is not considered harmful. Pipe shall be stored in such a manner as to prevent sagging or bending.

2.3.2 Expansion and Contraction

Thermal expansion and contraction of plastic drain waste and vent systems shall be taken into consideration. Thermal expansion and contraction may be controlled by several methods: offset, expansion joints, or restraints.

Regardless of method utilized, certain conditions shall be met:

(a) Support, but do not rigidly restrain piping at changes of direction.
(b) Do not anchor pipe rigidly in walls.
(c) Holes through framing members must be adequately sized to allow for free movement.

DWV installation with frequent changes in direction will compensate for thermal expansion and contraction.

Expansion joints may be utilized in vertical straight runs in excess of 30 feet (9,144 mm) provided they are installed per manufacturer's installation instructions.

Except piping buried below ground, horizontal and vertical piping should be installed with restraint fittings or a minimum of 24 inches (610 mm) 45° offset every 30 feet (9,144 mm). Thermal expansion for installation subject to temperature changes may be determined from Table 3-1. The linear expansion shown is independent of the diameter of the pipe. [UPC 313.0]

2.3.3 Exposed Piping

Piping shall not be exposed to direct sunlight.

Exception: Vent piping through roof. Plumbing vents through roof, exposed to sunlight, shall be protected by water base synthetic latex paints.

Adequate support shall be provided where PVC piping is exposed to wind, snow, and ice loading.

2.3.4 Protection from Damage

Piping passing through wood studs or plates shall be protected from puncture by minimum 1/16 inch (1.6 mm) thick steel plate.

Piping shall be protected from concrete form oil. [UPC 313.9]

2.3.5 Anti-Freeze Protection

PVC pipe and traps can be protected from freezing by the use of one of the following solutions of mixtures:

(a) 4 quarts (3.8 liters) of water mixed with 5 quarts (4.8 liters) of glycerol
(b) 2-1/2 lbs. (1.1 kg) of magnesium chloride dissolved in one (1) gallon (3.8 liters) of water
(c) 3 lbs. (1.4 kg) of table salt dissolved in one (1) gallon (3.8 liters) of water.

The salt solutions are effective to approximately 10°F (-12°C). If lower temperatures are anticipated, the pipe should be drained or the glycerol solution should be used. [UPC 313.6]

2.4 Piping Installed in Fire Resistive Construction

Where piping is installed and penetrates required fire resistive construction, the fire resistive integrity of the construction shall be as required by the Administrative Authority, or when not established by the Building Code, by qualified testing methods approved by the Administrative Authority. Approval shall be obtained prior to installing any such piping. [UPC 313.7]

2.5.0 Hangers and Supports

2.5.1 Abrasion

Hangers and straps shall not compress, distort, cut, or abrade the piping and shall allow free movement of pipe. Pipe, exposed to damage by sharp surfaces, shall be protected. [UPC 314.0]

2.5.2 Support

Support all horizontal piping at intervals of not more than four (4) feet (1,219 mm), at end of branches, and at change of direction or elevation. Supports shall allow free movement, but shall restrict upward movement of lateral runs so as not to create reverse grade. Vertical piping shall be supported at each story or floor level. Alignment of vertical piping shall be maintained between floors with the use of a mid-story guide. Support trap arms in excess of three (3) feet (915 mm) in length as close as possible to the trap. Closet flanges shall be securely fastened with corrosive resistant fasteners to the floor with top surface one-quarter (1/4) inch (6.4 mm) above finish floor. [UPC 314.0]

2.6 Traps

2.6.1 Connection to Traps

Traps shall be connected by means of listed trap adapters. [UPC 1003.0]