



Bureau of Planning and Sustainability
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Ordinance No. 189000
Effective Date: July 9, 2018

ADMINISTRATIVE RULE

Bird-Safe Window List

SUMMARY: The *Bird-Safe Windows List* specifies the window glazing treatments that must be used when implementing Portland Zoning Code section 33.510.223. Bird-Safe Exterior Glazing. The intent of the rule is to minimize the risk of bird strikes within the Central City.

AUTHORITY: Adopt the Central City 2035 Plan; amend the Comprehensive Plan, Comprehensive Plan Map, Transportation System Plan, Willamette Greenway Plan, Scenic Resources Protection Plan, Zoning Map, and Title 33; authorize adoption of administrative rules; repeal and replace prior Central City plans and documents. (Ordinance No. 189000)

Susan Anderson, Director
Bureau of Planning and Sustainability

Date



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1.0 INTRODUCTION, PURPOSE AND BACKGROUND

1.A Purpose

The purpose of the *Bird-Safe Windows List* is to specify the window glazing treatments that will reduce the instances of bird strikes. This rule will be updated periodically to include new technologies.

Portland is on the Pacific Flyway, a major north-south flyway for migratory birds in America. The Portland region hosts 209 species of birds, some are year-round residents and some are just passing through as they migrate northward or southward. The Great Blue Heron, the Rufous Hummingbird, and the Red-tailed Hawk are some of the birds that reside in Portland or migrate through and may stop, rest or feed on the way.

It is estimated that up to 1 billion birds die each year from collisions with buildings in the U.S. Birds do not see or perceive clear glass as a barrier. They see the reflection of trees and sky as places where they can fly. Bird strikes can occur anywhere there is exterior clear glass; particularly near water or vegetation, including street trees or ecoroofs. Portland is growing and becoming denser. In the Central City, buildings are getting taller and using extensive exterior glazing. Portland is also dedicated to increasing urban tree canopy and using vegetation to manage stormwater and reduce heat island impacts. All of this means that bird strikes in the Central City are likely to increase.

In 2003, Portland became a pilot bird city as part of the US Fish and Wildlife Service Urban Migratory Bird Conservation Treaty. In 2013, City Council passed Resolution 37034 (Oct. 2, 2013) directing City bureaus to seek opportunities to incorporate bird-friendly building design into City plans and projects, including the [2035 Comprehensive Plan](#), Central City 2035, and the City's Green Building Policy.

1.B How to use this document

Portland Zoning Code, 33.510.223, Bird-Safe Exterior Glazing standard, requires new buildings and major remodels of existing buildings to comply with the glazing standards. Applicants who propose buildings that trigger the requirements must choose the glazing treatment patterns and application techniques from this document.

When the standard is triggered in the zoning code, the applicant must choose from the following (see Figure 1):

- A. **Glazing on the ground floor** – The applicant may use any of the approved materials listed in subsection 2.A.1 and must choose from the pattern spacing and dimension requirements listed in subsection 2.A.2.
- B. **Glazing on upper floors** – The applicant may use any of the approved materials listed in subsection 2.B.1 and must choose from the pattern spacing and dimension requirements listed in subsection 2.B.2.

