

# Glossary of Terms

<b><u>Absolute Pressure</u></b>	The sum of gauge pressure and atmospheric pressure.	<b><u>Boiler Lay-Up</u></b>	Removing a boiler from service for a period of time. A boiler can be laid-up wet or dry.
<b><u>Accumulation Test</u></b>	Test used to establish the relieving capacity of boiler safety relief valves	<b><u>Boiler Room Log</u></b>	A data sheet to record pressures, temperatures of other operating conditions of a boiler on a continuous basis.
<b><u>Acid Dew Point</u></b>	Temperature at which acids begin to settle out of flue gases.	<b><u>Boiler Shutdown</u></b>	A sequence of operation completed when taking a boiler off line.
<b><u>Alkalinity</u></b>	Determined by boiler water analysis. Boiler water with a pH over 7 is considered alkaline.	<b><u>Boiler Startup</u></b>	A sequence of operations completed when preparing a boiler for service.
<b><u>Ambient Temperature</u></b>	Temperature of the surrounding area.	<b><u>Boiler Vent</u></b>	Valved port coming off highest part of the waterside of the boiler that is used to vent air from the boiler when it is filled. Also used to prevent a vacuum from forming when the boiler is drained.
<b><u>Ampere</u></b>	Unit of measure of electrical current.	<b><u>Boiling Point</u></b>	Temperature at which water changes into steam.
<b><u>Anion</u></b>	Ion that has a negative electrical charge.	<b><u>Bottom Blowdown</u></b>	Periodic draining of part of the water in the boiler to remove the heavy sludge that settles to the bottom of a vessel.
<b><u>Area</u></b>	The number of unit squares equal to the surface of an object.	<b><u>Breeching</u></b>	Ducting from boiler flue gas outlet to stack (or chimney).
<b><u>ASME Code</u></b>	Code written by the American Society of Mechanical Engineers that controls the construction, repairs and operation of boilers and their related equipment.	<b><u>British Thermal Unit</u></b>	(BTU) Amount of heat necessary to raise the temperature of 1 lb. of water 1°F.
<b><u>Atmospheric Pressure</u></b>	Pressure at sea level (14.7 PSI).	<b><u>By-Pass Line</u></b>	A pipeline that passes around a control. Used so a boiler can operate manually without use of the control.
<b><u>Atomization</u></b>	Process of breaking a liquid fuel stream into a mist of tiny droplets.	<b><u>Calibrate</u></b>	Adjusting a gauge, control or piece of equipment to conform to a test gauge, control or piece of equipment.
<b><u>Atomize</u></b>	To break up fluids into a fine mist.	<b><u>Carryover</u></b>	Particles of water that flow with steam into the system piping.
<b><u>Boiler</u></b>	Closed vessel in which water under pressure is transformed into steam by application of heat.		
<b><u>Boiler Capacity</u></b>	Pounds of steam or BTU's of hot water a boiler is capable of producing.		
<b><u>Boiler Horsepower</u></b>	The evaporation of 34.5 pounds of water per hour from and at a feedwater temperature of 212°F.		

<b><u>Cavitation</u></b>	Condition caused when a portion of water or other liquid entering the eye of a pump impeller flashes into steam or vapor bubbles. Causes pitting of pump impellers.	<b><u>Cross "T"</u></b>	Used in water column piping for inspection for being clean and clear.
<b><u>Celsius (Centigrade)</u></b>	Temperature scale commonly used with the metric system of measurements. The freezing point of water on this scale is 0° and the boiling point of water is 100° at normal atmospheric pressure.	<b><u>Cut-In Pressure</u></b>	Automatic pressure control setting at which the boiler turns on.
<b><u>Centrifugal Force</u></b>	Force caused by a rotating impeller that builds up in a centrifugal pump.	<b><u>Cut-Out Pressure</u></b>	Automatic pressure control setting at which the boiler turns off.
<b><u>Check Valve</u></b>	One-way flow valve for fluids.	<b><u>Cycle of Concentration</u></b>	Number of times solids in a particular volume of water are concentrated as compared to concentration of the solids in the original volume of water.
<b><u>Combustible Material</u></b>	Any material that burns when it is exposed to oxygen and heat.	<b><u>Deaerator</u></b>	Pressure vessel that removes oxygen from the feedwater before going into the boiler.
