

FILE NO. 4-408.1.5

DATE: March 24, 1994

CODE APPLICATION NOTICE

CODE SECTION: Section 408.1.5, Exception, 2001 California Mechanical Code

Exception. Dry steam-type humidifiers for local room humidity control may be installed downstream of filter bank No. 2 where designs are specifically approved by the enforcing agency.

INTERPRETATION:**A. Humidifiers upstream of final filters:**

There is no code restriction on installation of humidifiers upstream of the final filter. However, care should be taken to provide sufficient distance between the humidifier and filter and/or coils to allow for proper absorption of vapor by the airstream to prevent wetting of filters and coils.

B. Humidifiers located downstream of final filters:

OSHPD interprets "dry steam" to be dry saturated steam as defined by the 2000 ASHRAE Handbook (HVAC Systems and Equipment), Chapter 10, which defines "dry saturated steam" as "pure vapor without entrained water droplets."

Plans and/or specifications shall explain and detail how the proposed humidification device will provide dry steam as defined by ASHRAE.

1. One accepted means of providing dry steam is by means of a jacketed (double wall distribution tube) steam injector type humidifier with accessories for conditioning superheated steam to remove particulate matter and condensate before dispersing dry steam to the airstream. Such devices, when properly installed, will disperse dry steam without entrained water droplets and thus will prevent wetted duct surfaces downstream of the humidifier. If steam from a central boiler plant will be injected directly into the airstream, it is recommended but not required that the design professional ~~should~~ verify that the boiler water will not be treated with chemicals or contain minerals which are known to be hazardous to health or which might contribute to an indoor air quality problem.
2. Another acceptable means of providing dry steam will be a properly designed and installed, boiling water vapor injection type humidifier with the steam generation chamber in an accessible location outside the conditioned airstream. Vapor shall be injected into the conditioned airstream by means of a properly designed and installed distribution tube or tubes. The steam distribution tube(s) shall have provisions for condensate drainage and shall be designed and installed to prevent condensate in the distribution tube(s) from being ejected into the conditioned airstream. The distance

(Additions or changes indicated by underline; deletions by strikeout)

between the steam generator and the duct distribution tube(s) shall not exceed manufacturer's recommendations.

Due to potential for bacterial growth in the reservoirs of boiling water vapor injection type humidifiers, the water reservoir shall be equipped for timed flushing cycles. Other acceptable means of preventing bacterial multiplication in the reservoir will be considered. If a timed flush cycle is employed, the frequency shall be sufficient to prevent bacterial populations from multiplying to levels which could be hazardous to patients or hospital staff.

3. Humidifiers that discharge dry steam directly into the room air are not acceptable.

Other means of providing humidification downstream of the final filter bank will be considered on a case-by-case basis.

C. All humidifiers:

Regardless of humidifier type, all humidifiers shall be specified and installed with proper downstream distances to obstructions and/or restrictions which could be sites for condensation. Factors such as air velocity, airstream temperature, humidification load and relative humidity of the airstream shall be taken into consideration. Air flow proving devices and downstream humidity high limit controls shall be provided.

Construction documents shall detail how the distribution tubes are to be installed, indicating minimum distances from changes in direction and other potential points of condensation. Appurtenant piping and accessories shall also be detailed. Psychometric analysis or other acceptable means, shall be provided to verify that dry steam will be supplied.

Mechanical means of humidification, such as atomizers, and humidifiers requiring direct contact of conditioned air with water or wetted surfaces are not permitted.

REASON:

The intent of the requirement for dry steam type humidifiers is to prevent direct contact of conditioned air with water or wetted surfaces which could foster the growth of bacteria (including Legionella) in the HVAC system.

(Additions or changes indicated by underline; deletions by strikeout)

Clean, uncontaminated ductwork is a joint responsibility of the design professional, installing contractor, and the hospital maintenance staff. This Code Application Notice addresses the design and installation considerations necessary to prevent direct contact of conditioned air with wetted surfaces which could become sites for bacterial growth. Proper maintenance of the system is the responsibility of the health care facility and is regulated by other Titles of the California Code of Regulations.

ORIGINAL SIGNED

11/13/03

Kurt A. Schaefer

Date

(Additions or changes indicated by underline; deletions by strikeout)