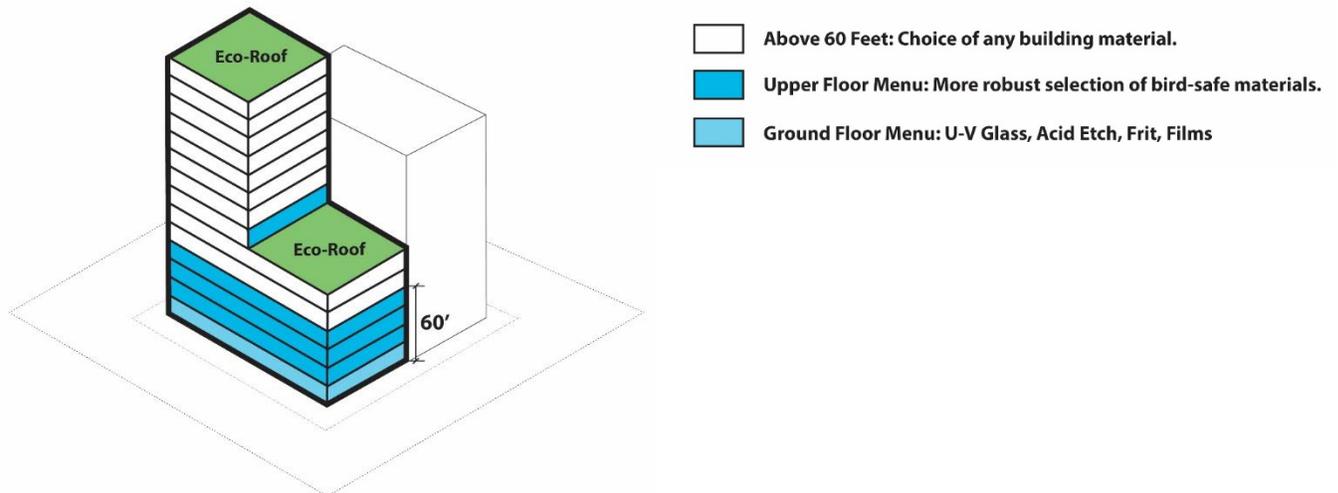


Figure 1 – Where the Glazing Standard Applies

1.C Summary of Bird-Safe Exterior Glazing Standard – 33.510.223

Glazing Percentage Threshold

More than 50 percent of documented bird strikes occur on the lower floors of buildings (under 11 stories). Based on review of current literature, local studies of bird window strikes, and consultation with local and national experts, glazing in excess of 30 percent on a building is associated with higher collision risk. The highest risk occurs within the first 60 feet above the ground, where birds are foraging, nesting and roosting in trees and vegetation. Therefore, the first 60 feet is prioritized for treatment to reduce bird collisions (see Figure 2).

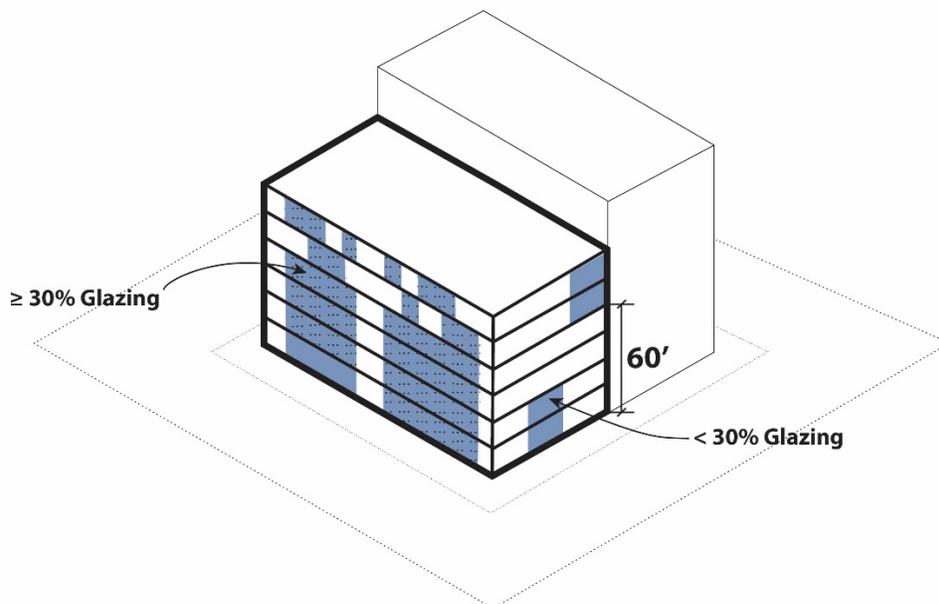


Figure 2 – Standard applies to facades with 30% or more glazing on the first 60 feet.

Allowance for Untreated Glass

The zoning code standard allows up to 10 percent of the glass on the facade to be untreated (see Figure 3). This is to allow flexibility to address other objectives, including transparency on the ground floor between the inside and outside of buildings, location of landscaping around the building, and the types of uses inside the building.