<b><u>Combustion</u></b>	The rapid union of oxygen with an element or compound that results in the release of heat.	<b><u>Dealkalizer</u></b>	Ion - Exchange unit that works exactly like a sodium zeolite water softener, but removes anions and replaces them with chloride.
<b><u>Complete Combustion</u></b>	The burning of all the supplied fuel using the minimum amount of excess air.	<b><u>Differential Pressure</u></b>	Difference between two pressures at different points.
<b><u>Compound Gauge</u></b>	Combination pressure gauge and vacuum gauge.	<b><u>Differential Setting</u></b>	Difference between the pressure at which the automatic pressure control turns the burner on, and the pressure at which the automatic pressure control turns the burner off.
<b><u>Condensate</u></b>	Steam that has lost its heat and returned to water.	<b><u>Dissolved Solids</u></b>	Impurities that have passed into solution.
<b><u>Condense</u></b>	Process whereby steam turns back to water after the removal of heat.	<b><u>Draft</u></b>	The difference in pressures between two points that cause air or gases to flow.
<b><u>Conduction</u></b>	A method of heat transfer in which heat moves from molecule to molecule.	<b><u>Economizer</u></b>	Uses the gases of combustion to heat boiler feedwater.
<b><u>Continuous Blowdown</u></b>	Small stream of water that constantly drains from a boiler to control the quantities of impurities in a boiler on a continuous basis.	<b><u>Element</u></b>	A basic substance consisting of atoms of the same type.
<b><u>Convection</u></b>	A method of heat transfer that occurs as heat moves through a fluid.	<b><u>Enthalpy</u></b>	Total heat in steam.
<b><u>"Cracking" Open</u></b>	Slowly opening a valve, generally to allow equalization.	<b><u>Erosion</u></b>	Wearing away of metal.
		<b><u>Excess Air</u></b>	Air more than the theoretical amount needed for combustion.

<b><u>Factor of Evaporation</u></b>	Heat added to water in an actual boiler in BTU per pound and divided by 970.3.	<b><u>Force</u></b>	Energy exerted or brought to bear on.
<b><u>Fahrenheit</u></b>	Temperature scale commonly used with the U.S. system of measurements. The freezing point of water on this scale is 32° and the boiling point of water is 212° at normal atmospheric pressure.	<b><u>Forced Draft</u></b>	Mechanical draft produced by a fan
<b><u>Feedwater</u></b>	Water that is supplied to a boiler.	<b><u>Furnace Volume</u></b>	Amount of space available in a boiler furnace to complete combustion.
<b><u>Feedwater Treatment</u></b>	Using softwater and chemicals in the boiler feedwater. Protects against scale and corrosion.	<b><u>Gate Valve</u></b>	Valve used to shutoff or admit flow.
<b><u>Fire Point</u></b>	Temperature at which fuel oil burns continuously when exposed to an open flame.	<b><u>Gauge Glass</u></b>	Glass connected to a water column or directly to a boiler that allows an operator to see the water level inside a boiler.
<b><u>Firetube Boiler</u></b>	Has heat and gases of combustion passing through the furnace and boiler tubes surrounded by water.	<b><u>Gauge Pressure</u></b>	Pressure above atmospheric pressure. Assumes atmospheric pressure being zero.
<b><u>Firing Rate</u></b>	Amount of fuel the burner is capable of burning in a given unit of time.	<b><u>Gas Analyzer</u></b>	Used to analyze the gases of combustion to determine combustion efficiency.
<b><u>Flame Failure</u></b>	When the burner pilot or main flame goes out on its own.	<b><u>Gas Leak Detector</u></b>	A device to locate gas leaks in the boiler room.
<b><u>Flame Scanner</u></b>	Device that confirms that the pilot and main burner flame exists.	<b><u>Gases of Combustion</u></b>	Gases produced by the combustion process.
<b><u>Flash Point</u></b>	Temperature at which fuel oil, when heated produces a vapor that flashes when exposed to an open flame.	<b><u>Globe Valve</u></b>	Valve having a tapered rounded or flat disc held horizontally on the stem.
<b><u>Flash Steam</u></b>	Created when water at a high temperature has a sudden drop in pressure.	<b><u>Gravity</u></b>	Natural force that makes objects on earth fall to the lowest point possible.
