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dissimilar metals that will produce a corrosion reaction. If pieces of mesh need to be joined, the joint should consist of an area 10-15 mm wide where the edges of the two pieces are folded together 2 1/2 times or a parged area 35 mm wide where the pieces overlap. Mesh can be used as a perimeter barrier for masonry exterior walls when parged to the concrete slab, draped across the cavity, and then built into the exterior wall. It can also be used as a continuous barrier under concrete slabs, or as a barrier under joints and for utility penetrations.

Where graded particles (sand or basalt) are used as a termite barrier, the particles should be graded and shaped so that a sufficient proportion of them are of a size that cannot be transported by local termite species. They also should be able to be placed so that voids between particles to not permit penetration of local termite species. They can be either igneous or metamorphic stone. The wet/dry analysis must have less than 35% variation and their specific gravity must be at least 2.52. Graded particles can be used as a perimeter barrier when installed in wall cavities or in a trench around the foundation. In either case the minimum depth of the particles should be 75 mm. Trenches should be at least 100 mm wide. Graded particles can also be used as a continuous under-slab barrier. These barriers should be 75-100 mmm deep and compacted with a vibrating plate-type tamper. Graded particles can also be used as a barrier under joints and around utility penetrations. Appropriate diameters for particles are 1.2-1.7 mm for the western subterranean termite, 1.7-2.8 mm for the eastern subterranean termite, and 1.7-2.4 mm for the Formosan termite.

Utility Penetration of Foundations and Slabs

Use epoxy immediately prior to pouring a slab to seal concrete around utilities.

Mesh barriers should consist of a flange of mesh 50 mm wide. The mesh flange should be attached to the penetrating utility with a stainless steel clamp and embedded in the slab. Alternatively, the mesh flange can be attached with a stainless steel clamp and then parged to the top surface of the slab.

For sand barriers, concrete should be poured in a circular area 25 mm around the utility pipe. That void should then be filled with sand at least 75 mm deep. The sand should be capped at the top of the slab, and a retainer cast into the slab below the sand should be used to prevent sand loss beneath the slab.

Clearances

There should be a minimum clearance of 18 inches between beams or joists and soil.

In areas of high termite hazard, clearance between beams or joists and soil should be 36 inches.

Curtain Walls Where Necessary: Rodents may burrow under foundations of buildings without basements. Vertical curtain walls 2 feet (0.6 m) below the surface with an 8 inch (20 cm) horizontal "L" or flange directed away from the building are usually effective in preventing rats from burrowing under foundations. Construct curtain walls of 29-gauge corrugated iron, concrete, or bricks.

Siding

Siding Material

For wood siding, durable species include Western red cedar, Redwood, and (less commonly) Incense cedar, Port Orford cedar, Black locust, Northern white cedar, Eastern red cedar, and Alaska yellow cedar. Only heartwood of these species has resistant qualities.

Other pest-resistant siding options include fiber-cement, aluminum, and steel. Some of these materials may not be appropriate for residential structures.

On siding, use high quality, exterior grade caulks and sealants that meet ASTM standard C-920. Caulk should be compatible with both siding materials and trim materials.

Caulk or seal the following areas: wherever siding meets trim, around windows and doors, and around any penetrations (pipes, wires, etc.) that are not self-flashing.

Use back flashing at siding butt joints to minimize openings that might allow entry of pests.

Siding and stucco should begin at least six inches above soil level. This decreases the risk of subterranean termites reaching the wood, and makes their mud tubes more visible to inspectors.

Building Exterior

Exterior Lighting

Choose light fixtures with sloping surfaces rather than horizontal surfaces to deter bird roosting and nesting.

Install bird spikes, "porcupine wire," netting, or similar devices to discourage birds from nesting on light fixtures.

Use bird exclusion devices, including wires, springs, nets, and electrical strips, to prevent birds from reaching light fixtures.

Motion detectors allow lights to be on for shorter amounts of time and can reduce accumulation of insects around lights.

Use timers to restrict light operation to high traffic times as appropriate. This may reduce the

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Semi-enclosed alcoves or courtyards, especially with open roofs, provide ideal roosting and nesting opportunities for pigeons and other birds. If these structures must be included in the building design, include bird barriers and minimize horizontal surfaces.

