

**AF:** Dimension between the center of the fifth wheel or the center of gravity of the body and rear axle. Maximum AF is longest dimension permissible to ensure against load damage to frame. AF dimensions are based on frame strength and do not consider adaptability of average trailer or bodies to the available space behind the cab.

**Air Resistance:** A measure of the drag or retarding effect due to the air turbulence produced by a vehicle in motion. Because it varies theoretically as the square of the speed, it affects the ability of the vehicle to reach top speed as well as the gradability at fast speeds.

**Allowable Body Payload:** Weight rating designated by the truck manufacturer for model types that are later equipped with some type of body (stripped chassis, chassis-cowl or chassis-cab models, for example). This is the combined allowance for total weight of body and payload together.

**Allowable Payload:** The maximum load weight, which may be carried without exceeding the truck manufacturer's designated maximum rating, or some component rating or legal limit (such as axle capacity or legal axle load limits).

**Auxiliary Springs:** Usually rear only, are for increased load stability or capacity without affecting light ride. Mounted to act only after regular springs are partially deflected.

**AW:** Axle width is the distance between the front wheels measured from the centerline of the front tires.

**Axle, Full-Floating:** The full-floating axle shafts have nothing to do but drive the wheels. The housing supports the entire rear weight through double opposed wheel bearings, which absorb all load and wheel stresses. Should axle shaft breakage occur, the truck can be towed since the wheel is supported by the wheel hub and bearings.

**Axle, Rear, Double Reduction:** A double reduction rear axle has a primary reduction through a hypoid or spiral bevel pinion and ring gear and a secondary reduction through a set of herringbone or helical gears. This rear axle is designed to maintain gear strength and give a more powerful driving force to the rear wheels without sacrificing road clearance and to provide higher numerical ratios than are possible with single reduction axles.

**Axle, Rear, Single Reduction:** This type rear axle has one driving pinion and one ring gear that turns the axle shaft. The driving torque at the rear wheels is increased or decreased according to the ratio of the teeth in the driving pinion to those in the ring gear.

**Axle, Semi-Floating:** The inner shaft is carried on an extension of the differential, the outer or wheel bearings being carried directly on the axle shaft. With this type, the axle shafts and wheel bearings not only support the total rear weight but must also transmit driving torque to the wheels and resist stresses due to skidding, turning corners, and tractive forces.

**BA:** Dimension from the front bumper to the centerline of the front axle.

**BBC:** Dimension from the front bumper to the back of the cab.

**BC (Body Clearance):** Distance between the back of the cab and the installed body to prevent cab-to-rear body contact due to flexing of chassis frame.

**Body:** The part of the vehicle designed to carry items related to the use of the vehicle rather than the operation of the unit. This does not normally include the cab except when the cab is an integral part of the body as in a school bus.

**Brake, Engine:** Brake device using engine compression pressure as a retarding medium.

**BW:** Outer track — measures the distance between the dual rear wheels from the outside of the outer wheels.

**CA:** The dimension from the back of the cab to the centerline of the rear axle. This dimension is important when determining the body application or fifth wheel mounting and weight distribution.

**Cab:** The part of the vehicle that encloses the driver and vehicle operating controls. The term "cab" may also include the front end, sheet metal housing, the engine, front fenders, etc.

**CE:** The dimension from the back of the cab to the rear of the standard frame. Used primarily to determine the size of the body that may be used.

**Center of Gravity:** Point where the weight of the truck and/or body and payload appears to be concentrated and, if suspended at that point, would balance front and rear.

**CGA (Center of Gravity to Axle):** The distance measured from the center of gravity of the body and payload to the center of the rear axle (midpoint between the axles for a tandem).

**Chassis:** May be used to represent: (1) Entire vehicle as produced by the factory when no body is included (cab, frame, powerplant, drive line, suspensions, axles, wheels, and tires); (2) Same as (1) except excluding cab and other sheet metal; or (3) Frame only with brackets, bumper, and other miscellaneous parts directly attached to the frame.

**Chassis Weight:** The actual weight of the fully equipped vehicle without body and driver. This weight includes all fluids (no driver or body).

**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 when the piston is at the top of its stroke. Higher compression ratios tend to increase engine efficiency.

**Conventional Cab:** This is a cab design where the powerplant is located ahead or mostly ahead of the cowl. Term may be applied to basic cab structure only or may include front fenders, hood, grille, etc.

**Cowl:** The front part of an automotive cab or body, directly below the base of the windshield between the dash panel, is used to indicate the complete vehicle (less body).

