
Group Housing Products for Cats

By Emily Poe and Katharine Hope

Space is always at a premium in an animal facility, making it necessary to maximize the efficiency of the available space in order to meet or exceed *Guide for the Care and Use of Laboratory Animals*¹ regulations. A facility's design should enhance the environment for both the animals and the staff (*see* related box for important planning and design considerations).

Cats are one of the primary research animals for visual and auditory research^{2,3}, as well as for other areas of neuroscience such as neuromuscular research⁴. Their large cognitive capacity makes cats valuable in neuroscience studies, but also mandates appropriate environments, with extra attention to providing adequate space, socialization, and physical enhancements.

Cats are social animals with a tendency to live in loose matrilineal groups, and they naturally groom and play with one another. Additionally, they are agile hunters—even in a laboratory environment, they must be able to climb, scratch, experience scents, scan their surroundings, and hide from other cats⁵. Cats generally respond to poor conditions by becoming inactive and exhibiting inhibition of behaviors such as self-maintenance (*i.e.*, feeding, grooming, and elimination), exploration, or play⁶. This response is indicative of despondency and stress, which can skew data in certain types of studies. It is therefore necessary to examine natural cat behavior and develop enclosures that foster natural cat behaviors and minimize stress.

BENEFITS OF GROUP HOUSING

Laboratory group housing benefits cats by encouraging normal behaviors, including socializing⁷. Since cat groups are matrilineal, it may be best to house several females with a few males (neutered, if required⁷). Neutered and intact males can live together; however, it is important to carefully determine if individuals are compatible. If the research permits cats to be housed together, and the cats are compatible, contact with conspecifics can be a valuable enrichment.

Colony housing is the preferred method of maintaining groups of cats, and cat colonies generally house two to six cats in one unit.

Important Considerations for Facility Planning, as per the Guide:

- The animal's species, strain, and breed;
- Specific characteristics (e.g., sex age, size, behavior experiences, and health);
- The availability or suitability of enrichments;
- Project goals and experimental design (e.g., production, breeding, research, testing, or teaching).

Gang housing is another option, whereby many cats are housed together in a large pen or room.

SPACE AND ENVIRONMENT REQUIREMENTS

The *Guide* recommends that cats less than or equal to 4 kg in weight have 3 ft² of floor area per animal, and an enclosure height (from floor to top) of 24". Cats larger than 4 kg need at least 4 ft² of floor area and a height of 24". The *Guide*, however, notes that larger animals may require more space to meet performance standards⁵. A mother and litter can be housed comfortably in approximately 10 ft² of cage space⁸.

The above are minimum requirements, however, and facilities must also bear in mind the behavior requirements of different cats. For example, cats of less than 3 kg are likely to be kittens or young, thus more active and playful than adults, and may therefore require more floor space than larger cats⁵.

Regardless of housing arrangements, environmental parameters (especially temperature and humidity) are also crucial to cats' health and well-being. Housing material and construction, along with numbers of animals per cage, are critical factors that affect cats' environmental temperatures. Recommended dry bulb temperatures for cats are 18-24C (64-84F)¹; however, certain conditions, like post-operative recovery and housing young kittens away from their mothers, require raised temperatures. Humidity must also be kept between 30-70%¹.

After satisfying basic space and environmental needs, suitable enrichments will vastly improve well-being, and decrease animal stress. In fact, cats actually benefit more from "enclosure complexities" than from simple increases in floor spaces. As the Universities Federation for Animal Welfare (UFAW) *Handbook*⁷ notes about cats, "Investing in the *quality* of the space rather than the *quantity* is often better value for the individual."

CAT COLONY UNITS

Enclosures with Removable Dividers

One of the most popular arrangements for housing two to six cats is the cat colony unit—individual enclosures with removable doors or floors that facilitate flexible housing options and control access to socialization. If cats are compatible and the research permits group housing, for example, panels can be removed to allow cats to interact. If cats need to be housed individually (e.g., post/preparturient females; mature males; sick, injured, or quarantined cats; or because of the research needs⁷), panels can be replaced to separate the animals. Table 1 lists contact information for some manufacturers who provide cat colony units. Enhancements to the units can also be added to augment cat enrichment (see below).

TABLE 1. Contact information for cat housing manufacturers.
Please note that this is a partial listing.

