

Automobile Drive Train Web Page Background

The Transmission Gear Ratio (R1) denotes the number of engine revolutions for each revolution of the drive shaft.

The Final Drive Ratio, also referred to as the differential gear or axle gear ratio (R2) denotes the number of times that the driveshaft will make for each revolution of the drive wheels.

The Combined Gear Train ratio can be determined by multiplying the Transmission Gear Ratio and the Final Drive Ratio together. This Combined Gear Train Ratio represents the number of revolutions required of the engine in order to rotate the drive wheels one time.

To calculate the distance travelled per rotation of the tire we must first calculate the radius of the tire.

Consider the example, 175/65R14:

175 indicates that the width of the tire is 175mm

65 indicates that the tire's sidewall height (from the edge of the rim to the tire's tread) is 65% of the tire's width.

14 indicates that the tire was designed to fit on rims with a diameter of 14 inches.

The conversion factor for mm $\longrightarrow$ in is: 0.039 mm/in

Therefore, for the example, the radius of the tire would be calculated as:

$$175\text{mm} * 65/100 * (0.039 \text{ mm/in}) + 14 \text{ in.} / 2$$

Once the radius of the tire has been determined, the distance travelled by one revolution of the tire can be calculated using the formula,

$$\text{Distance} = 2\pi r$$

Note: As represented above, your calculations will result in a speed that is measured in inches per minute. Use the following to convert your results into miles per hour.

$$1 \text{ mile} = 5280 \text{ feet}$$

$$1 \text{ foot} = 12 \text{ inches}$$

$$1 \text{ hour} = 60 \text{ minutes}$$