

# ENGLISH GLOSSARY

**Accelerate** To increase speed.

**Additives** Chemicals added to lubricants to improve or modify certain operating characteristics.

**Aerodynamic drag** The wind resistance of air moving over the size and shape of the vehicle.

**Aftermarket** Nonfactory parts, accessories, and upgrades to a motor vehicle.

**All-wheel-drive (AWD)** A drive system that can drive both the front and rear wheels through all phases of operation. (Also called full-time 4WD.)

**Alternating current (AC)** An electric current that reverses its direction at regular intervals.

**Ammeter** A meter used to measure electrical current.

**Amperes (A, amp)** The unit of measurement for electrical flow.

**Anaerobic sealant** A chemical that cures in tight, smooth areas to form a gasket to prevent fluid leaks.

**Annulus gear** An internal, or ring, gear used in a planetary gear set.

**Antilock braking system (ABS)** A system that senses wheel lockup during braking and momentarily reduces braking forces to maintain wheel rotation.

**Asbestosis** A health condition where asbestos causes scar tissue to form in the lungs, causing shortness of breath.

**Auburn assembly** A type of pressure plate assembly that can be identified by the pressure springs being mounted to the release levers.

**Automated manual transmission (AMT)** A manual transmission design that automatically shifts gears and applies and releases the clutch.

**Automatic hub** Locking hubs that lock automatically when needed.

**Automatic transmission** A transmission that automatically changes forward gear speeds.

**Automatic transmission fluid (ATF)** The fluid designed for use in an automatic transmission.

**Auxiliary transmission** An additional transmission with reduction and/or overdrive ratios.

**Axial** A direction parallel to the shaft or bearing bore.

**Axial runout** The amount of wobble of a spinning round object.

**Axis** The centerline of a rotating part.

**Axle gears** The two bevel gears in a differential that attach to the axles.

**B-** Symbol used to identify ground or the negative side of a circuit.

**B+** Symbol used to identify the positive side of a circuit.

**Backlash** The clearance between gears; also called *lash*.

**Backlash variation** The variation in backlash caused by ring gear runout.

**Balancing** A process to correct the imbalance of a part that could cause vibration.

**Ball and Trunnion joint** A type of U-joint that utilizes a shaft with bearings at each end that rides in a grooved housing.

**Ball bearing** A nonfriction bearing that uses steel balls as the rolling element.

**Bearing cage** A spacer to keep the balls or rollers in a bearing separated and in the proper position.

**Bearing cap** A device that is bolted in place to secure a bearing in place.

**Bearing cone** The inner race of a tapered roller bearing.

**Bearing cup** The outer race for the needles of a U-joint bearing and of a tapered roller bearing.

**Bearing race** The hardened surface on which the balls, needles, or rollers of a bearing run.

**Bearing retained axle** An axle that is retained at the outer end of the axle.

**Bearing spacer** Shim used to position bearings and maintain bearing preload.

**Bench bleed** The process of removing all air from a hydraulic component before installing that component.

**Belleville spring** A conical steel spring that gives a spring action because of its resistance to flattening.

**Bellows-type boot** An accordion-pleated rubber cover used to protect a mechanical device inside of it.

**Bevel gear** Gears that are cut at an angle and used to transfer power between nonparallel shafts.

**Blanchard grinding** A resurfacing procedure in which metal is removed by grinding as the surface is rotated.

**Bleed** A procedure to remove the air from a hydraulic system.

**Blocker ring clearance** A check to determine the amount of blocker ring wear.

**Blocker rings** *See* Synchronizer ring.

**Bolt** The major type of threaded fastener used with a nut to secure parts together.

**Bore runout** A measure of the amount that the bore of a clutch housing is off-center.

**Borg and Beck assembly** A type of pressure-plate assembly that can be identified by wide, stamped steel release levers.

