reduced boiler stress
- No limescale build up
- Radiators can be connected to system



Indirect Hot Water System Disadvantages

- Extra storage tank necessary
- Higher insulation cost due to more pipework



Solar Power

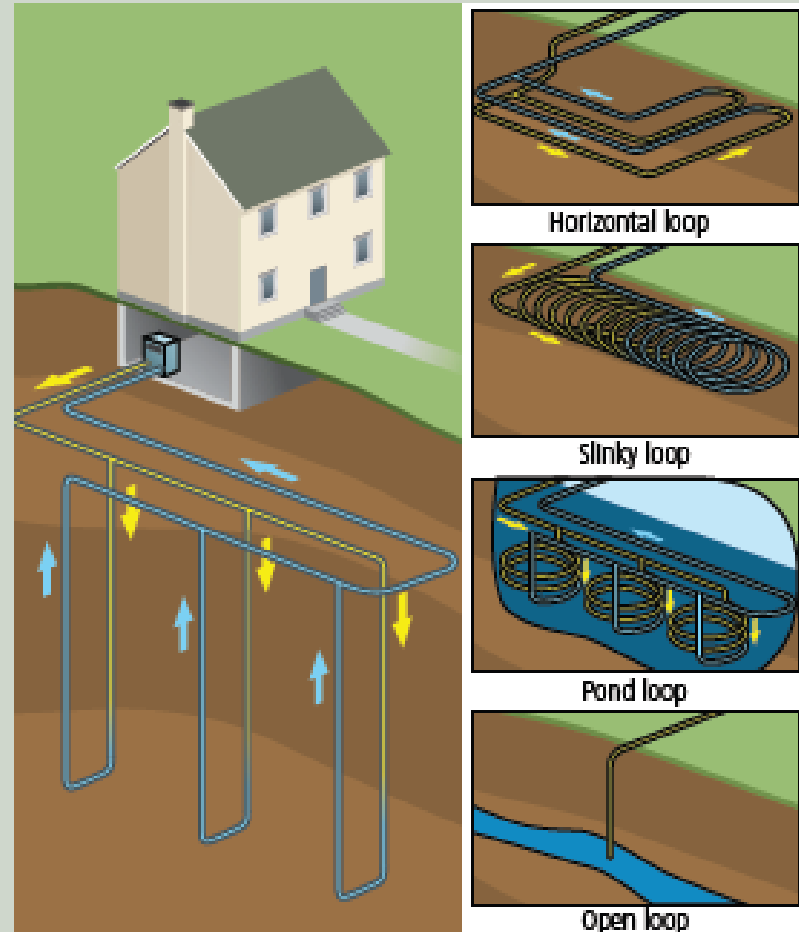
Hot water system with solar attachment

