

# Slant/Fin

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## TECHNICAL SERVICE BULLETIN

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SUBJECT: TERMINOLOGY

Even today, after so many years there is some misunderstanding about terms and definitions regarding oil burners and associated equipment. Local trade jargon has added to the confusion. While the following terms and definitions will not eliminate all confusion, they may assist serious readers to understand commercial industrial oil burning terminology.

It is realized that others may have their own terms and definitions. Those included here may serve as a guide.

### A

AIR-FUEL RATIO - the ratio of the weight, or volume, of air to fuel.

ALARM - a horn, bell, light or other device used to give notice to safety shutdown, low water, or other condition requiring attention of personnel.

ATOMIZE - reduce to a fine spray.

ATOMIZING AIR - compressed air used to provide the atomizing medium at the burner nozzle.

AUTOMATIC BURNER - a burner that stops and starts automatically.

### B

BOILER HORSEPOWER - the equivalent evaporation of 34.5 pounds of water from air at 212°F. This is equal to 33,475 Btuh.

BOND - a retaining or holding high-temperature cement for making a joint between brick or adjacent courses of brick.

BREECHING - a duct for the transport of the products of combustion between parts of a steam generating unit or to the stack.

BRIDGEWALL - a wall in a furnace over which the products of combustion pass.

BRITISH THERMAL UNIT (Btu) - the heat required to raise one pound of water one degree F. (approximately).

BURNER - a device for the introduction of fuel and air into a furnace at the desired velocities, turbulence and concentration to establish and maintain proper ignition and combustion of the fuel.

BURNER WINDBOX - a plenum chamber around a burner in which air pressure is maintained to insure proper distribution of secondary air.

BURNER WINDBOX PRESSURE - the air pressure maintained in the windbox or plenum chamber measured above atmospheric pressure.

C

CHECKER WORK - an arrangement of alternately spaced brick in a furnace with openings through which air or gas flows.

COLD OIL INTERLOCK (cold oil switch) - a control to prevent burner operation when oil temperature is too low.

COMBINATION BURNER (dual fuel burner) - a burner capable of burning more than one fuel, being changed from one fuel to the other either automatically or manually, i.e., throwing a manual switch.

COMBUSTION CHAMBER - the refractory-lined space in which combustion takes place.

COMBUSTION SAFETY CONTROL - a control to stop the burner (flow of fuel) on flame failure.

COMBUSTION SAFETY CONTROL - programming type - a combustion safety control providing various operations at definite time periods.

COMMERCIAL OIL BURNER - an oil burner used for space heating or domestic hot water heating other than in homes. May use any grade of fuel. The term does not depend on firing rate, but is usually above 3 gph.

CONSTANT IGNITION - usually a gas pilot that remains lighted at full volume whether the main burner is in operation or not.

D

DIFFERENTIAL (of a control) - the difference between cut-in and cut-out points.

DOMESTIC OIL BURNER - an oil burner used for space and hot water heating in residences; usually uses distillate oil (grades #1 and #2).

DRAFT CONTROL BAROMETRIC - a device that controls draft by means of a balanced damper, which bleeds air into the breeching on changes of pressure to maintain a steady draft.

DRAFT CONTROL SEQUENCE - a draft control that regulates the draft by means of a damper operated by a suitable control and actuator.

DRAFT, FORCED - a current of air provided by a fan blowing through the boiler.

DRAFT, INDUCED - a current of air provided by a fan sucking through the boiler.

DRAFT, NATURAL - a current of air provided by the difference in weight of the two columns of air...one inside and one outside the chimney.

E

EQUIVALENT DIRECT RADIATION (EDR) - one square foot EDR equals the heat delivery of 240 Btuh.

EXTERNAL-MIX OIL BURNER - a burner having an atomizer in which the liquid fuel is struck, after it has left an orifice, by a jet or high velocity steam or air.

F

FIRE TUBE BOILER - a boiler with straight tubes, which are surrounded by water and steam and through which the products of combustion pass.

FLAME DETECTOR - a device which indicates if fuel is burning or if ignition has failed. The indication may be transmitted to a signal or to a control system.

FLAME PROPAGATION RATE - speed of travel of ignition through a combustible mixture.

FLUE GAS - the gaseous products of combustion in the flue or stack.

FUEL-AIR RATIO - the ratio of the weight, or volume, of fuel to air.

FURNACE (of a boiler) - that part of the boiler in which combustion takes place.

FURNACE VOLUME - the cubical content of the furnace or combustion chamber.

H

HIGH LIMIT CONTROL - a safety control to stop burner on excessive steam pressure, water, or air temperature depending on type of system.

HIGH PRESSURE STEAM - steam pressure about 15 psig.

HIGH TEMPERATURE HOT WATER - hot water heating systems above 350°F.

HORIZONTAL RETURN TUBE BOILER (HRT) - a fire-tube boiler consisting of a cylindrical shell, with tubes inside the shell attached to both end enclosures. The products of combustion pass under the bottom half of the shell and return through the tubes.

HORIZONTAL ROTARY BURNER - an oil burner that atomizes the oil by means of a spinning cup driven by shaft placed horizontally.

I

IGNITION ARCH - a refractory arch, or surface, located over the flame propagation point to radiate heat and increase the rapidity of the ignition.

INCH OF WATER - a unit of pressure equal to that exerted by a column of water 1 inch high.

INDUSTRIAL OIL BURNER - an oil burner that is used in an industrial plant or more usually to provide heat for an industrial process - the term has no reference to size or grade of fuel.

