

Boilers

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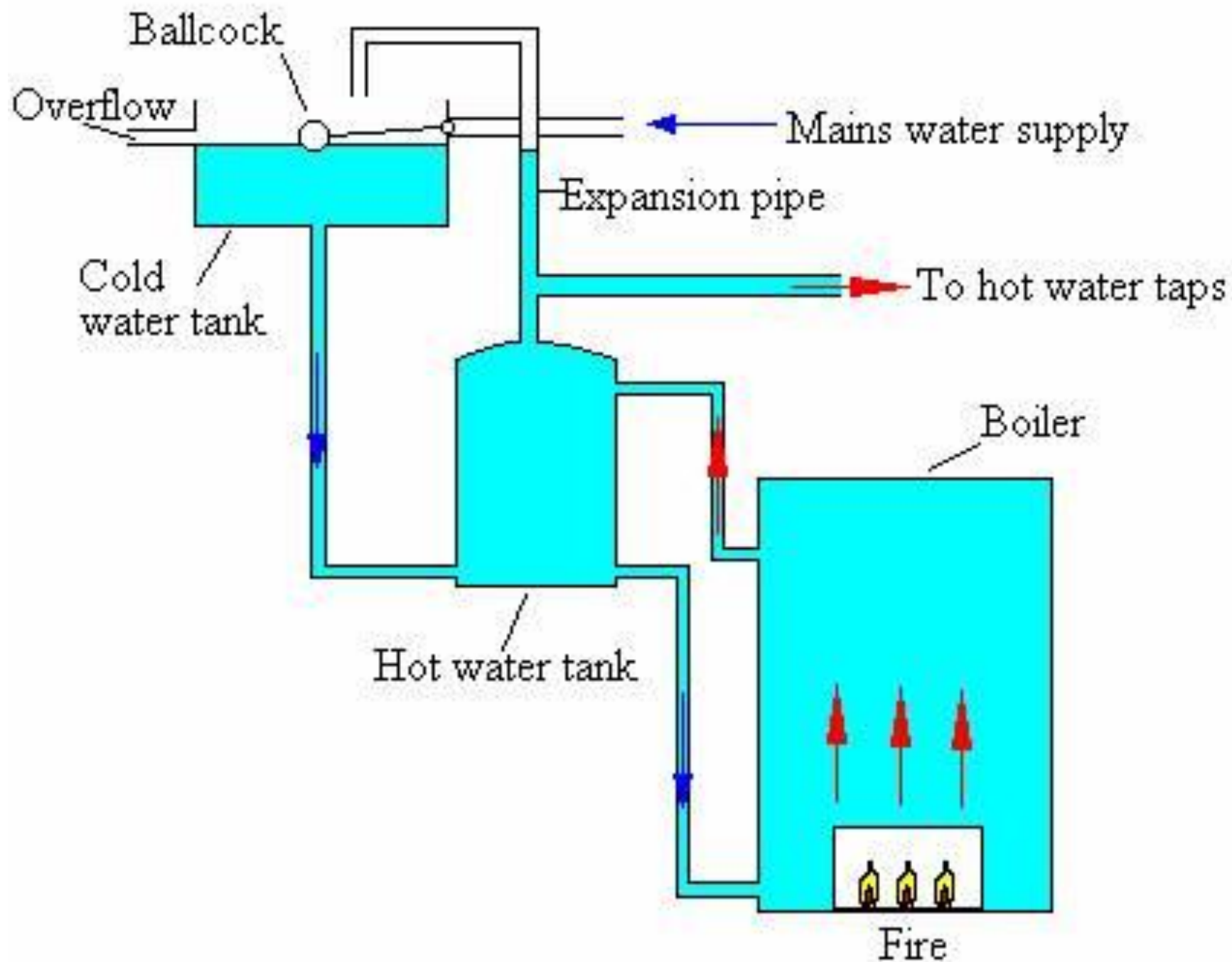
Objective: To describe and explain the boilers' functions and the two main types of boilers.

What is a boiler?

