PLUMBING, ELECTRICAL AND MECHANICAL ISSUES

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Animal Care Facilities have special plumbing, electrical and heating ventilating and air-conditioning requirements that are much different than standard commercial or office applications.

HEATING, VENTILATING AND AIR-CONDITIONING SYSTEMS (HVAC SYSTEMS)

Animal Care Facilities are not typical office buildings and therefore have special HVAC requirements much different than standard commercial or office applications. The animal hospital HVAC system is important not only for comfort but also is a critical component of sound and odor control.

HVAC system zoning is the key to an effective system. Usually three (or more) zones are defined for both odor and sound isolation:

- **Zone #1 (Front Zone)** Waiting Room, Reception, Pet Products, Doctor and Business Office
- **Zone #2 (Middle Zone)** Exam Rooms, Pharmacy, Lab, X-Ray, Surgery, Treatment and Pack/Scrub
- **Zone #3 (Back Zone)** Wards, Runs, Bathing/ Grooming and Storage

A single HVAC unit serves each zone with a return air/filter grille located in the zone. This zoned system accomplishes several things:

- Maintain pressure control within each zone (high pressure in most sanitary/least odor areas)
- Control individual zone temperature and ventilation
- Better control sound transmission from zone-to-zone (ductwork does not penetrate to next zone)
- Better control odor transmission from zone-to-zone (air is not supplied or returned from one zone to another)
- If one zone's HVAC system is down for maintenance or repair the building is still functional on even the most extreme days

Forced-Air type HVAC systems are recommended with easily accessible filters or electrostatic filters. HVAC systems that do not circulate and filter air cannot remove humidity and odors found in animal facilities. Programmable electronic thermostats are a good idea and should be located near return air locations in each zone.

Ventilation rates for general hospital areas should be between 10 and 20 cubic feet/minute. Animal Ward, Isolation and Run Areas require a minimum of 8 -10 total air changes/hour. Additional ventilation (10 -15 air-changes/hour) should be available for short periods of time after bathing, washing floors etc. Exhaust fans, independent from main HVAC systems, accomplish this temporary ventilation. Air should never be returned to the HVAC system from the run area and isolation room. These spaces should be kept at negative pressure within their zones.

PLUMBING SYSTEMS

- **Water System (Potable)**
  - Between a 1" and 2" service is required for most hospitals, depending on the number of fixtures and distance between fixture locations
  - Provide water hammer arrestors at all quick closing fixtures, isolated fixtures and supply headers to a group of fixtures
  - Consult with local water utility concerning connection fees and pressure available
  - Consider hot water recalculation system if hot water line runs are over 55 feet
  - Potable water system should be flushed and sterilized prior to use
- **Wastewater Drain and Vent System**
  - Check local sewer main invert elevations and building floor elevations for available gravity slope of waste
  - Run Areas must be constructed to provide a convenient, positive draining action to clean as it drains thus removing solids from drain and trap
  - Hair traps and tub strainers are a necessity in all grooming tubs, tubs and related areas where animal hair will be present
  - Locate cleanouts throughout drain system to facilitate removal of clogs should they occur
  - Water closets, urinals and lavatories should be vitreous china
  - Sinks in Exams, Lab, Pharmacy and Treatment Area should be of stainless steel or enameled cast iron
  - Janitor sinks should be of molded stone or fiberglass
  - Grooming tub should be enamelled cast iron or stainless steel
  - Water heater should be glass-lined
- **Natural Gas System**
  - Serves HVAC units, water heater and other gas fixtures
  - Bunsen burner in Lab?
- **Medical Gases System (Oxygen, Nitrous Oxide and Vacuum)**
  - Coordinate outlet locations w/Architect
  - Design bottle storage location for ease of delivery
  - Install scavenging system
- **Central Vacuum System**
  - Locate vacuum canister/motor unit carefully owing to noise and refuse removal
  - Locate outlets considering reach of hose

ELECTRICAL SYSTEMS

- **Electrical Power Distribution System**
  - Most animal hospital electrical systems are 400 or 600 amp services (up to 10,000 square feet)
  - 3 phase service is recommended (sometimes required by power company on over 400 amp service)
  - Provide ground fault interrupting (GFI) outlets at all outlets within 2’ of a water source or where wet floors are a possibility
  - Provide waterproof (WP) outlets at all outlets where rain or water spraying is a possibility
  - Provide isolated ground outlets to computers or other sensitive electronic equipment
  - Lighting Systems
### Lighting/Illumination Standards

<table>
<thead>
<tr>
<th>Area</th>
<th>Light Level</th>
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<tbody>
<tr>
<td>Waiting, Reception, Staff/Lounge, Pet Products and Toilets</td>
<td>30-50 foot-candles</td>
</tr>
<tr>
<td>Exam Rooms, Treatment, X-Ray and Workrooms</td>
<td>70-100 foot-candles</td>
</tr>
<tr>
<td>Offices, Grooming and Bathing</td>
<td>50-75 foot-candles</td>
</tr>
<tr>
<td>Runs, Wards, Storage and Service Areas</td>
<td>20-40 foot-candles</td>
</tr>
<tr>
<td>Parking Lots, Drives and Walks</td>
<td>1 foot-candle (3:1 max/min ratio)</td>
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</tbody>
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- **Type of Fixtures**
  - Incandescent fixtures should light entry, Waiting, Reception and Pet Products. Their warm colored light is what is found in residences and creates an inviting homey atmosphere. Directional spotlights can accent art or pet products.
  - Staff/Lounge, Toilets, Exam Rooms, Treatment, X-Ray, Workrooms, Offices, Grooming, Bathing, Runs, Wards, Storage and Service Areas should be lighted by energy saving, 2’ x 4’ or 2’ x 2’ fluorescent, lay-in fixtures.

- **Telephone and Computer Systems**
  - Locate exit and emergency illumination fixtures in appropriate spots throughout hospital.
  - Locate "nightlight" fixtures in hospital for security and convenience.
  - Place lighting for building entries, exterior sign and landscape lighting on a timer or photoelectric cell switches.

- **Sound Systems**
  - Generally, vendors independent of the construction contract install sound systems. The Architect should coordinate these installations.

- **Fire and Smoke Detectors/Burglar Alarm**
  - Fire and Smoke Detectors/Burglar Alarm systems should be strategically located about the hospital.
  - If possible these systems should be remotely monitored 24 hours a day.