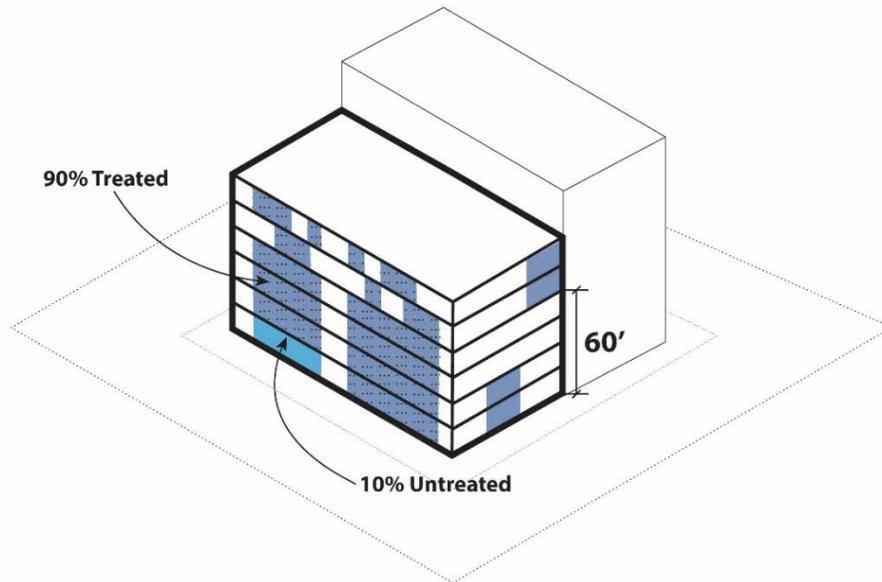


Figure 3 – Allowance for 10% Untreated Glazing

Relationship to Ecoroofs

The highest incidence of bird-strikes occurs from the ground floor up to 60 feet and on glazed facades adjacent to ecoroofs. In the Central City, new buildings are required to construct an ecoroof over a portion of the rooftop area. If an ecoroof is on a podium, the glazing directly adjacent to the ecoroof must be treated with bird safe materials (see Figure 4).

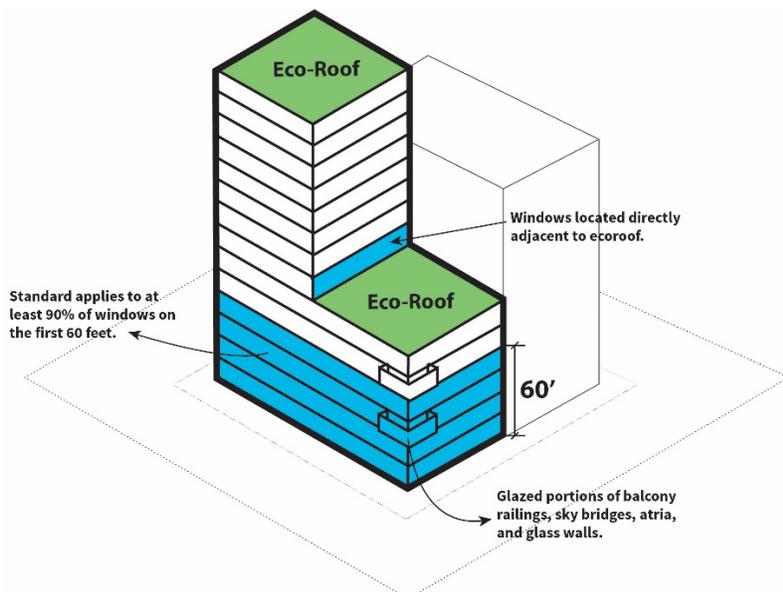


Figure 4 – Building Floors that Require Treated Glazing
Administrative Rule
Bird-Safe Windows List

The 2" x 4" Rule

Research shows that a specific spacing, width, and orientation of markers on glass can interrupt reflections and reduce risk of bird strikes. The research has shown that patterns applied to glass can cover as little as 6% of the total glass surface and can deter 90% of strikes. Most birds will not attempt to fly through horizontal spaces less than 2-inches high, nor through vertical spaces less than 4-inches wide. This concept is known as the 2" x 4" Rule. This rule is applied to spacing requirements listed in 2.A.2 and 2.B.2, except for UV treatments and exterior apparatus.

2.0 SUBSTANTIVE REQUIREMENTS

2.A. Allowed Treatments for the Ground Floor

For the ground floor, the applicant may use any of the approved materials listed in subsection 2.A.1 and must choose from the pattern spacing and dimension requirements listed in subsection 2.A.2 (see Figure 5).

An urban design objective for the Central City 2035 Plan is to encourage more ground floor activation on commercial streets to provide a rich pedestrian experience with a wide range of retail and service uses. To achieve this objective, the code will require specific ground floor window glazing options. It is important to treat the glass to adhere to the bird-safe standard while also maintaining an appropriate level of transparency and connection between the interior of the building and the public realm.

