

SEISMIC INTRODUCTION CHECKLIST

SEISMIC TOPIC OVERVIEW IN NFPA 13-2016

Seismic Bracing is not just about distances between lateral braces. NFPA 13 contains specific requirements concerning lateral and longitudinal bracing, restraint, and clearances to ensure the system is properly rigid in some areas and adequately flexible in others.

This cheatsheet is a starting point for seismic requirements that stem from NFPA 13.

Topic	Guidance	Reference
Purpose	Protect sprinkler system against earthquake damage	NFPA 13 2016 A.9.3.1
When Required	Requirements for seismic bracing are dictated by the following: <ol style="list-style-type: none"> (1) Occupancy Risk Category for the building (2) Soil conditions for site where building is located (3) Proximity to known major earthquake fault line(s) 	International Building Code Section 1613, to ASCE 7 Chapter 13
Flexible Couplings	<p>Risers: Within 24-inches at the top and bottom of all risers. <i>Exceptions for (1) risers less than 3-ft in length, or (2) one flexible coupling is adequate for risers up to 7-feet in length.</i></p> <p>Floors: Within 12-in above and 24-in below each floor in multi-story buildings.</p> <p>Concrete or Masonry Walls: Both sides of concrete or masonry walls, within 1-ft of wall surface <i>Exception when clearance is provided (see "Clearances" below)</i></p> <p>Building Expansion Joints: Within 24-in of building expansion joint.</p> <p>Long Drops: Within 24-inches of top of drops over 15-ft in length where supplying more than one sprinkler.</p> <p>Intermediate Riser Supports: Within 24-inches above and 24-inches below any intermediate points of support for a riser or vertical pipe.</p> <p>Floor Control: When flexible coupling below a floor is above the floor tie-in to a riser, provide at (1) within 24-in of horizontal tie-in point on horizontal pipe, or (2) on vertical portion if tie-in where tie-in incorporates a riser</p> <p>Drops to Hose Line, Rack Sprinklers, Mezzanines, and Freestanding Structures: Within 24-inches of top of drop, within 24-inches of uppermost drop support attachment, and within 24-in. above bottom of drop where no drop support is provided.</p>	<p>NFPA 13 2016 9.3.2.3(1)</p> <p>NFPA 13 2016 9.3.2.3(2)</p> <p>NFPA 13 2016 9.3.2.3(3) <i>NFPA 13 2016 9.3.4</i></p> <p>NFPA 13 2016 9.3.2.3(4)</p> <p>NFPA 13 2016 9.3.2.3(5)</p> <p>NFPA 13 2016 9.3.2.3(6)</p> <p>NFPA 13 2016 9.3.2.3.2</p> <p>NFPA 13 2016 9.3.2.4</p>
Seismic Separation	Building Seismic Separation Joints: Provided where pipe crosses building seismic separation joints above ground level.	NFPA 13 2016 9.3.3.1
Four-Way Braces	<p>Building Seismic Separation Joints: Upstream and downstream within 6-ft of a seismic separation assembly.</p> <p>Risers: Where top of riser exceeds 3-ft in length.</p>	<p>NFPA 13 2016 9.3.3.3</p> <p>NFPA 13 2016 9.3.5.5.1</p>