<b><u>Foaming</u></b>	Rapid fluctuations of the boiler water level that can lead to priming or carryover. Caused by impurities on the surface of the boiler water.	<b><u>Handhole</u></b>	Small access hole, smaller than a manhole (manway), used for looking and reaching into the boiler shell during inspections.
<b><u>Foot Pound</u></b>	Unit of measure that equals the movement of an object by a constant force (in pounds) to a specific distance (in feet).	<b><u>Header</u></b>	Manifold that feeds several branch pipes or takes in steam or water from several smaller pipes.
		<b><u>Heat Exchanger</u></b>	Any piece of equipment where heat is transferred from one substance to another.
		<b><u>Heating Surface</u></b>	Any part of a boiler metal that has hot gases or combustion on one side and water on the other.

<b><u>Heat Recovery System</u></b>	Equipment that is installed to reclaim heat that is normally lost.	<b><u>Main Steam Stop Valve</u></b>	Gate valve in the main steam line between the boiler and the steam header.
<b><u>Heat Transfer</u></b>	Movement of heat from one substance to another that can be accomplished by radiation conduction or convection.	<b><u>Makeup Water</u></b>	Water that must be added to the boiler to make up for condensate that was dumped, lost through boiler blowdowns or leaks in the system.
<b><u>Heating Value</u></b>	Expressed in BTU's. Heating value of fuel varies with the type.	<b><u>Manhole (Manway)</u></b>	Hole on the steam and waterside of a boiler used to clean, inspect and repair a boiler.
<b><u>High Pressure Boiler</u></b>	A boiler that operates over a steam pressure of 15 PSI.	<b><u>Maximum Allowable Working Pressure</u></b>	(MAWP) – Highest legal pressure at which a pressure vessel may be operated.
<b><u>Hot Water Boiler</u></b>	Boiler that is completely full of water that produces only hot water, not steam.	<b><u>MOD Motor</u></b>	Motor that controls the firing rate and airflow for burners. Single point positioning systems have only one MOD motor, which uses linkages to connect to all functions. Parallel point positioning systems have separate motors for each function. (Typically referred to as "servo" motors)
<b><u>Hydrostatic Pressure</u></b>	Water pressure per vertical foot (.433) exerted at the base of a column of water.	<b><u>Modulating Pressure Control</u></b>	Control device that regulates the burner for a higher or lower fuel-burning rate depending on steam pressure in the boiler.
<b><u>Inches of Mercury</u></b>	(IN.Hg) - Unit of measure for vacuum.	<b><u>Multiple-Pass Boiler</u></b>	Boilers that are equipped with a means to direct the flow of the gases of combustion so that the gases make more than one pass over the heating surfaces.
<b><u>Incomplete Combustion</u></b>	Occurs when all the fuel is not burned, resulting in the formation of smoke or soot.	<b><u>Natural Draft</u></b>	Caused by the difference in weight between a column of hot gases of combustion inside the chimney (stack) and a column of cold air of the same height outside the chimney.
<b><u>Infrared</u></b>	Invisible light rays produced by the combustion process and detected by a flame scanner.	<b><u>Non-Condensable Gas</u></b>	Any gas that will not change into a liquid when its temperature is reduced.
<b><u>Latent Heat</u></b>	Heat in BTU that is added so boiling water at a given temperature will change into steam at the same temperature.	<b><u>Non-Return Valve</u></b>	Shutoff and check valve that allows steam to pass out of the boiler, but a back flow of steam from a drop in pressure causes the valve to close.
<b><u>Laying Up</u></b>	Taking a boiler out of service for longer than a normal period of time.		
<b><u>Low Pressure Boiler</u></b>	A boiler that operates at a steam pressure of not more than 15 PSI.		
<b><u>Low Water</u></b>	Lower than acceptable water level in a boiler that is dangerous because it can cause over heating of a boiler.		
<b><u>Low Water Fuel Cutoff</u></b>	Device located slightly below the NOWL of a boiler that shuts off the boiler burner in the event of low water.		

<b><u>Normal Operating Water Level</u></b>	(NOWL) - Level of the boiler water at normal operation.	<b><u>Pour Point</u></b>	The lowest temperature at which a fuel oil flows as a liquid.
