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Risk Category and Oregon Wind Map

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The wind speeds identified on the Oregon map are based on geographical location and applicable Risk Category. Risk Category is a new concept under the 2012 IBC wind provisions which impact the wind pressure coefficients. Make sure you correctly identify the Risk Category before using the Wind Speed Map to determine your wind speed. The following is an excerpt from the 2012 IBC Code and Commentary, for reference purposes only.

1604.5 Risk category. Each building and structure shall be assigned a *risk category* in accordance with Table 1604.5. Where a referenced standard specifies an occupancy category, the *risk category* shall not be taken as lower than the occupancy category specified therein.

❖ This section requires classification of the risk category of any building in accordance with the nature of occupancy as described in Table 1604.5. The risk category serves as a threshold for a variety of code provisions related to earthquake, flood, snow and wind loads. Particularly noteworthy are the importance factors that are used in the calculation of design earthquake, snow and wind loads. The value of the importance factor generally increases with the importance of the facility. Structures assigned greater importance factors must be designed for larger forces. The result is a more robust structure that would be less likely to sustain damage under the same conditions than a structure with a lower importance factor. The intent is to enhance a structure's performance based upon its use or the need to remain in operation during and after a design event. The impact of a higher risk category classification is not limited to increasing the design loads. Compared to Risk Category I, II or III, for instance, a Risk Category IV classification can lead to a higher seismic design category classification that can, in turn, require more stringent seismic detailing and limitations on the seismic-force-resisting system. This can also affect the seismic design requirements for architectural, mechanical and electrical components and systems.



TABLE 1604.5. See page 16-9

- ❖ The risk category determined in this table generally increases with the importance of the facility, which relates to the availability of the facility after an emergency, and the consequence of a structural failure on human life. The categories range from Risk Category I, which represents the lowest hazard to life, through Risk Category IV, which encompasses essential facilities.

Risk Category IV: These are buildings that are considered to be essential in that their continuous use is needed, particularly in response to disasters. Fire, rescue and police stations, and emergency vehicle garages must remain operational during and after major events, such as earthquakes, floods or hurricanes. The phrase “designated as essential facilities” refers to designation by the building official that certain facilities are required for emergency response or disaster recovery. This provides jurisdictions the latitude to identify specific facilities that should be considered essential in responding to various types of emergencies. These could include structures that would not otherwise be included in this risk category. This designation would only be made with consideration of broader public policy, as well as emergency preparedness planning within the jurisdiction in question. The reasons for including facilities, such as hospitals, fire stations, police stations, emergency response operations centers, etc., should be self-evident. Some items warranting additional discussion are as follows:

- *Designated emergency shelters and designated emergency response facilities.* These items repeat the term “designated,” which is referring to designation by the building official that the facilities have been identified as necessary for sheltering evacuees or responding to emergencies (see discussion of “designated above”). For example, an elementary school having an occupant load of 275 would typically be considered a Risk Category III facility. If that school is designated as an emergency shelter, then the school will be considered a Risk Category IV building.
- *Facilities supplying emergency backup power for Risk Category IV.* A power-generating station or other utility (such as a natural gas facility) is to be classified as Risk Category IV only if the facility serves an emergency backup function for a Risk Category IV building, such as a fire station or police station. Otherwise, the power-generating station or utility should be classified as Risk Category III.
- *Structures with quantities of highly toxic materials in excess of the quantities permitted for a control area in Table 307.1(2).* This applies only to “Highly toxic materials” (see definition in Section 307.2), which are covered in the second row of Table 307.1(2). That table lists the maximum allowable quantities per control area of materials posing a health hazard. Since the use of control areas is permitted by Table 307.1(2), it is reasonable to recognize the control area for the purpose of making this risk category determination. In other words, this applies to occupancies that are classified as Group H-4 based on the quantities of highly toxic material exceeding the permitted quantity within a control area. However, recognizing control areas means that both the risk category as well as the occupancy classification could be lowered by adding either fire-resistance-rated walls or floor/ceiling assemblies in order to divide the building into a number of smaller control areas. The additional wording “...sufficient to pose a threat to the public if released” places a further qualification on the material quantity, but it is subjective since the threat to the public could be difficult to determine. Also note that a Group H-4 occupancy classification could be based on exceeding the quantities permitted for toxics or corrosives [see Table 307.1(2)], but the presence of those materials would not affect the assessment of the facility as Risk Category IV.