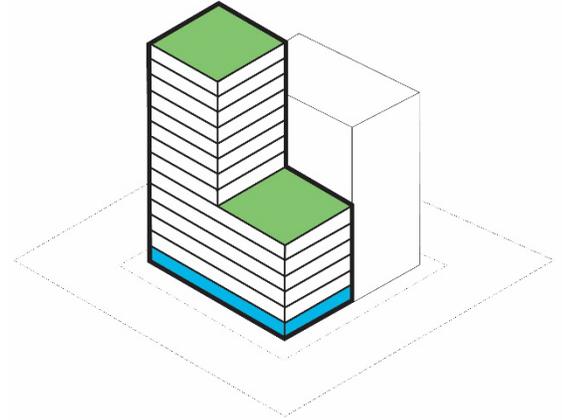


Figure 5 – Ground Floor Window Glazing

2.A.1 Approved Ground Floor Materials

The following materials are approved for use on the ground floor (see Figure 5). Color elements may be white or gray only. An applicant may choose one or more types of materials from the list below:

- A. Fritted Glass - Ceramic dots or 'frits' can be silk-screened, printed, or otherwise applied to the glass surface. This design element, useful primarily for new construction, can also improve solar heat gain control and reduce glare.
- B. Etched Glass - Glass etching on the surface of glass can be achieved through acidic, caustic, or abrasive substances. The etched markers should be on the outside surface.
- C. UV Coated Glass – Some birds can see into the ultraviolet (UV) spectrum of light, a range largely invisible to humans. UV-reflective and/or absorbing patterns (transparent to humans but visible to birds) are frequently suggested as a solution for many bird collision problems. This approach is not appropriate for situations where the glazing is backlit.
- D. Window Films - The application of the film covers the entire exterior glazed surface, reducing the reflectivity and transparency. This application is preferably for renovations and/or retrofits.

2.A.2. Ground Floor Spacing and Dimensions

In combination with the material chosen from subsection 2.A.1, the applicant must meet the following requirements for spacing and dimension of the patterns associated with the materials.

- A. Line markers - Visible continuous line markers must be at least 1/8-inch-wide and spaced 4 inches apart for vertical elements or 2 inches apart for horizontal elements (See Figure 6). These are fixed spacing distances between line markers.
- B. Dot markers - Visible circular or square markers must be at least 1/4-inch in diameter and spaced 4 inches apart for vertically aligned elements and 2 inches apart for horizontally-aligned elements (See Figure 6). These are fixed spacing distances between dot markers.
- C. UV treatment - Ultraviolet markers must be at least 1/16-inch in thickness and be spaced no more than 2.25 inches apart in all directions on interior (#2) surface. Ultraviolet markers can be random in placement.

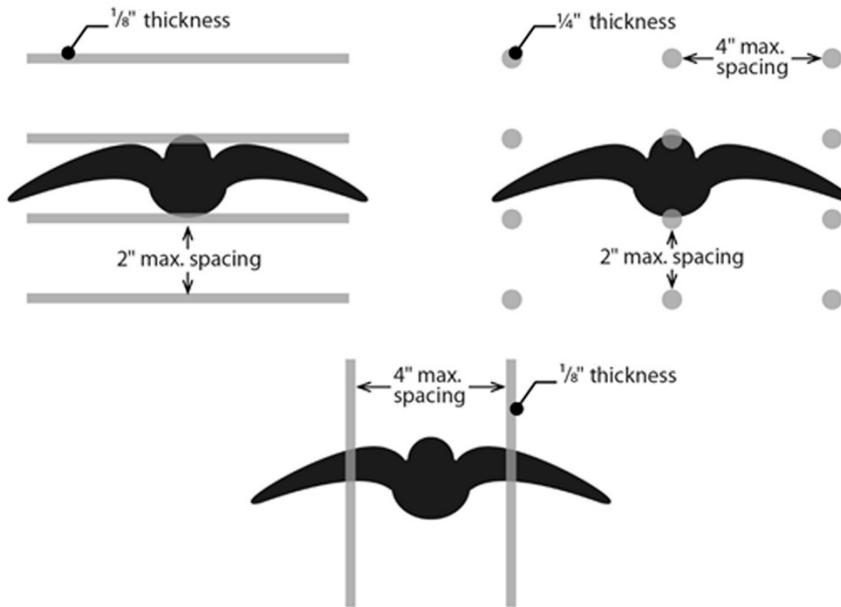


Figure 6— Marker Spacing Requirements

2.B. Allowed Treatments for Upper Floors

For upper floors, the applicant may use any of the approved materials listed in subsection 2.B.1 and must choose from the pattern spacing and dimension requirements listed in subsection 2.B.2 (see Figure 7).

The stories above the ground floor up to 60 feet or directly adjacent to an ecoroof are required to treat glazing. However, the need for the greatest level of transparency is not as critical as it is for the ground floor. Therefore, the material menu is expanded to include more materials, including exterior apparatus for which the spacing requirements are larger.