**Crossmember:** Structural unit that connects side rails of the frame.

**Curb (Vehicle) Weight:** The weight of the truck (without load or driver), including fuel, coolant, oil, body and all items of standard and optional equipment.

**CWR (Cargo Weight Rating):** The value specified by the manufacturer as the cargo-carrying capacity, in pounds, of a vehicle, exclusive of the weight of the occupants. The actual cargo weight is also called the payload.

**Deflection Rate:** The deflection rate of a spring is the force required to compress or deflect the spring a distance of one inch. For torsion springs, this distance is measured at the end of the control arm attached to the springs.

**Design Weight:** This is the maximum to which a vehicle or component may be loaded without the danger of failure and/or premature wear taking place. It is a limit imposed by the manufacturer of that vehicle or component.

**Differential:** (A) Standard — gear assembly on the drive axle that permits the wheels to turn at different speeds. (B) No-Slip or Limited-Slip — gear assembly on the drive axle that will not permit one wheel to spin while the other is motionless, such as when a truck is stuck in snow or mud. Torque is transmitted to both wheels of the driving axle.

**Disc Brakes:** A brake assembly containing a disc, which rotates as the wheel turns. A caliper device grabs the disc to stop the wheel from rotating.

**Displacement:** Engine displacement is the volume displaced by a piston during one stroke multiplied by the number of pistons.  $(\text{bore}) \times (\text{bore}) \times (\text{stroke}) \times (\text{no. of pistons}) \times (.785)$

**Drum Brakes:** A brake assembly with brake shoes, which are pressed against a brake drum to stop the wheels from rotating.

**DRW:** Dual Rear Wheel.

**Fifth Wheel:** Load supporting plate mounted to the frame of the vehicle. Pivot-mounted, it contains provision for accepting and holding the kingpin of a semi-trailer providing a flexible connection between the tractor and the trailer. Center of fifth wheel (where kingpin is held in position) should always be located ahead of the centerline of the tractor rear axle or axle group.

**Forward Control:** Vehicle with driver controls (pedals, steering wheel instruments) located as far forward as possible. Supplied with or without body, the controls are stationary-mounted as opposed to the special mountings of tilt cab models.

**Frame Cut-off:** Standard frame on most models extends behind the rear axle, far enough to support a body mounted on the vehicle. For special purpose bodies that may be unusually short for the wheelbase of the vehicle on which it is mounted, or in most tractor operations, this frame extension behind the rear axle may be shortened. The shortest allowable extension for each vehicle is referred to as “maximum frame cut-off.”

**Full Trailer:** A trailing load carrying a vehicle, which is entirely supported by its own suspension systems. The powered unit merely tows this type of trailer and does not directly support any of its weight. Sometimes referred to as a “pup” when towed behind a truck with a mounted body or behind a tractor/semi-trailer combination. Tractor/semi-trailer/full-trailer combinations are often referred to as “double” or “double bottoms.”

**GAWR (Gross Axle Weight Rating):** The value specified by the vehicle manufacturer as the load-carrying capacity of an axle system measured at the tire-ground interfaces.

**GCW (Gross Combination Weight):** Represents the actual weight of a vehicle at the ground with a trailer or trailers including vehicle, equipment, driver, passengers, fuel, and payload (everything that moves with the vehicle).

**Gear Ratio:** The number of revolutions a driving gear requires to turn a driven gear through one complete revolution. For a pair of gears, the ratio is found by dividing the number of teeth on the driven gear by the number of teeth on the driving gear.

**Geared Speed:** The theoretical vehicle speed based on engine rpm, transmission gear ratio, rear axle ratio, and tire size.

**Gradability:** Ability of a truck to negotiate a given grade at a specific GCW or GVW.

**GVW (Gross Vehicle Weight):** Actual weight of the entire vehicle including all equipment, fuel, body, payload, driver, etc. This is for the individual unit only, such as a truck or tractor.

**Helical Gears:** Gears with slanted teeth, usually used in transmissions. The teeth are positioned diagonally across the face of the gear for quieter operation and more gear tooth contact.

**Horsepower:** A measure of the amount of work that can be done by an engine in a certain amount of time. One horsepower is equal to 33,000 ft.-lb. of work per minute. The horsepower of an engine depends upon the torque and speed of the engine.

- **Brake Horsepower:** The actual horsepower delivered by the crankshaft and is measured by means of an electric dynamometer.