**Break (open)** A disconnected or incomplete path that will not allow the flow of electricity.

**Brinelling** A wear pattern that presses or wears a series of grooves or dents in a bearing surface.

**Bump cap** A hard plastic hat to protect the head from bumps.

**Burnish** To smooth or polish through rubbing action.

**Burr** Deformed metal that leaves a protruding sharp edge.

**Bushing** A simple bearing, usually made from a soft metal, that requires oil or grease to reduce friction.

**Cam** A part of the shift mechanism that transfers motion from the shift shaft to the shift fork.

**Cancelling angles** Equal and opposite angles of two U-joints, used to cancel vibrations generated by the U-joints.

**Cap screw** A bolt that is threaded into a casting.

**Cardan joint** The common U-joint used in most RWD driveshafts.

**Carrier** The casting section of a drive axle that contains the differential and ring and pinion gears.

**Carrier bearing preload** The load placed on carrier bearings during assembly.

**Carrier bearings** The bearings that support the differential carrier.

**Case** The rigid housing for a drive axle, transaxle, transmission, or transfer case.

**Center section** The carrier portion of a drive axle.

**Centrifugal force** The force on a revolving object that tries to push it away from the center of revolution.

**Chamfer** A beveled edge on a shaft or bore.

**Chatter** A clutch problem in which there is a rapid apply and release of the clutch.

**Chip** An area of a part that has a small fragment of metal broken out of it.

**Circlip** A snap-ring type of ring with a round cross section used to position a shaft in a bore.

**Circuit breaker** A circuit protection device that can be manually or automatically set.

**Clash** The grinding sound that is heard when trying to mesh two gears that are operating at different speeds.

**C-lock** A C-shaped locking device used to retain an axle shaft. Often called a c-clip.

**C-lock-retained axle** An axle that is retained by C-lock on the inner end of the axle.

**Center differential** A differential used with AWD to allow a speed difference between the front and rear axles.

**Closed case** A transmission design that does not mount the shift levers through an opening in the case.

**Closed knuckle** A large, rounded housing that encloses a CV joint on a front drive axle.

**Cluster gear** A group of gears that are machined from one piece of metal, or individual gears combined into one group so they operate together, also called a *counter gear* or *layshaft*.

**Clutch** A device that controls the power transfer between two points by either allowing or not allowing a transfer.

**Clutch cable** A cable that transmits motion from the clutch pedal to the release bearing.

**Clutch disc** The clutch member that transmits torque to the transmission input shaft.

**Clutch fork** The clutch member that transmits motion from the linkage to the release bearing.

**Clutch housing** The casting that surrounds the flywheel and clutch; often called a *bell housing*.

**Clutch pedal free travel** The amount that the clutch pedal moves before the release bearing contacts the release levers.

**Clutch plate** *See* Clutch disc.

**Clutch shaft** A part of the main drive gear; the transmission input shaft.

**Clutch slippage** A clutch problem in which the clutch does not transmit the torque load and the engine overrevs.

**Clutch spin down** A diagnostic test to determine clutch drag.

**Coast** A load condition in which the vehicle is driving the engine, as during deceleration.

**Coast side** The concave side of a gear tooth.

**Coefficient of friction** A reference to the amount of friction between two surfaces.

**Collapsible spacer** *See* Crush sleeve.

**Complete circuit** A complete path from battery B+ to ground required for electrical current to flow.

**Composite rings** Synchronizer rings that are lined with carbon, metal, or paper based composite material.

**Cone clutch** A type of clutch that uses conical driving and driven members.

**Constant mesh** A transmission in which each gear (with the possible exception of the reverse idler gear) is constantly meshed with its mating gear.

**Constant-velocity joint (CV joint)** A V-joint that can transmit power without changing the velocity.

**Contact pattern** *See* Gear contact pattern.

**Contamination** Scratches, pitting, or scoring in a scattered pattern.

**Continuity** A circuit or component that has a complete path for current to flow.

**Continuously variable transmission (CVT)** A transmission that varies the gear ratio in a continuous, rather than step-wise, manner.

**Control module** Electronic device that controls electrical circuits.

**Countershaft** The shaft that supports some cluster gears.

**Countertrack** A plunge-type CV joint that uses eight drive balls.

**Coupler** A clutchlike device that can connect or disconnect the power flow between two components.

**Cover** The outer part of a pressure plate assembly that contains the other parts.

**Crack** A surface break that appears as a line.

**Cross and yoke joint** Most common type of U-joint, also known as a Cardan joint.

**Cross groove joint** A plunge joint similar to a Rzeppa joint.

**Crosstrack** A fixed-type CV joint that uses eight drive balls.

**Crush sleeve** A collapsible spacer used to maintain pinion bearing preload.

**Cushioned disc** A clutch disc with a damper assembly.

**Damper** A device that reduces the torsional vibrations between the engine and transmission.

**Dead axle** An axle that supports a wheel but does not transmit power.

**Decelerate** To reduce speed.

**Deflection** The bending or movement caused by a load.

**Department of Transportation (DOT)** A governmental agency that is concerned with transportation.

**Detent** A spring-loaded device used to position a shift fork correctly.

**Diagnostic trouble code (DTC)** Codes generated by a control module that are used to help with troubleshooting.

**Dial indicator** A measuring instrument that is used to measure travel/clearance.

**Diaphragm** A type of pressure plate assembly that uses a diaphragm spring.

**Diaphragm spring** A round, conical-shaped spring; a Belleville spring.

**Differential** A gear arrangement that allows the drive wheels to be driven at different speeds.

**Differential clearance** A check to determine the amount of differential wear.

**Digital multimeter (DMM)** A meter that has multiple functions for measuring electrical activity and uses a digital read out.