<p>Allentown Caging Equipment Co., Inc. Route 526, PO Box 698 Allentown, NJ 08501 Tel.: 609-259-7951 / 800-762-CAGE Fax: 609-259-0449 Email: acecage@acecaging.com (mailto:acecage@acecaging.com) http://www.acecaging.com</p> <p>Britz-Heidbrink, Inc. PO Box 1179 1851 Oak St. Wheatland, WV 82201-1179 Tel.: 307-322-4040 Fax: 307-322-4141</p> <p>Cedar River Laboratories PO Box 1462 Mason City, IA 50401 Tel.: 515-228-2212 / 800-323-4858 Fax: 515-228-4455</p>	<p>Lab Products, Inc. 742 Sussex Ave. Sealord, DE 19973 Tel.: 302-628-4300 Fax: 302-628-4309 Email: lpilabproductsinc.com (mailto:lpilabproductsinc.com) http://www.labproductsinc.com (http://www.labproductsinc.com/)</p> <p>Lenderking Metal Products 8370 Jumpers Hole Rd. Millersville, MD 21108 Tel.: 410-544-8795 Fax: 410-544-5069 http://www.lenderking.com (http://www.lenderking.com/)</p> <p>LGL Animal Care Products, Inc. 1520 Cavitt St. Bryan, TX 77801 Tel.: 409-775-1776 Fax: 409-775-8449</p>	<p>Lock Solutions, Inc. PO Box 1099 Laurence Harbor, NJ 08879 Tel.: 732-441-0982 / 800-947-0304 Fax: 732-441-0612 Email: Locksolx3@aol.com (mailto:Locksolx3@aol.com)</p> <p>Plas-Labs 917 E. Chilson St. Lansing, MI 48906 Tel.: 517-372-7177 / 800-866-PLAS Fax: 517-372-2857 Email: plaslabs@aol.com (mailto:plaslabs@aol.com) http://www.plas-labs.com (http://www.plas-labs.com/)</p> <p>Suburban Surgical Co., Inc. 276 12th St. Wheeling, IL 80090 Tel.: 847-537-9320 / 800-323-7366 Fax: 847-537-9061</p>
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Allentown Caging (Allentown, NJ) cat housing units are available in configurations of two, four, or six cages. The four-cage unit and the six-cage unit, both composed of a standard 4 ft² enclosure model (optional sizes available), have solid rear and right-side panels and optional divider panels between enclosures for socialization. In addition, Allentown Caging provides the Integral Cat Colony unit (55" wide x 30" deep x 75" high) for group housing. The removable divider grid assembly can configure single- and double- tiered compartments.

Four-cage (5.4 x 28" high) units with removable divider panels are available from Britz-Heidbrink (Wheatland, WY). When the panels that divide the two top or bottom cages are removed, a pair of cats (or mother and kitten) can be housed together in either the top or bottom section. Removing the litter pans between the top and bottom enclosures allows four adult animals to be housed together. All panel surfaces are made of a solid-surfaced, thermoneutral composite, which negates the heat-loss factor that animals experience when maintained on wire floors⁸. The *Guide* recommends keeping daily temperature fluctuations to a minimum to "avoid repeated large demands on the animals' metabolic and behavioral processes." Since it is key to prevent the animals from having to compensate for changes in their thermal environments, thermoneutral material is an important consideration.

Cedar River Laboratories (Mason City, IA) offers the VersaCageTM System Cat Condo (56" wide x 30" deep x 68" high) and the Mini Cat Condo (28" wide x 30" deep x 34" high), both featuring removable divider panels between enclosures that offer various configurations⁹.

Facilities can order custom-designed units for group housing from LGL Animal Care Products (Bryan, TX). LGL's past custom designs include a four-cage unit with removable side panels made from a section of clear plastic (to allow visual contact when closed) and a section of wire mesh (to allow olfactory contact when closed) . The unit also features removable floor

panels for the top enclosures to allow full access to the unit.

Lab Products, Inc. (Seaford, DE) offers individual cat housing units with removable panels in four- or six-cage configurations. Enclosure sizes are 3 or 4 ft² minimum with solid rear and right-side panels. Individual housing units can be configured two-over-two or three-over-three.

The ComfortCage™ from Lenderking Metal Products (Millersville, MD) consists of four units (25" wide x 25" deep x 26" high) stacked two-by-two with removable panels between adjacent units. The bottom of the enclosures is lined with an autoclavable, plastic insert for warmth and comfort. They also offer a group-housing unit (55" wide x 29" deep x 75" high) that features two levels with polypropylene resting boards, an access ramp, and an insertable litter box to separate the top and bottom levels.

Suburban Surgical, Inc. (Wheeling, IL) offers the stainless steel integral cat cage unit (6.4 ft² x 79" high) featuring an insertable panel to divide the enclosure into two separate compartments.

Individual Enclosures for 2-3 Cats

Individual enclosures provide less variability with housing, but provide other benefits like sanitation and comfort. Lab Products offers large, self-contained stainless steel units for group housing, which measure 54.5" wide x 29" deep x 75" high. This unit does not have the option of separating the cats; instead, cats have access to all three levels in this unit, and experience a large amount of socialization. Lock Solutions (Laurence Harbor, NJ) customizes enclosures suitable for two to three cats. Plas-Labs, Inc. (Lansing, MI) provides autoclavable isolation units, suitable for two to three cats. The company claims the units are warm and soft, eliminating threats of hypothermia, and protecting animals from cross-contamination.

Resting Perches

Stress in cats is negatively related to cortisol concentrations (as referenced in Rochlitz⁶) which can alter the scientific validity of studies. Cats are likely to become stressed when housed in a high-density environment, so facilities should design group-housing areas with adequate activity and provide hiding centers.⁷ Small, high perches allow cats to be concealed yet able to monitor surroundings. Multiple level perches can provide a separate hiding place for each cat in the enclosure and a vantage point from which they can easily scan their surroundings in a relatively enclosed area. Cats also can remain clean by having a spot away from where they eat and eliminate wastes.

