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Expansion and Contraction Considerations and Recommendations

A White Paper from Assmann

This document is to serve as a general guideline for installation of polyethylene storage tanks. Polyethylene tanks expand and contract under normal service conditions. To make it easy to understand, you should picture that plastic, unlike FRP or steel, has more of an elastomeric property than a rigid structure and there are many factors that influence movement on a polyethylene tank. Polyethylene tanks expand and contract with temperature changes and when they are filled and emptied.

Assmann Corporation of America recommends that expansion joints or flexible hoses are used on sidewall connections to help eliminate problems caused by rigid plumbing versus movement of tanks. However, we understand that expansion joints and flexible hoses are a maintenance concern and customers prefer not to install these items.

The tables shown to the right are general guidelines on what to expect for movement, loads and vertical deflection on polyethylene tanks

Please make note that all information listed is variable based on site conditions, i.e., fill and discharge rates, ambient temperatures, indoor or outdoor installations. All information listed above is based on indoor conditions at 70-degree Fahrenheit on vertical flat bottom tanks. Assmann will not warrant tank failures as a direct result of rigid or unsupported plumbing.

Vertical tank expansion and contraction	
20 – 1,000 Gallon Tanks	0" – ¼" Expansion and Contraction
1,100 – 2,000 Gallon Tanks	¼" – ½" Expansion and Contraction
2,050 – 4,000 Gallon Tanks	½" – ¾" Expansion and Contraction
4,100 – 12,000 Gallon Tanks	¾" – 1 ¼" Expansion and Contraction

Vertical tank sidewall loading	
20 – 1,000 Gallon Tanks	Max Unsupported Load ½ to 1 lb.
1,100 – 2,000 Gallon Tanks	Max Unsupported Load 1 to 2 ½ lb.
2,050 – 4,000 Gallon Tanks	Max Unsupported Load 2 ½ to 6 lb.
4,100 – 12,000 Gallon Tanks	Max Unsupported Load 6 to 11 lb.

Note: Assmann requires all plumbing to be supported independent of tank to allow for free tank movement, i.e., hangers and flexible supports.

Vertical tank nozzle deflection based on 6" projection from tank wall	
20 – 1,000 Gallon Tanks	⅛" = + or 4 Degrees
1,100 – 2,000 Gallon Tanks	½" = + or 10 Degrees
2,050 – 4,000 Gallon Tanks	½" = + or 16 Degrees
4,100 – 12,000 Gallon Tanks	¾" = + or 24 Degrees

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