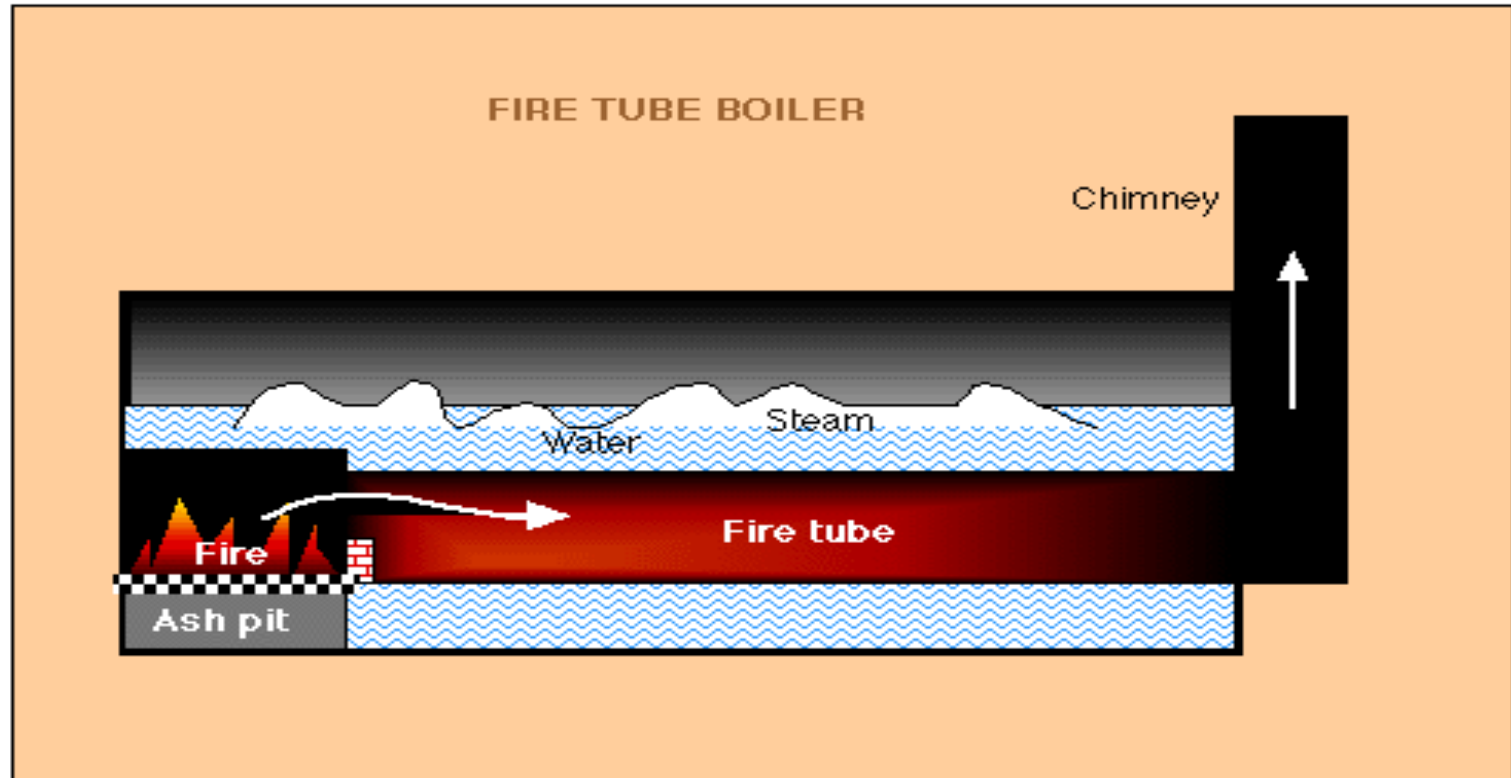
- A water containing vessel in which water is heated under pressure
- Transfer heat from a fuel source (oil, gas, coal) into steam
- The steam or hot fluid circulates out of the boiler for use in various process or heating appliances.

How does a boiler work?

- Closed system: when 100% of the steam produced is returned to be reused.
- Examples of closed systems are close steam heating, hot water heating, and “one-pipe” systems.
- Open system: a system that does not return the condensate.