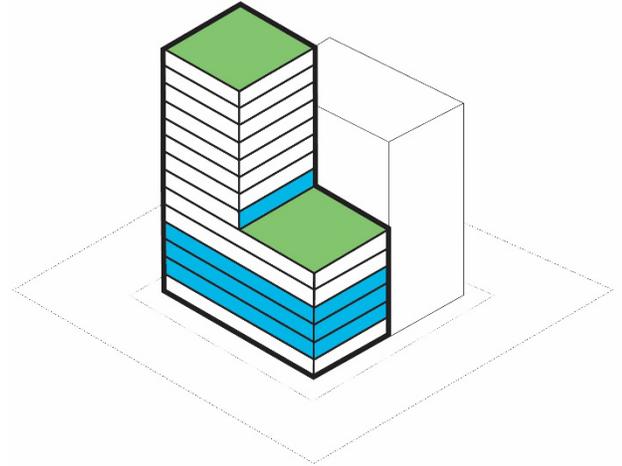


Figure 7 – Upper Floors Window Glazing

2.B.1 Approved Upper Floor Materials

The following materials are approved for use on stories above the ground floor and adjacent to an ecoroof. Color elements may be white or gray only. An applicant may choose one or more types of materials from the list below:

- A. Fritted Glass - Ceramic dots or 'frits' can be silk-screened, printed, or otherwise applied to the glass surface. This design element, useful primarily for new construction can also improve solar heat gain control and reduce glare.
- B. Etched Glass - Glass etching on the surface of glass can be achieved through acidic, caustic, or abrasive substances. The etched markers should be on the outside surface.
- C. UV Coated Glass - Some birds can see into the ultraviolet (UV) spectrum of light, a range largely invisible to humans. UV-reflective and/or absorbing patterns (transparent to humans but visible to birds) are frequently suggested as a solution for many bird collision problems. This approach is not appropriate for situations where the glazing is backlit.
- D. Window Films - The application of the film covers the entire exterior glazed surface, reducing the reflectivity and transparency. This application is preferably for renovations and/or retrofits.
- E. Permanent Stencils or Frosting - Frosted glass is created by acid etching or sandblasting transparent glass. Frosted areas are translucent, but different finishes are available with different levels of light transmission. An entire surface can be frosted, or frosted patterns can be applied.
- F. Exterior Apparatus - Fixed exterior screens, grilles, netting, louvers, fins or mullions can effectively reduce visible reflections, provide insulation from strike impact, reduce solar heat gain, reduce glare and provide weather protection.

2.B.2. Upper Floor Spacing and Dimensions

In combination with the material chosen from subsection 2.B.1 the applicant must meet the following requirements for spacing and dimension of the patterns associated with the materials.

- A. Line markers - Visible continuous line markers must be at least 1/8-inch-wide and spaced 4 inches apart for vertical elements or 2 inches apart for horizontal elements (See Figure 8). These are fixed spacing distances between line markers.
- B. Dot markers - Visible circular or square markers must be at least 1/4-inch in diameter and spaced 4 inches apart for vertically aligned elements and 2 inches apart for horizontally-aligned elements (See Figure 8). These are fixed spacing distances between dot markers.
- C. UV treatment - Ultraviolet markers must be at least 1/16-inch in thickness and be spaced no more than 2.25 inches apart in all directions on interior (#2) surface. Ultraviolet markers can be random in placement.

