STANDATA bulletin 20-PCB-003

Plumbing

Expansion and contraction - for drainage, venting and water distribution systems (including water hammer)

Date Issued: April 2023

Purpose

This bulletin informs the plumbing industry of the installation requirements for expansion joints to protect the drainage and venting systems in buildings three storeys or less.

This notice clarifies responsibilities under the *Safety Codes Act* (SCA). Designers, installers and safety codes officers (SCO) must ensure the design and installation of plumbing systems in all buildings comply with the SCA and the regulations. Expansion joints, water hammer arresters or other equivalent protection are required to reduce the probability of damage to the piping system in buildings. Expansion, contraction or water hammer arresters that are **not** accounted for could lead to leakage and/or breakage of systems for drainage, venting and water distribution. Systems failure could lead to property damage and/or health risks, where microbiological growth or exposure to waste products could occur.

Discussion

The design and installation of every piping system must include a means to accommodate its expansion and contraction caused by temperature changes, movement of the soil, building shrinkage or structural settlement in accordance with Division B Article 2.3.3.9 of the National Plumbing Code of Canada (NPC) 2020.

The installer must confirm the expansion rates for the piping materials being installed in accordance with good engineering practices and by using the linear expansion table in Appendix A of the NPC. In addition, experience has shown that building shrinkage can be as much as ¾ of an inch per floor depending on the moisture content and height of the wood framing.

Unless stated otherwise, all Code references in this STANDATA are to the National Plumbing Code of Canada 2020

Issued by the Provincial Plumbing Administrator

Original signed

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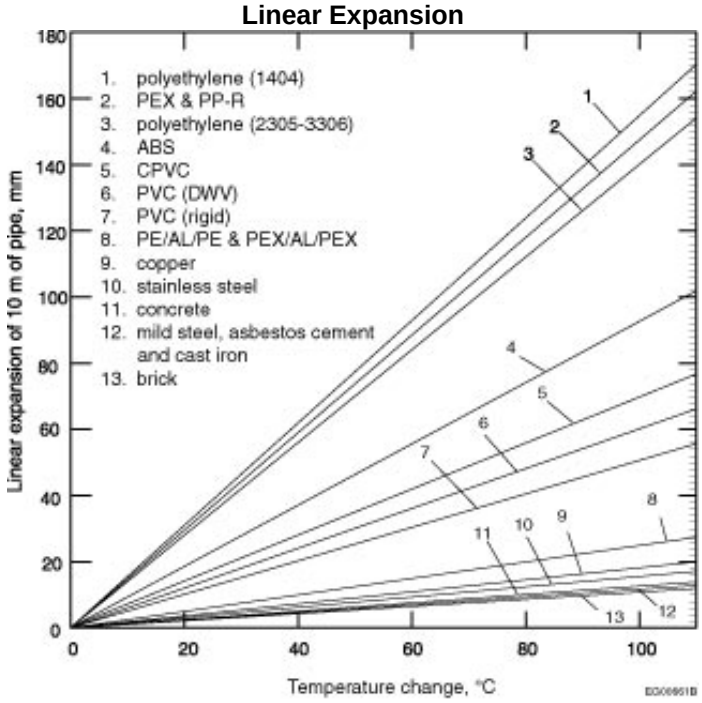
As a result, the installation of plastic piping supported with a single riser clamp on alternate storeys would require an expansion joint on alternate floors (see attached drawing). However, this is contingent on the piping design and the method of fire stopping. If riser clamps are installed on the top and bottom of each floor, an expansion joint will be required on every floor.

Residential plumbing systems often have quick closing valves on devices such as icemakers, dishwashers and clothes washers. However, commercial systems have many potential locations where water distribution systems could be exposed to the effects of water hammer. Air chambers made from vertical pipes cannot provide acceptable protection and are considered unacceptable. Instead, manufactured water hammer arrester's are required and must be installed following the manufacturers installation instructions to ensure proper protection for the piping system. This protection must be provided to address water hammers in accordance with Division B Article 2.6.1.9. of the NPC 2020 for all water distribution systems.

Water distribution systems exposed to thermal expansion must be protected by a suitably sized diaphragm expansion tank designed for use with the potable water system and an auxiliary thermal expansion relief valve conforming to CAN/CSA - B125 “plumbing fittings” and set at a pressure of 550K PA or less as designed for repeated use or other equally effective means. Thermal expansion shall be addressed when required in accordance with Division B Article 2.6.1.11. of the NPC 2020.