Most cat colony enclosures come with permanent resting shelves, although some have optional shelves that can be added. Allentown Caging and Lab Products offer three resting boards in one compartment; Allentown Caging resting boards are made from polypropylene. Britz-Heidbrink resting shelves are removable and made of interchangeable solid composite. They also offer a suspended, washable fleece hammock as an alternative to the standard shelf design. Cedar River Laboratories offers removable shelves, and two levels in the Mini Cat Condo. LGL Animal Care Products enclosures contain polyethylene or metal resting shelves, whereas Lenderking offers polypropylene resting boards, and Lock Solutions enclosures contain polypropylene resting shelves. Suburban Surgical offers shelves, in various materials, as optical accessories.

Rotating Food and Water Pans and Removable Litter Pans

Some companies offer removable food and water pans, or removable litter pans, to limit contact between caretakers and the animals and to facilitate cleaning. Allentown Caging units are equipped with 3"-deep, removable excreta pans and separate polycarbonite litter pans, and offer optional rotating food and water bowls. Britz-Heidbrink offers rotating feed and water bowls, and recessed litter pans for easy cleaning and sanitation. Cedar River Laboratories' Cat Condos contain two levels, so that food, water, and litter can be on one level, and, during removal, the cats are coaxed to stay on the other level. LGL Animal Care Products can customize enclosures to include rotating food and water feeders. Lab Products' individual units feature removable floor mesh and pans, and optional rotating or removable food and water bowls. The larger group unit also features a 4.1 "-deep, rolled-edge excreta tray. Lenderking offers removable food and water bowls and removable, autoclavable waste pans. Suburban Surgical offers watering systems and removable litter pans as optional accessories, and rotating food and water bowls as standard equipment. Their Angular Rack system allows easy cleaning of litter and the floor grid.

GANG HOUSING

Although gang housing cats can be useful in some boarding and breeding scenarios, using pens or rooms to gang house cats is often not appropriate for a research setting. However, when the research being performed permits, a maximum of about 20-25 cats can be housed together in a laboratory setting⁵, depending on the available space.

Custom-designed enclosures are an option for gang housing and facilities with special needs. LGL Animal Care Products provides primarily custom-designed cat housing products for gang housing, including pens and individual enclosures. Recent projects include a fully equipped glass-paneled pen for 15-20 cats. Britz-Heidbrink also offers customized full-room enclosures with enrichment and activity devices.

Cats are likely to become stressed when housed in a high-density environment, so facilities should design gang-housing areas with adequate activity, and hiding centers must be provided⁷. Resting shelves are also important when gang housing cats, because they allow, for example, subordinate cats the opportunity to get away from more dominant cats in the gang. Some facilities have found that bookshelves or other pieces of furniture work well to enrich the environment in a gang-housing pen⁸ by acting as resting shelves.

ENRICHMENTS

While basic enclosure design can greatly improve the well-being of the cats used in research, the enrichments listed below are also very important to minimize cat distress.

Viewing Windows

The UFAW *Handbook* recommends adding windows to provide stimulation for cats⁷. Cedar River Laboratories offers VersaCage™ windows that can be used to overlook outdoor scanning areas (with enrichments like bird feeders or birdbaths), or an indoor scanning area to watch other cats, human activities, fish aquariums, caged birds, or televisions. Viewing windows can provide especially useful enrichment for individually housed cats. In addition, viewing windows also allow personnel to scan the animals with closed-circuit cameras.

Surfaces for Claw Abrasion

Surfaces types can be varied within the enclosure to encourage grooming and scratching. Scratch posts, rush matting, polyester fleece, wood, and carpet are all easy enrichments that encourage natural scratching. Britz-Heidbrink sells carpet inserts, called Scratcher Inserts, that are created to fit into Britz-Heidbrink enclosure systems.

Vertical Mobility Apparatuses

Cats are great climbers, and a variety of products maximize both vertical space and climbing exercise. Ladders, climbing frames, hammocks, and raised walkways increase vertical mobility. Allentown Caging sells a ramp assembly to allow cats to climb to multiple levels. Lab Products' mesh ramps make multiple levels accessible. Britz-Heidbrink offers extra perches and an innovative fleece hammock that cats can use both as a climbing device and as a place to sleep.

CONCLUSIONS

Because it is imperative for cats' well-being and for scientific validity to fulfill the *Guide's* recommendations, facilities must consider group housing whenever possible. When cat temperament and research design allow cats to be housed in groups, using cat colony units is most common. These units lend themselves to a great deal of flexibility, since animals can be kept apart or allowed to socialize with ease. However, facilities should also consider the pros and cons of using gang housing and individual enclosures. By housing cats in groups and with appropriate enrichments, according to their physical and psychological needs, researchers can decrease the animals' stress and distress.

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