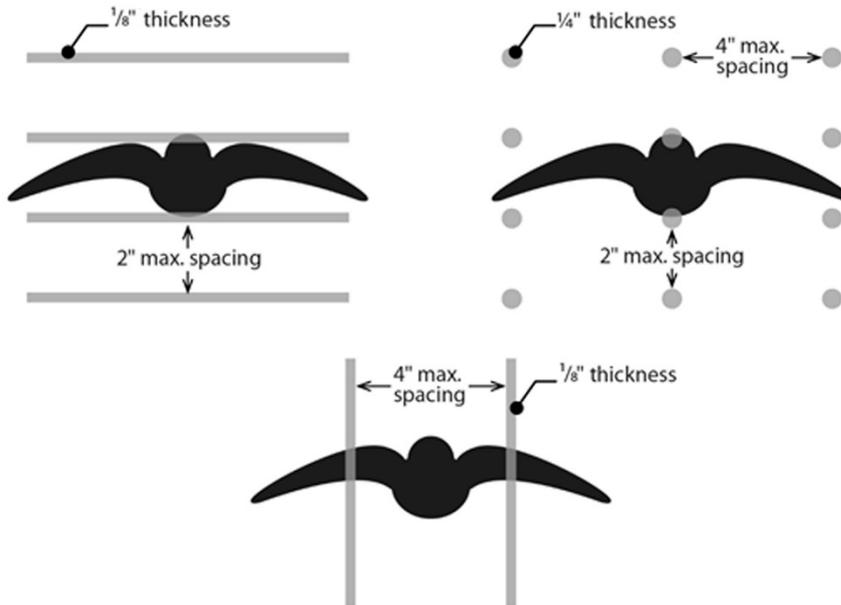


Figure 8 – Marker Spacing Requirements

- D. Exterior Apparatus –
 - A. Screens, grilles, or netting must be at least 1/8-inch in thickness and spaced no more than 2 inches between elements. (see Figure 9)
 - B. Louvers, fins or mullions must be at least 1/8-inch in thickness. The maximum spacing between elements is 1:1, depth of element to spacing between elements, with a maximum spacing of no more than 9 inches. For example, 1-inch thick, 4-inch deep elements may be spaced no more than 4 inches apart. Another example, 1.5-inch thick, 9-inch deep elements may be spaced no more than 9 inches apart. (see Figure 10)