**Diode** An electrical one-way check valve.

**Direct current (DC)** An electrical current that only flows in one direction.

**Direct drive** A 1:1 gear ratio.

**Disc alignment** The procedure of aligning a new disc to the flywheel before replacing the pressure plate.

**Disc runout** The checking procedure to make sure that a clutch disc runs true.

**Dog clutch** A type of clutch that uses gearlike, one male and one female, driving and driven members. It is engaged when one is slid over the other.

**Dog clutch teeth** The set of teeth on a speed gear that engage the synchronizer sleeve.

**Dogs** *See* Keys.

**Double-Cardan joint** Two Cardan joints separated by a ball and spring to maintain equal operating angles.

**Double cone** A synchronizer design that uses two or more cones.

**Double-lip seal** Used to seal two lubricant containing units so the lubricant will not pass between them.

**Double-offset joint** A plunging CV joint typically used as the inboard CV joint on FWD shafts.

**Dowel** A round metal pin attached to a casting, which ensures proper alignment as a hole in another casting is placed onto it.

**Drag** The resistance or friction created by one object passing by another.

**Drive** A load condition in which the engine is applying power to the drive wheels.

**Drive axle** An axle that supports the vehicle and provides a method of driving the wheels.

**Driveline** Another name for a driveshaft.

**Drive pinion gear** The smaller drive gear in a ring and pinion gear set.

**Drive side** The convex side of a gear tooth.

**Driveshaft** A device that transmits power from one unit to another.

**Dual mass flywheel** A two-part flywheel that drives the secondary flywheel through a set of long damper springs.

**Dynamic friction** The relative amount of friction between two surfaces that have different speeds.

**Dynamic shift test** A shift test that is made with the engine running.

**Eccentric** Two circles that do not have the same center.

**Electric arcing** A series of small burn marks around a bearing or shaft caused by electrical sparks.

**Electronic control module (ECM)** An electronic device that uses various inputs to determine the needed output reaction to efficiently operate the system.

**Electronic traction control (ETC)** A system that prevents wheels from spinning to increase overall vehicle traction.

**Electrostatic discharge (ESD)** A momentary flow of electricity that occurs when an excess of electric charge finds a path to ground.

**End float** *See* End play.

**End play** Free movement of a part in a sideways direction.

**Energy** The ability to do work.

**Engagement modulation** The ability to engage the clutch in order to produce a smooth, slip-free engagement.

**Engine support** A device that supports the engine so the transaxle can be removed.

**Environmental Protection Agency (EPA)** A governmental agency that is charged with protecting human health and with safeguarding the natural environment: air, water, and land.

**Excessive wear** Wear that causes a part to become unusable.

**Extension rod** *See* Stabilizer bar.

**Extreme-pressure (EP) lubricant** A lubricant designed to stay in place and keep parts from touching when under extremely high pressure.

**Face** The area of a gear tooth above the pitch line.

**Face runout** The checking procedure to make sure that the face of the clutch housing is true to the flywheel.

**Facing** The friction material on a clutch disc.

**Feeler gauge** Thin metal strips of precise thickness, used to measure the clearance between two parts.

**Fiber composites** A mixture of fiber threads (glass, graphite, or other materials) and a resin.

**Final drive** The last set of reduction gears before the power flows to the differential gears and drive axles.

**Final drive ring gear** The larger driven gear in a ring and pinion gear set.

**Fixed joint** A CV joint that does not change length.

**Flank** The area of a gear tooth below the pitch line.

**Float** A load condition in which two parts are turning at the same speed with no driving force between them; also when a shaft is supported by a gear that, in turn, is supported by a bearing.

**Fluid clutch** A type of clutch that drives through fluid; similar to a torque converter.

**Flywheel** The rotating metal mass attached to the crankshaft that helps even out power surges and provides a mounting point and friction surface for the clutch.

**Force** A push or pull measured in units of weight-like pounds or kilograms.

**Formed-in-place gasket (FIPG)** A gasket material that comes from a tube, which is applied to metal surfaces before assembly.

**Four-wheel drive (4WD)** A drive system that can drive both the front and rear wheels.

**Fretting** Small particles that decay and break off bearing races.

**Friction** The resistance in motion between two bodies in contact with each other.

**Friction disc** A flat disc that is faced with friction materials; it is driven when it is clamped between two flat metal surfaces.

**Friction modifier** An additive that increases the slipperiness of a lubricant.

**Front drive axle** The driving axle at the front of a 4WD vehicle.

**Front-wheel drive (FWD)** A drive system that drives the front wheels.

**Fulcrum** The pivot or supporting point for a lever.

**Full-floating axle** An axle supported by two bearings at the wheel end that transfers vehicle weight from the axle housing to the wheel.