<b><u>Overfiring</u></b>	Forcing a boiler beyond its designed steam producing capacity.	<b><u>Pre-Purge</u></b>	The passing of air through the boiler fireside prior to pilot and main burner flame lightoff.
<b><u>Package Boiler</u></b>	Boiler that comes completely factory assembled, with exception of those items that have to be removed from the boiler for shipment.	<b><u>Pressure</u></b>	Application of force commonly measured in PSI.
<b><u>Parallel Positioning Control System</u></b>	A programmer controlled system of controlling the inlet air damper, FGR damper, and fuel valves of the burner. Separate servo motors are used for each component controlled.	<b><u>Pressure Reducing Station</u></b>	Where higher pressure steam is reduced in pressure for lower pressure needs.
<b><u>Passes</u></b>	Number of times gases or combustion flow the length of the pressure vessel as they transfer heat to the water.	<b><u>Primary Air</u></b>	Air supplied to the burner that regulates the rate of combustion.
<b><u>Perfect Combustion</u></b>	Burning of all the fuel with the theoretical amount of air. Can only be achieved in a laboratory.	<b><u>Priming</u></b>	Severe form of carryover in which large slugs of water leave the boiler with the steam.
<b><u>PH</u></b>	Value representing how acidic or alkaline water is.	<b><u>Process Steam</u></b>	Steam used in a plant for manufacturing or processing purposes.
<b><u>Phosphates</u></b>	Chemicals that cause hardness particles to settle out as a heavy sludge.	<b><u>Products of Combustion</u></b>	Gases that are formed as a fuel is burned in a furnace.
<b><u>Power</u></b>	Unit of measure that equals the amount of foot pounds of work in a given period of time.	<b><u>Programmer</u></b>	Device that controls the burner sequence of operation.
<b><u>Pneumatic System</u></b>	A system of control that uses air as the operating medium.	<b><u>Proving Pilot</u></b>	Sighting the pilot through a flame scanner to verify that the pilot is lit.
<b><u>Pounds of Steam per hour</u></b>	(LB/HR) - Unit of measure that expresses the amount of steam produced by a boiler in one hour.	<b><u>Pounds Per Square Inch</u></b>	(PSI) Number of pounds of pressure exerted on one square inch of a given area.
<b><u>Popping Pressure</u></b>	Predetermined pressure at which a safety relief valve opens and remains open until the pressure drops.	<b><u>Purge Period</u></b>	Before ignition and after burner shutdown when explosive combustibles are removed.
<b><u>Post-Purge</u></b>	The passing of air through the boiler fireside after normal burner shutdown.	<b><u>Quality of Steam</u></b>	Term used to express the moisture content present in saturated steam. Quality of steam effects the BTU content of the steam.
		<b><u>Rate of Combustion</u></b>	The amount of fuel that is being burned in the furnace per unit of time.
		<b><u>Raw Water</u></b>	Untreated water.

<b><u>Reseat Pressure</u></b>	The pressure at which a safety valve will reseat. It will pop above the pressure.	<b><u>Solid State</u></b>	An electronic system using transistors in place of electronic tubes.
<b><u>Ringlemann Chart</u></b>	Chart used as a measure of determining smoke density.	<b><u>Soot</u></b>	Fine powder consisting primarily of carbon that results from incomplete combustion.
<b><u>Safety Valve</u></b>	Valve that keeps the boiler from exceeding its maximum allowable working pressure.	<b><u>Spalling</u></b>	Hairline cracks in boiler refractory due to changes in fireside temperatures.
<b><u>Safety Valve Capacity</u></b>	Measured in pounds of steam per hour safety valves can discharge.	<b><u>Specific Gravity</u></b>	Weight of a given volume of a material divided by the weight of an equal volume of water measured at 60°F.
<b><u>Sample Cooler</u></b>	Closed heat exchanger that cools a sample before it enters a sample container.	<b><u>Spontaneous Combustion</u></b>	Occurs when combustible materials self-ignite.
<b><u>Saturated Steam</u></b>	Steam at a temperature that corresponds with its pressure.	<b><u>Stack</u></b>	Outlet to the atmosphere for the gases of combustion. Used to create a draft.
