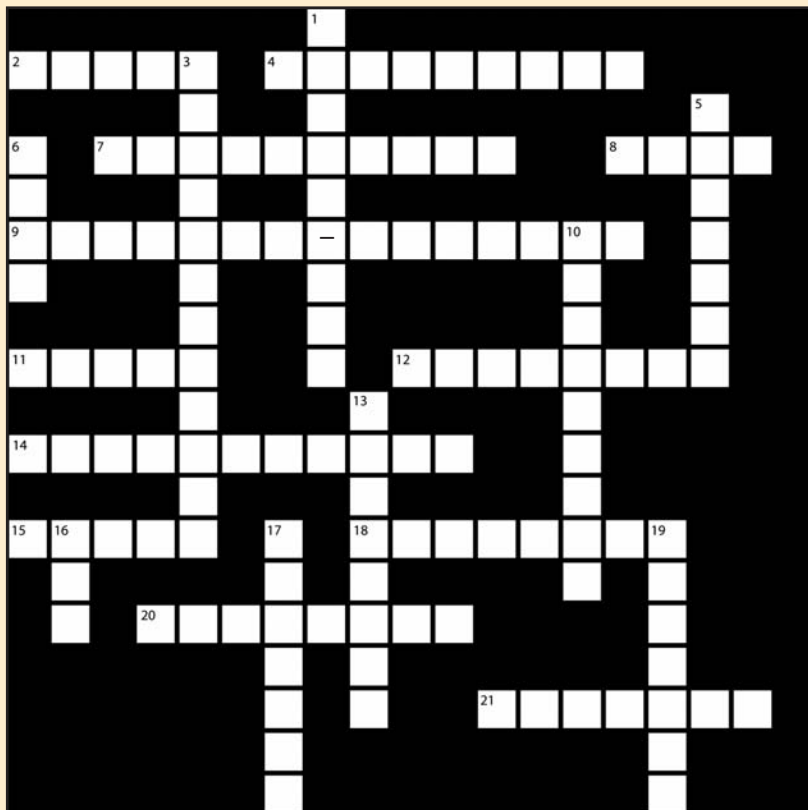




# Take the HVAC CHALLENGE™

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

## Retail Facilities



### ACROSS

2. Large areas of this building component at the front of many small stores may cause high peak solar heat gain unless they have a northern exposure.
4. These types of obstacles in a store ceiling could interfere with proper air distribution.
7. This type of retail store varies in size, type, and location, so air conditioning design should be specific to each store with an ample minimum quantity of outside air to reduce or eliminate odor problems.
8. This type of system selection and design for retail facilities is normally determined by economics.
9. Large department stores often use this type of HVAC system, which consists of AHUs with chilled water and heating coils, fans, and filters.
11. This is the preferred return grille location for areas in supermarket-type retail facilities with refrigerated display cases, where the coolest air can be returned low.
12. For small stores, this part of the air conditioning system should be kept as simple as

possible while still providing the required functions.

14. Many small stores such as discount stores, supermarkets, drugstore, theaters, and sometimes department stores, are located in this type of retail center and the lease agreement may stipulate that the tenant provide their own HVAC system.
15. The air supplied to this type of space in a supermarket is typically in the range of 1.0 cfm/sq ft.
18. This static pressure availability in small store air conditioning units is limited, so duct system resistances should be kept low.
20. This type of shopping center generally incorporates an enclosed heated and air conditioned mall and is generally owned by a developer.
21. Maintenance for large discount, big-box, and super center-type retail stores is typically handled by this type of contract in lieu of trained employed maintenance personnel.

### DOWN

1. This type of retail complex is being developed in most metropolitan areas, generally combining retail with offices, hotels, residences, and other commercial spaces on a single site, which can provide benefits and opportunities for utility savings and more efficient HVAC systems.
3. Space conditioning in this type of retail store is required for both human comfort and for proper operation of refrigerated display cases.
5. The duct system in retail stores should have enough of these for air balancing.
6. These types of heaters are generally furnished with manufacturer installed safety controls.
10. These economics along with the types of spaces served often dictate the inside design conditions for discount, big-box, and super center-type retail stores.
13. This segment of a retail store's cooling load in a shopping center will be similar from store to store although the external loads may differ, depending on the exposure.
16. This type of curtain can be used in supermarket entrances to help heat the entrance and to minimize infiltration due to frequent door openings.
17. Single-level and smaller regional shopping centers usually use this type of HVAC system for mall and tenant air conditioning, while larger regional shopping centers use a central plant.
19. This agreement may include a provision that could have a detrimental effect on energy conservation, therefore the HVAC engineer who designs the system must be aware of these agreements and help guide the design team toward better energy efficiency.

To brush up on the facts behind this month's clues, refer to Chapter 2 ("Retail Facilities") in the 2003 ASHRAE HVAC Applications Handbook.

The solution to this month's puzzle can be found on ESONline, at [www.esmagazine.com](http://www.esmagazine.com). It will also be printed in next month's issue.



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## Solution to June's HVAC Challenge™

