

Study Session

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2018 SBC 601 Chapter 6

Heating, Ventilating and Air Conditioning

OBJECTIVE: To obtain an understanding of the requirements for conditioning a space and an understanding of the requirements for ventilation to maintain a healthy building.

REFERENCE: Chapter 6, 2018 *Saudi Energy Conservation Code* (SBC 601)

KEY POINTS:

- What provisions are prescriptive?
- Does this chapter have requirements for new equipment?
- What circumstances is this code not required to be complied with?
- Is mechanical equipment required to meet a testing standard?
- What if the equipment is not listed in the Saudi Arabia Energy Efficiency Program?
- What requirements do heat pumps and packaged terminal air conditioners (PTAC) have when they are a nonstandard size?
- What are the acceptable practices for calculating heating and cooling loads?
- What controls are required for cooling?
- What do outdoor intake and exhaust systems require to maintain the building envelope?
- What type of ventilation is required for parking garages?
- What are the provisions for demand control ventilation?
- When are direct digital controls required?
- What ductwork and plenums are required to be insulated?
- When is heating, ventilation and air-conditioning (HVAC) piping required to be insulated, or is it required?
- What is an economizer?
- When are limitations for fans required?
- How does variable air volume (VAV) control the outside air intake?
- How are multiple chilled water plants permitted to operate?
- When are energy recovery systems required for exhaust air?
- What is required with kitchen exhaust?
- Is radiant heating permitted by this code?
- What operating manuals are required to be provided?
- What systems are required to be balanced?

Code Text: *Mechanical equipment and systems serving the heating, cooling, or ventilating needs of new buildings shall comply with the requirements of this section as described in Section 6.2.*

Discussion and Commentary: This section governs how to design, review, construct and inspect new mechanical equipment and system controls for cooling and ventilation systems. The section refers one to Section 6.2, which contain the compliance path requirements. It lists the sections that must be complied with for HVAC equipment.



This new ductwork for this new building has been sealed and contains the required insulation.

Code Text: *Exceptions to 6.1.1.3: Compliance shall not be required:*

- (a) *for equipment that is being modified or repaired but not replaced, provided that such modifications and/or repairs will not result in an increase in the annual energy consumption of the equipment using the same energy type, or*
- (b) *where a replacement or alteration of equipment requires extensive revisions to other systems, equipment, or elements of a building, and such replaced or altered equipment is a like-for-like replacement, or*
- (c) *for a refrigerant change of existing equipment, or*
- (d) *for the relocation of existing equipment, or*
- (e) *for ducts and pipes where there is insufficient space or access to meet these requirements, or*
- (f) *historical buildings.*

Discussion and Commentary: There are a number of important instances when the code does not apply to replacement HVAC equipment. Existing equipment has some exceptions to compliance with this section. Many of these exceptions are dealing with the various types of maintenance and repair of the equipment.



HVAC equipment after being repaired.

Code Text: *Minimum Equipment Efficiencies – Listed Equipment – Standard Rating and Operating Conditions. Equipment shown in the most recent edition of SASO 2663³³ and SASO 2874³⁴ shall have a minimum performance at the specified rating conditions when tested in accordance with the specified test procedure.*

Discussion and Commentary: The minimum efficiency requirements for all HVAC components are obtained from the most recent editions of SASO 2663¹⁴ and SASO 2874⁶⁶. Equipment must meet or exceed the energy efficiencies listed by Saudi Standards, Methodology and Quality Organization (SASO) when measured in accordance with the rating standards as specified by SASO. Equipment efficiency requirements apply to all equipment, and chillers must meet both full-load and part-load requirements.



The label provided on the mechanical equipment provides information to be able to determine many components within this code but specifically provides the information to be able to verify that it meets the efficiency requirements in the latest standards.

Code Text: *Equipment efficiency information supplied by manufacturers shall be verified as follows:*

- (a) *If a certification program exists for a covered product, and it includes provisions for verification and challenge of equipment efficiency ratings, then the product shall be listed in the certification program, or,*
- (b) *if a certification program exists for a covered product, and it includes provisions for verification and challenge of equipment efficiency ratings, but the product is not listed in the existing certification program, the ratings shall be verified by an independent laboratory test report, or*
- (c) *if no certification program exists for a covered product, the equipment efficiency ratings shall be supported by data certified by the manufacturer, or*
- (d) *where components such as indoor or outdoor coils from different manufacturers are used, the system designer shall specify component efficiencies whose combined efficiency meets the minimum equipment efficiency requirements in 6.4.1.*

Discussion and Commentary: In most cases, the efficiency of products will be established by certification programs from industry associations such as the Air-Conditioning, Heating and Refrigeration Institute (AHRI 15), the Association of Home Appliance Manufacturers (AHAM 16) or the Cooling Technology Institute (CTI 17). Where such certification programs exist but a manufacturer chooses not to participate, equipment performance must be verified by an independent laboratory test. Where there is no industry certification program, equipment efficiencies must be supported by data furnished by the manufacturer. Field tests of performance are not required.



This baseboard heat was located in a hotel. This did not have the required documentation of the equipment efficiency that manufacturers are required to supply.

Code Text: *Mechanical equipment that is not covered by the Saudi Arabia Energy Efficiency Program shall carry a permanent label installed by the manufacturer stating that the equipment complies with the requirements of ASHRAE Standard 90.1¹⁹.*

Discussion and Commentary: Not all mechanical equipment can be listed in this code, so this section provides provisions on what to do when there is equipment that is not covered. Mechanical equipment may not be listed in the program, so provisions are made to accommodate the equipment by requiring the manufacturer to provide labeling that states that the equipment complies with ASHRAE 90.1.



This equipment is not covered by the Saudi Arabia Energy Efficiency Program, so the label needs to state that it complies with ASHRAE 90.1 in order to also comply with this section.