CNG TERMNINOLGY GLOSSARY

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ACH	Air Changes per Hour-a measurement of the amount of ventilation in a building.
AHJ	Authority having Jurisdiction (the regulatory body with the authority to mandate design)
ASME	American Society of Mechanical Engineers Boiler Pressure Vessel Code Section VIII Division 1
ASME B31.3	American Society of Mechanical Engineers Refinery Piping
ATS	Automatic Transfer Switch
Buffer	A fast-fill strategy that uses a relatively small storage and a large compressor(s) to direct fill large vehicles. This strategy is usually employed on high volume vehicles where filling is sustained over a window of several hours. Buffer can also refer to the storage in a buffer station.
C	Celsius or Centigrade-metric unit of temperature measurement.
Cascade	A fast-fill strategy for CNG stations that divides the storage into (usually 3) banks and then sequences or cascades them to the vehicle using the difference in pressure between the storage gas and the vehicle as the driving force. This type of station is typically used for small or medium sized fast fill stations where fast filling is required but the fast fill fueling is over a limited period of time such as 60 minutes. Cascade can also refer to the storage in a cascaded station.
Clearance	The portion of gas that remains in a compressor cylinder when the

piston is at top-dead-center. This is also known as the unswept volume.

Clearance adjustment is possible in compressors and is useful in adjusting compressor flow, required horsepower, and in shifting work from one stage to another to lower the temperature in a hot stage of a compressor.

See Volumetric Efficiency.

CNG	Compressed Natural Gas
Coalescing	A type of filter that is used to remove liquid (aerosol) from the gas stream. Coalescing filters flow from the inside of the element to the outside. Note that coalescing filters will not remove oil vapor or water vapor from gas.
Dew Point	The temperature at which moisture begins to condense in natural gas (or any other gas such as air). Dew point is strongly influenced by pressure—as the pressure of CNG rises, its Dew Point also rises thus CNG is more likely to have condensation at high pressure than at low pressure.
DGE	Diesel Gallon Equivalent (the amount of CNG required to provide an amount of energy equal to one USG of diesel fuel).
DSL	Digital Subscriber Line (broadband communication over a phone line)
Efficiency	Usually this refers to mechanical efficiency. It is simply the ratio of worked performed over energy consumed. The mechanical efficiency of a CNG compressor might be 90 percent. This term should not be confused with Volumetric Efficiency (see definition).
ESD	Emergency Shut Down
FACP	Fire Alarm Control Panel—this is the building fire panel
F	Fahrenheit-imperial unit of temperature measurement.

FPM	Feet per Minute-the average piston speed is calculated by multiplying two times the compressor stroke in inches times the RPM then dividing by 12 (inches per foot). The piston speed is the most useful indicator of compressor speed. Most lubricated compressors will be 900 FPM or less. Non lubricated machines should be less than 750 FPM.
GGE	Gasoline Gallon Equivalent (the amount of CNG required to provide an amount of energy equal to one USG of gasoline=5.66 pounds of CNG).
GTAW	Gas Tungsten Arc Welding-commonly referred to as "TIG" welding. This process often used to weld stainless steel. It utilizes an electrode and a shield gas and thus it is commonly an indoor or sheltered welding procedure.
HVAC	Heating Ventilation and Air Conditioning
IBC	International Building Code
IFC	International Fire Code
IMC	International Mechanical Code
IR	Infrared-most new combustible gas detection systems now use IR based detectors.
IS	Intrinsically Safe-an electrical rating that ensures that the power in a circuit or device is low enough to avoid ignition of a combustible mixture.
LCNG	Also L/CNG-CNG that is produced by pumping LNG to pressure of approximately 4500 psig then exposing it to higher temperature through a vaporizer and allowing it to vaporize or "boil". The resulting 4500 psig gas is then odorized and stored and dispensed as CNG.
LEL	Lower Explosive Limit (this is 5 percent gas in air by volume—thus

20 percent LEL is 1 percent gas in air by volume)

LNG — Liquefied Natural Gas-gas at less than -260F and usually 80 psig to 100 psig.

Lubricated — Compressor that injects or otherwise intentionally introduces oil into the gas and cylinders to lubricate the moving parts in the upper end of the compressor.

MCC — Motor Control Center-this is a panel that is typically installed to house high motor control and other control equipment related to the CNG compressors at a station.

