



Mechanical Terms Glossary

A

A-Arm - A suspension linkage formed in the shape of an "A" or "V" found commonly on the front suspension. The sides of the two legs of the A-arm are connected to the chassis by rubber bushings and the peak of the A-arm is attached to the wheel assembly. In this way, the wheel can freely move up and down. Sometimes there is an upper A-arm, a lower A-arm, or both upper and lower A-arms. The British call it a "wishbone."

Accelerator - Fuel pedal or throttle. A foot-operated pedal or hand-operated lever connected by linkage or electronics to control vehicle speed.

Adaptive Automatic Transmission - Some transmissions can "learn" and adapt to the driver's style, altering shift points and other transmission functions to produce the most efficient operation.

Adaptive Cruise Control - One step beyond cruise control, adaptive cruise control uses a radar sensor mounted in the front of the vehicle to maintain a safe cruising distance between your vehicle and the vehicle in front of you. Most systems allow you to set the interval (distance between vehicles) and will then accelerate and brake (within reason) to maintain that interval. In many cases, the systems can take into account hilly terrain and passing situations. All have the ability to act like regular cruise control, and they still require the driver to steer the vehicle normally. Some automakers refer to it as "intelligent" cruise control.

Adjustable Suspension - Provides better ride or handling. A variety of systems are used to vary shock-absorber firmness. Some automatically sense road conditions and adjust shock-absorber settings accordingly. Others include a switch on the dashboard or console that allows the driver to adjust shock-absorber settings to provide a softer or firmer ride, or sharper handling.

Aftermarket - All products and services used in the repair and maintenance of vehicles that was not produced by the original vehicle manufacturer.

Alternator - A component of the electrical system, it converts 12-volt DC (Direct Current) from the battery into AC (Alternating Current) at the rate of 13.8 to 14.2 volts. The alternator also provided electric power to operate the engine and accessories

Air Bag - The air bag, also known as a Supplemental Inflatable Restraint System, is a passive safety device, supplemental to safety belts, that inflates to provide a cushion to absorb impact forces during moderate to severe frontal collisions. This system can help to lessen the chance of contact with the steering wheel, instrument panel and windshield. The air bag is actuated automatically by sensors located in the front of the vehicle. To maximize effectiveness, seat and shoulder belts must always be used in conjunction with this system

Air Filter - A particulate air filter is a device composed of fibrous materials which removes solid particulates such as dust, pollen, mold, and bacteria from the air.

Air Gap - Space between the spark plug electrodes, also known as gap, often adjusted to gain maximum performance.

Airfoil - An aerodynamic device designed to improve traction by increasing the downforce on the vehicle. The use of airfoils (also called wings) increases the cornering capability and improves stability at speed, but often at the expense of additional aerodynamic drag.

Air Injection - A system that injects air into the exhaust ports of the engine for combustion of unburned hydrocarbons in the exhaust gases, thus producing "cleaner" exhaust emissions.

Air Suspension - Instead of steel coil or leaf springs, some vehicles have a bellows-like unit at each corner that contains pressurized air. As a rule, air suspensions can produce a softer ride.

Alignment - Angles of the tire and suspension axis relative to each other and the ground: camber, caster, toe. Also, the adjustment of components to bring them into a predetermined position for the most efficient operation of wheel and vehicle for proper even tire wear.

Alpha-Numeric - A load-based tire sizing system containing the load capacity, type of tire construction, aspect ratio, and the rim diameter in inches.

Anti-Lock Brakes (ABS) - Helps maintain control in emergency stops. Particularly useful on slick pavement. While the driver applies steady pressure to the brake pedal, the system automatically "pumps" the brakes many times per second to prevent wheel lock-up.

Anti-Roll Bar - A steel bar, linking the left and right side of a suspension. It comes into play during cornering. As the car leans in a turn, the anti-roll bar resists this leaning by transferring more weight to the outside tire. It provides a means to achieve good handling from stiff roll resistance while maintaining a comfortable ride through soft springs.

Antiskid System - Helps maintain control in fast turns. Works whether or not the brakes are applied. Sensors automatically apply individual brakes to prevent a sideways skid. Some systems also cut back on the throttle, slowing the engine. It's also known as an electronic stability system or stabilization program.

A-Pillar - In the side view, the foremost roof support of a vehicle, located in most instances between the outer edge of the windshield and the leading edge of the front door upper. Also known as an A-Post.

Alloy Wheels - A generic term used to describe any non-steel road wheel. The most common alloy wheels are cast aluminum. Technically, an alloy is a mixture of two or more metals. These wheels are known for their light weight and strength.

Alternating Current (AC) - Flow of electricity that periodically reverses direction.

All-Wheel Drive - Often confused with Four-Wheel Drive (4WD), this drive system features four, full-time active drive wheels to reduce wheel slippage and provide greater driver control over the vehicle. All-Wheel Drive automatically splits engine torque between the front and rear wheels as needed, improving on-road traction in unfavorable road conditions. Unlike Four-Wheel Drive, All-Wheel Drive is an on-road system and is not designed for off-road use. AWD does not require the driver to actively engage the system. It is operational at all times, and requires no switches, lights or visor instructions for system operation.

Ampere - After Andre-Marie Ampere, French (1775-1836). The ampere is a unit of electrical current, or the flow of electricity.

Anti-Lock Brake System (ABS) - On a vehicle equipped with Anti-Lock Brakes, the wheels are equipped with speed sensors. When a sensor determines that a wheel is decelerating so rapidly that lockup may occur, the electro-Hydraulic Control Unit (EHCUC) is activated. The EHCUC then modulates the brake pressure in the appropriate brake lines by means of the solenoid-operated valves. This is intended to prevent wheel lockup and help the vehicle maintain directional stability during potentially hazardous braking situations. (See also: Rear-Wheel Anti-Lock and Four-Wheel Anti-Lock.)