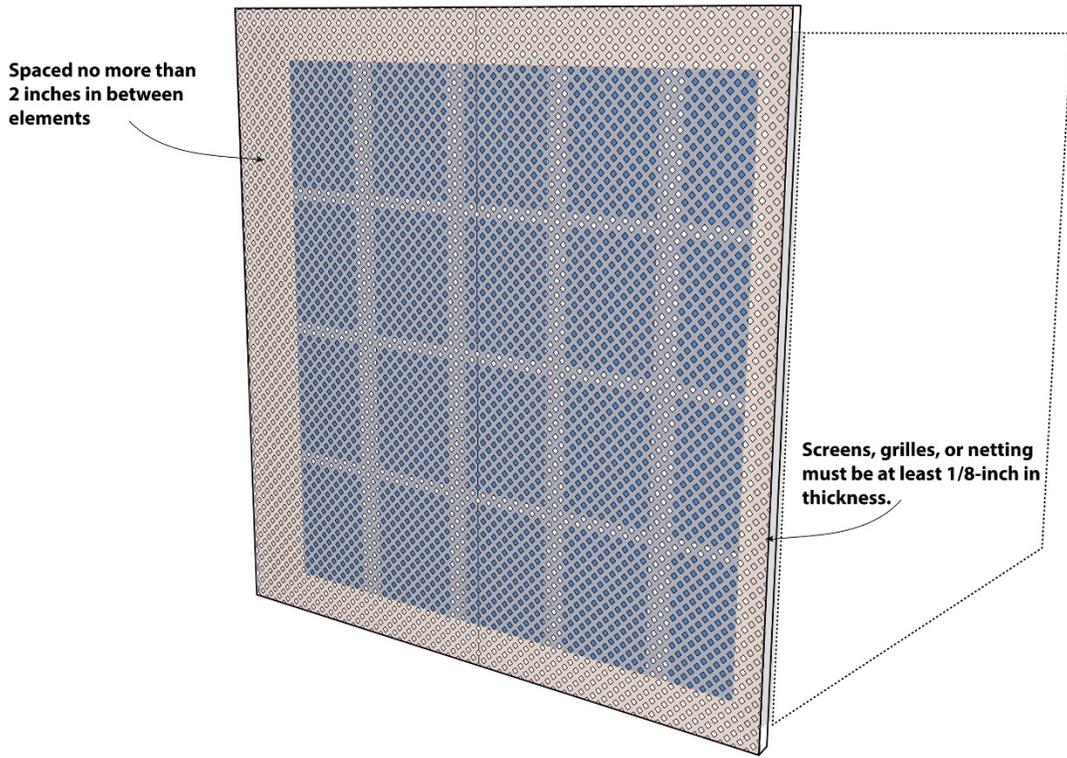


Figure 9 – Thickness and Spacing Requirements for Screen, Grilles or Netting

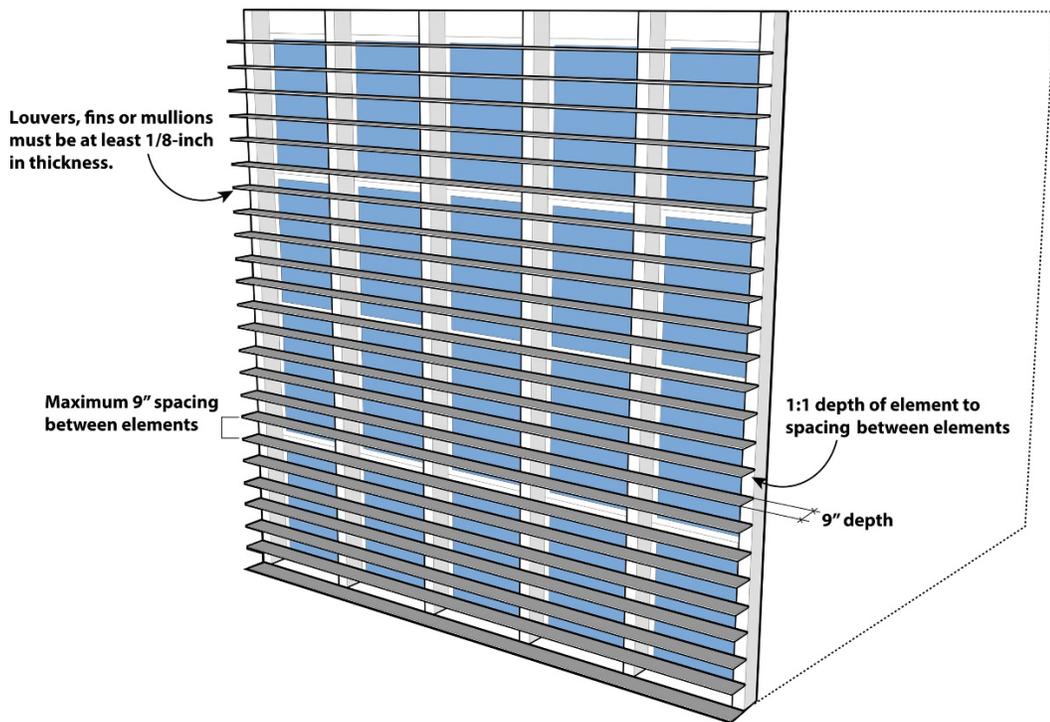


Figure 10 – Spacing Requirements for Louvers, Fins or Mullions

3.0 PROCESS REQUIREMENTS

3.A. Submittals

The manufacturer's specification sheet must be provided to the Bureau of Development Services (BDS) to verify that the materials, pattern application techniques and spacing requirements meet sections 2.A and 2.B of this administrative rule. Appendix B includes a list of products that meet the requirements; it is not an exhaustive list and other products that meet the requirements may be used.

3.B. Amendments to the Bird-Safe Windows List

The Bureau of Planning and Sustainability (BPS) is the bureau in charge of amending the *Bird-Safe Windows List* Administrative Rule. The BPS Director, or their delegate, signs the amended administrative rule. BPS will follow the process laid out in this standard operative procedure.

Amendments to the *Bird-Safe Windows List* Administrative Rule should:

1. Be appropriate, scientifically defensible, and generally accepted by technical experts;
2. Maintain or enhance the clarity, understandability, educational value, and "user-friendliness" of this document; and
3. Be efficient, and timely as possible, making best use of City staff and external technical reviewers' time.

Steps to Amend the *Bird-Safe Windows List*

1. Timing

Amendments to the *Bird-Safe Windows List* will occur as needed to respond to changes in bird-safe glazing techniques and technologies. The frequency of amendments will depend on the number and complexity of requested updates and the availability of staff to process the amendments.

2. Submitting requests to amend the *Bird-Safe Windows List*

Requests to amend the *Bird-Safe Windows List* may be submitted by any individual or organization to BPS, preferably using the request form in Appendix A. BPS will review the requests and follow up with the requestor as needed.

3. City Bureau Coordination

BPS will distribute the requested amendments to designated staff from Bureau of Development Services (BDS) and Bureau of Environmental Services (BES). BDS and BES staff will be given ten (10) business days to respond with comments and recommendations, including rationale and documentation, as to whether the requested amendments should be further considered or rejected. Each bureau shall provide one consolidated set of comments to BPS. BPS will compile feedback from the bureaus. If there is disagreement, BPS will convene a meeting to discuss the different viewpoints and come to an agreement or determine next steps to resolve any remaining conflicts.

4. Initial Stakeholder Consultation

BPS may consult with stakeholders on the amendments prior to public review. BPS will distribute the requested amendments and stakeholders will be given no less than ten (10) business days to respond with comments and recommendations, including rationale and documentation. This initial consultation may occur at the same time as the Bureau Coordination or after, depending on the complexity of the requested amendments.

BPS will maintain a list of community stakeholders who have participated in developing and amending this administrative rule, as well as other stakeholders with expertise in bird-safe glazing techniques and technologies and those who request to be on the stakeholder list.

5. Public Review and Comments

BPS will send notice to organizations and community members who provided testimony on adoption of the CC2035 bird-safe glazing standard; provided comments on the *Bird-Safe Windows List* Administrative Rule adoption or past amendments; or whom have requested notice. (BPS will maintain the notice list.) Notice will also be posted on the City's website announcing the public review period.

