

MPTA-B13i-2013 R2019

## RIM SPEED LIMITS



MPTA STANDARD

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**Abstract**

This standard provides rim speed limits for sheaves and pulleys based on typical construction and materials. Any rim speed above 6,500 feet per minute must be carefully considered.

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**Foreword**

This Foreword is provided for informational purposes only and is not to be construed to be part of any technical specification.

This standard was revised to format defined by MPTA-A1-2011 R2019

Suggestions for the improvement to or comments about this publication are welcome. They should be emailed to Mechanical Power Transmission Association at [www.mpta.org](http://www.mpta.org).

**Scope**

This standard is intended to provide rotational velocity rim speed limits for industrial V-Belt sheaves and Synchronous belt pulleys. The products shall be of solid homogeneous materials with common design orientations. The information contained in this document is solely reflective of rotational speed capability for stresses imposed by centrifugal forces only. This standard does not consider the effects from belt interaction, operating conditions or specific part geometry.

Rim speed limits are dependent on a part's construction and material properties. Table 1 provides the rim speed limit in feet per minute (FPM) for typical constructions and material grades.

The MPTA recommends guidance from the drive component manufacturer for all rim speeds exceeding 6,500 feet per minute.

**Table 1**

Product Material	Minimum Ultimate Tensile Strength (psi)	Maximum Allowable RIM Speed	
		Web/Arm Style (FPM)	Block Style (FPM)
Class 30 Gray Cast Iron (ASTM A-48)	30,000	6,500	7,500
Ductile Iron (65-45-12, ASTM A-536)	65,000	8,000	10,000
Ductile Iron (80-55-06, ASTM A-536)	80,000	10,000	13,000
Aluminum (6061T6)	44,000	N/A	18,000
Steel (1018)	55,000	9,000	11,000
Steel (1144)	95,000	16,000	20,000

In order to convert rim speed from FPM to RPM, use Formula 1.

**Formula 1**

$$\text{RPM} = \frac{\text{Rim Speed (FPM)}}{0.262 \times \text{Outside Diameter (in)}}$$

For high-speed applications dynamic balancing may be desired for optimal drive operation. However, regardless of the balance grade specified, the rim speed limits above are still in effect. Further information on balancing can be found in MPTA-B2c.

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