Antifreeze - An additive that lowers the freezing point of a liquid

Aspect Ratio - The dimensional relationship between tire section height and section width; section height divided by section width.

A.T.D.C. - After top dead center

Automatic Climate Control - A heating and air conditioning system that adjusts itself as needed, to maintain a pre-set temperature.

Automatic Locking Front Hubs - Found in some four-wheel drive vehicles, this allows the driver to engage, or "lock," the front axle hubs without leaving the vehicle.

Automatic Transmission With Manual-Shift Capability - Allows manual gear changes, when desired, in an automatic transmission. Functions as a traditional automatic transmission when left in Drive, but includes a slot in which the shift lever can be moved to change gears manually. Sometimes, buttons for shifting manually through the gears are located on the steering wheel. This affords some of the advantages of a manual transmission, such as greater control of engine speed for better throttle response, but eliminates the need for a clutch pedal.

Axle - A cross support of a vehicle on which its road wheels turn.

Axle Ratio - The ratio between the rotational speed (RPM) of the drive shaft and that of the driven wheel. Gear reduction in final drive is determined by dividing the number of teeth on the ring gear by the number of teeth on the pinion gear.

B

Backspacing - The measurement from the back of the bolt pad to the back edge of the rim; used to calculate offset and determine where the back of the bolt pad is located in relation to the rim width, sometimes referred to as rear spacing.

Balance - A uniform mass distribution of a tire and wheel assembly about its axis of rotation.

Ball Joint - A ball-and-socket connection that lets a steering knuckle move in several directions at the same time.

Bead - The area of the mounted tire which seats against the wheel.

Bead Seat - The position where the tire rests and seals on the inside of the rim.

Belted Bias Tire - A bias tire with additional reinforcing belt(s) between the casing plies and the tread

Block Heater - An accessory which uses electric power to keep an engine that's been turned off from becoming too cold, which makes it hard to start in extremely cold climates.

Bias Tire - A tire built with two or more casing plies, which cross each other in the crown at an angle of 30 to 45 degrees to the tread centerline.

Biodiesel - Refers to a vegetable oil, or animal fat-based diesel fuel consisting of long-chain alkyl (methyl, propyl or ethyl) esters. Biodiesel is typically made by chemically reacting lipids (e.g., vegetable oil, animal fat (tallow)) with an alcohol. Biodiesel is meant to be used in standard diesel engines and is thus distinct from the vegetable and waste oils used to fuel *converted* diesel engines. Biodiesel can be used alone, or blended with petrodiesel.

Blemish Tire - A tire with a cosmetic or minor uniformity imperfection but whose safety and performance are unaffected.

Bluetooth Capability - The ability of a radio system to work with Bluetooth wireless connectivity, to function in concert with a cellular phone.

Bore - The diameter of an engine cylinder or bearing.

Brake Assist - Designed to shorten stopping distance in a "panic" stop. Applies full braking power even if the brake pedal is not fully depressed. Sensors gauge the speed at which the driver initially depresses the brake pedal and determine whether full emergency stopping power is warranted.

Brake Drum - A drum brake is a brake in which the friction is caused by a set of shoes or pads that press against a rotating drum-shaped part called a brake drum.

Brake Fade - A condition brought about by repeated brake applications, resulting in build-up of heat that causes a temporary reduction or fading of braking effectiveness.

Brake Horsepower (BHP) - The actual horsepower of an engine, measured by a brake attached to the driving shaft and recorded by a dynamometer.

Brake Linings - The replaceable friction material which contacts the brake drum in a drum brake system to slow or stop the vehicle.

Brake Master Cylinder - A cylinder containing a movable piston activated by pressure on the brake pedal. The piston produces hydraulic pressure that pushes fluid through the lines and wheel cylinders. This forces the brake lining or pad against the drum or disc to slow or stop the vehicle.

Brake Pads - In a disc system, they are the replaceable flat segments consisting of a rigid backing plate plus frictional lining that takes the place of the shoe and lining in a drum brake.

Brake Shoe - The arc-shaped carrier to which the brake linings are mounted in a drum brake. They also force the lining against the rotating drum during braking.

Brakes, Disc - A type of braking system in which brake shoes, in a vise-like caliper, grip a revolving disk mounted on a wheel to slow or stop disc and wheel rotation for braking.

Brakes, Drum - A type of braking system that utilizes a metal drum mounted on a wheel to form the outer shell of a brake. The brake shoes press against the drum to slow or stop drum and wheel rotation for braking.

B-Pillar - The roof support between a vehicle's front door window and rear side window, if there is one.

Bolt Circle - Often referred to as the wheel bolt pattern; the diameter of an imaginary circle drawn through the center of each lug hole.

Braking Torque - Torque applied by a brake to a tire/wheel assembly, which slows or stops the vehicle.

Breakaway - The point at which tire cornering traction is lost.

Bumpsteer - A steering effect resulting from toe or camber changes as the suspension moves up and down.

C

Caliper - In a disk brake, a housing for cylinder, pistons and brake shoes, connected to the hydraulic system. The caliper holds the brake shoes so they straddle the brake disc.

Camber Angle - The inward or outward angle which a front-wheel spindle makes with a vertical line, as viewed by either the front or the rear of the vehicle. Positive camber results when the top of the tire tilts out further than its bottom. The adjustment of this setting affects both tire wear and vehicle handling.

Camshaft - The shaft in the engine which is driven by gears, belts or chain from the crankshaft. The camshaft has a series of cams that opens and closes intake and exhaust valves as it turns.

Camber Thrust - The lateral force developed by a tire due to its camber. A force in the same direction as the leaning of the tire.

Carrying Capacity - Amount of load that a tire can carry at a given inflation pressure as established by the Tire and Rim Association.

Cart - Championship Auto Racing Teams; sanctions races for Indy type cars.

Casing (Carcass) - The structure of tire cords locked around wire beads, (most often used in relation to worn tires).