- **Gross:** The brake horsepower of an engine with optimum ignition setting (manual instead of automatic advance) and without allowing for the power absorbed by the engine's accessory units such as the fan, water pump, generator, and exhaust system.

- **SAE, Net:** The brake horsepower remaining at the flywheel of the engine to do useful work after the power required by the engine accessories (fan, water pump, generator, etc.) has been provided as measured in accordance with SAE standards.

- **Taxable:** The N.A.C.C. (National Automobile Chamber of Commerce) adopted an arbitrary formula for estimating horsepower to enable comparison of engines on a uniform basis. It assumes that engines deliver their rated power at a piston speed of 1000 feet per minute and that mechanical efficiency will average 75% Taxable Horsepower = (Diameter of Bore)  $2 \times$  Number of Cylinders / 2.5 = D<sup>2</sup>N / 2.5. Advancement in engine design since this formula was developed has rendered the formula obsolete as a basis of estimating true engine output. The formula is still used in some states for licensing purposes, however.

**Hotchkiss Drive:** Hotchkiss drive is a term applied to that type of chassis design where the rear springs are mounted at the forward end in a stationary bracket (not shackled as at the rear end) and all driving and braking forces are cushioned by the springs and transferred directly to the frame side members. Open-type universal joints and propeller shafts are used in this design.

**Hypoid Gears:** Hypoid gears and pinions have a tooth form that permits the drive pinion to mesh with the driven gear below the center of the driven gear.

**Landing Gear:** The two small wheels at the forward end of a semi-trailer used to support the trailer when it is detached from the tractor.

**Maximum Rolling Grade:** (Gradability) Greatest grade a vehicle is able to climb while under motion, or the number of foot rise the vehicle can attain continuously for each 100 feet of horizontal movement. Maximum rolling grade is calculated with the vehicle in motion with rated load and with gearshift settings to obtain greatest gear reduction.

**Maximum Speed:** Ability of a vehicle to attain speeds under full load conditions. This speed is calculated using level road conditions and with best concrete road surface. When the vehicle power is great enough to exceed geared MPH, the geared MPH becomes the maximum speed. Speeds are calculated in the best gear to obtain the highest speed (using a lower gear if necessary).

**Maximum Starting Grade:** (Gradability) Greatest grade a vehicle is able to start on from complete stop. Approximately 10% grade loss from the rolling gradability. (Starting Gradability (%) = Rolling Gradability (%) - 10%).

**Model Weight:** Weight of the vehicle with all items of standard equipment, 150 pounds per passenger in each designated seating position, and maximum capacity of fuel, oil and coolant.

**Nominal Truck Rating:** An arbitrary classification of truck capacity in tons, such as ½-ton, 1½-ton. Although this classification is still used, the correct rating of truck capacity is gross vehicle weight (GVW).

**OAL:** Overall length of chassis measured from the front bumper to the end of the frame.

**OH:** Overall height of chassis measured from the ground to the topmost point of the cab.

**Off-Highway:** Vehicle operation over private roads or asphalt or maintained crushed rock surface or similar material, variable grades. Not subject to legal weight and dimensional limitations.

**Off-Road:** Vehicle operation over private roads in areas with no maintained hard surface variable grades. Not subject to legal weight and dimensional limitations.

**On-Highway:** Vehicle operation over well-maintained major highways of excellent concrete or asphalt construction, level to rolling terrain with uniform grades. Subject to legal weight and dimensional limitations.

**On/Off-Highway:** Vehicle operation over secondary roads of good concrete or asphalt construction with partial operation on well-maintained crushed rock surface or similar material, variable grades. Subject to legal weight and dimensional limitations.

**Overdrive Transmission:** A transmission in which the high gear ratio is less than one to one. This permits the truck, under favorable conditions, to maintain a higher road speed with any given engine speed or a given road speed at a lower engine rpm. The primary use in trucks is for fuel economy on empty return trips.

**OW:** Overall width of chassis from the widest point of the cab.

**Payload:** Weight or commodity being hauled. This will include the packaging, pallets, banding, etc., but does not include the truck, truck body, etc.

**Pintle Hook:** Hook mounted on the truck or semi-trailer used to couple on a full-trailer.

**Planetary Drive:** Gear reduction system with sun gear transmitting reduction through planetary gears to main output shaft.

**Power Curve:** A graphic illustration of maximum output of power and torque at all operating speeds. These curves are established from data obtained by running a sample engine on an engine dynamometer. Net power figures are used in vehicle.