Roofs

Fit eave roof tiles with commercially available bird stops, which also exclude bats and flying insects.

Attic and chimney screens can prevent problems with bats, squirrels, and birds. In areas of where drywood termites are known to be a problem, consider replacing screens on attic vents (typically 1/4 inch) with window screening. This may not be appropriate in damp climates, because the smaller mesh screening can impede airflow. Building codes generally allow attic vent screening as long as the mesh size is greater than 1/16 inch.

Landscape

Maintain at least 10 feet of clearance between exterior walls and tree limbs/branches that might provide vertebrate pest access.

Use plants that shed a minimum of seeds and fruits, since the seeds and fruit may attract and support insects, rodents, and undesired birds.

Avoid planting Algerian or English ivy, star jasmine, and honeysuckle on fences or buildings, as they provide shelter and food for rats.

Where Argentine ants are common, avoid bamboo, cherry laurel, fig, pine, and roses near buildings. These plants often have abundant scale and aphid populations, and excreta from these insects provides food for ant colonies.

Separate the canopy of densely growing plants from one another and from buildings by a distance of 2 feet or more to make it more difficult for rats to move between them.

Decorative wood chips and mulch should be used sparingly in situations where termite infestation is a high probability. Wood chips should never be allowed to contact wood siding or framing of doors or windows. Crushed stone or pea gravel are alternative solutions and may also discourage ants and spiders.

Floors

In food preparation areas, use quarry tile, poured seamless epoxy floor, approved commercial grade vinyl, or similar materials to avoid moisture accumulation and harborage of insect pests.

Where floor drains are installed, slope surrounding floors 1/4 inch per foot to the drain

Floor drains should be easily accessible to enable cleaning and inspection. Floor drains should not be located under fixed kitchen equipment.

Doors

Use solid-core doors where possible. Solid-core doors are more durable and do not have hidden recessed areas or cavities that could harbor pests

In areas of high rodent pressure, fit external doors with 26-gauge sheet metal kick plates 12 inches tall and mounted no more than 1/4 inch from the bottom of the door. Metal plates should not interfere with the swinging of the door.

Doors should fit tightly; the distance between the bottom of the door and the threshold should not exceed 1/4 inch. Use tight-fitting door sweeps if gaps are larger than 1/4 inch. If appropriate, use automatic door sweeps, which drop to seal against the floor when the door

is closed. If automatic sweeps are not possible, bristle sweeps are preferable to rubber or plastic. If rodent pressure is high, protect rubber and plastic sweeps with metal kick plates installed on the outside of the door.

Use weather-stripping of all exterior doors to better seal against pest entry.

Windows:

Slope smooth-surfaced window ledges and projections at 45 degrees to minimize bird percutsisting.

Use weather-stripping for all operable windows.

Bedrooms

Moldingscr9d joints around the room perimeter (floors, doors, cabinets, r92 windows) should be caulke2 with a silicone sealant to eliminate hiding spots for be2 bugs.

Use wood, tile, linoleum, or similar flooring materials instead of carpets or s.

Built-in furniture provides harborage for ugs t hat is difficult to inspect. If built-in furniture is used, provide access for inspection.

Use leather, metal, plastic or lami9ate furniture rather than upholstered, wicker, or wood furniture. Metal r92 lami9ate furniture is harder for bedbugs to climb than wood furniture. If upholstered furniture is used, it shoul2 Twhave metal legscr9d the fabric shoul2 be at least a few inches from the floorcr9d fromcr9y other pieces of furniture. If possible, use furniture that is easily washable r92 light colored. Beds should not have headboardscr9d mattresses shoul2 be encased in commercially available, insect-proof coverings.

Openings around pipes or other structures that come through walls, floorscr92 Twceilings shoul2 be sealed. Caulk, foam, seal, paint, or otherwise fill r9y Twcracks and holes larger than the thickness of a credit Twcard. TJTJ0 -1.3233 TD0 Tc0 Tw( )Tj/TT2 1 Tf-1.7964 -1.3174 TD.0008 Tc[Bat)4.5(h).9(roc where they meet walls.