Caster Angle - The forward or backward tilt of the steering axis as viewed from the side. If the point of load is ahead of the point of contact, the caster angle is positive. The caster angle tends to keep wheels in a straight line. Proper caster adjustment improves both tire wear and fuel economy.

Catalytic Converter - A stainless steel canister that is part of a vehicle's exhaust system and contains a thin layer of catalytic material spread over a large area of inert supports. It induces chemical reactions that convert an engine's exhaust emissions into less harmful products prior to entering the environment.

Center of Gravity - The center balance point of a vehicle; the single point where a vehicle would be supported without tipping up or down.

Centerline - A plane dividing a tire, wheel, or vehicle into two symmetrical halves.

Centrifugal Force - The force that tends to throw a tire away from the axis of rotation, same as radial force.

Chapman Strut - A rear suspension system which operates on the same principles as the MacPherson Strut; it uses lower links or a control arm and a long spring-shock strut.

Chassis - The frame, suspension system, engine, and drive train of a vehicle. The assembled parts of the automobile without the body.

Closed Crankcase Ventilation (CCV) - A system in which crankcase vapors are discharged into the engine intake system (usually via the intake manifold) where they are burned during the combustion process rather than being discharged into the atmosphere.

Clutch - A disc-shaped mechanical device that disengages the engine from the transmission.

Clutch-Starter Interlock - A safety device that prevents a truck from being started while it's in gear. The clutch must be depressed for the engine to start.

Coefficient of Friction - The force required to initiate the sliding of an object, divided by the weight of the object; this ratio indicates the difficulty in sliding one surface against another.

Coil Springs - Suspension components that compress and respond to road inputs, permitting the up-and-down movement of a vehicle as it goes over road bumps and dips.

Cold Cranking Amps (CCA) - A rating, measured in amperes. Used for comparing cranking strength of vehicles batteries during extremely cold (0 F or lower) weather.

Cold Inflation - The pressure in a tire that has been driven less than 1 mile at moderate speed or has been standing for three hours or more.

Combustion Chamber - The volume of space at the top of the cylinder where burning of the air/fuel mixture begins.

Compliance Steer - A steering effect caused by the deflection or compliance of bushings, joints, and other suspension components under loads and forces.

Compound - The general term referring to the tire tread's chemical makeup.

Composite Headlamps - Usually manufactured with replaceable halogen bulbs and separate hard acrylic or glass lenses. This type of lamp provides superior illumination compared to the long-conventional sealed beam unit.

Compression Ratio - The volume of the combustion chamber and cylinder when the piston is at the bottom of its stroke, divided by the volume of the combustion chamber and cylinder when the piston is at the top of its stroke. Higher compression ratios tend to increase engine efficiency.

Compressor (Air Conditioning) - The mechanism is an air conditioner that pumps vaporized refrigerant out of the evaporator, compresses it to a high pressure, and then delivers it to the condenser.

Condenser (Air Conditioning) - Air conditioning component used to remove heat from the inside of a vehicle.

Connecting Rod - The metal rod that connects a piston to the crankshaft.

Contact Patch - The part of the tire in contact with the road surface.

Continuously Variable Transmission (CVT) - Operates like an automatic transmission, with no need for a clutch pedal, but contains no gears. Instead, power is transmitted in a continuous flow from the engine to the drive wheels.

Control Arm - A suspension element that has one joint at one end and two joints at the other end, typically on the chassis side. Also known as a wishbone or an A-arm.

Coolant - The mixture of water and anti-freeze that picks up heat from the engine and transfers it to the air passing through the radiator. This transfer of heat keeps the engine operating within its optimum temperature and preventing premature engine wear.

Cooling System - The system that removes heat from the engine by the forced circulation of coolant and thereby prevents engine overheating. In a liquid-cooled engine, it includes the water jackets, water pump, radiator, and thermostat.

C-Pillar - The roof support between a vehicle's rearmost side window and its rear window. Also known as a C-Post. On a vehicle with four side pillars, the rearmost roof support may be called a D-pillar.

Cord - Fabric or steel wire strands forming plies and belts in tires.

Cornering Force - The force that turns a vehicle around a corner. The opposite of lateral or centrifugal force.

Crankcase - A case that encloses the crankshaft. In most engines, the oil pan and the lower portion of the cylinder block form the crankcase.

Crankshaft - A shaft with one or more cranks, or "throws," that are coupled by connecting rods to the engine's pistons. The combustion process creates reciprocating motion in the rods and pistons which in turn is converted to a rotating motion by the crankshaft.

Crossmember - One of several horizontal members in a vehicle frame which join the side members and add to overall strength and stability.

Cross Pattern - The sequential torquing of the lug nuts in a pattern across from one another.

Cross-Section Width - External sidewall-to-sidewall measurement of inflated tire, exclusive of ornamental ribs and lettering. Sometimes called section width.

Crown - The region between the shoulders of a tire.

Crowned Road - A road design with a slope or pitch from its center to the curb or shoulder in order to facilitate water drainage.

Curb Guard - A rubber protrusion running circumferentially around some tires just above the whitewall to prevent curb scuffing on the whitewall area of a tire.

Curb Weight - The total weight of a vehicle with no passengers and a full tank of gas.

Curtain Side Airbags - Designed to cushion and protect occupants' heads. Located on both the left and right sides of the vehicle, curtain side airbags deploy from above the front and rear side windows in a side-impact collision. Advanced systems deploy the bags when sensors detect an impending rollover. The bags inflate within a fraction of a second and deflate after a few seconds. They also help shield occupants from broken side glass. In some vehicles with three rows of seats, the curtain airbags do not reach backseat occupants. Curtain-side airbags deploy from above the side windows during a side-impact collision or when a rollover situation is sensed.

Custom Wheel - An aftermarket wheel designed to improve performance and enhance appearance and comprised of one, two, or three different pieces.

Cylinder Block - The basic part of the engine to which other engine parts are attached. It is usually a casting and includes engine cylinders and the upper part of the crankcase.