**Full-time 4WD** See All wheel drive (AWD).

**Fuse** A circuit protection device that will break (open) a circuit if the current flow exceeds the rating of the fuse.

**Fusible link** A circuit protection device that is made of wires that is four gauge sizes smaller than the circuit wire. The wire will melt (open) if the current flow exceeds the ability of the wire to pass the current.

**Galling** Wear that transfers metal and is caused by metal-to-metal contact without proper lubrication.

**Gasket** A compressible material used as a seal between two mating surfaces.

**Gauge (wire)** The cross-section size of a wire. AWG gauges use low numbers for large wires and higher numbers for smaller wires.

**Gear** A metal wheel with teeth that transmit power or motion to another gear.

**Gear clash** The noise created when gears rotating at different speeds are tried to move into mesh.

**Gear contact pattern** The pattern made as a result of two gears contacting each other.

**Gear marking compound** A paint compound that is placed on the gear teeth to make the gear contact pattern more visible.

**Gear ratio** The ratio in the number of teeth on the driving and driven gears; it is calculated by dividing the number of teeth on the driven gear by the number of teeth on the driving gear.

**Gear rattle** A noise created when one of the gears in mesh tries to change speed.

**Gear reduction** A condition in which the driving gear is smaller than the driven gear; the result will be an increase in torque and a reduction in speed.

**Grab** A clutch problem in which it applies suddenly, more rapid than desired.

**Grade** The strength rating of a bolt.

**Grade resistance** One hundredth of the vehicle weight times the angle of the grade in percent.

**Graphite** A very fine carbon dust that is used as a dry lubricant or a fiber that is combined with resin to form very strong and lightweight objects, such as driveshaft tubing.

**Gravity bleeding** A method of removing air from the hydraulic system using gravity.

**Grease** A thick lubricant typically made of oil and lithium soap.

**Grease spray** A spray of grease that came from a faulty seal for a rotating part—typically a CV joint.

**Ground** The return path of a circuit. The chassis of a vehicle usually provides the ground.

**Grounded circuit** A circuit that has an unwanted connection to ground causing a short circuit.

**Halfshaft** The driveshaft used to connect the differential to the drive wheels on drive axles with independent suspension.

**Hard shift** A shift that takes more effort than normal.

**Hat** Another name for a clutch pressure plate cover.

**Hazardous waste materials** Chemicals or components that are no longer needed and pose a danger to the environment or people.

**Heel** The outer end of a bevel or hypoid ring gear tooth.

**Helical gear** A gear with teeth cut at an angle.

**High Efficiency Particulate Air (HEPA)** A type of air filter that can theoretically remove at least 99.97% of airborne particles.

**High-resistance circuit** High resistance prevents current flow. The higher the resistance the lower the current flow. Also referred to as *weak*.

**Hooke joint** See Cross and yoke joint.

**Hotchkiss driveshaft** A type of rear suspension that uses leaf springs to absorb drive axle housing torque reactions.

**Hub** The center part of a wheel; the surface where a wheel mounts.

**Hub and damper assembly** The center of a clutch disc that connects to the transmission shaft with the damper springs.

**Hunting** See Hunting gear set.

**Hunting gear set** A gear set in which the driving gear will mesh with every tooth on the driven gear as they rotate.

**Hydra-Lok** A differential that uses hydraulically applied clutches to prevent wheel spin.

**Hydraulic clutch** A clutch operating system that uses hydraulic pressure to transfer motion and pressure.

**Hydraulics** A branch of science dealing with the transfer of power through fluids under pressure.

**Hypoid gear** A special form of bevel gear that positions the gear axis on nonintersecting planes and is commonly used in drive axles.

**Hypoid gear set** A matched set of hypoid gears.

**Idler gear** A gear positioned between two other gears such that it causes a change in the direction of rotation.

**Inboard joint** The inner CV joint that can change angle and length (plunge).

**Inclinometer** A device used to measure mounting positions relative to true level.

**Indentation** A dent showing the displacement of metal caused by heavy contact.

**Independent rear suspension (IRS)** A type of rear suspension in which the two rear wheels can move vertically without changing the other's position.

**Index** To align two parts in the proper position before assembly.

**Inertia** The physical property maintaining that a body at rest tends to remain at rest and a body in motion tends to remain in motion and travel in a straight line.

**Input shaft** The shaft that carries the driving torque into a gear box.

**Insert plates** *See* Keys.

**Integral** Manufactured into; part of.

**Integral carrier** A rear axle carrier that is integrated with the axle housing so it cannot be removed for service.

**Integrated microchips** Very small electrical circuits contained in a small package.

**Integrated wheel end disconnect** A system that is used to connect and disconnect the outboard CV joint with the wheel hub.