INTERMITTENT IGNITION - ignition that comes on at the end of the prepurge and stays on all during the firing cycle.

INTERNAL-MIX-OIL BURNER - a burner having a mixing chamber in which high velocity steam or air impinges on jets of incoming liquid fuel which is then discharged in a completely atomized form.

INTERRUPTED IGNITION - ignition that comes on at the end of the prepurge and is cut off automatically after a pre-determined period of time.

L

LAGGING - a covering, usually of insulating material, on pipe or ducts.

LATCH SWITCH - a control to prevent fuel valve opening if the burner is not secured in the firing position.

LOW DRAFT SWITCH - a control to prevent burner operation if the draft is too low. Used primarily with mechanical draft.

LOW GAS PRESSURE SWITCH - a control to stop the burner if gas pressure is too low.

LOW PRESSURE STEAM - steam up to 15 psig.

LOW TEMPERATURE HOT WATER - hot water heating systems below 250°F.

LOW WATER CUT-OFF - a device to stop the burner on unsafe water conditions in the boiler.

M

MANIFOLD - a pipe or header for collecting a fluid from or the distributing of a fluid to a number of pipes or tubes.

MANUAL BURNER - a burner that is started and stopped manually. Safety controls and alarms are required by modern practice, however.

MECHANICAL ATOMIZING OIL BURNER - a burner which uses the pressure of the oil for atomization.

MEDIUM TEMPERATURE HOT WATER - hot water heating systems between 250° and 350°F.

MODULATING CONTROLLER - a device to sense changes in load demand and position the modulating motor.

MODULATING MOTOR (firing rate control motor) - a positioning device to vary the firing rate with the load demand.

O

OIL TEMPERATURE CONTROL - a control for regulation oil temperature.

OPERATING CONTROL - a control to start and stop the burner - must be in addition to the high limit control.

ORSAT - a gas analysis apparatus in which certain gaseous constituents are measured by absorption to separate chemical solutions.

P

PACKAGED STEAM GENERATOR - a boiler equipped and shipped complete with fuel burning equipment, mechanical draft equipment, automatic controls and accessories.

PEEP HOLE - a small hole in a door covered by a movable cover.

POST PURGE - a period of time during shutdown when the burner fan or fans are allowed to run alone to blow any combustible gases from the boiler.

PREHEATER - a device to heat the oil prior to introduction into the atomizing device. May be powered by steam, hot water or electricity.

PREPURGE - a period of time during start-up when the burner fan or fans are allowed to run without ignition or fuel to purge the boiler of any accumulation of combustible gases.

PRESSURE ATOMIZING BURNER - a domestic burner of the mechanical atomizing type using oil pressure to produce atomization at the nozzle.

PRIMARY AIR - air introduced with the fuel at the burners.

PRODUCTS OF COMBUSTION - the gases, vapors, and solids resulting from the combustion of fuel.

PSIA - pounds per square in absolute; pressure readings from a zero datum.

PSIG - gauge pressure measured in pounds per sq. in. To convert to absolute pressure, subtract atmospheric pressure - usually 14.7 psi at sea level.

PUFF - a minor combustion explosion within the boiler furnace or setting.

PUMP & HEATER SET - a manufactured or assembled unit consisting of oil pre-heaters, fuel pumps, strainers and the necessary valves and piping.

R

REFRACTORY - material that will withstand temperatures above 500°F. without distortion or deterioration. Many refractories are made of fire clay.

REGISTER - the apparatus used in a burner to regulate the direction of flow of air for combustion. Used primarily with steam, mechanical and high pressure air atomizing burners.

RETURN FLOW OIL BURNER - a mechanical atomizing oil burner in which part of the oil supplied to the atomizer is withdrawn and returned to storage or to the oil line supplying the atomizer.

RINGELMANN CHART - a series of four rectangular grids of black lines of varying widths printed on a white background, and used as a criterion of blackness for determining smoke density.

ROTARY OIL BURNER - a burner in which atomization is accomplished by feeding oil to the inside or a rapidly rotating cup.

S

SCOTCH TYPE BOILER - in stationary service, a fire tube boiler consisting of a cylindrical shell with one or more cylindrical internal furnaces in the lower portion and a bank of tubes attached to both end closures. The fuel is burned in the furnace, the products of combustion leaving the rear to return through the tubes to an uptake at the front head.

SECONDARY AIR - air for combustion supplied to the furnace to supplement the primary air.

SEMI-AUTOMATIC BURNER - a burner that stops automatically, but requires an operator to start.

STEAM ATOMIZING BURNER - a burner that uses steam (usually above 40 psi) as the atomizing medium.

T

TRIAL FOR IGNITION - the period of time during which the presence of the pilot flame must be proven by the flame detector.

TRIAL FOR MAINFLAME - the period of time during which the pilot (ignition) and fuel valve are both powered. The main flame must be established during this period so the flame detection will prove it when ignition is cut off.

V

VAPORIZATION - the change from liquid or solid phase to the vapor or gaseous phase.

W

WATER TUBE BOILER - a boiler in which the tubes contain water and steam, the heat being applied to the outside surface.

WIDE RANGE MECHANICAL ATOMIZING OIL BURNER - a burner having an oil atomizer with a range of flow rates greater than that obtainable with the usual mechanical atomizers.

WING WALLS - angled walls in the combustion chamber to reduce turbulence and reflect heat into the flame.