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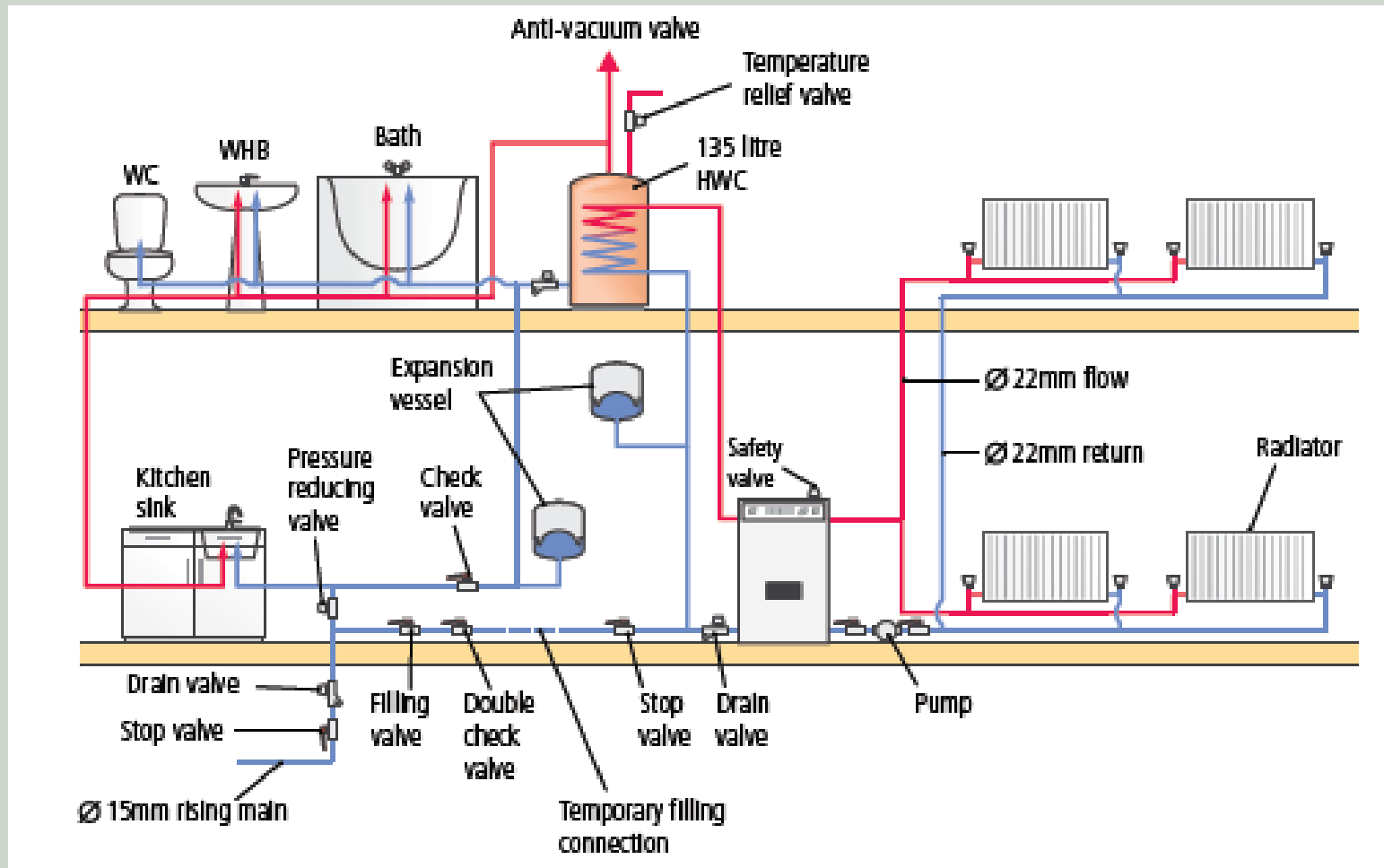


Geothermal

- Uses heat stored in the land
- Circulates warmth into the heating system
- Low operation cost
- Environmentally friendly
- Expensive install
- Eventually reduces heat of soil

