



**Fire Department**  
400 NW Harrison Blvd  
Corvallis, OR 97330

(541) 766-6961

Fax (541) 766-6938

Email: [fire@corvallisoregon.gov](mailto:fire@corvallisoregon.gov)

October 2020

## Fire Escape Testing

Fire Escape Testing, in accordance with Oregon State Fire Code section 1031.11 will be conducted every 5 years.

Listed below are the Oregon State Fire Code testing criteria, and acceptable testing methods.

Alternate methods are allowed in accordance with Oregon State Structural Code 104.10. The Alternate methods must be submitted to Development Service and the Corvallis Fire Department for review and analysis PRIOR to testing

Even if the fire escape system is not required, it MUST be maintained per code.

Permanent removal of a Fire Escape will require an Exiting Analysis, prepared by an Architect licensed to practice in the State of Oregon. Such analysis will include plans and narrative, indicating compliance with the OSSC and OFC. A Building Permit will be required thru Development Services.

### Fire Escape Performance Criteria

Fire escapes shall comply with the following standards:

1. Fire escape stairways and their landings shall support their dead load plus a live load of not less than 100 pounds per square foot placed anywhere on the landing, balcony or stairway so as to produce the maximum stress.
2. All stairway and balcony railings shall support a horizontally applied force of not less than 50 pounds per lineal foot of railing applied at top of railing, or a concentrated load of 200 pounds placed anywhere on the railing so as to produce the maximum stress.
3. Firefighter's ladders shall be designed and connected to the building to withstand a minimum horizontal force of 200 pounds concentrated load or 50 pounds per lineal foot horizontal load so as to produce the maximum stress. Each rung shall support a concentrated load of 500 pounds placed anywhere on the rung so as to produce the maximum stress. Ladder assemblies shall have a minimum vertical load capacity of 100 pounds per lineal foot for each foot of width. New firefighter's ladders shall have a minimum width of 16 inches measured from inside rail to inside rail.
4. All loads noted above are unfactored loads.

### Fire Escape Evaluation Using In-Situ Testing

Before a test is conducted the structural components and connections of the fire escape should be visually inspected.

- The entire fire escape shall be checked for rust, damage and unauthorized modifications.
- Handrails must be physically checked for integrity.
- All welds, rivets, bolts, grates, hangars, framework, etc. must be inspected.
- Faulty welds, loose bolts, grates, rivets, and framework should be tightened, repaired, or replaced as necessary.
- The ladder must be checked for unauthorized modification.
- All safety chains shall be in good repair.
- The counterbalanced stair or ladder release mechanism must be checked **twice** for proper operation. The stair or ladder must travel to the ground without hesitation and it must be stable and firm in its position after reaching the ground or sidewalk.

If visual inspection determines that structural repairs are required, that work must be completed before commencement of testing.

In-situ load testing shall be conducted as outlined below:

A test procedure shall be developed by a registered design professional. A stamped copy of the test procedure shall be submitted to Development Services (DS) for approval before any testing is carried out. The test protocol shall:

- a. Simulate the applicable loading and deformation conditions as necessary to address the concerns regarding structural stability of the structure.
- b. The test load shall be equal to two times the unfactored design loads. The test loads shall be left in place for one hour.
- c. Test loads may be applied to the entire structure at one time. If however, each landing is to be tested separately, then components such as standpipes, ladders etc. connecting the landings must be disconnected so that load sharing does not occur.

Testing shall be supervised by a registered design professional.

The structure shall be considered to have successfully met the test requirements where the following criteria are satisfied:

1. Within one hour after removal of the test load, the structure shall have recovered not less than 75 percent of the maximum deflection.
2. During and immediately after the test, the structure shall not show evidence of failure

### **Fire Escape Evaluation Using Structural Analysis and Limited Testing**

The fire escape shall first be visually inspected by a registered design professional and the following shall be completed:

- The entire fire escape shall be checked for rust, damage and unauthorized modifications.
- Handrails must be physically checked for integrity.
- All welds, rivets, bolts, grates, hangars, framework, etc. must be inspected.
- Faulty welds, loose bolts, grates, rivets, and framework should be tightened, repaired, or replaced as necessary.
- The ladder must be checked for unauthorized modification.
- All safety chains shall be in good repair.

The counterbalanced stair or ladder release mechanism must be checked **twice** for proper operation. The stair or ladder must travel to the ground without hesitation and it must be stable and firm in its position after reaching the ground or sidewalk.

A complete structural analysis of all the elements and connections shall be completed for each fire escape on the building. The analysis shall be done by a registered design professional. Fire escapes and parts thereof shall be analyzed in accordance with the provisions of the Oregon Structural Specialty Code. The structural analysis shall be based on actual material properties and other as-built conditions.