**Interaxle differential** *See* Center differential.

**Interlock** A transmission mechanism that prevents two shift rails or forks from moving at the same time.

**Intermediate shaft** The output shaft of the transmission portion of a transaxle that drives the differential.

**Internal gear** A gear with the teeth pointing inward toward the center of the gear.

**International Automotive Technicians Network (iATN)** A web-based group that shares vehicle repair information.

**Journal** A bearing surface for a shaft, gear, or bearing to rotate on.

**Jumps out of gear** A transmission problem that occurs when it shifts to neutral on its own.

**Keys** A synchronizer part that pushes the synchronizer rings into contact with the gear cone.

**Lash** Excessive looseness in a drivetrain that can cause a "clunk" when torque load is changed. *See* Backlash.

**Leak** Fluid escaping from a housing.

**Level protractor** A tool used to check U-joint or driveshaft angles.

**Limited slip differential** A differential that uses internal clutches to limit the speed difference between the axles.

**Lining** *See* Facing.

**Linkage** The series of rods, levers, cables, etc. used to transmit motion of force from one point to another.

**Linkage adjustment** The procedure to ensure that the transmission gears shift completely in or out of mesh as the shift lever is moved.

**Live axle** An axle that transmits power.

**Locked differential** A differential that will not allow differential action to occur.

**Locked into gear** When a transmission cannot be shifted out of a gear.

**Locking hub** A 4WD front hub that will unlock the hubs for highway use and lock for off-road use.

**Lock washer** A washerlike locking device designed to preload a nut to prevent rotation.

**Loctite** A brand of adhesive used to prevent screws and bolts from coming loose.

**Long assembly** A type of pressure plate assembly that can be identified by weights on the outer end of the release levers.

**Lubricant checks** A check to determine the fluid level.

**Lung cancer** A serious illness that can result from exposure to asbestos or other hazardous materials.

**μ** The Greek letter (mu) that is used as the symbol for micron.

**Magnetic clutch** A clutch that is applied and released by magnetic force.

**Main drive gear** The transmission's input gear.

**Mainshaft** The transmission's output shaft.

**Make (close)** When a switch is closed it will make the circuit, allowing current to flow.

**Malfunction indicator light (MIL)** An indicator light on the dash that alerts the driver to a problem.

**Manual transmission** A transmission device in which the gear ratios are changed by manually shifting.

**Manual transmission fluid (MTF)** The lubricant required for a transmission that uses composite synchronizer rings.

**Marcel** A large series of wave springs between the two lining sections of a clutch disc.

**Material Safety Data Sheets (MSDSs)** Forms containing data regarding the properties of a particular substance.

**Mechanical hub** A 4WD locking front hub that must be manually switched.

**Mesh** The interlocking of the teeth of two gears.

**Mesothelioma** A fatal type of cancer of the lining of the chest or abdominal cavity, which can be caused by asbestos inhalation.