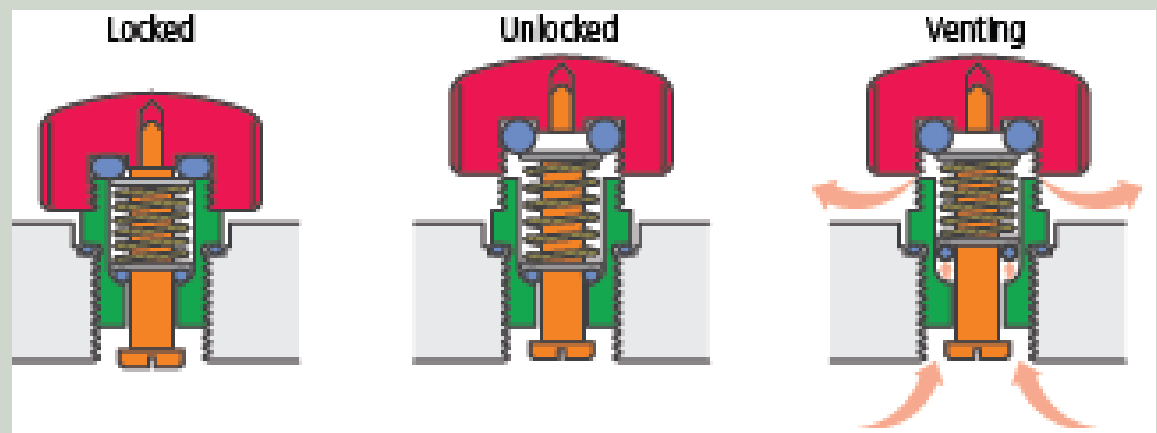
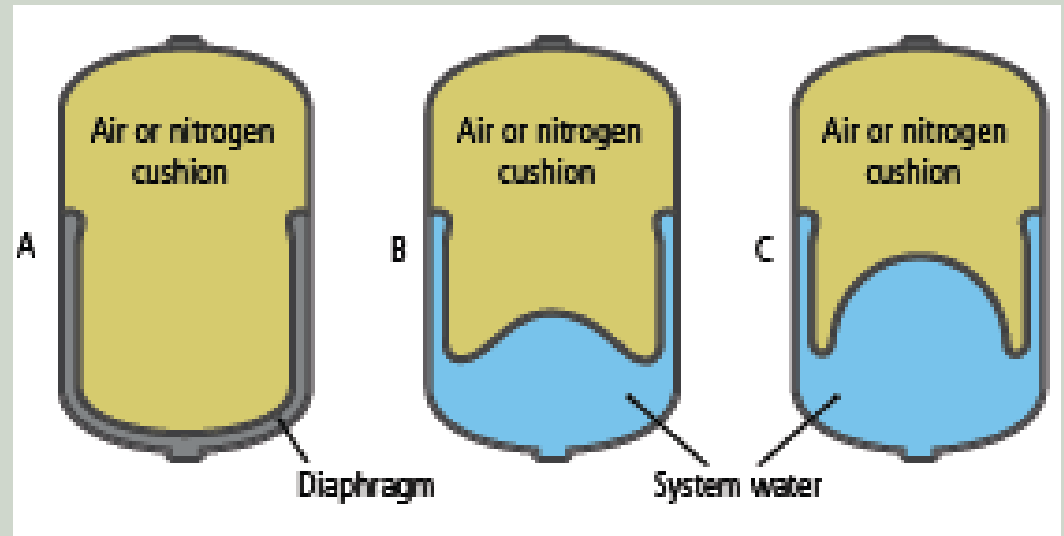


