TRANS-02, Speedometer, Gear Ratio, and Tire Size Manual Calculations

Use the following formula to determine tire circumference:

$$\left[\left(\frac{\text{Tread Width} \times \text{Aspect Ratio} \times 2}{25.4}\right) + \text{Wheel Diameter}\right] \times 3.14159 = \text{Tire Circumference}$$

As an example, for a tire of size 225/50 VR 16:

Tread Width	225 mm
Aspect Ratio	50
Wheel Diameter	16 in.

Aspect Ratio is used to determine the height of the sidewall in terms of percentage of the tread width. In the example given the height of the sidewall is 50% of the tread width or 112.5 mm. In the formula above, we would use .50 for the aspect ratio.

Multiplying by 2 in the formula accounts for the height of the sidewall at the top and bottom of the wheel and dividing by 25.4 converts the total wall height from millimeters to inches. By adding the wheel diameter (given in inches) to the wall height, we obtain total diameter.

Using the formula for circumference of a circle, we obtain the circumference of the tire.

$$\text{Circumference} = \pi \times D \text{ (diameter)}$$

Substituting for the tire size in the example:

$$\left[\left(\frac{225 \times .50 \times 2}{25.4}\right) + 16\right] \times 3.14159 = 78.1 \text{ inches}$$

To determine the speed in MPH for a given gear ratio use the following formula:

$$\frac{\text{Engine RPM} \times \text{Tire Circumference}}{\text{Final Drive Ratio} \times \text{Gear Ratio} \times 1056} = \text{MPH}$$

So, the calculated speed for a 1983 944 in 5th gear at 6400 RPM with 225/50 VR 16 tires would be:

$$\frac{6400 \times 78.1}{3.889 \times .829 \times 1056} = 147 \text{ MPH}$$

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