

SECTION 238100 – AIR COOLED SPLIT AND PACKAGED SYSTEMS

- 1.0 ASHRAE 90.1 Compliance: University of Pennsylvania buildings shall comply with the Commercial Energy Efficiency Requirements of ASHRAE Standard 90.1-2016. The ASHRAE 90.1-2016 compliance paths shall be followed instead of the International Energy Conservation Code (IECC) requirements as permitted by 2018 IECC Section 401.2 Application.
- 2.0 The use of split-systems and packaged air cooled direct expansion units is strongly discouraged. These systems are permitted only under the following conditions:
 - A. Central chilled water is not available and the space cooling load and layout prohibits the use of an air or water cooled chiller system.
 - B. Prior review and approval by the University's Representative.
- 3.0 Any local system designed to provide cooling during a site chilled water shut down must be designed to interface with the central chilled water system. The central chilled water system shall be used to provide cooling whenever the central plant is operational. An automatic changeover system shall be designed to energize the local system during central plant shut-downs via the site monitoring and control system. This requirement shall be followed independent of central chilled water availability unless prior approval for deviation from this standard has been granted by the University Representative.
- 4.0 The design and location of condensing units must consider the effects of noise, aesthetics, and service access. Some buildings on campus are listed in the Historical Register and must conform to the requirements of such. On a project by project basis, exterior installations of air cooled equipment shall be evaluated against local site noise level goals and criteria. Refer to Part I, General Section XI. The A/E shall submit an acoustic report to University representative identifying any noise impacts.
- 5.0 All equipment installed on rooftops must be accessible through a stairway or roof scuttle which directly accesses the roof where the unit is to be located. The A/E shall plan full maintenance access for all units. The A/E shall demonstrate access availability for equipment installation and removal.
- 6.0 Rooftop equipment shall be designed with vibration isolation type curbs to reduce noise and vibration transmission to the structure and occupied spaces.
- 7.0 All duct, conduit and piping penetrations through the roof shall be installed using prefabricated pipe and duct curbs. The designer is responsible for determining the type of roofing material used, state of the existing roof warranty, and ascertaining that the existing warranty will remain in effect after all modifications have been completed.
- 8.0 Systems requiring low-ambient operation shall use condenser fan speed controls. Damper systems are prohibited.
- 9.0 All split-system units shall be provided with an economizer in accordance with ASHRAE 90.1-2016 section 6.5.1.
- 10.0 All air cooled split and packaged systems shall exceed the requirements of the minimum efficiency tables in ASHRAE Standard 90.1-2016 section 6.8.1.
- 11.0 All package rooftop systems shall be equipped with economizers and relief provisions. Units in

excess of 5 tons capacity shall use return air fans.

- 12.0 The University is responsible to maintain an inventory of refrigerants. As part of the project specifications, the A/E shall require the installing contractor to provide data to the University on the type and quantity of refrigerant utilized for each piece of equipment on the project. The University will provide project closeout data required.