The public review and comment period will be no less than fifteen (15) business days. Comments will be directed to the BPS director, or their delegate. If staff recommend substantive revisions based on comments, notice of the revised amendments will be sent to organizations or community members and posted on the BPS website. The public review and comment period on the revised amendments will be no less than fifteen (15) business days. Once the public review and comment period is closed, BPS staff will provide a final recommendation to the BPS director or their designee.

7. Completion of *Bird-Safe Windows List* Amendments

Once the BPS Director, or their delegate, has approved the amendments, BPS staff will finalize all updates to the *Bird-Safe Windows List*. BPS staff will submit the updated version to the City Auditor's Office for inclusion in the Portland Policy Documents repository. BPS staff is responsible for ensuring that the updated list is published on the City's website.

BPS will maintain records documenting amendment requests, review process and updates for historical continuity and to assist in responding to future update requests. BPS may submit these records to be maintained at City Archives.

Appendix A: Bird-Safe Windows Amendment Request Form

This form can be used by any individual or organization to request amendments to the *Bird-Safe Windows List*. After completing the form, please return to:

Bureau of Planning and Sustainability
c/o Urban Design
1900 SW 4th Ave, Suite 7100
Portland, OR 97201

Requesting Person's Contact Information

Name: _____

Organization: _____

Mailing Address: _____

Email Address: _____

Phone Number: _____

Bird-Safe Windows List Section and Subsection to be Amended (you may list more than one)

Section: _____

Subsection: _____

Change Requested (you may attach additional pages)

Rationale for Request (you may attach additional information or provide links to online information)

Additional Information Attached (circle one) Yes No

Appendix B: Bird-Safe Glazing Product Examples

The following list are example of current products that meet one or more of the required treatments in the *Bird-Safe Windows List*. This is not a list of vendors and products from which a project must choose. It is only a list of some examples products that will meet the administrative rule requirements.

Product Name	Manufacturer	Treatment	Webpage
AviProtek	Walker Textures	acid etch	http://walkerglass.com/products/aviprotek-bird-friendly-glass/#.WQOYPIPyvR0
Ornilux Bird Protection	Arnold Glas	UV pattern	http://www.ornilux.com/technical-specs.html
GlasPro – Bird Safe	GlasPro	UV pattern	http://www.glas-pro.com/products/glas-pro-bird-glass/
Channel Glass	Bendheim	translucence	https://bendheim.com/system/channel-glass-curtainwall-systems/
Acrylite Soundstop Bird Guard	Evonik Performance Materials	embedded polyamide threads	http://www.acrylite.net/product/acrylite/en/products/acrylite-soundstop/pages/default.aspx
Viracon Screen 5006	Viracon	silk screen frit	http://www.viracon.com/page/silkscreen
SX-BSFH Bird Safety Film	Solyx	film	https://www.decorativefilm.com/specialty-bird-safety
CollidEscape Clear	CollidEscape	film	http://www.collidescape.org/
Feather Friendly	Convenience Group 3M Architectural + Window Film Solutions	tape/dot pattern	http://www.conveniencegroup.com/featherfriendly/feather-friendly

Appendix C: References

Toronto Green Standard Version 3, 2018, City of Toronto

<https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/toronto-green-standard/toronto-green-standard-version-3/mid-to-high-rise-residential-all-non-residential-version-3/ecology-for-mid-to-high-rise-residential-all-non-residential/>

Green Building Policy, April 2015, City of Portland

<https://www.portlandoregon.gov/bps/article/529212>

Bird-Friendly Building Design, 2015, American Bird Conservancy

https://abcbirds.org/wp-content/uploads/2015/05/Bird-friendly-Building-Guide_2015.pdf

Bird-Friendly Landscape Design Guidelines, August 2013, Vancouver Board of Parks and Recreation

<https://sustain.ubc.ca/sites/sustain.ubc.ca/files/uploads/pdfs/2013%20GCS%20Reports/GC%20Scholars%20-%20Final%20Report%20-%20Michele%20Campbell%20-%202013.PDF>

Resource Guide for Bird-Friendly Building Design, July 2012, City of Portland and Audubon Society of Portland <http://audubonportland.org/files/hazards/bfbdd;>

<https://www.portlandoregon.gov/bds/article/408796>

Portland, Oregon's Bird Agenda, June 2011, City of Portland

<https://www.portlandoregon.gov/bes/article/354681>

Standards for Bird-Safe Buildings, November 2011, City of San Francisco

<http://sf-planning.org/standards-bird-safe-buildings>

BirdSafe.ca, Fatal Light Awareness Program [FLAP]

<https://birdsafeca/>