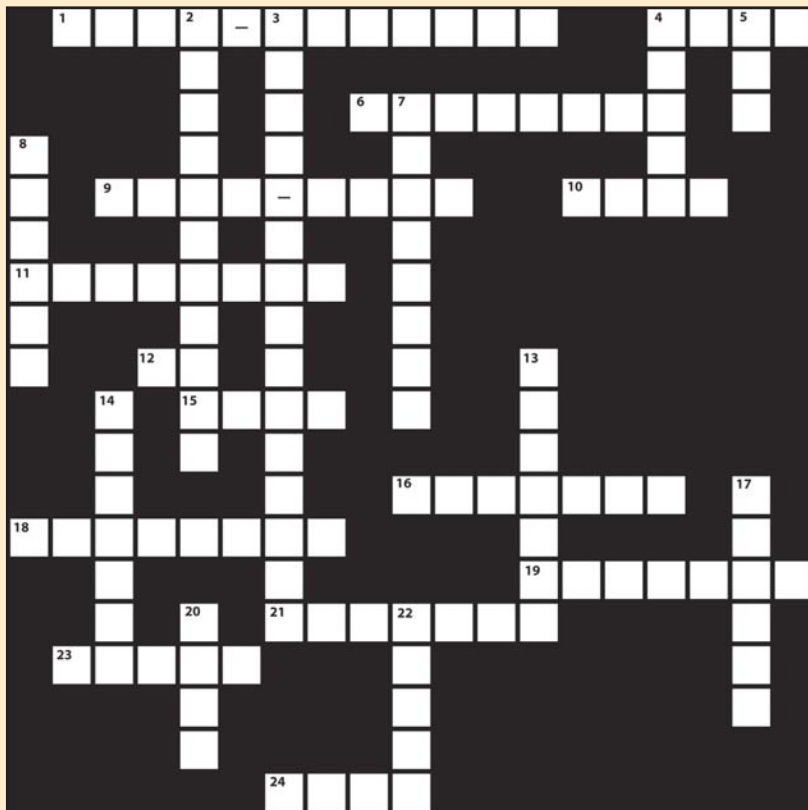




Take the HVAC CHALLENGE™

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Snow Melting/Freeze Protection



ACROSS

- This thermostat reads the pipe temperature and activates the heat trace system when the pipe temperature approaches freezing.
- These temperature sensors limit energy waste during normal and light snow conditions for snow-melting systems used to heat these flat horizontal surfaces.
- This heat flux takes into account the specific heat of ice and water.
- A dimensionless area ratio, which means at a value of 1, the system must melt snow rapidly enough that no accumulation occurs.
- The proper one of these in a hydronic system is selected based on the fluid flow rate, energy requirements of the piping system, specific heat of the fluid, and the viscosity of the fluid.
- A type of snow-melting and freeze protection system that uses overhead high-intensity radiant heat.
- Every one of these magnesium oxide mineral-insulated heating cables is factory-fabricated with a non-heat-generating, cold-lead cable attached long enough to reach a dry location for termination and of sufficient wire gage to comply with local and NEC standards.

- These are not corrosive fluids, but they are more expensive than brine or glycol and have a lower specific heat and higher viscosity.
- This heat flux is the heat required to melt the snow.
- A type of snow-melting and freeze protection system that uses hot fluid circulated in slab-embedded pipes.
- This mean temperature is the equivalent blackbody temperature of the surroundings of the snow-melting slab when used to calculate the convective and radiative heat flux from a snow-free surface.
- These are the most popular in hydronic snow-melting systems because of their moderate cost, high specific heat, low viscosity, ease of corrosion control, and resistance to freezing.
- This is the least costly heat transfer fluid, but it has a lower specific heat than glycol.
- These heaters consist of two insulated copper bus wires wrapped with a small gauge nichrome heating wire covered with polymer insulation.

DOWN

- This heat flux is the heat required to evaporate water from a wet surface.
- These cables consist of two parallel conductors embedded in a heating core made of conductive polymer and they automatically adjust their power output to compensate for local temperature changes.
- When this is used in a pipe-tracing system it re-condenses and releases its latent heat and transfers it into the heat traced pipe to prevent freezing in that pipe.
- The introduction of this causes deterioration of antifreeze so the piping of hydronic snow-melting systems should not be vented to atmosphere.
- A type of snow-melting and freeze protection system that uses embedded cables or wires.
- This part of a hydronic snow melting system may be metal, plastic, or ethylene-propylene terpolymer.
- Electrical heating cables are used to prevent heavy snow and ice accumulation on room overhangs and to prevent ice dams from forming in these.
- This thermostat may be used to deactivate the snow melting or freeze protection system when this ambient temperature rises above 35 to 40°F.
- This type of control is strictly by on-off control where an operator must activate and deactivate the system when snow falls.
- These detectors monitor precipitation and temperature.
- To determine this layout for a specific area, it is necessary to know the heated area size, the power density required, and the voltages available.

To brush up on the facts behind this month's clues, refer to Chapter 50 ("Snow Melting and Freeze Protection") in the 2003 ASHRAE Handbook —Applications.

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Solution to November's HVAC Challenge™