Cylinder Head - The removable part of the engine that attaches to the cylinder block directly above the cylinders. The head is cast from aluminum or iron and houses the combustion chambers, the intake and exhaust ports, spark plugs or injectors and much or all of the valve train. It has oil and water passages for cooling and lubrication.

D

Daytime Running Lamps (DRLs) - Lights that automatically turn on when a vehicle is started, making it more visible during daylight hours.

Detonation - Also known as "knock," it is caused by the spontaneous combustion of the fuel/air mixture in a combustion chamber. Detonation can be a result of too low an octane fuel (see Octane), improper fuel/air mixture or incorrect ignition timing, or a combination of these things. It is a symptom of an engine that is out of tune.

Diesel Engine - A diesel engine uses heavier weight components than gas engines to handle higher compression ratios. Typically, diesel engines run with greater efficiency and higher torque than similar size gas engines. These attributes lead to better fuel economy and towing performance. Diesel engines do not have spark plugs or carburetors. Instead glow plugs are used to preheat air in the cylinders to ensure easy starts. Once the engine is started, compression heats the fuel in the cylinders for combustion.

Dieseling - A condition in which gasoline continues to fire after the ignition has been shut off. In late-model engines, dieseling, or run-on, is caused by heat and the unusually high manifold pressure that result from retarding the spark at idle. In fuel-injected cars when the engine is turned off, fuel is automatically shut off, eliminating dieseling.

Differential - The gear assembly connected to the drive shaft that permits the wheels to turn at different speeds when going around a corner, while transmitting power from the drive shaft to the wheel axles.

Differential, Locking - The same attributes of a standard differential, except that when one wheel is slipping, the most torque is supplied to the wheel with best traction. A locking differential reduces the possibility of a vehicle becoming immobile when one driving wheel loses traction.

Directional Stability - The ability of a vehicle to travel in a straight line with a minimum of driver control.

Disc Brakes - Properly called caliper disc brakes, a type of brake that consists of a rotor that rotates at wheel speed, straddled by a caliper that can squeeze the surfaces of the rotor with brake pads near its edge. Disc brakes provide a more linear response and operate more efficiently at high temperatures and during wet weather than drum brakes.

Displacement - In an engine, the total volume of air or air-fuel mixture an engine is theoretically capable of drawing into all cylinders during one operating cycle. Generally expressed in liters or cubic inches. Engine displacement is equal to (bore) x (bore) x (stroke) x (number of pistons) x (.785).

Distributor - A component of the ignition system, usually driven by the camshaft that directs high-voltage surges to the spark plugs in the proper sequence.

Dog Tracking - A condition where the rear wheels do not follow the path of the front wheels.

Double Wishbone Suspension (A Arm Suspension) - A system of independent suspension in which each wheel is located on a "knuckle" that is connected by ball joints to an upper A arm and a lower A arm. Usually, the lower A arms are longer. This system provides minimal changes in track and camber when the suspension is under load, as when going over bumps or in hard cornering.

Drag Coefficient - A measure of the aerodynamic sleekness of an object. Drag coefficient is signified by "dc.": The lower the number, the greater the aerodynamic efficiency. The higher the drag coefficient, the more a car's engine must work to keep a given road speed. Also known as "CD" for coefficient of drag."

Drive Shaft - The shaft that transmits power from the transmission to the differential in a rear-drive power train.

Drivetrain - The power-transmitting components in a vehicle, including clutch, gearbox (or automatic transmission), driveshaft, universal joints, differential and axle shafts.

Dual Front Airbags - Designed to protect the driver and front passenger in a frontal collision. Mounted in the steering wheel hub and in the right side of the dashboard, they inflate and deflate within a fraction of a second. Most systems can judge the severity of an impact and determine whether a front-seat occupant is wearing a safety belt or is out of position. This allows them to adjust the rate of deployment to minimize injuries from the airbags themselves. Dual front airbags are required by law on all new passenger vehicles.

Dual Overhead Camshafts (DOHC) - A DOHC engine has two camshafts in each cylinder head; one camshaft actuates intake valves and the other actuates exhaust valves. The camshafts act directly on the valves, eliminating pushrods and rocker arms. This reduced reciprocating mass of the valve train enables the engine to build RPM more quickly. DOHC designs are typically high-performance, four valve per cylinder engines. (A four valve per cylinder two intake and two exhaust design helps the engine "breathe" more freely for increased performance.)

Duals - Two tire and wheel assemblies, mounted on one side of an axle.

Dual-Stage Airbags - Front airbags that can deploy at either of two levels, depending on the severity of a collision.

Dual-Zone Climate Control - Allows individualized control of heating and air conditioning. Most systems are adjustable for the driver and front passenger; others feature a third adjustment for rear passengers.

Dynamic Balance - Balance in Motion. The balance of a tire and wheel while it is rotating. A condition in which a tire and wheel assembly has weight distributed equally on both sides of the wheel's axis of rotation.

Dynamometer - A device which absorbs and measures the power derived by an internal combustion engine.

E

Electrolyte - Any solution that conducts an electrical current, such as a mixture of sulfuric acid and distilled water found in vehicle batteries.

Electronic Brake-Force Distribution - Operates in conjunction with ABS to balance the force applied to brakes at front and rear wheels. Can prevent over-braking, improve brake-pad life, reduce "brake fade" caused by excessive heat, and ensure peak braking efficiency in all conditions.

Electronic Fuel Injection System - A system that injects fuel into the engine and includes an electronic control unit to time and meter the fuel flow.

Electronic Ignition System - An ignition system that uses transistors and other semiconductor devices as an electronic switch to turn the primary current on and off.

Exhaust Gas Recirculation (EGR) - An exhaust-emission control system in which a portion of the exhaust gas is picked up from the exhaust manifold and sent back to the intake manifold to be reburned in the engine. Mixing exhaust gases with the fresh air/fuel mixture lowers the combustion temperature and reduces the formation of oxides of nitrogen in the exhaust.