<b><u>Scale</u></b>	Deposits in the boiler waterside caused by improper boiler water treatment.	<b><u>Static Head Pressure</u></b>	(SHP) - Pressure at the bottom, or at some specified point, of a column of still liquid.
<b><u>Scotch Marine Boiler</u></b>	A firetube boiler with an internal furnace.	<b><u>Steam</u></b>	Gaseous form of water. Steam is odorless, colorless and tasteless.
<b><u>Secondary Air</u></b>	Air that is needed to complete the combustion process.	<b><u>Steam Boiler</u></b>	A closed pressure vessel in which water is converted to steam by the application of heat.
<b><u>Sediment</u></b>	Particles of foreign matter present in the boiler water.	<b><u>Steambound</u></b>	Condition that occurs when the temperature in the open feedwater heater gets too high and the feedwater pump cannot deliver water to the boiler.
<b><u>Sensible Heat</u></b>	Heat that can be measured by a change in temperature.	<b><u>Steam Space</u></b>	The space above the water line in a steam boiler.
<b><u>Single Point Position System</u></b>	Control system in which only one MOD motor is used. A system of linkages and connectors is used to control air inlet damper, FGR damper, and firing rate.	<b><u>Steam Trap</u></b>	Mechanical device used to remove condensate from steam piping.
<b><u>Sludge</u></b>	Accumulated residue produced from impurities in water.	<b><u>Sulfur</u></b>	A combustion element found in coal and fuel oil.
<b><u>Smoke Density</u></b>	Varies from clear to dark. Determined by the amount of light that passes through the smoke as it leaves the boiler.	<b><u>Superheated Steam</u></b>	Steam at a temperature above its corresponding pressure.
<b><u>Sodium Zeolite Water Softener</u></b>	Ion - Exchange water softener that uses a bronze solution and resin beads to soften water.	<b><u>Surface Tension</u></b>	Caused by impurities on the top of the water in a steam boiler.

<b><u>Tensile Stress</u></b>	Occurs when two forces of equal intensity act on an object, pulling in opposite directions. Affects boiler plates and staybolts.	<b><u>Waste Heat Recovery Boiler</u></b>	Boiler in which heat that would otherwise be discarded is used to make steam.
<b><u>Therm</u></b>	Unit used to measure BTU content of natural gas. A therm has 100,000 BTU.	<b><u>Water Column</u></b>	Metal vessel installed on the outside of a boiler shell or drum at the NOWL that helps an operator determine the water level in a boiler.
<b><u>Thermal Efficiency</u></b>	The ratio of heat that is absorbed by the boiler to the heat available in the fuel per unit of time.	<b><u>Water Hammer</u></b>	A banging condition that is caused by steam and water mixing in a steam line
<b><u>Thermal Shock</u></b>	Stress imposed on boiler metal by a sudden and drastic change in temperature.	<b><u>Wet-Lay-Up</u></b>	Method of short term boiler storage that keeps the boiler free from oxygen on the inside, which prevents damage from corrosion.
<b><u>Total Force</u></b>	Total pressure that is acting on an area, determined by diameter and pressure.	<b><u>Working Pressure</u></b>	Maximum allowable working pressure or the pressure at which the boiler is normally operated.
<b><u>Total Heat</u></b>	Sum of sensible heat and latent heat.		
<b><u>Turbulence</u></b>	Movement of water in the boiler.		
<b><u>Ultraviolet</u></b>	A form of light that is produced during combustion. Seen by flame scanner.		
<b><u>Vacuum</u></b>	A pressure below atmospheric pressure.		
<b><u>Vacuum Breaker</u></b>	Vent on top of vessel that allows air to be pulled into the tank to prevent formation of a vacuum.		
<b><u>Vacuum Gauge</u></b>	Pressure gauge used to measure pressures below atmospheric pressure.		
<b><u>Valve</u></b>	Mechanical device that starts, stops or regulates flow of a liquid, gas or loose bulk material.		
<b><u>Vapor</u></b>	Diffused matter in a gaseous state.		
<b><u>Vertical Firetube Boiler</u></b>	2 or 3 pass boiler that has firetubes in a vertical position.		
<b><u>Viscosity</u></b>	Ability of a liquid or semi-liquid to resist flow.		

