

# Selecting Motor Roller Speed Code

You can always contact Pulseroller for assistance in properly selecting the right motor roller for your application, but here are some basic guidelines and calculations you can make to get good idea of what roller speed code to select.

You need to know the following about your application:

- Load Weight
- Load Material
- Conveyor Speed
- Number of idler rollers in your conveyor zone
- Interlocking method between motor roller and idlers

## Required Tangential Force

We will use the **Required Tangential Force** method to calculate the force needed based upon your data.

The basic equation is:

$$F_{Total} = F_{Load} + F_{Idlers}$$

So, the total force is equal to the sum of the force required to move the load plus the force required to drive the idler rollers

## Force for the Load

To calculate  $F_{Load}$  in Newtons (N):

$$F_{Load} = m \times g \times \mu_r$$

Where

$m$  = Mass of Load in Kg

$g$  = Gravitational Constant =  $9.8 \text{ m / s}^2$

$\mu_r$  = Coefficient of Rolling Resistance of Load Material

Coefficient of Rolling Resistance ( $\mu_r$ ) for materials are typically ranges of values that vary depending on the particular quality of the material. The greater the value, the more force required, so using the higher value in the range is “worst case” scenario and should be used. Common materials and their values are:

Wood	Steel	Cardboard	Plastic	Rubber
0.02 ~ 0.05	0.01 ~ 0.02	0.05 ~ 0.1	0.02 ~ 0.04	0.1

## Force for the Idlers

To get the  $F_{Idlers}$  in N, we will use a formula that takes idler roller quantity multiplied by a force required per idler constant based upon the interlocking method

Interlocking Method	Calculation
Two Groove with standard O-Bands <sup>1</sup>	$F_{Idlers} = \text{Qty of Idlers} \times 0.85$
Micro-V with 2-Rib Belts <sup>2</sup>	$F_{Idlers} = \text{Qty of Idlers} \times 1.2$
Micro-V with 3-Rib Belts <sup>2</sup>	$F_{Idlers} = \text{Qty of Idlers} \times 1.8$

## Calculate an Example

For an example, let's use the following application data:

Load Weight	35 kg
Load Material	Cardboard
Conveyor Speed	40 m/min
Number of idler rollers in your conveyor zone	7
Interlocking method between motor roller and idlers	Two Groove with standard O-Bands

$$F_{Load} = 35 \times 9.8 \times 0.1 \cong 34N$$

$$F_{Idlers} = 7 \times 0.85 \cong 6N$$

$$F_{Total} = 34 + 6 = 40N$$

To select the speed code, we need to first find the speed code whose maximum speed matches closest to our desired speed and then examine its Rated Tangential Force value to see if it meets our requirement:

We need 40 m/min, so from the Performance Data Chart on page 10, a 35 Speed Code has a maximum speed of 48.5 m/min. The Rated Tangential Force for a 35 Speed Code is 49.7N. A 35 Speed Code motor roller should work for this application<sup>3</sup>.

<sup>1</sup> O-Bands lose their transmission ability as the quantity increases. You should limit the number of O-Band idlers to 10 or less.

<sup>2</sup> Various factors including load weight determine whether you need to use a 2-Rib or 3-Rib Micro-V belt. Contact Pulseroller details of your application if you are not sure.

<sup>3</sup> Factors other than required force and speed can affect the proper speed code selection. Contact Pulseroller with details of your application.