	<p>Long Risers: Provided at 25-foot spacing for tall risers.</p> <p><i>Exceptions: Not required for riser nipples or where risers penetrate intermediate floors in multi-story buildings when clearances are under limits.</i></p>	<p>NFPA 13 2016 9.3.5.5.4</p> <p>NFPA 13 2016 9.3.5.5.2, 9.3.5.5.5</p>
Clearances	<p>Penetrations in Platforms, Foundations, Walls or Floors: Hole must be 2-inches larger than nominal pipe diameter for 1-in to 3-in pipe or 4-inches larger than nominal pipe diameter for 4-in or larger pipe.</p> <p>Suspended Ceilings: Hole in suspended ceilings must have clearance for sprinkler when installed with rigid pipe.</p> <p>Non-Connected Structural Members: Minimum 2-inch clearance for all non-connected structural members, or 3-inch between sprinkler and structure</p> <p><i>Exceptions:</i></p> <ul style="list-style-type: none"> - when penetrating gypsum or equally frangible, non-rated construction, - where flexible couplings are located within 1-ft of each side of wall, floor, platform or foundation, - where horizontal pipe passes perpendicular through successive studs or joists forming a wall or floor/ceiling assembly. - where nonmetallic pipe has inherent flexibility equal or greater than flex couplings on either side of penetration - where pipe is supported by holes in structural members 	<p>NFPA 13 2016 9.3.4.2, 9.3.4.3</p> <p>NFPA 13 2016 9.3.4.9 and Exception 9.3.4.11.1</p> <p>NFPA 13 2016 9.3.4.9 NFPA 13 2016 9.3.4.11</p> <p>NFPA 13 2016 9.3.4.4 NFPA 13 2016 9.3.4.5</p> <p>NFPA 13 2016 9.3.4.6</p> <p>NFPA 13 2016 9.3.4.7</p> <p>NFPA 13 2016 9.3.4.10</p>
Lateral Sway Bracing (where required)	<p>All Feed and Cross Mains (regardless of size)</p> <p>All Pipe 2-1/2 inch and Larger</p> <p><i>Exceptions: 2-1/2" starter pieces less than 12-ft long</i> <i>Where pipe is individually supported by rods less than 6-inches (measured from top of pipe to point of attachment)</i> <i>Where U-Type hooks keep pipe tight to underside of structure</i> <i>Where Longitudinal Braces act as Lateral if within 24-inch of centerline of pipe braced laterally</i></p>	<p>NFPA 13 9.3.5.3</p> <p>NFPA 13 9.3.5.3</p> <p>NFPA 13 9.3.5.3.4 NFPA 13 9.3.5.3.9</p> <p>NFPA 13 9.3.5.3.10 NFPA 13 9.3.5.4.2</p>
Lateral Sway Bracing (where located)	<p>Spaced at:</p> <p>No more than 40-feet on center Within 6-feet of end of the pipe</p> <p>Within 24-inches of every other non-essential flexible coupling Pipe change in direction, unless pipe run is 12-ft or less</p> <p>Size and Spacing Calculated in accordance with NFPA 13 2016 9.3.5.5</p>	<p>NFPA 13 2016 9.3.5.3.2.2 NFPA 13 2016 9.3.5.3.5 NFPA 13 2016 9.3.5.3.8 NFPA 13 2016 9.3.5.7</p>
Longitudinal Sway Bracing (where required)	<p>All Feed and Cross Mains</p> <p><i>Exceptions: Lateral braces can act as longitudinal if they are within 24-inches of centerline of pipe and are of sufficient or greater size than pipe being braced longitudinally.</i></p>	<p>NFPA 13 2016 9.3.5.4.1 NFPA 13 2016 9.3.5.3.7</p>
Longitudinal Sway Bracing (where located)	<p>Spaced at:</p> <p>No more than 80-feet on center Within 40-feet of end of pipe</p> <p>Pipe change in direction, unless pipe run is 12-ft or less</p> <p>Size and Spacing Calculated in accordance with NFPA 13 2016 9.3.5.6</p>	<p>NFPA 13 2016 9.3.5.4.1 NFPA 13 2016 9.3.5.4.3 NFPA 13 2016 9.3.5.7</p>
Branch Line Restraint (where required)	<p>Wherever Branch Lines Are Without Lateral Sway Bracing</p> <p>Provided by: (1) listed sway brace assembly, (2) wraparound U-hook, (3) No. 12 wire at least 45 degrees from vertical plane on both sides of pipe, (4) CPVC hangers listed to provide restraint, (5) hangers at least 45 degrees from vertical, with limits, or (6) other approved means</p>	<p>NFPA 13 2016 9.3.5.5.1.1</p>