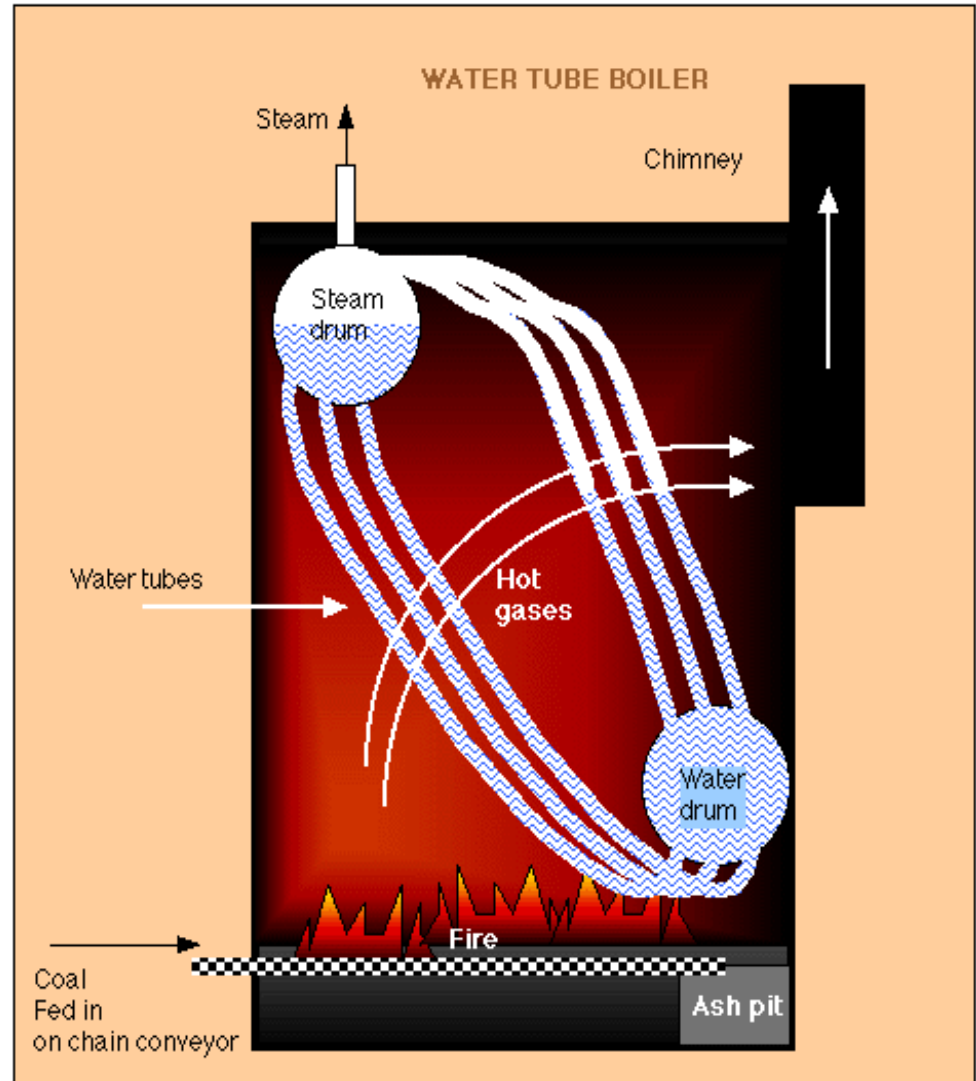
Fire Tube Boilers



- The combustion gases pass inside boiler tubes, and heat is transferred to water on the shell side.

Water Tube Boilers

- Boiler water passes through the tubes while the exhaust gases remain in the shell side, passing over the tube surfaces.



Conclusion

- Boilers are classified into fire tube or water tube boilers depending on whether the heat source is inside or outside the tubes.
- The goal in both cases is to maximize the heat transfer between the water and the hot gases heating it.

References

- Energy Solution Center Inc.
<http://www.energysolutionscenter.org/BoilerBurner/>
- Alkan Murray Corp.
<http://www.alkenmurray.com/Boilerworks.html>