**Power Takeoff:** A device usually mounted on the side of the transmission or transfer case, or off the front of the crankshaft, used to transmit engine power to auxiliary equipment such as pumps, winches, etc.

**Powertrain:** A name applied to the group of components used to transmit engine power to the wheels. The powertrain includes clutch, transmission, universal joints, drive-shafts, and rear-axle gears.

**PR (Ply Rating):** A measure of the strength of tires based on the strength of a single ply of designated construction. An 8-ply rating does not necessarily mean that 8 plies are used in building the tire, but simply that the tire has the strength of 8 standard plies.

**Ratio:** Proportion input revolutions to output revolutions of a unit (axle, transmission, steering gear, etc.). A two-to-one ratio (2:1) means that two complete revolutions must be made on the input shaft of the item to obtain one complete revolution of the output shaft. This is used primarily to multiply torque (turning force), which is the opposite of speed. To interpret a ratio in terms of torque, the expression becomes the proportion of the output to the input. Thus, a 2-to-1 ratio means that 2 units of force are available at output shaft for each unit of force applied to input shaft.

**RBM (Resisting Bending Moment):** (Frame section modulus) x (Frame yield strength). The resulting number is used when comparing the strength of two frames made of different materials.

**Reduction:** Used to indicate the slower output speed resulting from a ratio proportion (faster on reductions less than 1).

**Rim Pull:** The force available at the road surface contacting the driving wheels of the truck. It is determined by engine torque, transmission ratio, axle ratio, tire size, and frictional losses in the drive train. Rim pull is also known as Tractive Effort.

**Road Rolling Resistance:** A measure of the retarding effect of the road surface to forward movement of the vehicle and varies with the type and condition of the road.

**Rolling Radius (Loaded Radius):** Tire-rolling radius is the distance from the center of the wheel to the road. Static radius applies when the vehicle is at rest, rolling radius for a vehicle in motion. The latter dimension is usually slightly greater than the static radius and is the figure used in determining the tire revolutions per mile.

**Section Modulus:** A measure of the strength of frame side rails determined by the cross-section area and shape of the side rails.

**Semi-Trailers:** This is a trailering unit that is supported in the rear by its own suspension system and at the front by the towing vehicle. A separate suspension unit with towing provisions sometimes supports this type of unit, but while being used this way it becomes a full trailer. An exception is the utility-type trailer, house trailer, etc., which is towed by a ball coupling. This is referred to simply as a trailer and is not designed as a semi- or full trailer.

**Set Back or Forward Front Axle:** The front steering axle is normally as close to the front of the vehicle as the design and wheel and tire size permit on conventional and set forward axle (SFA) models. When the front axle is purposely located farther toward the rear it is referred to as being set back or (SBA). The centerline of the front axle to the front bumper is normally 26 to 33-1/4 inches on Conventional and SFA models and 51-3/4 inches for set back front axle models. The purpose of moving the axle rearward is to increase loads applied to the front axle and increase maneuverability. Standard-type front axle setting generally enables more economical cab construction and meets axle spread requirements of states using the Bridge Formula.

**Shipping Weight:** The weight of the basic truck including all standard equipment plus grease and oil wherever required. It does not include the weight of fuel or coolant.

**Slack Adjuster:** Adjustable brake lever on air brake assemblies.

**Spiral Bevel Gears:** Gears with spiral-shaped teeth used primarily to change the direction of transmitted power, such as from the propeller shaft to axle shafts.

**Spring Capacity At Pad:** The amount of sprung weight that will bend a leaf spring its maximum amount.

**Spring Deflection Rate:** The number of pounds necessary to deflect the spring one inch.

**Springs, Auxiliary Type:** Springs that do not come into operation until a predetermined load is placed on the chassis. They are designed to provide riding comfort whether the truck is empty or under partial load.

**Springs, Progressive Type:** Springs that automatically adjust to load or road conditions, ensuring a smooth, comfortable ride.

**Springs, Semi-Elliptical:** Springs basically consisting of one main leaf with eyes at each end for connection to spring shackles and brackets and a number of shorter leaves of uniformly decreasing length shaped in the form of an arc.

**SRW:** Single Rear Wheel.

**Stroke:** The distance traveled by a piston in a cylinder during 1/2 revolution of the crankshaft.

**Synchromesh Transmission:** A transmission with mechanisms for synchronizing the gear speeds so that the gears can be shifted without clashing, thus eliminating the need for double clutching.