Unvented system: Connect Hot Water Cylinder to the Mains Instead of Storage Tank

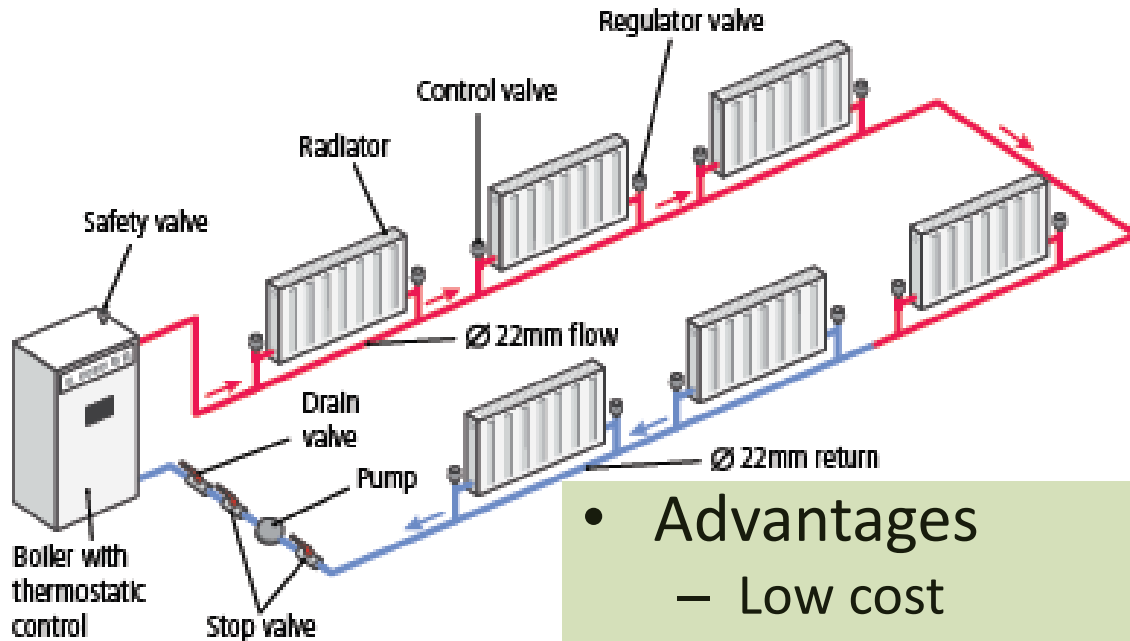


Safety Features of Unvented System

- Expansion vessel
- Temperature relief valve



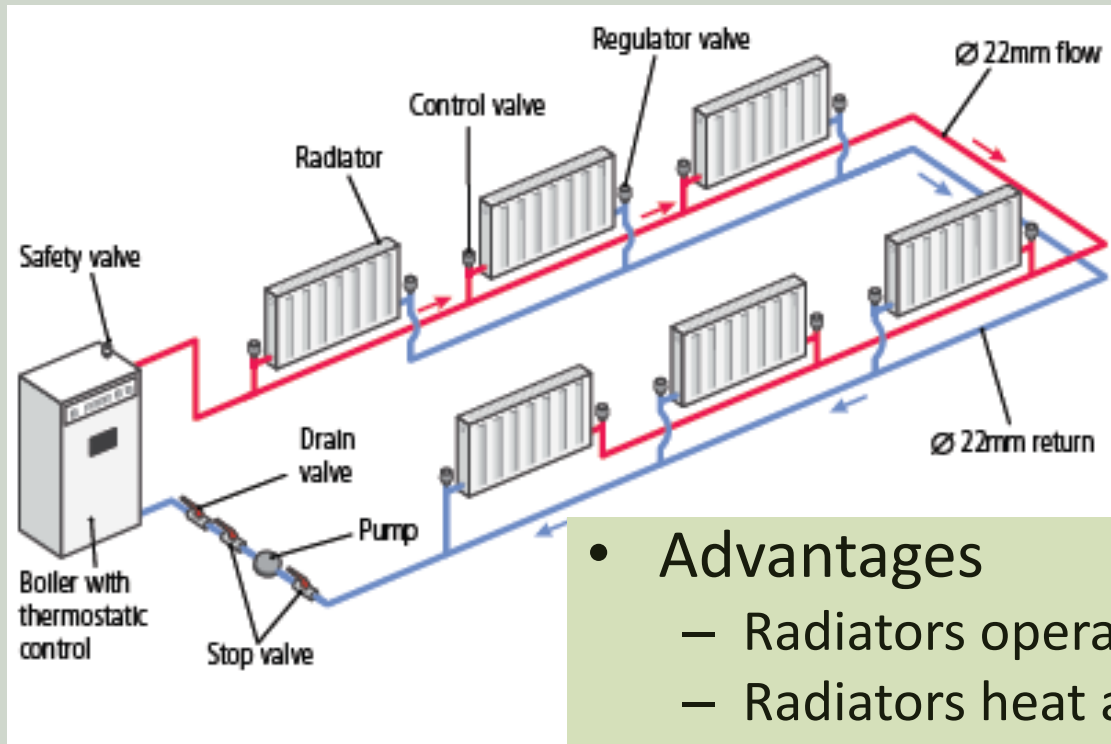
Heating: One Pipe System



- Advantages
 - Low cost
 - Ease of install
 - Low maintenance
- Disadvantages
 - Temp difference in the radiators
 - Reduced control over radiators