Exhaust Manifold - The network of passages that gathers the exhaust gases from the various exhaust ports and routes them toward the catalytic converter, the muffler and the exhaust system.

F

Fifth Wheel - Provides a connection (flexible) between the tractor and the trailer. Pivot mounted, it contains provision for accepting and holding the kingpin of a trailer, Center of the fifth wheel should always be located ahead of the centerline of the rear axle.

Flywheel - A metal disc bolted to the end of the crankshaft. The inertia of the spinning flywheel while the engine is running smoothes the engine's operation

Follower Joint - A non-load-carrying ball joint that maintains the position of the steering knuckle and provides the correct steering axis inclination angle; sometimes called pilot joint or friction joint.

Footprint - The mark left by a loaded tire's tread as it meets the road surface.

Footprint Area - The amount or area of contact in square inches the tire has with the road. This is dependent upon both load and inflation pressure as well as tire dimensions.

Fore and Aft Weight Transfer - A load factor where weight is transferred from the front tires to the rear tires during acceleration and from the rear to the front tires during braking.

Four-Wheel Anti-Lock Brakes - All four wheels are equipped with speed sensors. When these sensors determine that the wheels are decelerating so rapidly that lockup may occur, the Electro-Hydraulic Control Unit (EHCUC) is activated. The EHCUC then modulates the brake pressure in the appropriate brake lines by means of the solenoid-operated valves. This is intended to prevent wheel lockup and help the vehicle maintain directional stability during potentially hazardous braking situations.

Four Wheel Drive (4WD) - In a Four Wheel Drive system, a secondary transmission assembly, called a transfer case, is driven from the main transmission. The transfer case distributes power to both axles to drive all four wheels. It is the heart of the Four-Wheel Drive system. Four-Wheel Drive can be full-time, in which power is delivered to both axles at all times or part-time, where the driver selects two or four wheel drive. Four wheel drive is often combined with independent suspension systems and off-road type tires to enhance drive ability on rough, off-road terrain, or on-road drive ability in unfavorable driving conditions.

Four Wheel Independent Suspension - A type of suspension in which all wheels are mounted to separate suspension members with no rigid axle connecting them. Therefore a disturbance affecting one wheel has no effect on the opposite wheel. Four wheel independent suspension reduces the un-sprung weight, improves ride and handling over rough surfaces and permits room for a larger trunk.

Front Wheel Drive (FWD) - A drive system where the engine and trans axle components apply the driving force to the front wheels rather than the rear wheels. Benefits of Front-Wheel drive include: Maximized passenger space. Enhanced cargo area. excellent drive traction; particularly on wet or Slippery surfaces, since the drive is through the front wheels, which carry a heavier load.

Fuel Injection - A method of delivering fuel under pressure into an engine's combustion chamber. Fuel injection systems can be single-point, multi-point, etc. Replaces carbureted system.

Fuel Injection, Electronic - A computer-controlled method of delivering fuel under pressure. The computer monitors signals from coolant temperatures, manifold vacuum, exhaust oxygen sensor, and engine cranking sensor. It "tells" the injectors to release and adjust the fuel to yield an air/fuel mixture assuring engine operation well matched with emission requirements, optimum fuel economy and overall vehicle performance.

Fuel Pump - A mechanical or electrical device that draws fuel from the fuel tank and delivers it to the carburetor, injectors, or injector pump.

G

g - A unit of acceleration. "g" is a symbol that represents the acceleration of gravity. Acceleration of one g equals 32 feet per second each second.

Gage - A standard SAE designation of wire sizes. Expressed in AWG (American wire gage) The larger the number the smaller the wire size.

Galling - A condition that takes place when two metals or fasteners stick together and cannot be easily loosened.

Gallon - A U.S. Gallon (3.785) Liters

Gasket Kit - A collection of gaskets required to overhaul an engine or part of an engine.

Grooves - Circumferential channels between the tread ribs of a tire

Grooving - A tread cutting process in which grooves of varying depths and angles are cut into a tire's tread to improve forward traction, braking, or lateral stability.

Gross Axle Weight Rating (GAWR) - The maximum weight that the front or rear axle can carry. The front and rear gross axle weights must not exceed the front and rear GAWR's.

Gross Combination Weight Rating (GCWR) - The total weight of the loaded tow vehicle and the loaded trailer.

Gross Vehicle Weight (GVW) - The total weight of the vehicle, including passengers, fuel, cargo, and attachments.

Gross Vehicle Weight Rating (GVWR) - The maximum permissible loaded weight of the vehicle and takes into account the capabilities of the engine, transmission, frame, spring, brakes, axles, and tires. The GVW must not exceed the GVWR.

H

Hazardous Waste - Automotive wastes that are on the EPA's list of hazardous materials or that have one or more hazardous characteristics.

High Flotation Sizing System For Light Trucks - A system using overall diameter in inches, section width in inches, type of tire construction, and rim diameter in inches (e.g.: 33x12.50R15LT)

High Pressure Die Cast - A wheel manufacturing process using aluminum alloys in special high-pressure die casting machines.

Hub Centric - A situation where the center bore hole of a wheel is made to match up with the hub diameter of the vehicle; the wheel is then centered by the center hole, rather than the lug nuts.

Hydroplaning - Loss of traction at high speeds caused by a wedge of water, which lifts a tire off the road surface.

I

Idler Arm - A device attached to the frame of the car, which duplicates the movement of the Pitman arm and keeps the center link aligned.

Imbalance - A non-uniform distribution of mass in a tire and wheel assembly about its axis of rotation causing bounce (static imbalance) or shake (dynamic imbalance).

Independent Suspension - A suspension system in which the front or rear pair of wheels of a car are independently connected to the frame or underbody. In this system, deflection of the wheel on one side has a minimal affect on the wheel on the other side.

Inertia - The tendency of any mass at rest to stay motionless, or any mass, which is moving to remain moving.