Risk Category III: Risk Category III buildings include those occupancies that have relatively large numbers of occupants because of the overall size of the building. They also include uses that pose an elevated life-safety hazard to the occupants, such as public assembly, schools or colleges. In addition, Risk Category III includes uses where the occupant's ability to respond to an emergency is either restricted, such as in jails, or otherwise impaired, such as in nursing homes housing patients that require skilled nursing care. A discussion of some of the specific table listings follows:

- *Buildings and other structures with a primary occupancy that is public assembly with an occupant load greater than 300.* Public assembly occupancies meeting this criterion will typically be classified as Group A in Chapter 3. The wording requires agreement on the determination that a building's "primary occupancy" is in fact public assembly. This could be as simple as verifying that the portion of the building housing the public assembly occupancy is more than 50 percent of the total building area.
- *Group 1-2 occupancies with an occupant load of 50 or more resident patients but not having surgery or emergency treatment facilities.* This category applies to health care facilities with at least 50 resident patients. The term "resident patient" is not defined or used elsewhere in the code, but would seem to refer to locations where those patients receive around-the-clock (24-hour) care as opposed to ambulatory surgery centers or outpatient units. This table entry covers facilities where patients have difficulty responding to an emergency or are incapable of self-preservation.
- *Buildings having an occupant load greater than 5,000.* Uses that pose elevated life-safety concerns, such as public assembly uses, schools and health care facilities, are covered elsewhere and have a much lower threshold based on the number of occupants. This table entry covers buildings that are large enough to have more than 5,000 occupants, providing added protection for the occupants of larger structures whatever the use happens to be. In order to determine occupant load, the methods outlined in Section 1004 are normally used. Chapter 10 sets forth standards that provide a reasonably conservative number of occupants for all spaces, and while actual loads are commonly less than the design amount, it is not unusual in the life of a space in a building to have periods when high actual occupant loads exist. Because there is no clear rationale that connects the occupant load used to calculate minimum means of egress requirements to the risks associated with structural design, Note a provides some reasonable adjustment to this determination by permitting the use of net floor area. It provides a more reasonable approach for occupancies, such as office, mercantile and residential, that are required to base occupant load on gross area - an area that includes corridors, stairways, elevators, closets, accessory areas, structural walls and columns, etc.
- *Power-generating stations, potable water treatment facilities, wastewater treatment and other public utilities not included in Risk Category IV.* A failure and subsequent shutdown of these types of facilities would not pose an immediate threat to life safety. These infrastructure items are considered Risk Category III because of the impact an extended disruption in service can have on the public.
- *Buildings not included in Risk Category IV containing quantities of toxic or explosive materials that exceed permitted quantities per control area in Table 307.1(1) or 307.1(2) and are sufficient to pose a threat to the public if released.* Buildings included under Risk Category IV would be those containing quantities of highly toxic materials that exceed the permitted quantity in Table 307.1(2) (see discussion under "Risk Category IV" above). This item addresses buildings with explosives or toxic substances, both of which are defined in Section 307.2.

Risk Category II: Risk Category II buildings represent a lesser hazard to life because of fewer building occupants and smaller building size compared to those that are considered Risk Category III. Since Risk Categories III and IV represent buildings with higher risk or essential facilities, on a relative scale Risk Category II can be thought of as a “standard occupancy” building as evidenced by importance factors for earthquake, snow and wind that are all equal to 1.

Risk category I: Risk Category I buildings exhibit the lowest hazard to life since they have little or no human occupants or, for those that are temporary, the exposure to the hazards of earthquakes, floods, snow and wind would be considerably less than that of a permanent structure. Note that this category includes “minor storage facilities,” but the code does not provide an explanation of which storage facilities could be considered minor.

