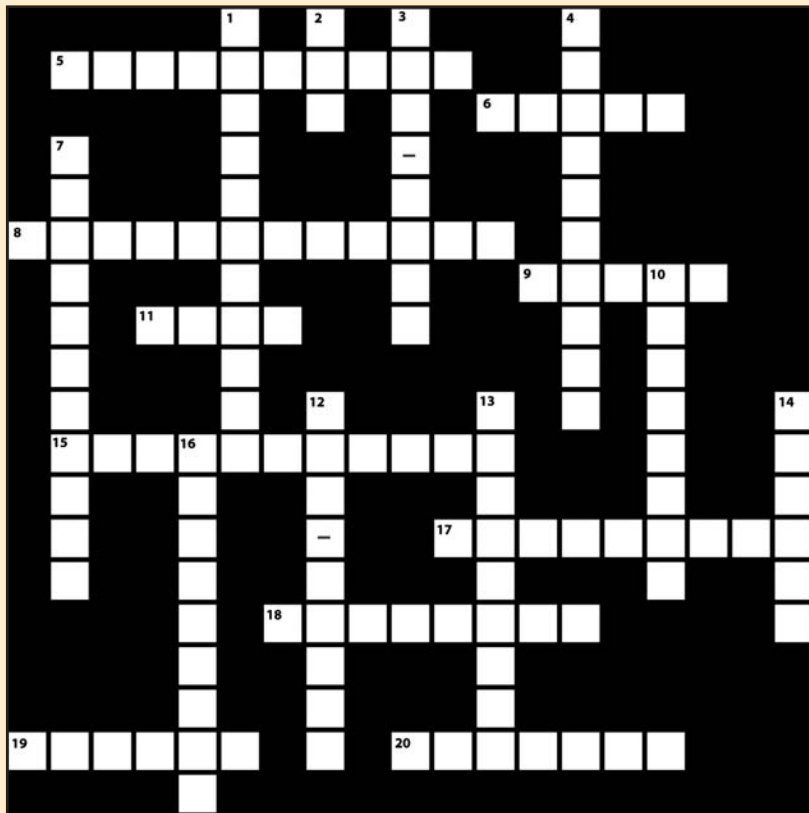




Take the HVAC CHALLENGE™

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

Museums, Libraries, and Archives



ACROSS

5. This form of damage can be caused by very low or fluctuating relative humidity or temperature levels.
6. This airborne pollutant causes fading of some artists' colorants, dyes, and pigments, and oxidation of organic objects in conjugated double bonds like rubber.
8. These and other volatile organic compounds (VOCs,) such as alcohols and ketones, may be important for other considerations such as human health and comfort, but generally are not threats to artifacts in museums.
9. This damage is perhaps the most extensive threat to museum collections.
11. This type of storage vault extends the life of materials particularly sensitive to thermal deterioration such as acetate films and color photographic materials.
15. Some polymers become brittle and are more easily fractured when this is too low. If this is too high, damaging chemical processes may accelerate for some materials.
17. Along with shock, this can cause long-term damage to sensitive objects in a museum.
18. This type of damage can be caused by higher temperatures and moderate amounts of adsorbed moisture that lead to rapid decay in chemically unstable artifacts and archival records.
19. This airborne pollutant causes degradation of proteins.
20. This type of air is almost always at non-design temperature and humidity and can introduce particulate and gaseous pollution if not properly conditioned.

DOWN

1. This type of filtration systems usually needs to be 90% to 95% per ASHRAE Standard 52.1 to avoid particle buildup and cleaning problems.
2. This pollution includes outdoor-generated gaseous and particulate pollutants that infiltrate the building as well as indoor-generated ones.
3. The units have been and can be problematic when placed in and above collection areas.
4. This type of damage is caused by dampness that accelerates mold growth on most surfaces, corrosion of base metals, and chemical deterioration in most organic materials.
7. Using this type of lighting in museums, libraries, and archive facilities can save energy but should be avoided as much as possible over collection areas.
10. This relative state presents a risk for museum materials, and each material has a level of environmental moisture content consistent with maximum chemical, physical, or biological stability.
12. This type of filtration may be needed where new construction materials, indoor pollutants, collection off-gassing, or infiltration of outside pollution threaten a sensitive collection.
13. This type of dehumidifier is less familiar but can be quite effective if properly designed, installed, and maintained in museums, libraries, and archive facilities.
14. These airborne pollutants in the form of ammonia blemishes on ebonite and in other forms blemishes on paintings.
16. These airborne pollutants cause discoloration of photographic prints, fading of some artists' colorants, and oxidation of organic objects.

To brush up on the facts behind this month's clues, refer to Chapter 21 ("Museums, Libraries and Archives") in the 2003 ASHRAE Handbook—Applications.

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Solution to June's HVAC Challenge™