**Micrometer** A precision measuring instrument used to measure outside or inside diameters and depth.

- Mineral oil** A refined oil product that comes from a crude oil base.
- Misalignment** A wear pattern that leaves a diagonal polish on bearing races.
- Modular clutch** An assembly that combines the flywheel, clutch disc, and pressure plate.
- Multiple-disc clutch** A clutch that uses more than one friction disc.
- Needle bearing** A very thin roller bearing.
- Neutral** A condition in a transmission where the input shaft rotates and the output shaft is not driven.
- Neutral rattle/rollover** Gear rattle that occurs while the transmission is in neutral.
- Newton-meter (N-m)** The metric measurement for torque.
- Nick** A break or notch caused by impact.
- Nodular iron** A type of cast iron that incorporates graphite to increase strength.
- Noisy transmission** Unusual noises that indicate a potential problem.
- Nominal shim** A shim of designated thickness used when beginning a gauging process.
- Nonhunting** A gear ratio that allows contact of the same drive and driven gear teeth each revolution of the gear set.
- Nut** A threaded fastener that is used with a bolt.
- Occupational Safety and Health Administration (OSHA)** A governmental agency that regulates workplace safety.
- Ohmmeter** A meter used to measure the resistance of a circuit or component.
- Ohms (O,  $\Omega$ )** Unit of measurement for resistance.
- Oiling funnel** A transmission part that feeds oil into a shaft.
- One-way clutch** An overrunning clutch that locks in one direction and freewheels or overruns in the other.
- Open case** A transmission design that mounts the shift levers through an opening in the case.
- Open circuit** A break or interruption in a circuit that will not allow current to flow.
- Open design** A design used for most 4WD that has ball joints and Cardan joints.
- Open differential** A differential that will split torque equally between axles and does not limit the speed difference between the axles.
- Original equipment manufacturer (OEM)** The manufacturer of a particular vehicle.
- “O”-ring** A round sealing ring.
- Outboard joint** The outer CV joint that only changes angle.
- Output shaft** The shaft that carries the torque out of a gear box.
- Overdrive** A gear arrangement that causes the output shaft to turn faster than the input shaft.
- Overhung pinion** A pinion that hangs over from the support bearing.
- Parallel circuit** A circuit that has more than one load with each load sharing a common battery ground connection.
- Partial nonhunting** A gear ratio that allows contact of the same drive and driven gear teeth in a regular pattern.
- Part-time 4WD** A 4WD vehicle that allows the front drive axle to be disconnected for highway use and applied for off-road use. Commonly called *4WD*.
- Passing gear** A forced downshift from a higher gear to the next lower gear.
- Pawl** A locking device that holds a gear stationary.
- Peeling** A slight scraping away of material from a bearing race.
- Peen** A process of striking a metal surface with a hammer or steel shot to upset or harden the surface.
- Phasing** The placement of U-joints in a driveshaft relative to each other.
- Pilot bearing** A bearing in the end of the crankshaft used to support the front end of the transmission input shaft.
- Pinion bearing preload** The load placed on the pinion bearings during assembly.
- Pinion depth** The pinion gear's position relative to the ring gear.
- Pinion gear** A small gear that meshes with a larger gear.
- Pitch** The distance between threads of a bolt and nut; the relative number of teeth or spacing of the teeth on a gear.
- Pitch diameter** The effective diameter of a gear; midpoint of gear tooth. (Also called *pitch line*.)
- Pitch line** The line of contact between driving and driven gears.
- Pivot shaft** A shaft that runs through the clutch housing that transfers force from the clutch linkage to the release bearing. Also called a *cross shaft*.
- Planetary gear set** A gear system composed of a sun gear, a planet carrier with planet pinions, and a ring gear that can produce one or more gear ratios.
- Plug-in connection** A method of holding the inboard CV joint into the differential side gear using a circlip.
- Plunge joint** A CV joint that allows a driveshaft to change length.

**Positraction** The brand name of limited slip differentials used in Chevrolets.

**Power** The rate at which work is done.

**Power source** The source of electrical power. Battery, generator, and capacitors are typical automotive power sources.

**Power train** The mechanism that transfers and modifies the driving torque from the engine crankshaft to the drive wheels.

**Power train control module (PCM)** An electronic control module for the engine and transmission.

**Power transfer unit (PTU)** A gear box added to a FWD transaxle to control the power flow to a rear drive axle.

**Preload** An adjustment that removes all clearance and places a load on the parts.

**Pressure** A force per unit area measured in pounds per square inch (psi) or units of atmospheric pressure (bars or kilopascals).

**Pressure plate** The metal disc that applies pressure onto the friction disc to transmit torque.

**Pressure-plate assembly** The major clutch part that combines the pressure ring, cover, release levers, and spring(s).

**Pressure ring** Part of the pressure-plate assembly that squeezes the clutch disc.

**Pressure springs** Part of the pressure-plate assembly that pushes the pressure ring against the clutch disc.

**Propeller shaft** *See* Driveshaft.

**Protection devices** Devices that protect a circuit from excessive current flow.

**Quill** The extension from the transmission input bearing retainer that supports the clutch release bearing.

**Race** A hardened surface for the bearing rollers or balls to roll on.

**Rack and pinion gear set** A gear set combining a straight gear (the rack) with a pinion gear so the rack moves sideways when the pinion is rotated.

**Radial** A direction perpendicular to the rotating axis.

**Radial runout** A measure of the amount that a round component like a flywheel is out of round or off-center. Excessive radial runout can cause a vibration.

**Rail** A metal rod/shaft on which the shift forks are mounted.

**Rear wheel drive (RWD)** A drive system that drives the rear wheels.

**Reduction** A gear ratio that increases torque and reduces speed.

**Relay** A device that uses a small current to control a large current.

**Release bearing** The bearing that is forced against the pressure plate assembly to release a clutch. (Also called *throwout bearing*.)

**Release bearing support** A transmission part, usually the front bearing retainer, that provides a place for the release bearing to slide on.

**Release levers** Part of the pressure plate assembly that links the pressure ring to the release bearing.

**Reluctor** A toothed ring that rotates and is used to monitor speed or position of a rotating part.

**Removable carrier** A rear axle carrier that can be removed from the housing for service.

**Resistance** The opposition to current flow.

**Reverse idler gear** *See* Idler gear.

**Reverse idler shaft** The shaft that supports the reverse idler gear.

**Right-to-know laws** Laws that state that employees have a right to know when the materials they use at work are hazardous.

