Glossary of Terms

Adhesive – a substance capable of holding materials together by surface attachment.

Adhesive solvent – an adhesive having a volatile organic liquid as a vehicle. See Solvent Cement.

Aging – (1) The effect on materials of exposure to an environment for an interval of time. (2) The process of exposing materials to an environment for an interval of time.

Antioxidant – a compounding ingredient added to a plastic composition to retard possible degradation from contact with oxygen (air), particularly in processing or exposure to high temperatures.

Artificial weathering – the exposure of plastics to cystic laboratory conditions involving changes in temperature, relative humidity, and ultraviolet radiant energy, with or without direct water spray, in an attempt to produce changes in the materials similar to those observed after long-term continuous outdoor exposure. Note: The laboratory exposure conditions are usually intensified beyond those encountered in actual outdoor exposure in an attempt to achieve an accelerated effect. This definition does not involve exposure to special conditions such as ozone, salt spray, industrial gases, etc.

Bell end – the enlarged portion of a pipe that resembles the socket portion of a fitting and that is intended to be used to make a joint by inserting a piece of pipe into it. Joining may be accomplished by solvent cements, adhesives, or mechanical techniques.

Beam loading – the application of a load to a pipe between two points of support, usually expressed in pounds and the distance between the centers of the supports.

Burst strength – the internal pressure required to break a pipe or fitting. This pressure will vary with the rate of build-up of the pressure and the time during which the pressure is held.

Cement – see adhesive and solvent, cement.

Chemical resistance – (1) The effect of specific chemicals on the properties of plastic piping with respect to concentrations, temperature and time of exposure. (2) The ability of a specific plastic pipe to render service for a useful period in the transport of a specific chemical at a specified concentration and temperature.

Cleaner – medium strength organic solvent such as methyl ethyl katone to remove foreign matter from pipe and fitting joint surfaces.

Compound – the intimate admixture of a polymer or polymers with other ingredients such as fillers, softeners, plasticizers, catalysts, pigments, dyes, curing agents, stabilizers, antioxidants, etc.

Copolymer – see Polymer.

Creep – the time-dependent part of strain resulting from stress, that is, the dimensional change caused by the application of load over and above the elastic formation and with respect to time.

Deflection Temperature – the temperature at which a specimen will deflect a given distance at a given load under a prescribed conditions of test. See ASTM D648. Formerly called heat distortion.

Deterioration – a permanent change in the physical properties of a plastic evidenced by impairment of these properties. Note a. – Burst strength, fiber stress, hoop stress, hydrostatic design stress, long-term hydrostataic strength, hydrostatic strength (quick), long-term burst, ISO equation, pressure, pressure rating, quick burst, service factor, strength, stress and sustained pressure test are related terms.

Elasticity – that property of plastics materials by virtue of which they tend to recover their original size and shape after deformation. Note – if the strain is proportional to the applied stress, the material is said to exhibit Hookean or ideal elasticity.

Elastomer – a material which at room temperature can be stretched repeatedly to at least twice its original length and, upon immediate release of the stress, will return with force to its approximate original length.

Elevated temperature testing – tests on plastic pipe above 23° (73°F).

Environmental stress cracking – cracks that develop when the material is subjected to stress in the presence of specific chemicals.

Extrusion – a method whereby heated or unheated plastic forced through a shaping orifice becomes one continuously formed piece. Note – this method is commonly used to manufacture thermoplastic pipe.

Failure, adhesive – rupture of an adhesive bond, such that the plane of separation appears to be at the adhesive-adherend interface.

Fiber stress – the unit stress, usually in pounds per square inch (psi), in a piece of material that is subjected to an external load.

Filler – a relatively inert material added to a plastic to modify its strength, permeance, working properties, or other qualities, or to lower costs.

Fungi resistances – the ability of plastic pipe to withstand fungi growth and/or their metabolic products under normal conditions of service or laboratory tests simulating such conditions.

Heat joining – making a pipe joint by heating the edges of the parts to be joined so that they fuse and become essentially one pipe with or without the addition of additional material.

Hoop stress – the tensile stress, usually in pounds per square inch (psi), in the circumferential orientation in the wall of the pipe when the pipe contains a gas or liquid under pressure.

Hydrostatic design stress – the estimated maximum tensile stress in the wall of the pipe in the circumferential orientation due to internal hydrostatic pressure that can be applied continuously with a high degree of certainty that failure of the pipe will not occur.

Hydrostatic strength (quick) – the hoop stress calculated by means of the ISO equation at which the pipe breaks due to an internal pressure build-up, usually within 60 to 90 seconds.

Long-term burst – the internal pressure at which a pipe or fitting will break due to a constant internal pressure held for 100,000 hours (11.43 years).

Impact, Izod – a specific type of impact test made with a pendulum type machine. The specimens are molded or extruded with machined notch in the center. See ASTM D256.