Innerliner - The layers of low permeability rubber, which are laminated to the inside of a tubeless tire to insure that air retention quality of the tire body.

J

Joule - Is the derived unit of energy in the International System of Units. It is the energy expended in applying a force of one newton through a distance of one metre (1 newton·metre or N·m). In terms of dimensions. Sometimes used as a measurement to rate bumper impact absorption.

K

Kilopascals (kPa) - Unit of air pressure; in metric terms it takes 6.895 kPa to equal 1 psi.

L

Laboring – An engine that is struggling to keep turning due to lack of revs. or the use of too high of a gear.

Lateral Runout - Wobble or side-to-side motion of a rotating wheel or tire/wheel assembly.

Lateral Weight Transfer - A load factor in cornering where weight is transferred from the inside tires to the outside tires.

Lead - A slight pull to one side.

Leaf Springs - A series of steel leaves used on suspension systems that are bolted together in the middle. Under compression, they flatten and expand in length, then rebound to their original arched shape.

Level (price) - Refers to the manufacturer's established list of suggested prices of tires expressed in percent of some established par line (100 level).

Lift Points - Those contact points on the chassis of a vehicle used to hoist the vehicle for servicing; to prevent serious problems and permanent damage, owners' manuals should always be checked for proper lift point locations.

Light Load - A P-metric tire with a maximum inflation pressure of 35, 44, or 51 psi.

Linearity - The ability of a vehicle to respond linearly to the driver's steering input at low cornering levels.

Load-Carrying Ball Joint - A ball joint that supports the weight of the vehicle.

Load Carrying Capacity - The load a particular size tire can carry at a given inflation pressure under certain driving conditions, as established by the Tire and Rim Association.

Load Index - A numerical code associated with the maximum load a tire can carry at the speed indicated by its Speed Symbol under specified service conditions up to 130 mph. For speeds in excess of 130 mph, actual load on the tire shall be reduced in accordance with Tire and Rim Association guidelines.

Loading - The amount of weight put on tires. Increased load can increase cornering force.

Load Range - Replaces the former ply rating term and identifies load and inflation limits.

Lower Sidewall - The part of the sidewall nearest the bead.

LT-Metric - A sizing system using the section width in millimeters, aspect ratio, type of construction, and rim diameter in inches (e.g.: LT235/85R16)

Lug Centric - The centering of a wheel by matching it up with the lug nuts, rather than by the center bore hole of the wheel; hub centric is the more accurate centering method.

M

M + S, M/S, or M & S - A tire sidewall designation indicating that the tire meets the RMA/RAC definition of an all-season tire.

MacPherson Strut - A front suspension assembly that combines the functions of the shock absorber, the upper steering pivot, and the wheel spindle in a single unit.

MAG - A misleading description of specialty wheels; with exception of pure racing wheels, specialty wheels contain little or no magnesium.

Main Bearings - The bearings in engine block that supports the crankshaft.

Manual Transmission - A transmission in which gears are selected by the driver.

MAP Sensor - The Sensor that monitors the engines intake manifold pressure and transmits the data to the engine controller.

MAT Sensor - Sensor that monitors the temperature of the air entering the intake manifold.

Match Mounting - A mounting procedure that matches the high point of a tire with the low point of its wheel. A dot or mark on the tire is matched with a dot, a sticker, or the valve hole on the wheel.

Metric Tire Size System - A tire sizing system using the cross section in millimeters, aspect ratio, speed category, tire construction and all the rim diameter in inches (e.g.: 185/70SR13)

Mountain Snowflake Pictograph - Winter passenger and light truck tire design identification. Tires with this identification provide improved snow performance over tires meeting the existing RMA/RAC all-season tire definition.

Mounting Pad - The surface area of the back of the wheel's center that contacts the brake drum or hub flange of the vehicle.

N

Negative Camber - A condition where the top of the tire is leaning inward from the tire's vertical centerline, as viewed from the top.

Negative Caster - A setting where the steering axis is inclined forward at the top as viewed from the side; a condition, which tends to cause instability.

Negative Offset - When the back of the bolt pad is closer to the inside of the wheel; when the mounting face is inboard of the rim centerline; extends assembly away from vehicle resulting in wider tracking.

NHTSA - National Highway Traffic Safety Administration.

Nomenclature - Systematic naming of tire sizing systems.

Nominal - A designated or theoretical size that may vary from the actual.

Numeric System - A tire sizing system using tire cross-section width and rim diameter in inches (e.g.: 7.35-14).

O

O2 Sensor - A device that detects the amount of oxygen in the exhaust stream and sends that information to the ECM.

Offset - The distance of the centerline of the wheel to the mounting face of the wheel.

Off-the-Car Balancing - A procedure in which a tire and wheel assembly is balanced by a bubble or computerized electronic balancer while the assembly is off the vehicle; computerized electronic balancers are the best way to accurately measure dynamic balance.

One-Piece-Wheel - Used to describe an aluminum specialty wheel that is cast in one piece; also the standard wheel found as OEM on production cars.

Original Equipment (O.E.) - Refers to tires sold to automobile manufacturers for equipping their new vehicles.

Out-of-Round - A wheel or tire condition in which the wheel or tire is not round.

Overall Diameter - The maximum height of a tire when mounted on a wheel and inflated to rated pressure.

Overinflation - The inflation of a tire above recommended pressure to achieve improved performance; negative byproducts are rough side, bruise damage, and suspension system strain.

Oversteer - A cornering condition where rear tires operate at a greater slip angle than the front tires; the tendency of a car to turn more sharply than the driver intends while negotiating a turn.

Oxidation - Reaction of a material with oxygen; usually resulting in degradation of the material.

P

Permeation - Tires lose air normally through the process of permeation.

Pitch - The length from a point on one tread block to the same point on the next tread block. Pitch is varied around a tire to minimize noise.

Pitman Arm - A device in a recirculating ball steering system that converts circular motion into a back-and-forth motion through its connection to the system's center link or relay rod.