**Tilt Cab:** Vehicle designed with the engine beneath the cab and having provisions for tilting the cab forward on a pivot near the front bumper to provide easy access to the engine.

**Tire Load Capacity:** The maximum recommended load that may be carried by the tires. Altering the size of the tires on a vehicle will have a direct bearing on the load that can be carried.

**TL (Trailer Length):** Front of body to bumper.

**Torque, Converter:** A torque converter is made up of a pump, a turbine, and a stator. It multiplies engine torque. When torque multiplication nears a one-to-one ratio, the converter acts as a fluid coupling between the engine and the transmission. At all other pump-turbine ratios, torque is automatically multiplied according to the load imposed on the vehicle, within the limits of the converter.

**Torque, Engine:** Engine torque is the amount of twisting effort exerted at the crankshaft by an engine. The unit of measure is a pound-foot, which represents a force of one pound acting at right angles at the end of an arm one foot long.

**Torque, Gross:** The maximum torque developed by an engine without allowing for the power absorbed by the engine's accessory units such as the fan, water pump, generator and exhaust system. Gross torque is used to determine gross horsepower.

**Torque, Net:** The torque available at the flywheel of the engine after the power required by the engine accessories (fan, water pump, generator, etc.) has been provided.

**Tractive Effort:** See Rim Pull.

**Tractor (Highway):** Vehicle designed for pulling loads greater than weight actually applied to the vehicle. Most heavy-duty trucks are designed for either tractor or truck service. Optional equipment is available to adapt each unit for the particular tractor or truck application for which it is to be used. GCW rating indicates total pulling capacity of a unit including its own weight when used as a tractor in a specified type of service. GVW rating also must not be exceeded.

**Trailer, Full:** A full trailer is a truck trailer constructed so that all of its own weight and that of its load rests upon its own wheels (see Full Trailer).

**Trailer, Semi:** A trailer having axle (or axles) only at the rear; the front of the semi-trailer is supported by a tractor fifth wheel. A semi-trailer may be operated as a full trailer by using a converter dolly to support the front of the trailer.

**Transmission:** A transmission contains a number of gears that, when a connection is made between a specific set, provide a choice of ratio. Connection is made by sliding the teeth of one gear into mesh with another, or by engaging a tooth-type clutch that has one part fastened to a gear already meshed to another, and the other part splined to a shaft. Synchronesh transmissions use gear speed synchronizers to ease engagement.

**Tread:** The distance between the centers of tires at the points where they contact the road surface. Duals are measured from the center of dual wheels.

**Truck:** Vehicle designed for carrying entire load; GVW rating indicates truck capacity. GCW will also apply if a trailer is to be pulled behind the truck. GVW and GCW ratings are maximum at the ground including vehicle, payload and all equipment. A load capacity chart for each model indicates basic equipment needed for each GVW and GCW.

**Turbocharger:** A rotary compressor that pressurizes engine intake air driven by the flow of exhaust gases. It raises the pressure in the combustion chamber to increase the power of the engine.

**Turning Radius:** Half the distance across the smallest circle in which a truck will turn. Can be measured from the centerline of the outside front tire or the outside of the front bumper.

**Universal Joint:** A particular coupling that permits a driving shaft to operate between two power train units that are not always in alignment with each other or subject to movement. For example, between a frame-mounted transmission and a spring-mounted rear axle, a universal joint will usually angle. When installed on a propeller shaft, it allows the shaft to rotate through an angle.

**Vacuum Assist (Power) Brakes:** Standard-type hydraulic brakes with a pressure assist cylinder having a vacuum chamber that, when atmospheric pressure is allowed to one side of the piston or diaphragm, drives a plunger in the hydraulic system, increasing the effect of pedal pressure.

**WB (Wheelbase):** The distance between the centerlines of the front and rear axles. For trucks with tandem rear axles, the centerline is midway between the two rear axles.

**Weight Distribution:** Portions of total weight of a vehicle that will be supported by each axle. Proper predetermination of the distribution of vehicle, equipment, and payload weight is one of the most important requirements in selecting a truck or tractor for a particular operation.

**Weight Sprung:** The weight of those things supported by the springs, such as frame, engine, body, payload, etc.

**Weight Unsprung:** The weight of components such as tires, wheels, and axles that are not supported by the springs.

**Yield Strength:** Yield strength is the maximum amount of stress in pounds per square inch to which material, for example, as in a frame, may be subjected through loading and return to its original shape upon removal of the stress; i.e., no deformation remains.