A-2.3.3.9. Linear Expansion

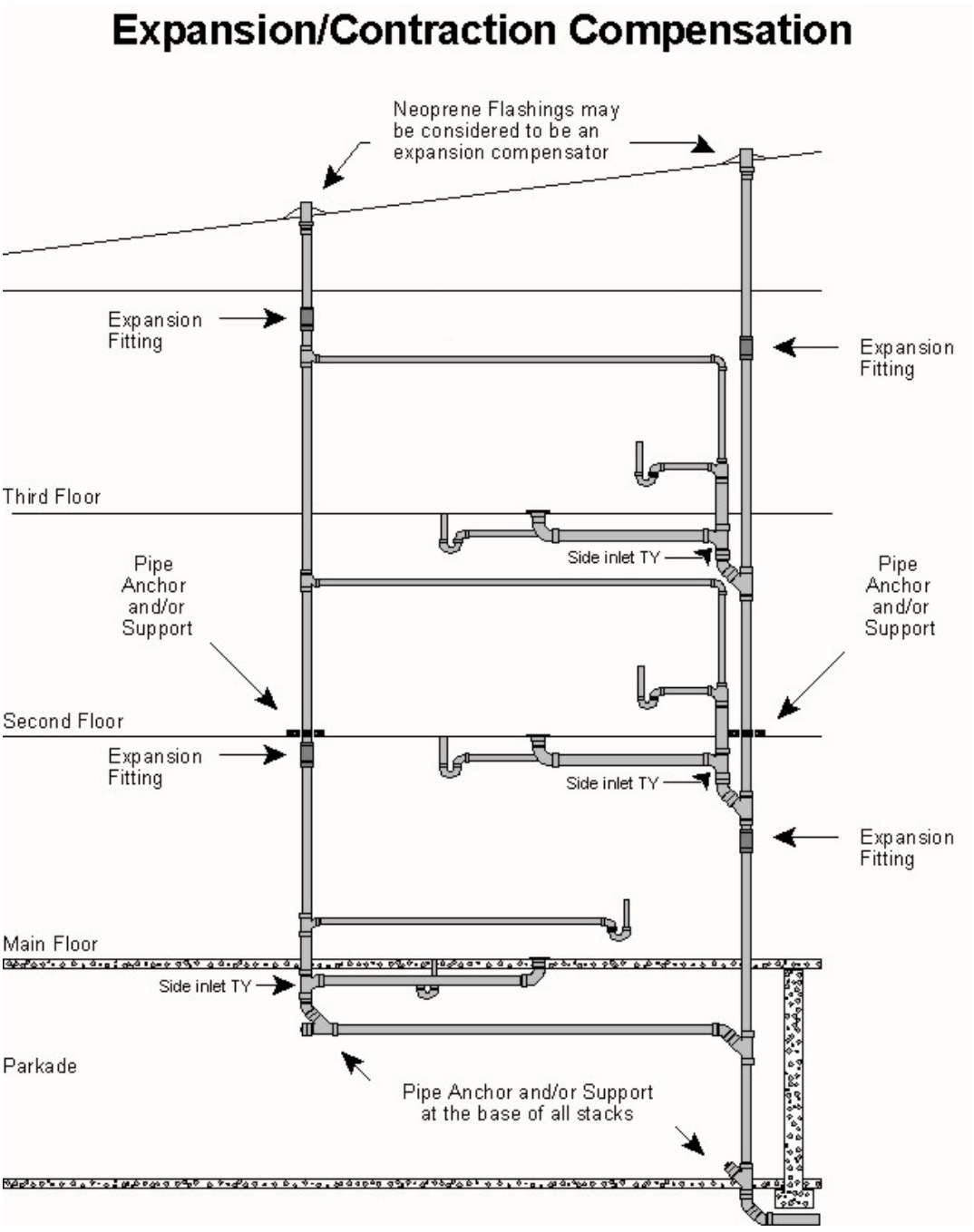
Figure A-2.3.3.9.
Linear Expansion



Example: To determine the liner expansion of 20 m of ABS pipe for a temperature change from 10°C to 60°C.

- Temperature change = 60 – 10 = 50°C,
- Enter the chart at 50°C, read up to ABS line, and then across to the mm scale = 47 mm/10 m of pipe,
- Change in length for 20 m of pipe = 20 divided by 10 = 2 X 47 = 94 mm

Note: Compensation for expansion and contraction of buildings in excess of three storeys must meet the requirements of the Plumbing Code Regulation and be identified as complex projects requiring professional involvement as identified in Part 18(1) of the Administrative Items Regulation AR 16/2004.



NOTE: This typical drawing is of a general nature and does not necessarily include the allowances that must be taken into account in each specific installation.

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