Plasticizer - A rubber compound chemical; used to make or keep rubber soft and flexible.

Plies - The layers of fabric that make up the cord body and belts of a tire.

Plowing - The loss of cornering capability of the front of the vehicle. The car tends to go straight.

P-Metric System - A tire sizing system using the section width in millimeters, aspect ratio, and type of tire construction, and rim diameter in inches (e.g.: P225/70R15).

Polyester - A strong and lightweight synthetic cord material used in casing construction.

Positive Camber - A condition where the top of a tire is leaning outward from the tire's vertical centerline, as viewed from the top.

Positive Caster - A setting where the steering axis is inclined rearward at the top, as viewed from the side; makes possible the self-centering force that tends to return the wheel to the direction the vehicle is traveling.

Positive Offset - When the back of the bolt pad is closer to the outside of the wheel; when the mounting face is outboard of the rim centerline, draws assembly towards the vehicle resulting in narrower tracking.

PSI - Pounds per Square Inch

Pull - The tendency of a vehicle to veer to one side when driving straight ahead.

Pyrometer - A thermocouple device used for measuring exhaust temperatures.

Q

Quartz-halogen bulb - A Bulb with an inner quartz Bulb which holds a tungsten Filament. Usually the inner Bulb contains an inert gas such as iodine or one of the other five halogen gases. The use of a halogen gas prevents the Bulb from turning black and thus reducing the amount of light output. Because this type of Bulb requires intense heat, a quartz inner Bulb is needed instead of glass. As a result, the quartz-halogen Bulb produces more light per watt of electrical power. When replacing a quartz-halogen Bulb, it is important not to touch the outer Bulb with your fingers. The moisture and oils deposited on the glass will cause the glass to break under the high temperature.

R

Rack-and-Pinion System - The steering used for front wheel drive cars in which a gear at the end of the steering column meshes with a rack of steel teeth; the rack is then connected to the steering arms. Commercial trucks are now starting to use.

Radial Play - The side-to-side movement of a ball joint

Radial Runout - A measurement of out-of-roundness; by rotating the inflated tire and measuring how far the tread surface varies (up and down) from a true circle.

Radial Tire - A tire built with casing plies that cross the crown at an angle of 90 degrees.

Recirculating Ball System - The conventional type of steering system in which steering motion is transferred through a gearbox.

Refrigerant - The liquid used in refrigeration systems to remove heat from the Evaporator coils and carry it to the Condenser. It absorbs and gives up heat as it changes from a liquid to a gas to a liquid. Freon-12 was a common automotive refrigerant, but it has been replaced by C134A.

Repacking - The repacking of wheel bearings with quality, heavy-duty grease according to manufacturer's specifications.

Retread - A used casing which has new tread rubber applied to it.

Returnability - The ability of a vehicle to return to a straight ahead attitude after removal of steering input.

Revolutions Per Mile - The number of revolutions a tire makes in a mile at a given load, inflation, and speed.

Ribs - The rubber elements at the tire tread which contact the ground, oriented in a generally circumferential direction.

Ride Height - The distance between the frame of the vehicle and the road.

Rim Diameter - The diameter of the bead seat, not the diameter of the rim edge.

Rim Drop - The area of the wheel's rim having the smallest diameter.

Rim Flange - The outermost edge of a wheel's rim to which clip-on weights are attached.

Rim Width - The measurement inside of the rim flanges; i.e. from inside the flange on one side to inside the flange on the other side.

Road Wheel - A large diameter (typically 67") steer wheel capable of rotating at selected speeds; used to simulate road surface for tire testing.

Rolling Resistance - The force required to roll a loaded tire.

Rollover - The condition that occurs during hard cornering when a tire sidewall rubs the road surface.

Rotation - The pattern of movement of tires to different positions on a vehicle to compensate for irregular or unequal tire wear.

Rubbing - A condition where a hose or electrical wire rubs on frame or each other causing chaffing to the extent of causing a leak or electrical short.

Runout Gauge - A device used to check radial and lateral runout.

S

Safety Hump - The raised area circling the rim of the wheel and located slightly inward from the bead seat; to keep the tire from slipping into the rim well, if accidentally deflated.

Section Height - The distance from the bottom of the bead to the top of the tread.

Section Width - The distance from sidewall to sidewall, exclusive of any raised lettering.

Self-Aligning Torque - The force, which causes a tire/wheel assembly to return to its straight-ahead position after a turn.

Semi-Trailing Arm - A rear suspension system that uses a large A-arm for each wheel; its pivot axis is set between the 0 angle of a swing axle and the 90 angle of a trailing arm to a line running straight across the car.

Series - This is the part of the size designation in tires, which gives the ratio of the height of a tire (from the rim to the top of the tread) to the width of the tire (from sidewall to sidewall). It is also referred to as the aspect ratio of a tire.

Service Description (Load Index/Speed Symbol) - The service description consists of a Load Index and a Speed Symbol. The Load Index is a numerical code that specifies the maximum load a tire can carry at the speed indicated by its Speed Symbol, at maximum inflation pressure.

Shimmy - A rapid oscillation or wobble of a wheel and tire assembly about the steering axis.

Shock Absorber - A "damper" between the body or frame of the truck and the suspension; used to cushion road bumps and bounces and keep the tire in contact with the road.

Shoulder - The outer edges of a tire's tread where it joins the sidewall.

Shoulder Gauge - The total thickness of a tire in the shoulder area. This is invariably the thickest part of the tire and this gauge directly affects the running temperature of a tire.

Sidewall - The side of a tire between the tread shoulder and the rim bead.

Singles - A tire and wheel assembly, mounted, alone, on one side of an axle. Normally referred to as wide based or super single.

Sipes - Small, narrow slots molded into the ribs of the tread design which increase the traction edges of the tire and increase the traction ability of the tire on wet pavement.

