



Q: “How do I calculate PV values?”

A: PV at its most simple level is an equation to derive an understanding of the heat generated by the interaction between bearing wear surface and shaft. It is the heat that is generated during typical bearing life cycling that can cause premature bearing failure as a result of the wear surface degrading or the engineered backing material going through a gradual reduction in mechanical or physical properties.

The calculation of PV can vary slightly depending on the type of bearing being evaluated (journal bearing, thrust washer, flanged bearing or linear bearing); however, in most cases the bearing calculation will follow the example below.

Calculating Sleeve Bearing PV Limit

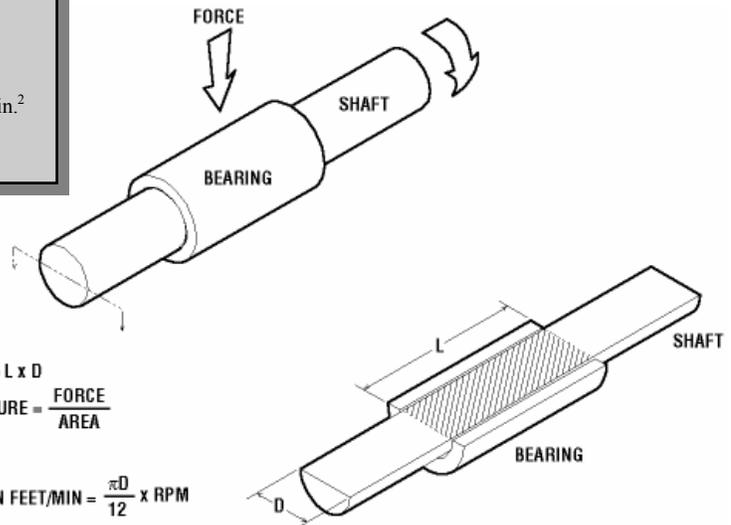
Example: 0.750” shaft @ 200 RPM; 8
 85.0 lb. Total load, bearing length 0.750”

$V = 0.262 \times \text{RPM} \times \text{diameter}$
 $= 0.262 \times 200 \times 0.750 = 39.3 \text{ fpm}$

$P = \text{total load} / \text{projected area (A)}$

$A = 0.750 \text{ (shaft)} \times 0.750 \text{ (bearing length)} = 0.562 \text{ in.}^2$

$P = 85.0 \text{ lbs.} / 0.562 \text{ in.}^2 = 151.2 \text{ psi}$



$\text{AREA} = L \times D$

$\text{PRESSURE} = \frac{\text{FORCE}}{\text{AREA}}$

$\text{VELOCITY IN FEET/MIN} = \frac{\pi D}{12} \times \text{RPM}$

$\text{PV} = \text{PRESSURE} \times \text{VELOCITY}$