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News to Use
Design Requirements Manual
The formulae for building state of the art biomedical research facilities.
'Design Requirements Manual (DRM) News to Use' is a monthly ORF publication featuring salient technical information that should be applied to the design of NIH biomedical research laboratories and animal facilities. NIH Project Officers, A/E's and other consultants to the NIH, who develop intramural, extramural and American Recovery and Reinvestment Act (ARRA) projects will benefit from 'News to Use'.
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Plumbing Requirements for Animal Biosafety Level 3 Laboratories

In general, Animal Biosafety Level 3 (ABSL-3) facilities must comply with all BSL-3 requirements in addition to requirements unique to animal facilities, a number of which are outlined below.

The term "BSL-3" as used within the scope of this section, refers to laboratory and animal research facilities performing work at Biosafety Level 3 as defined in the latest edition of HHS/CDC/NIH's *Biosafety for Microbiological and Biomedical Laboratories* (*BMBL*) (World Health Organization [WHO] Risk Group 3), including facilities where work may include select agents.

Piping systems and equipment not serving ABSL-3 facilities shall not be located within containment areas. Waste piping shall not be routed above food service, food storage, or surgical/aseptic areas.

Containment Piping systems or other isolated systems serving BSL-3/ABSL-3 areas shall not serve across higher or lower biosafety level.

Access panels and similar openings through containment barrier walls or ceilings shall be avoided. Access doors are not acceptable in ABSL-3 areas or insectaries.

Specific ABSL-3 system requirements include (but are not limited to):

Animal Drinking Water Systems:

The use of an automatic piped system (in lieu of bottled or prepackaged water) shall be evaluated by Risk Assessment with the program veterinarians. Piped systems require maintenance and sanitization and are not appropriate for all applications. Direct mouth contact with animals in low-pressure liquid streams is a potential cross-contamination concern.

Animal drinking water shall be completely independent of other containment levels. Water shall be taken directly from building potable water and shall be isolated from all other systems with backflow preventer located outside the containment barrier.

System Design Requirements:

- Only non-circulated (automatic flushing-type) systems shall be used for piped systems. Due to the risk of cross contamination, systems shall avoid serpentine arrangements of piping that could permit flow from one suite into another.
- Only systems that maintain appropriate disinfectant residuals may be utilized for piped systems.
- Methods of periodic sanitization for the system shall be planned and coordinated with the program during the design phase.
- Water production systems shall be located outside the containment barrier in program-controlled secure space to facilitate access for maintenance and service.
- Penetration protection and pipe mounting details shall meet requirements for other piping systems within ABSL-3.

Veterinary Medical Gas Systems (VMGS):

VMGS shall be independent of systems from areas outside ABSL-3 containment and protected from backflow or contamination with upstream filters located outside of the containment barrier. Filters must be disposable or sterilized between uses for cross-infection control and shall be suitable for medical gas service.

Portable gas cylinders may be an alternative to piped systems. Cylinders may be located in the anteroom or other accessible location.

Piped Vacuum Systems:

Piped vacuum systems shall not be utilized because it is unacceptable to pipe potentially infectious material out of containment. Where vacuum is required, point-of-use (portable) equipment shall be used. The type of filtration utilized on the equipment shall be reviewed and coordinated with standard operating procedures. Fluids shall be collected and autoclaved. Lab vacuum systems shall not be used for surgical vacuum.

Anesthetic Gas Scavenging:

Anesthetic gas scavenging shall be of the air-driven venturi type. The drive gas shall include an in-line filter or gas-tight check valve at the containment barrier. The terminal unit exhaust shall be piped to a capture device within containment, upstream of HVAC HEPA filters. Lab vacuum systems shall not be used for anesthetic scavenging.

Drainage Inlet Grinders:

Drainage inlet grinders (food waste disposers/garbage disposals) shall not be utilized in ABSL-3 facilities due to potential for aerosolization of infectious waste. All wastes must be autoclaved or disposed in accordance with the NIH and the BMBL.

Insectaries:

Plumbing connections in insectaries shall be subject to review and approval of DOHS and ORF, and shall be in accordance with an approved risk assessment.

Drain openings in insectaries shall be provided with durable, tight fitting double-layer stainless steel screens with openings sufficiently small to prevent escape (but not larger than #52 mesh), and free of sharps hazards. Sinks should include normally closed valves for each individual trap. Specific requirements shall be reviewed and verified with program use group. Floor drains shall be avoided. The use of approved, validated, effluent treatment and a controlled collection system suitable for fumigation may be required. There shall be no uncontrolled escape paths through piping networks.

Select Agents and Veterinary Pathogens:

Additional requirements for facilities handling select agents will be addressed on a project-specific basis with DOHS and in accordance with the approved risk assessment.

Where pathogens of veterinary or agricultural significance are manipulated, or animals housed such that the room becomes the primary containment barrier, additional requirements of the USDA APHIS may also apply and shall be discussed with the DOHS and ORF prior to design. Additional requirements do not typically apply to agents utilized only in diagnostic/small quantities within a primary containment device. Refer to the facility's risk assessment.

Further details on this month's topic are available on the DRM website
http://orf.od.nih.gov/PoliciesAndGuidelines/BiomedicalandAnimalResearchFacilitiesDesignPoliciesandGuidelines/Pages/DesignRequirementsManualPDF.aspx
DRM Chapter 8 Section 8-11 BSL3 & ABSL 3 Biocontainment