Skid Resistance - Maintenance of grip on the road and resistance to slide or slip, either longitudinally or laterally.

Slip - The change in distance traveled per tire revolution due to driving or braking conditions; expressed as a percentage of the distance traveled under a free rolling condition.

Slip Angle - The difference between the direction a tire is traveling and the direction it is pointing.

Slots - Grooves generally positioned in the ribs and shoulder areas of some tires, which aid in wet pavement traction.

Speed Rating System (Speed Category Markings) - An alphabetical system describing a tire's capability to travel at established and predetermined speeds.

Spindle (or Knuckle) - A device connected to a vehicle's control arm by a ball joint; it is moved by the steering arm to change the direction of the wheels and to transmit braking torque.

Sprung Weight - The total weight of a vehicle that is supported by the suspension system.

Squirm - The footprint distortion of a rolling tire; usually hourglass in shape on a straight road and crescent-shaped on curves.

Stability - The ability of tires to maintain direction of a vehicle on curves without causing excessive body sway.

Star Pattern - The proper method for sequential torquing of lug nuts in a 5-lug bolt circle.

Static - Having no motion.

Static Balance - Balance at rest. A condition in which a tire and wheel assembly has equal weight around the wheel's axis of rotation.

Static Loaded Radius - The measurement from the middle of the axle to the road surface; measured with the tire inflated to required pressure and carrying the rated load.

Steel Belt - A belt material used in tires. Its high stiffness provides good handling and low tread wear.

Steering Axis - An imaginary line drawn through the center of the steering pivots. The axis about which the wheel pivots when turned.

Steering Response - Reaction time between driver input at the steering wheel and the directional change of the vehicle.

Steering System - A major control mechanism that multiplies driver input on the steering wheel into the motion of turning a vehicle's front wheels.

Suspension - A system of devices supporting the upper part (body and chassis) of a vehicle on its axles.

Suspension Package - A specialized kit of suspension components designed specifically for individual makes and models of vehicles; usually sold to improve carrying capability and performance.

T

Tensile Strength - The maximum tensile force per cross-section area that a material can withstand before it breaks.

Three Piece Wheel - A specialty wheel composed of two outer rim halves, usually made of aluminum alloy, and a center section of pressure-cast aluminum or magnesium alloy. The center is either bolted or riveted to the rim.

Tie Rods - Devices that join the center link of a steering system to the steering arms that connects to the wheels.

Tire Mixing - The installation of tires of different sizes and/or construction on a vehicle; a condition generally to be avoided. However, certain manufacturers do recommend different tire sizes on the front and rear positions. Manufacturer's specifications should always be checked.

Toe - The difference in distance between the front and the rear of a pair of tires mounted on a common axle.

Toe-In - A condition where the fronts of two tires on the same axle are closer together than at the rear.

Toe-Out - A condition where the fronts of two tires on the same axle are farther apart than at the rear.

Toe-Out-Turns (Ackerman Angle) - The difference between the turning angle of the inside wheel and the outside wheel during a turn to the left or right; tow-out turns is not adjustable and is designed into the steering linkage system by the manufacturer.

Torque - The product of a force applied through a lever arm to product a rotating or turning motion.

Torque Rating - The proper torque, expressed in foot-pounds, for tightening lug nuts of various diameters.

Torquing - The securing of the tire/wheel assembly and or any part to the vehicle by the tightening of the wheel's lug or any fastener .

Torsion Bar - A "straight" spring that twists under loads; the natural resistance to this twisting provides the spring action.

Track - The distance between the front tires on the front axle and the rear tires on the rear axle.

Tracking - The difference in distance between each of the rear wheels and the centerline of the vehicle.

Trailing Arm - A rear suspension system consisting of an arm whose pivot axis is exactly across the vehicle or perpendicular to the direction of travel.

Tread - The portion of a tire, which contacts the road surface.

Tread Depth - The distance from the tread surface to the bottom of the grooves.

Tread Wear Indicators - A raised area in the tread grooves which becomes even with the tread surface when the tire is worn to 4/32" tread depth; used to define the legal wear-out point in a tire's life.

Tread Width - The tread width is the distance from outer edge to outer edge of the tread.

Two-Piece Wheel - A specialty wheel comprised of a center section of aluminum or steel that is fastened to an aluminum or steel wheel.

U

Underinflation - A condition where a tire is inflated below recommended pressure.

Understeer - A cornering situation where the front tires generate more slip angle than the rear tires; the tendency of a car to turn less sharply than the driver intends and compensated for by the addition of more steering input.

Undulation - A slight indentation or wavy appearance on the sidewall surface of an inflated radial tire. Radial body ply cords run straight across the tire from bead to bead and the joining of the ply material in the sidewall area may sometimes cause this condition. Undulation is a common characteristic of radial tires and will not affect the performance of the tire.

Uniformity - A term describing the amount of radial and lateral force variation in a rotating part.

Unsprung Weight - The total weight of a vehicle not supported by the suspension system; example: tires and wheels.

Upper Sidewall - The part of a tire's sidewall nearest the tread shoulder.

W

Waddle - Side-to-side movement of a vehicle at low speeds, caused by a bent wheel or axle or by a tire with high lateral force variation.

Wander - The tendency of a vehicle to veer or drift to either side from a straight path.

Wheel Base - The distance between the center of the front wheels and the center of the rear wheels.

Wheel Bearing - Most commonly, a tapered roller bearing consisting of tapered rollers, matching races, and a cage. Mounted on a hub, they permit the spindle to rotate freely with minimum friction.

Wheel Play - The up-and-down or side to side movement caused by worn steering or suspension parts.

Wheel Weight - Weights that are clipped, taped, or self-adhered to the inside or outside of the wheel in order to balance the tire/wheel assembly.

Wires - Special coated for electrical power for lighting etc...

Z

Zero Offset - A condition where the centerline of the wheel coincides with the mounting face.

Zero Toe - A condition in which two tires on the same axle are exactly parallel.