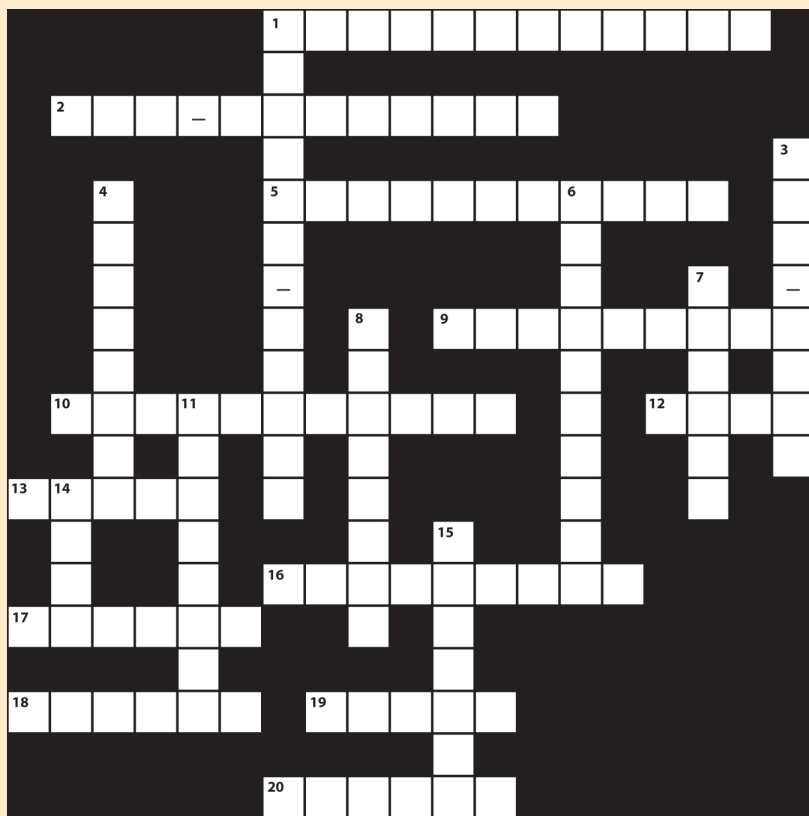




Take the HVAC CHALLENGE™

BY STEVEN G. LIESCHEIDT, P.E., CSI-CCS, CCPR

Medium and High Temperature Water Heating Systems



ACROSS

1. This piping system is the major investment in an HTW (hot water) system.
2. For inert gas-pressurized cycles in an HTW system, this type of safety control should be included to shut down the combustion system if pressurization is lost.
4. Tubes in heat exchangers and converters in HTW systems are generally made of this material, stainless steel, or an admiralty metal.
9. This type of mixing of the liquid and vapor with room air reduces the temperature below 212°F when HTW is released to atmosphere.
10. These drops are greater and less water is circulated in HTW systems than in low-temperature water systems.
12. This type of pressurization of an HTW system in its simplest form consists of this feed equipment and a regulator valve.
13. The selection and sizing of these components in an HTW system is important because of the relatively high temperature drops and smaller flows required.

16. Doing this to the storage tank in an HTW system is a simple pressurization method, but because of the great heights required for the pressure encountered, it is generally impractical.
17. These temperature water systems have operating temperatures below 350° and permit design to a pressure rating of 125 to 150 psig.
18. The danger of this water effect is always present when the pressure drops to the point at which pressurized hot water flashes to steam in a HTW system.
19. This type of pressurization of an HTW system requires the use of an expansion vessel separate from the HTW generator.
20. When this is introduced into makeup water systems, oxidation occurs on the steel, resulting in substantial corrosion over a period of time.

DOWN

1. In this type of HTW generator, the central stations are comparable to steam boiler plants operating within the same pressure range.
3. This type of heat exchanger construction is desirable in large HTW systems, in order to allow removal of the tube bundle without breaking piping connections.
4. The high heat storage capacity of water produces this effect in most HTW systems, evening out load fluctuations.
6. It is necessary to modulate this rate on all systems with a capacity of over a few million Btuh, due to the rapid response through the HTW generators.
7. Control valves are commonly located in these lines from heat transfer units to reduce the valve operating temperature and to prevent plug erosion caused by high-temperature water flashing to steam at lower discharge pressure.
8. This is the most commonly used inert gas used for gas pressurization in an HTW system.
11. One type of HTW system is one in which this is imposed externally by gas or a pump.
14. This organization publishes *Standard B31.1 - Power Piping*.
15. This type of HTW generator sometimes uses an existing steam distribution system and is installed apart from the central plant.

To brush up on the facts behind this month's clues, refer to Chapter 14 ("Medium and High Temperature Water Heating Systems") in the *2004 ASHRAE Handbook — HVAC Systems and Equipment*.



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Solution to May's HVAC Challenge™