ISO equation – an equation showing the inter-relations between stress, pressure and dimensions in pipe, namely:

$$S = \frac{P\,(ID + t)}{2t} \text{ or } S = \frac{P\,(OD - t)}{2t}$$

Where: S = stress
P = pressure
ID = average inside diameter
OD = average outside diameter
t = minimum wall thickness (Note a)

Reference: ISO R161–1960 Pipes of Plastics Materials for the Transport of Fluids (Outside Diameters and Nominal Pressures) Part I, Metric Series.

Joint – the location at which two pieces of pipe or a pipe and a fitting are connected together. The joint may be made by an adhesive, a solvent-cement or a mechanical device such as threads or a ring seal.

Long-term hydrostatic strength – the estimated tensile stress in the wall of the pipe in the circumferential orientation (hoop stress) that when applied continuously will cause failure of the pipe at 100,000 hours (11.43 years). These strengths

are usually obtained by extrapolation of log-log regression equations or plots.

Molding, injection – a method of forming plastic objects from a granular or powdered plastics by the fusing of plastic in a chamber with heat and pressure and the forcing part of mass into a cooler chamber where it solidifies. Note: this method is commonly used to manufacture thermoplastic fittings.

Outdoor exposure – plastic pipe placed in service or stored so that it is not protected from the elements of normal weather conditions, i.e., the sun's rays, rain, air and wind. Exposure to industrial and waste gases, chemicals, engine exhausts, etc. are not considered normal "outdoor exposure."

Permanence – the property of a plastic which describes its resistance to appreciable changes in characteristics with time and environment.

Plastic – a material that contains as an essential ingredient an organic substance of large molecular weight, is solid in its finished state, and, at some stage in its manufacture or in its processing into finished articles, can be shaped by flow.

Plastics pipe – a hollow-cylinder of plastic material in which the wall thicknesses are usually small when compared to the diameter and in which the inside and outside walls are essentially concentric. See plastics tubing.

Plastics tubing – a particular size of plastics pipe in which the outside diameter is essentially the same as that of copper tubing. See plastics pipe.

Polypropylene plastics – plastics based on polymers made with propylene as essentially the sole monomer.

Poly (vinyl chloride) – a resin prepared by the polymerization of vinyl chloride with or without the addition of small amounts of other monomers.

Poly (vinyl chloride) plastics – plastics made by combining poly (vinyl chloride) with colorants, fillers, plasticizers, stabilizers, lubricants, other polymers, and other compounding ingredients. Not all of these modifiers are used in pipe compounds.

Pressure – when expressed with reference to pipe the force per unit area exerted by the medium in the pipe.

Pressure rating – the estimated maximum pressure that the medium in the pipe can exert continuously with a high degree of certainty that failure of the pipe will not occur.

Primer – strong organic solvent, preferably tetrahydrofuran, used to dissolve and soften the joint surfaces in preparation for and prior to the application of solvent cement. Primer is usually tinted purple.

Quick burst – the internal pressure required to burst a pipe or fitting due to an internal pressure build-up, usually within 60 to 90 seconds.

Schedule – a pipe size system (outside diameters and wall thicknesses) originated by the iron pipe industry.

Self-extinguishing – the ability of a plastic to resist burning when the source of heat or flame that ignited it is removed.

Service factor – a factor which is used to reduce a strength value to obtain an engineering design stress. The factory may vary depending on the service conditions, the hazard, the length of service desired, and the properties of the pipe.

Solvent cement – in the plastic piping field, a solvent adhesive that contains a solvent that dissolves or softens the surfaces being bonded so that the bonded assembly becomes essentially one piece of the same type of plastic.

Solvent cementing–making a pipe joint with a solvent cement. See Solvent Cement.

Stress – when expressed with reference to pipe the force per unit area in the wall of the pipe in the circumferential orientation due to internal hydrostatic pressure.

Sustained pressure test – a constant internal pressure test for 100 hours.

Thermoplastic – a plastic which is thermoplastic in behavior. Capable of being repeatedly softened by increase of temperature and hardened by decrease of temperature.

Vinyl Chloride Plastics – plastics based on resins made by the polymerization of vinyl chloride or copolymerization of vinyl chloride with other unsaturated compounds, the vinyl chloride being in greatest amount by weight.

Weld-orKnit-line – a mark on a molded plastic formed by the union of two or more streams of plastic flowing together.

ABBREVIATIONS

ASA – American Standards Association
ASTM – American Society for Testing and Materials
CPVC – Chlorinated Poly (Vinyl Chloride) plastic or resin.
IAPMO – International Association of Plumbing and Technical Officials
ISO – International Standards Organization
NSF – National Sanitation Foundation
PP – Polyproylene plastic or resin
PPI – Plastic Pipe Institute
PS – Product Standard when references to a specification for plastic pipe and fittings. These specifications are promulgated by the U.S. Department of Commerce and were formerly known as Commercial Standards.
PSI – pounds per square inch
PVC – Poly (Vinyl Chloride) plastic or resin
SPI – The Society of the Plastics Industry, Inc.