Use one-piece tub or shower enclosures where they are appropriate with the bathroom design, to minimize potential infiltration of moisture.

In large shower enclosures, offset water controls so that they are close to the door. This makes them easier to use, r92 lessens the likelihoo2 Twof water escaping the shower.

Slope horizosial surfaces of soap holders, shampoo cubbies,cr92 Twshower seats so water drains into the shower or tub. This reduces moisture buildup.

1Ensure horizostal ventilation ducts are slope2 so that condensation water doesn't accumulate in the ducts.

Kitchens

Foo2 storage should be elevated off the floorcr9d away fromcwalls to facilitate inspection and cleaning.

Wall-wall and wall-floor junctions should be coved to facilitate easier cleaning and prevent the accumulation of debris. Wall-ceiling junctions should be coved or sealed. Rubber or flexible plastic baseboard coving should be avoided, since it is very difficult to remove and inspect. Avoid cove base that is installed with adhesive. Choose coving that does not include an air gap under the curve, which could provide harborage for cockroaches.

Storage areas should have adequate lighting to allow efficient cleaning and easy pest inspection.

Provide access to voids above suspended ceilings for inspections and cleaning. In large buildings, provide walkways for this purpose.

Specify cabinets with legs to facilitate cleaning underneath. Legs should either be bolted to the floor with gaskets or sealant to eliminate gaps, or should be on wheels to enable easy moving.

Specify the use of wheeled stoves, mixers, refrigerators, and other appliances to encourage regular cleaning. Wheel fenders should include adequate clearance for cleaning around the wheels.

Locate drains so that they are accessible for cleaning.

When possible use flush thresholds in doorways. Thresholds collect dirt and food debris that can attract fruit flies or roaches.

When possible, locate food preparation areas on islands rather than against walls. Cleanup is generally easier around islands.

Install stainless steel backsplashes behind sinks and work surfaces for easier cleaning and avoid moisture buildup. Use sealant around edges.

Refuse disposal, recycling areas, and food delivery entrances should ideally be located away from frequently used entries. Refuse disposal and recycling areas attract flies and other pests, even when bins are well sealed and frequently cleaned. If the disposal area is adjacent to frequently used entries, such as those used for food deliveries, it is easier for the flies to enter the kitchen.

Use self-closing doors for food storage rooms to shut out rodents and some insect pests. Doors should be adequately sealed around the edges, with door sweeps or bottoms and no gaps over 1/4 inch.

Seal all penetrations through walls and floors, including wiring and pipe penetrations through wall framing at top and bottom plates. Use either an elastomeric sealant or fire block, depending on the size of the gap, its location, and local building codes. This is especially important in institutional kitchens where there is no tolerance for pest infestations. For larger gaps, including copper or stainless steel

Where rodent pressure is not high, or with gaps < ¼", use silicone sealant to seal around utility penetrations to deter insect movement.

Use foam gaskets behind electrical cover plates to seal off access to pests, particularly in pest sensitive areas such as kitchens.

There should be adequate space and access for cleaning around utility penetrations.

Trash and laundry chutes should have tight-fitting doors. Avoid any gaps between door and surrounding wall.

Use metal garbage and laundry chutes with a circular cross section to avoid accumulation of debris in hard-to-clean corners.

Hopper doors into vertical trash chutes should be large enough to fit a full trash bag, to avoid the accumulation of debris from torn bags and keep chutes cleaner.

Refuse and Recycling

Design refuse and recycling areas with concrete pads that extend past the boundaries of the enclosure so that rodents cannot burrow into the enclosed area.

Enclose refuse and recycling areas with metal, concrete, or similar materials to prevent vertebrates from gnawing or climbing the enclosure. Enclosures should be solid and extend all the way to the ground. Do not plant ivy around enclosures.

Use refuse containers that are heavy duty, rust resistant, rat and damage resistant, and equipped with tight-fitting lids. Racks or stands prevent corrosion or rusting of containers, reduce rat shelter under containers, and minimize the chance of containers being overturned.

Use concrete floors in refuse and recycling areas.

Slope floor of recycling and refuse area to a drain connected to the sanitary sewer.

Provide a hose bib near the enclosure for periodic cleaning.