

Hose Assembly

DESIGN CRITERIA

TERMINOLOGY

Abrasion/Erosion

Internal abrasion is the wearing away of the inside corrugations of the hose caused by the flow of the media conveyed such as wet steam or abrasive particles. External abrasion is the damage to the hose assembly caused by being rubbed on a foreign object.

Ambient Conditions

Surrounding conditions such as pressure, corrosion or temperature to which the hose assembly is exposed.

Amplitude of Vibration

The distance a hose assembly deflects laterally to one side from its installed position.

Angular Offset

The bending of the hose so that the ends are no longer parallel. Amount of movement is measured in degrees from centerline of the hose.

Annular Corrugation

Convolutions on a hose that are a series of complete circles or rings located at right angles to the longitudinal axis of the hose.

Armor/Casing

Flexible interlocked tubing placed over the entire length or in short lengths at the end of a metal hose to protect it from physical damage and/or to limit the bending radius.

Attachment

The method of fixing end fittings to flexible metal hose, i.e. welding, brazing, soldering, swaging, bonding or mechanical.

Axial Motion

Compression or extension movement along the longitudinal axis of the pipeline.

Basket Weave Braid

Strands of wire are alternately crossed two over and two under.

Bend Radius

The radius of a hose measured at the hose centerline.

Braid

Metal wire braid on a hose assembly permits the hose assembly a higher pressure capability by acting as a restraint against hose elongation and acts to dampen vibrations. A second layer of braid may be used to increase pressure ratings provided the test pressure does not result in permanent corrugation deformation. Other design considerations may result in the use of a heavy braid to increase abrasion resistance characteristics.

Braid Angle

Angle formed by the braid strands and the longitudinal axis of the hose.

Braid Coverage

Optimal braid coverage is engineered to contain the core and reduce the possibility of squirm. Properly designed braid coverage will balance pressure capability with flexing requirements. Minimization of braid wear on the crown of the corrugation is also provided by optimal braid coverage.

Braid Sleeve/Ferrule

The Braid Sleeve or Ferrule is used to isolate the end of the corrugated hose and braid from flexure. The core and braid are welded to the braid sleeve or ferrule during fabrication of the hose assembly.

Braid Wear

Motion between the braid and corrugated hose normally causes wear on the crown or OD of the corrugation and the inside diameter of the braid.

Braided Braid

Braided braid is manufactured the same as tubular braid except that wires in the strand are braided together prior to the manufacture of the braid. Braided braid is primarily used on larger diameter hose assemblies.

Brazing

A process of joining metals using a non-ferrous filler metal having a melting point that is lower than the parent metals to be joined.

Casing

Same as Armor.

Constant Flexing

Regular cyclic motion at a slow cyclic rate and constant travel. The dynamic minimum centerline bend radius must be doubled on constant flexing applications.

Corrosion

The chemical or electro-chemical attack of a media upon a hose assembly.

Corrugation/Convolution

Annular or helical flexing member in corrugated metal hose.

Cycle Life

The number of cycles a hose is flexed before failure.

Cycle Motion

Movement from neutral to extreme position and then returning to the neutral position.

Deflection Force, Lateral

Force to laterally deflect the hose assembly a specific distance from the neutral position with one end fixed and the other end in motion.

Developed Length

Overall length of the hose assembly, including the fittings, that is required to meet the conditions of a specific application.

Diamond Weave Braid

Strands of wire alternately cross one over and one under.

Dog-Leg Assembly

Two hose assemblies joined by a common elbow to permit movement in multiple planes.

Dye Penetrant Test

Non-destructive test method for detecting surface defects.

Dynamic Motion

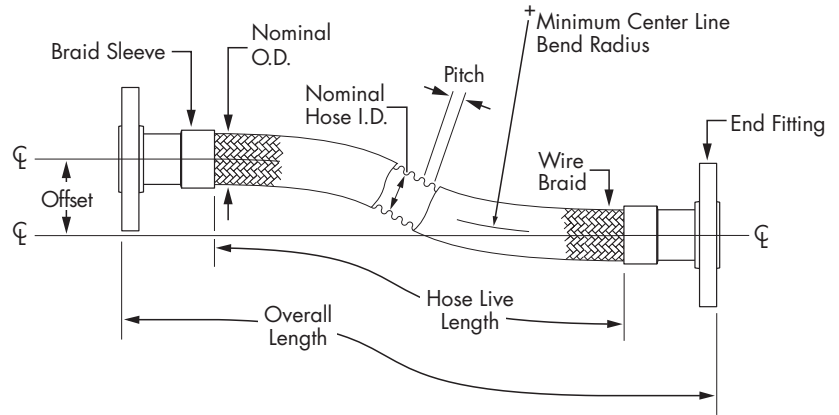
Non-continuous or intermittent controlled motion such as the result of thermal expansion.

Duplex Hose Assembly

Jacketed or Duplex hose assembly is a hose within a hose. Both inner and outer hoses act independently as separate pressure carriers.

Effective Thrust Area

Cross-sectional area defined by the mean diameter of the hose.



Fatigue

Damage of the hose assembly due to excessive flexing of the corrugations.

Flow Rate

Volume of media being conveyed in a specific time period such as gallons per minute, cubic feet per second or pounds per hour.

Frequency of Vibration

The rate of vibration or flexure of a hose in a given time period such as cycles per second (CPS), cycles per minute (CPM) or cycles per day (CPD).

Galvanic Corrosion

Corrosion that occurs on the less noble of two dissimilar metals in direct contact with each other in an electrolyte such as water, sulfuric acid or sodium chloride solution.

Helical Corrugation

Hose corrugation formed in tubing to resemble a continuous spiral or screw thread.

