

Vehicle Speed or Motor RPM Calculation



Author – Varun Rai

Version – V1-26102020



Formula Used

Speed = RPM X L (Here, RPM= Revolution per minutes and L = Distance covered by wheel in One revolution which is circumference of the wheel)

$L = \pi \times D$ (D= dia. of wheel)

$D = d + 2H$ (Height of Tire)

1 foot = 2.54cm = 25.4mm

Speed conversion = mm/minutes into Km/h = 60/1000.



Wheel Specification Explained

Tire Width (W) = 90

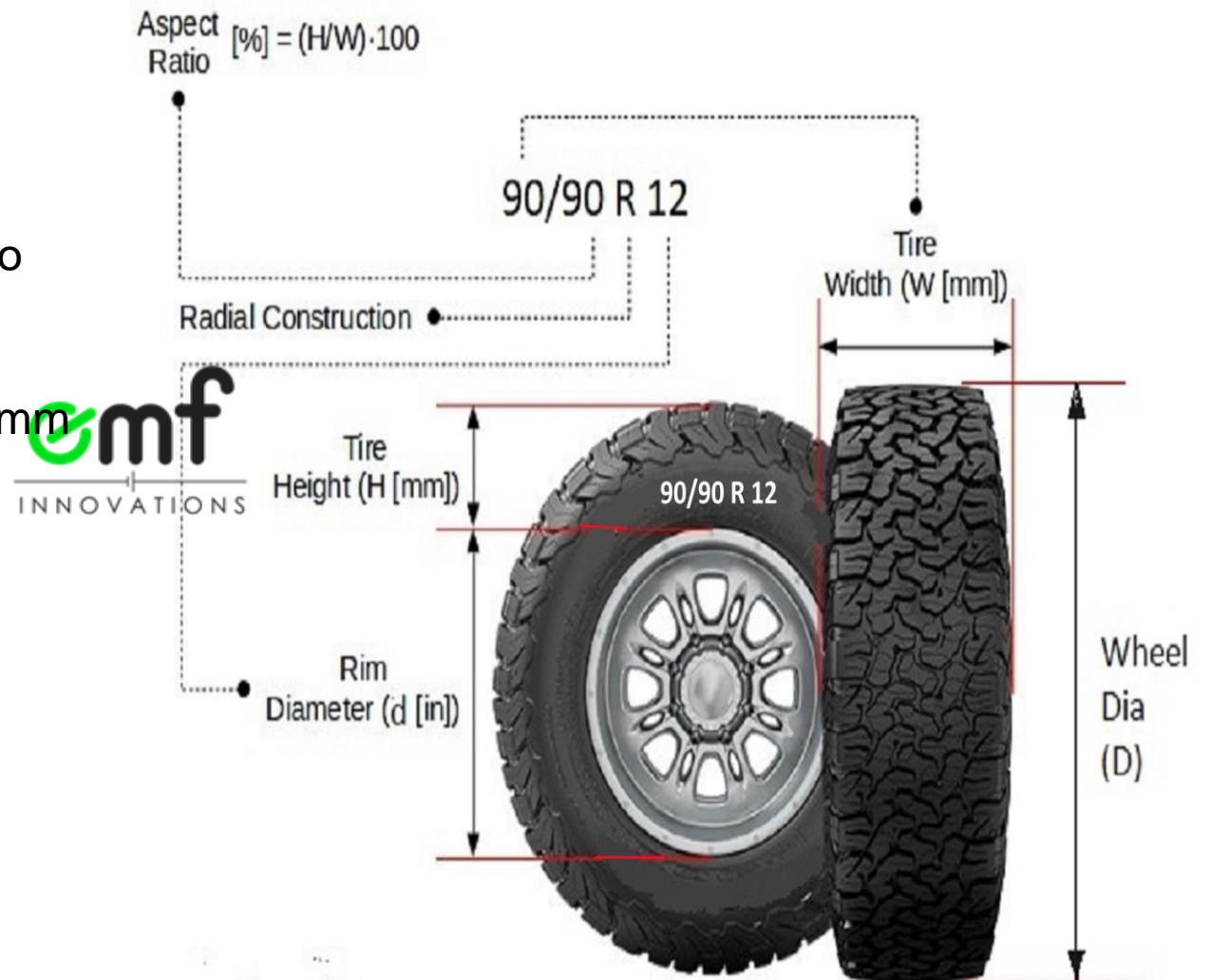
Aspect Ratio(R) = $H/W \cdot 100 = 90$ (It's needed to calculate the Height of the tire)

Height of Tire, $H = W \cdot R / 100 = 90 \cdot 90 / 100 = 81\text{mm}$

Rim Dia, $d = 12\text{ Inch} = 12 \cdot 25.4 = 304.8\text{mm}$

Wheel Dia, $D = \text{Rim dia} + 2H$

$= 304.8 + (2 \cdot 81) = 466.8\text{mm}$



Example 1

Wheel dimension- 90/100 - 10 (Here, 10 is dia. of Rim in Inch, 90 is tire width in mm and 100 is aspect ratio)

Tire Height = $90 \times 100\% = 90\text{mm}$



Now total Wheel diameter, $D = (10 \times 25.4) + (2 \times 90) = 434\text{mm}$

$L = \pi \times D = 3.14 \times 434 = 1362.76 \text{ mm} = 1.36 \text{ mtrs}$

Consider motor RPM is 500

Speed = $500 \times 1.36 = 680 \text{ mtrs/min} = 680 \times 0.06 = 40.8 \text{ Km/hr.}$



Example 2

Wheel dimension – 90/90 – 12 (Here, 12 is dia. of Rim in Inch, 90 is tire width in mm and 90 is aspect ratio in %)

Tire Height = $90 \times 90\% = 81\text{mm}$



Now total Wheel diameter, $D = (12 \times 25.4) + (2 \times 81) = 466\text{ mm}$

$L = \pi \times D = 3.14 \times 466 = 1462.24\text{ mm} = 1.46\text{ mtrs}$

Consider motor RPM is 500

Speed = $500 \times 1.46 = 730\text{ mtrs/min} = 730 \times 0.06 = 43.8\text{ Km/hr.}$