**Ring gear** *See* Annulus gear.

**Ring gear runout** The side-to-side wobble of the ring gear as it is rotated.

**Roller clutch** A one-way clutch that uses a set of rollers and a special cam as the locking mechanism.

**Rolling friction** The drag of the tires on the road plus bearing friction.

**Room-temperature vulcanizing (RTV)** A formed-in-place gasket material; a rubberlike material that vulcanizes at room temperature.

**Runout** Deviation in an item's rotation or a mounting plane.

**Rzeppa joint** The most commonly used outboard CV joint.

**Schematic** *See* Wiring diagram.

**Scoring** A tear or break in a metal surface caused by heavy contact.

**Seizing** Parts that are partially or completely welded together from friction-generated heat.

**Selective fit** Parts that are available in slightly different thickness so a technician can select the correct size.

**Self-induction** The generation of current in a coil circuit when the coil is first completed (made) or opened (broken).

**Semi-floating axle** A rear drive axle that is supported at one end by a bearing and the differential side gear at the other end.

**Sensor** A device that measures (motion, pressure, position etc.) and sends (electrically) information to a control unit.

**Sequential transmission** A transmission that shifts through its gears in linear sequence with no gear skipping (1 to 2, 2 to 3,



3 to 4 or 4 to 3, 3 to 2, 2 to 1) one gear at a time either up or down. The shift lever is moved one direction for upshifts and the opposite direction for downshifts. Motorcycles use sequential transmissions.

**Series circuit** A circuit that has the loads connected one after the other.

**Service spacer** Shims used to space the carrier bearings and maintain carrier bearing preload.

**Shift blackout** When a transmission cannot be shifted into one or more gears.

**Shift effort test** A check to determine the amount of effort required to complete a shift.

**Shift fork** The part that transfers motion from the shift shaft to the synchronizer sleeve.

**Shim** A thin metal spacer used to adjust clearance or preload.

**Shorted circuit** A circuit that has a path that bypasses part of a circuit.

**Side bearings** *See* Carrier bearings.

**Side gears** *See* Axle gears.

**Sleeve** The synchronizer part that slides to engage the speed gear's dog teeth.

**Slider clutch** A clutch designed to slip until a certain rpm to prevent the transfer of too much torque for the drive wheels.

**Slip fit** A free-running or sliding fit.

**Slip joint** A splined joint in a driveshaft to allow it to change length.

**Slipping** A loss in torque transfer accompanying an increase in engine rpm.

**Slip yoke** The part that allows for length change in a RWD driveshaft.

**Solenoid** An electromechanical device that has a movable core.

**Solvent** Usually colorless liquids that are used to remove grease and oil.

**Spalling** A condition where surface metal breaks away from a bearing race.

**Special Service Tools (SSTs)** Tools that are developed by OEM so service or repair procedures can be done.

**Speed gears** The gears that are meshed with the cluster gear that transfer motion to the synchronizer assembly.

**Speed sensitive** Associated to a vibration that is noticeable with a change in engine or vehicle speed.

**Spiral bevel gear** A type of bevel gear that uses curved teeth that are spiral cut to provide quieter operation.

**Spline** A slot or groove cut in a shaft or bore that is used to connect to a matching spline.

**Split case** A transmission design that splits the case vertically into two halves.

**Spontaneous combustion** Self-ignition of oily rags without the use of an ignition source.

**Sprag** The locking element in a one-way sprag clutch.

**Sprag clutch** A type of one-way clutch.

**Spur bevel gear** A type of bevel gear with straight cut teeth, commonly used in differentials.

**Spur gear** A gear with teeth cut parallel to the axis of the gear.

**S spring** A steel spring shaped like the letter S.

**Stabilizer bar** A brace connecting the shift linkage to the transaxle case.

**Stall** A condition where the engine is running but the transmission input shaft is not rotating.

**Stall speed** A condition where the engine is running at maximum speed but the automatic transmission input shaft is not turning.

**Standard transmission** *See* Manual transmission; at one time the standard equipment on a new vehicle.

**Static friction** The relative amount of friction between two stationary surfaces or two surfaces that are rotating at the same speed.

**Static shift test** A shift test that is made with the engine off.

**Stepped flywheel** A flywheel that is thicker at the rim than at the clutch friction surface.

**Step wear** Heavy wear that produces a step that can be seen or felt.

**Straddle mounting** Mounting a gear between two bearings.

**Struts** *See* Keys.

**Stud** A short rod with threads on both ends.

**Swage** Deforming metal to hold/lock parts in place.

**Switch** An electrical device used to control a circuit by opening (breaking) and closing (making) a circuit.

**Symbols (circuit components)** Used to represent components in an electrical circuit.

**Synchronize** To bring two objects to the same rotating speed; to cause two events to occur at the same time.

**Synchronizer assembly** A group made up of a hub, sleeve, synchronizer rings, keys, and energizer springs.

**Synchronizer ring** Part of a synchronizer assembly that blocks a shift until the speeds are synchronized.

**Synthetic oil** An oil with significant man-made modifications.

**Tapered roller bearing** A nonfriction bearing that uses tapered steel rollers as the rolling element.

**Technical Service Bulletin (TSB)** A form that describes a particular vehicle concern and the recommended correction procedure.