Helical Wire Armor/Spring Guard

Used to provide additional protection against abrasion. Metal hoses can be supplied with an external round or oval section wire spiral.

Inside Diameter (ID)

The diameter inside of the hose corrugation measured at the closest point either side of centerline of the hose.

Intermittent Flexure

Non-continuous or intermittent controlled motion such as the result of thermal expansion.

ISO 10380

A standard developed by ISO (International Standards Organization) that helps define the industry requirements for design, manufacture and testing of corrugated metal hose and hose assemblies.

TERMINOLOGY (Continued)

Lateral Offset

This motion occurs when the hose centerline is moved in a plane perpendicular to the longitudinal axis with the end remaining parallel.

Liner

Flexible sleeve used to protect the internal side of the corrugation when conveying a high velocity media, also helps to reduce internal abrasion.

Live Length

The amount of active or flexible length of hose in an assembly. Does not include the length of fittings and braid sleeves/ferrules.

Loop Installation

The assembly is installed in a loop or U shape and is most often used when frequent and/or large amounts of motion are involved.

Media

The substance(s) transferred through a system.

Minimum Bend Radius

The smallest radius to which a hose can be bent without permanent deformation of the corrugations.

Nominal Hose Size

Indicates the approximate inside diameter of the hose.

Operating Conditions

The pressure, temperature, motion and environment to which a hose assembly is subjected.

Outside Diameter (OD)

The external diameter of a metal hose measured at the top of the corrugation or braiding.

Penetration (Weld)

The percentage of wall thickness of the two parts to be joined that is fused into the weld pool in making a joint.

Permanent Bend/Static Bend

A fixed radius bend in a hose assembly used to compensate for misalignment.

Pitch

The distance between the two peaks of adjacent corrugation or convolution.

Ply/Plies

The number of individual thicknesses of metal used in the construction of a wall of the convoluted hose.

Pressure

Usually expressed in pounds per square inch gauge or psig.

Pressure, Absolute

A total pressure measurement system in which atmospheric pressure at sea level is added to the gauge pressure and expressed as psia.

Pressure, Atmospheric

The pressure of the atmosphere at sea level which is 14.7 psig or 29.92 inches of mercury.

Pressure, Burst (Actual)

Amount of pressure determined through testing required to cause a rupture in the hose wall.

Pressure, Burst (Nominal)

The average amount of pressure, at ambient temperature, at which the core or braid can be expected to rupture.

Pressure, Deformation

The pressure at which the convolutions of a hose become permanently deformed.

Pressure, Feet of Water or Head

Often used to express system pressure in terms of water column height. A column of water 1 foot high exerts a .434 psi at its base.

Pressure, Maximum Working

Maximum pressure that the hose should be subjected to on a continuous basis.

Pressure, Maximum Test

Maximum pressure the hose should be subjected to during proof pressure testing without permanently deforming the corrugations.

Pressure, Pulsating

A rapid change in the pressure above and below the normal base pressure usually associated with reciprocating type pumps. Pulsating pressure can cause excessive wear between the braid and the top or crown of the hose corrugation.

Pressure, Shock

A sudden increase of pressure in a hydraulic or pneumatic system that produces a shock wave. This shock can cause severe permanent deformation of the corrugations in a hose as well as rapid damage of the assembly due to metal fatigue.



Pressure, Static

A non-changing constant pressure.

Pressure, Working

The internal or external pressure imposed on a hose during operating conditions.

psia

Pounds per square inch absolute.

psig

Pounds per square inch gauge.

Radial Motion

The type of movement that occurs when hoses are bent in a 180° arc such as in vertical or horizontal traveling loops.

Random Motion

The uncontrolled motion of a metal hose such as motion that occurs during manual handling.

Reinforced End

A short interlocked casing or spring guard used to restrict bending at the end of the hose.

Safety Factor

The relationship or ratio of maximum working pressure to nominal burst pressure.

Scale

An oxide or thin coating of media in/on a hose assembly brought about by surface conditions or welding.

Seamless

Used in reference to corrugated metal hose that is made from a base tube that does not have a longitudinal weld seam.

Segment/Splice

A method of joining two sections of hose.

Squirm

Damage to the hose when it is deformed into an “S” or “U” bend as the result of excessive internal pressure being applied to unbraided corrugated hose while its ends are restrained, or in a braided corrugated hose that has been axially compressed.

Static Bend

A fixed radius bend in a hose assembly used to compensate for misalignment.

Strand

Individual groups of wire in a braid.

Stress Corrosion

A form of corrosion in stainless steel normally associated with chlorides.

Temperature Correction Factor

The factor that corrects the pressure rating in elevated temperature applications.

Tig Weld/GTAW

The tungsten inert gas welding process sometimes referred to as a shielded arc. Common trade name is heliarc.

Traveling Loop

General classification of bending wherein the hose is installed to a U-shaped configuration.

Traveling Loop, Class A Loop

An application wherein the radius remains constant and one end of the hose moves parallel to the other end.

Traveling Loop, Class B Loop

A condition wherein a hose is installed in a U-shaped configuration and the ends move perpendicular to each other so as to enlarge or decrease the width of the loop.

Torque/Torsion

A force that produces or tends to produce rotation of or torsion about the longitudinal axis of a hose assembly while the other end is fixed.

Vacuum

Negative pressure or suction usually expressed as inches of mercury.

Velocity

The speed at which the medium flows through the hose.

Velocity Resonance

Vibration of corrugations due to the buffeting of a high velocity gas or liquid flow.

Vibration

Low amplitude motion occurring at high frequency.

Welding

The process of localized joining of two or more metallic components by means of heating their surfaces to a state of fusion or by fusion with the use of additional filler material.