In addition to the structural analysis, limited testing shall be conducted to determine the adequacy of the anchorage of the fire escape to the building structure or for any connection that cannot be analyzed due to the connection being hidden from view. Unless agreed to by Development Services (DS) upon recommendation from the design professional performing the analysis, testing of anchorage for the fire escape to concrete or reinforced or unreinforced masonry structure is required to determine the capacity of the anchors. The Engineer of Record must also provide an assessment of the exterior wall system for its structural capacity.

Testing is not required when all anchors are being replaced and shown by analysis to meet the requirements of the Oregon Structural Specialty Code. The new anchors shall be designed to resist all loads imposed on the connection by the fire escape.

Testing Requirements:

1. Testing shall be conducted by a qualified testing agency under the supervision of the registered design professional.
2. The anchors shall be tested to two times the unfactored design loads. Modifications to these loads shall be appealed through Development Services (DS) as part of the permit process.
3. The anchors shall be tested for all loads imposed on the anchor (shear and tension). Test loads shall be left in place for one hour.

4. The registered design professional shall prepare and submit a plan for testing of the anchors. This testing plan shall be submitted to Development Services Center (DS) for approval prior to being carried out
5. A minimum of 20% of the anchors shall be tested.
6. The anchors shall be considered to have successfully met the test requirements if 90% or more of the tested anchors pass the test and 100% of the anchors have a capacity of at-least 150% of the unfactored design loads. If this is not the case another 20% of the anchors shall be tested. The tests shall be repeated until the anchors meet the criteria defined above.
7. All failed anchors shall be retrofitted and the new anchors shall carry the entire load imposed by the fire escape. There shall be no load sharing between existing and new anchors in a connection.

At the conclusion of the evaluation and testing of the fire escape, the following shall be completed:

1. A report prepared and stamped by a design professional that includes but is not limited to drawings, calculations and test results shall be submitted to Development Services (DS) for approval.
2. The engineer of record shall submit to the building inspector a letter of structural observations stating the testing was completed in accordance with the approved testing plan and the fire escape passed the test.
3. The owner and the engineer of record shall submit a letter to the Corvallis Fire Department, outlining testing procedure used, area of building tested and stamped by a registered design professional

## **FIRE ESCAPE REPAIR, CLEANING AND PAINTING**

The following information specifies the methods to be used in correcting deficiencies that have been noted on your fire escape(s). These repairs must be completed as soon as practical to ensure the continued safe use of these exiting systems. Cleaning and painting may be delayed upon written request. The following is provided by this office to assist you in expediting the repairs, cleaning and painting:

### **REPAIRS**

- A permit from Development Services (DS) shall be required for replacing structural components (knee bracing and connections to the building), replacing major sections of the fire escape (a flight of stairs, a length of the firefighter's ladder, a section of railing, a section of a platform) or when a significant amount of welding occurs. All repair work shall be done under the supervision of a registered design professional.
- A permit is not required for minor repairs, such as removing paint and rust, replacing bolts, nuts, rivets, incidental welding, like for like replacement of a minimal number of steel components that are not major load bearing elements (floor slats, stair treads, railing pieces). Minor repairs shall be addressed in the following ways:
  - a) **BOLTS/NUTS:** If used in the replacement of existing or missing nuts/bolts/rivets, they shall be stainless steel, minimum 3/8" diameter and of appropriate length. These specifications ensure the strength and resistance to rust for years to come.
  - b) **WELDING:** Rigid joining of fire escape components is **not** recommended. When used, welding on fire escapes shall be completed by a person holding a current American Welding Society (AWS) certification for the type of welding that is being done.

**CLEANING** the fire escape(s) prior to painting is an extremely important step. Studies show that paint applied to a surface prepared using hand tools (scrapers, grinders, wire wheels, etc.) will survive for approximately 2 years, while the same paint applied following preparation by sandblasting will last about 10 years. This office may require sandblasting prior to painting. NOTE: Precautions shall be taken when working with lead based paint and may require separate permits through other agencies (DEQ, EPA, etc.).

**PAINTING** your fire escape(s) preserves the integrity of the joining systems. Paint may be applied using brush, roller, or spray and shall be applied to all surfaces. Caulking all metal to metal contacts prior to painting should be considered and is preferred.

Paint coatings shall be one of the following:

- One (1) coat of **iron oxide primer**, followed by one (1) coat of **alkyd enamel finish** (or)

- One (1) coat of a single coat paint such as "**Hammerite**" brand paint, **Amershield Polyester- Acrylic Aliphatic Polyurethane** or **Val-Chem Epoxy Mastic 75-W-9W (or)**
- Alternative coatings of paints equivalent to above listed items upon approval by this office and Development services.