**Throw-out bearing** *See* release bearing.

**Thrust** A motion of a gear or shaft along its axis.

**Thrust washer** A bearing that is used to separate rotating parts from stationary parts or parts that are rotating at different speeds.

**Toe** The inner end of a bevel or hypoid ring gear tooth.

**Tone ring** *See* Reluctor.

**Torque** A turning or twisting effort that is normally measured in foot-pounds or Newton-meters.

**Torque bias check** Measures the torque required to rotate one wheel while the other wheels are held stationary.

**Torque bias ratio (TBR)** The relative amount of torque that each drive wheel will receive.

**Torque converter** A type of fluid coupling that is used with automatic transmissions that will multiply engine torque. It self-releases to allow the vehicle to stop with the engine running and the transmission in gear.

**Torque sensitive** Associated to a vibration that is noticeable with a change in torque.

**Torque tube** Steel tube used to position the rear axle.

**Torsen**<sup>®</sup> Torque-sensing worm gear differential.

**Traction** The relative amount of grip between a tire and the road surface.

**Traction control** A system used to sense wheel spin and reduce drive wheel torque to the amount of traction.

**Tractive effort** The amount of thrust that the engine and drivetrain can generate at the road surface.

**Tractive resistance** The load that the drivetrain works against.

**Transaxle** A transmission that is combined with the final drive and differential and is normally used in FWD and mid-engine vehicles.

**Transfer case** An auxiliary transmission used in most 4WD vehicles to divide and control the power flow to the front and rear drive axles.

**Transistors** A semiconductor device that can work like a relay or amplifier.

**Transmission** A device in the power train that provides different forward gear ratios, a neutral, and a reverse.

**Transverse** A position that is across the vehicle.

**Tripod joint** A type of fixed, outboard CV joint.

**Tripod tulip joint** A plunge, inboard joint commonly used on FWD shafts.

**Trough** A raised area inside a transmission case to direct oil to a shaft or bearing.

**Trunnion** The projecting arms of a U-joint cross that form the bearing journals.

**Tunnel case** A transmission design that installs the gear and shaft assembly through the end of the case.

**Twin-traction axle** A Ford front drive axle that utilizes a swing axle system.

**U-joint angle** *See* U-joint operating angle.

**U-joint operating angle** The angle between a U-joint's input and output shafts.

**UNC** Unified National Coarse.

**Uneven wear** Unevenly distributed wear.

**UNF** Unified National Fine.

**Universal joint (U-joint)** A mechanical device used to transfer power and motion at changeable angles.

**Upset** The action of displacing metal with hammer blows.

**Used brake fluid** Brake fluid that has been used.

**Used coolant** Coolant that has been used.

**Used oil** Any petroleum-based or synthetic oil that has been used.

**Vacuum motor** A vacuum-operated device that does work.

**Vari-lock** Jeep's name for a Hydra-Lok differential.

**Vehicle emission control information (VECI)** An underhood label with emission control information.

**Vernier caliper** A precision measuring instrument used to measure outside and inside diameters as well as depth.

**VIN** Vehicle identification number.

**Viscosity** A fluid's resistance to flow.

**Viscous** Thick; tending to resist fluid flow.

**Viscous coupling** A sealed clutch filled with a viscous fluid that will transfer power as the fluid is heated.

**Visual check** A visual inspection to determine the overall condition.

**Visual inspection** A careful inspection of a part or vehicle using sight and feel.

**Volts (V)** Unit of measurement for electrical pressure.

**Washer** A thin metal disk with a hole used to support the load of a threaded fastener.

**Watts (W)** Unit of measurement for electrical work (amps × volts = watts).

**Wave spring** A spring that resembles a flat, wavy washer.

**Wet clutch** A clutch that operates in fluid.

**Wheel end** The outer end of the axle housing where the axle bearing is situated.

**Wheel speed sensor (WSS)** A device to sense the speed of a wheel, typically used with ABS brakes and traction control.

**Wiring diagram** A diagram made of symbols and lines to represent an electrical circuit.

**Work** The result of force that changes the speed or direction of motion of an object.

**Workplace Hazardous Materials Information Systems (WHIMS)** A Canadian form that contains data regarding the properties of a particular substance.

**Worm gear** A type of gear with teeth that resemble screw threads.

**Yoke** A U-shaped portion of a shaft that connects to a U-joint cross.