

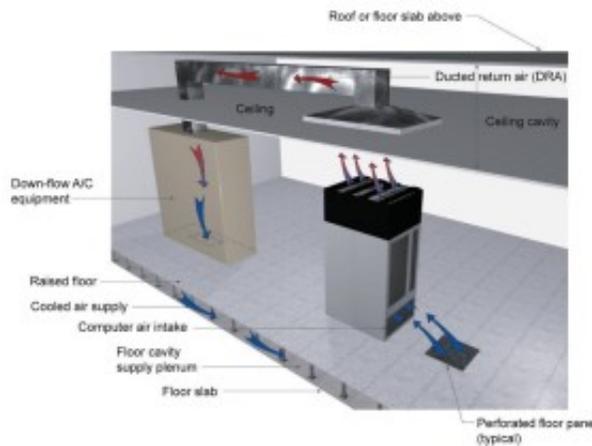
Modifying Your Fire Protection System When Using A Return Air Plenum

To combat heating challenges in today's mission critical facility, consideration is often given to using the space above the suspended ceiling as a return air plenum.

There are two types of return air plenums: Ducted return air plenums and ceiling return air plenums.

Ducted Return Air Plenum

This method requires the installation of ductwork that runs from each computer room air conditioning (CRAC) unit up into the space above the suspended ceiling and to each return air grille. Return air is then directed into the grille and travels to each CRAC unit. This method does not use the entire space between the suspended ceiling and the floor slab above as the return air plenum. Only the ductwork acts as a plenum.



Ceiling Return Air Plenum

This method requires the installation of return air grilles throughout the suspended ceiling and return air intakes at each CRAC unit. The return air is then directed into the plenum through the grilles and travels to the nearest CRAC unit intake. This method uses the entire space that is between the suspended ceiling and the deck as the return air plenum.

Regardless of which type of plenum is installed, you should consider modifying your mission critical facility's existing sprinkler system and/or gaseous suppression system.

Sprinkler System

If a mission critical facility is protected by a sprinkler system, modifications are not necessary if using a ducted return air plenum.

If a ceiling return air plenum is used, the National Fire Protection Association (NFPA) states that:

“Noncombustible and limited combustible concealed spaces with limited access and not permitting occupancy or storage of combustibles shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.”

-NFPA 13 Standard for the Installation of Sprinkler Systems (2002 Edition) Chapter 8, Section 14

Your local Authority Having Jurisdiction – Fire Marshal (AHJ) will determine how the code is applied in your municipality. In some instances, the AHJ may require that additional sprinklers be added to the plenum space.

Gaseous Suppression System

If a mission critical facility is protected by a gaseous suppression system, modifications are mandatory in both ducted plenums and ceiling plenums.

NFPA explains that:

“To prevent loss of agent through openings to adjacent hazards or work areas, openings shall be permanently sealed or equipped with automatic closures. Where reasonable confinement of agent is not practicable, protection shall be expanded to include the adjacent connected hazards or work areas or additional agent shall be introduced into the protected enclosure using an extended discharge configuration.”

-NFPA 2001 Standard on Clean Agent Fire Extinguishing Systems (2004 Edition) Chapter 5, Section 3

If a facility is protected by a gaseous suppression system and a ducted return air plenum is installed, two options are available:

1. Install dampers in the ductwork at the point where air enters from the return air grille and at the point where the ductwork passes through the suspended ceiling.
2. Add clean agent inside the ductwork and include the space as part of the total hazard volume.

If a facility is protected by a gaseous suppression system and a ceiling return air plenum is

installed, suppression must be added to the plenum space and the space must be included as part of the total hazard volume. In addition, Bick Group recommends that duct detectors be installed at each CRAC unit intake to provide additional protection.

Sprinkler System and Gaseous Suppression System

If a mission critical facility is protected by both a sprinkler system and a gaseous suppression system, it is only necessary to modify the suppression system. The same modifications mentioned in the previous section apply.

Installing a ducted or ceiling return air plenum is a powerful tool for controlling the environment of your mission critical facility. But, it is important to remember that in doing so, modifications will be necessary to maintain the level of fire protection that currently exists in your facility.

Bick Group has subject matter experts in this and many other topics. Talk to our Fire Protection experts by emailing: jknabe@bickgroup.com