Heating: Two Pipe System

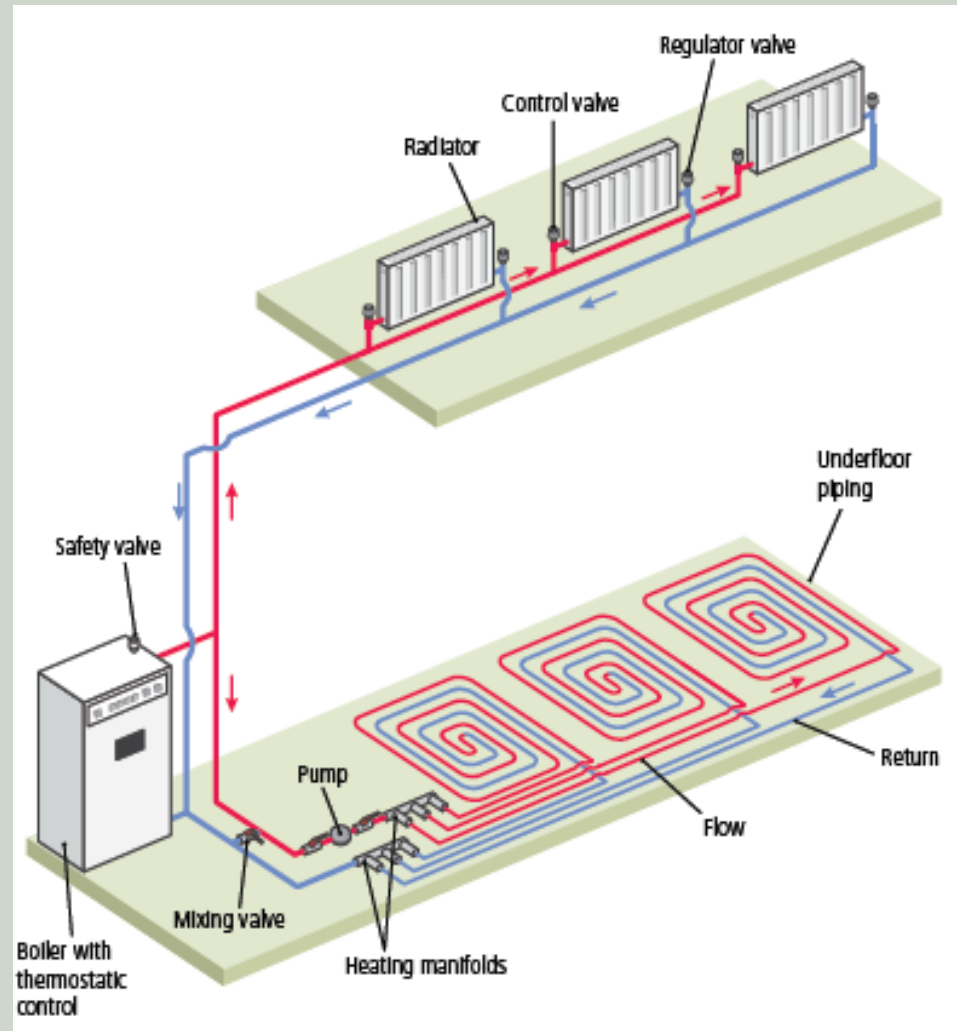


- Advantages
 - Radiators operate at same temperature
 - Radiators heat at same time
 - Greater control over individual radiators
- Disadvantages
 - Higher cost
 - Longer to install



Heating: Underfloor

- Advantages
 - Warm conditions, cool air temperature
 - Warmth stays in the room
 - Energy efficient
 - More Space
- Disadvantages
 - Costly install
 - Costly repairs
 - Slow build up of heat