MCF — One thousand Standard Cubic Feet

MMSCF — One million Standard Cubic Feet

NB — The National Board of Boiler and Pressure Vessel Inspectors-the group that verifies compliance with certain aspects of the ASME codes and certifies shops and inspection agencies.

NFPA 30A — National Fire Protection Association Code for Motor Fuel Dispensing Facilities and Repair Garages

NFPA 52 — National Fire Protection Association Vehicular Gaseous Fuel Systems Code—this is the primary code for CNG station and vehicle design.

NFPA 70 — National Electrical Code (NEC)

NFPA 780 — Standard for the Installation of Lightning Protection Systems

NGV — Natural Gas for Vehicles or Natural Gas Vehicle (depending on context)

Non-lube — A compressor that utilizes self-lubricating plastic rings, packings and valve internals instead of using oil to lubricate these parts. Note that a non-lube compressor is not “oil-free”—it is possible for oil to migrate from the oil lubricated crankcase into the cylinders.

NRTL	Nationally Recognized Testing Laboratory-these labs are responsible to test the safety of components and assemblies. Examples would be Underwriters Laboratories (UL), Canadian Standards Association (CSA), Factory Mutual (FM)…
Odorize	The addition of Mercaptan to natural gas to provide the distinctive smell of rotten eggs. Gas must be odorized to a concentration such that the average person can smell it at 20 percent LEL which is equivalent to one percent gas in air.
Oil-free	A compressor with no oil in the cylinders or crankcase. There are only a small number of Oil-free compressors used in the CNG industry and these are typically low horsepower machines.
OSHA	Applicable standards and regulations by Occupational Safety and Health Administration
P&ID	Piping and Instrumentation Diagram
Piston Speed	See FPM
PQR	Procedure Qualification Record-a record of the testing done to validate a welding procedure.
PSI	Pounds per Square Inch-a unit of pressure
PSIG	Pounds per Square Inch Gauge (Atmospheric pressure is 0 psig)-the primary unit of pressure used in the North American CNG market.
Rod Load	This describes the net force on the compressor rod exerted by the maximum pressure in the cylinders working against the area of the piston.
RPM	Revolutions per minute-the rotational speed of a CNG compressor. This should not be confused with FPM. The RPM alone does not dictate whether a compressor is considered “low speed” or “high speed”.

SAE J1616	The Society of Automotive Engineers published this fuel quality standard to address a number of aspects of the quality of CNG fuel including, most importantly, water content. Note that this standard does not define a maximum oil content of the gas.
SCADA	System Control and Data Acquisition-a computer monitoring system that is used to display station parameters in real time and log certain events.
SCF	Standard Cubic Feet (the volume of gas within one cubic foot at atmospheric pressure and 60 F)
SCFM	Standard Cubic Foot per Minute—the primary unit of flow used to express the capacity of CNG compressors and other components in the North American market.
SCR	Silicon Controlled Rectifier—an electronic controller that reduces the voltage to motors during starting to reduce the current drawn during starting. These are commonly used on motor over 50 horsepower
SMAW	Shielded Metal Arc Welding—often referred to as “stick welding”.
SRV	Safety Relief Valve—this is a valve that protects vessels and piping from overpressure. SRVs vent to atmosphere if they are activated.
Stroke	The distance travelled by the compressor piston in half of a revolution.
Time Fill	A fill strategy that allows vehicles to fill directly from a compressor usually overnight
VFD	Variable Frequency Drive— an electronic controller that allows AC motors to operate at a variety of speeds.
WPS	Welding Procedure Specifications
USG	US Gallon—a unit of measurement applied to liquid fuels in this

context.

Volumetric Efficiency This is the ratio of the "swept volume" (the volume of gas that is actually expelled from a compressor cylinder) over the total volume of the cylinder including the volume lost between the piston and the head. Note that the unswept volume of the cylinder is called the "clearance".

It should be noted that the Volumetric Efficiency or VE should not be confused with mechanical efficiency. A compressor cylinder with a VE of 70 percent may be just as mechanically efficient as a cylinder with a VE of 90 percent.

Rob Adams is a professional engineer with nearly 30 years of experience in the CNG market. He has designed nearly 200 CNG stations for a wide variety of applications. He is the founder and Principal of Marathon Corporation.