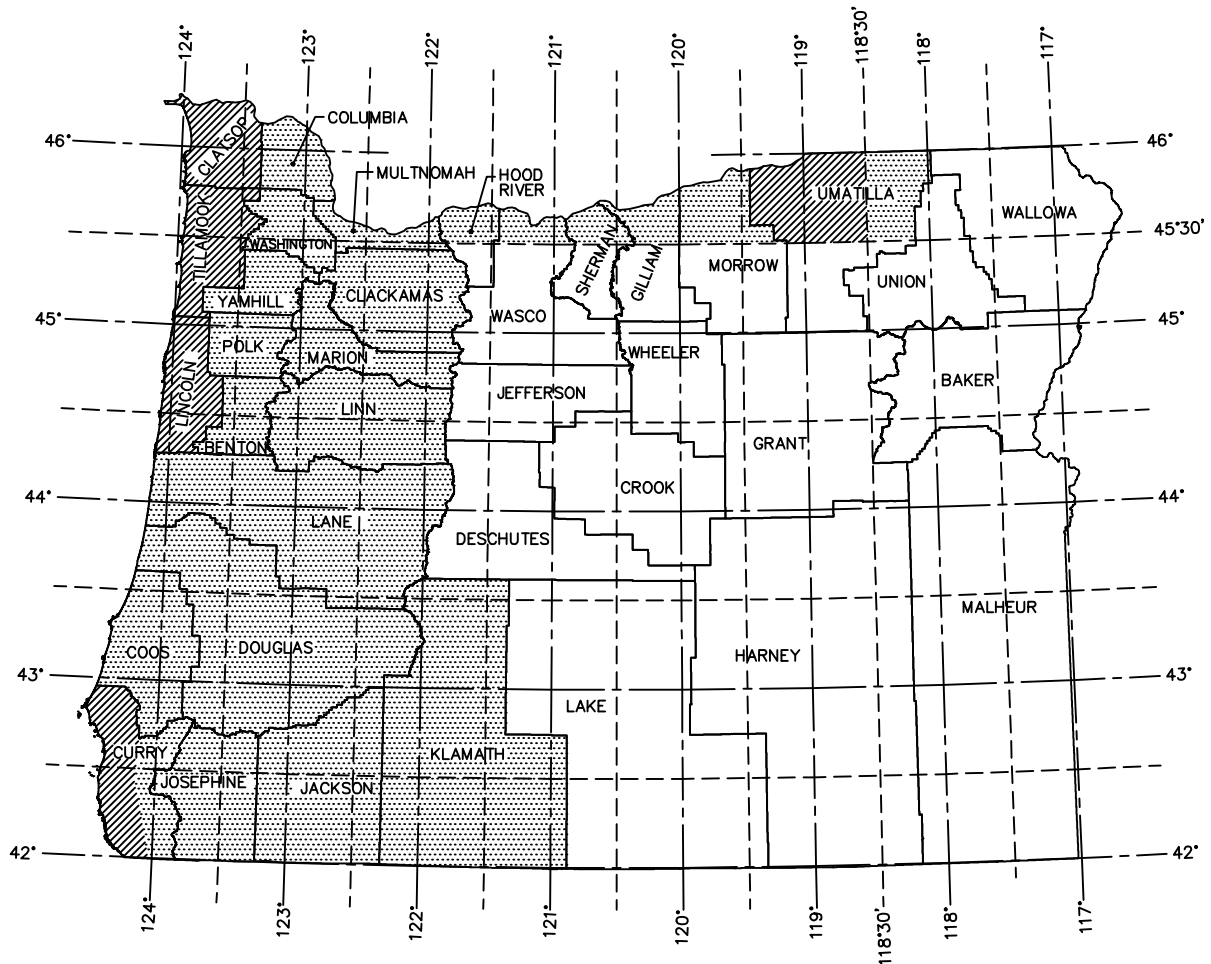
1604.5.1 Multiple occupancies. Where a building or structure is occupied by two or more occupancies not included in the same *risk category*, it shall be assigned the classification of the highest *risk category* corresponding to the various occupancies. Where buildings or structures have two or more portions that are structurally separated, each portion shall be separately classified. Where a separated portion of a building or structure provides required access to, required egress from or shares life safety components with another portion having a higher *risk category*, both portions shall be assigned to the higher *risk category*.

❖ Buildings are frequently occupied by a mixture of uses or occupancies. A single-use building is probably the exception rather than the rule. Where multiple occupancies are proposed in a building, the risk category of each one must be considered. In some cases, the proposed occupancies in a building will fall into more than one risk category and the requirements for multiple occupancies stated in Section 1604.5.1 must be satisfied. These requirements were previously part of the earthquake load provisions. As of the 2006 edition, they were relocated so that they now apply regardless of the type of load being considered. The code identifies two design options for mixed-use buildings. The entire structure can be designed as a single unit based on the requirements for the most stringent risk category for the building. Alternatively, the engineer can structurally separate portions of the structure containing distinct occupancy categories and design each portion accordingly based on its risk category.

This section also provides direction regarding access to and egress from adjacent structures that fall into different occupancy categories by making the requirements for the more stringent risk category applicable to both structures. This requirement is the result of lessons learned from events, such as earthquakes, in which essential functions have been rendered unusable because of a failure in an adjacent structure.



Combined Oregon Wind Speed Map



1. All areas with full exposure to ocean winds shall be designed to the highest wind speed for that Risk Category.
2. Areas in Hood River and Multnomah Counties with full exposure to Columbia River Gorge winds shall be designed to the highest wind speed for that Risk Category.

RISK CATEGORY I

	125 mph
	115 mph
	100 mph

RISK CATEGORY II

	135 mph
	120 mph
	110 mph

RISK CATEGORY III & IV

	145 mph
	130 mph
	115 mph

For SI: 1 mile per hour = 0.44 m/s

ULTIMATE DESIGN WIND SPEED, Vult BASED ON RISK CATEGORY

This map is a compilation of all 3 wind speed maps based on Risk Category in the 2014 OSSC. Refer to the actual maps in the code for exact code language.