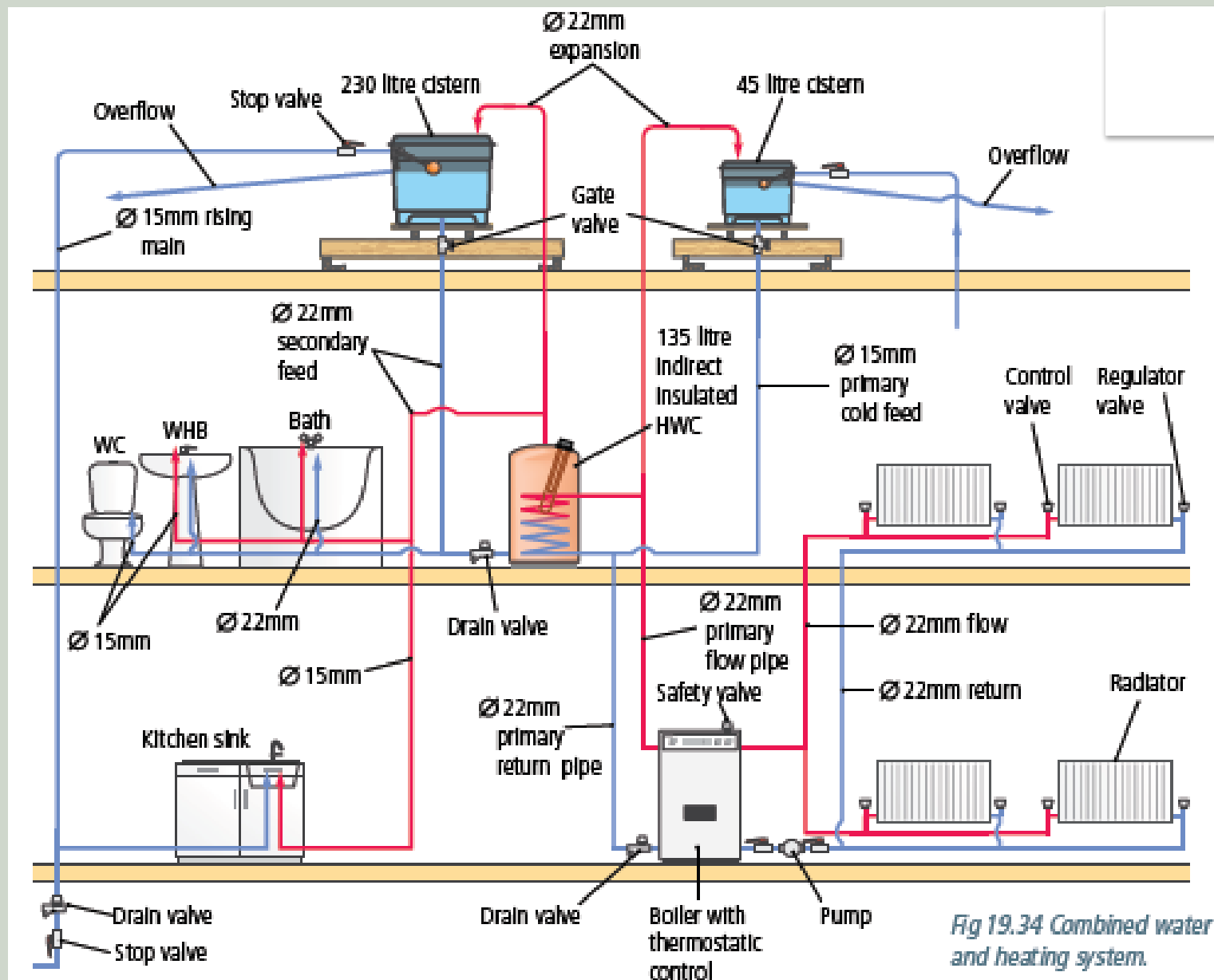


Fig 19.34 Combined water and heating system.



Sustainable Use of Water: Rain Water Harvesting

- Use for:
 - Flushing Toilets
 - Washing Clothes
 - Gardening
 - Outside Taps

