

BEARING LIFE FORMULA

ISO ADJUSTED BEARING LIFE FORMULA FOR ANTI-FRICTION BEARINGS

The ISO adjusted bearing life formula is used by bearing manufacturers and equipment design engineers to predict the service life of anti-friction bearings.

$$L_{na} = a_{23} (L_{10})$$

L_{na} = Actual bearing life (millions of revolutions)

(L_{10}) = Bearing design life (includes all design and installation parameters such as fit, alignment, balance, etc.)

a_{23} = Oil film thickness ÷ composite surface roughness (composite surface roughness = combined roughness of the bearing and the opposing race; a23 is also called "relative oil film thickness")

THIS FORMULA ILLUSTRATES:

1. The quality of lubrication is as important as the mechanical factors in determining the bearing life.
2. Oil film thickness must at least equal the combined surface roughness of the bearing and race in order for the bearing to reach its design life in service.
3. Bearing life is increased in direct proportion to:
 - a) the percentage increase in the thickness of the oil film.
 - b) the percentage reduction in the composite surface roughness.

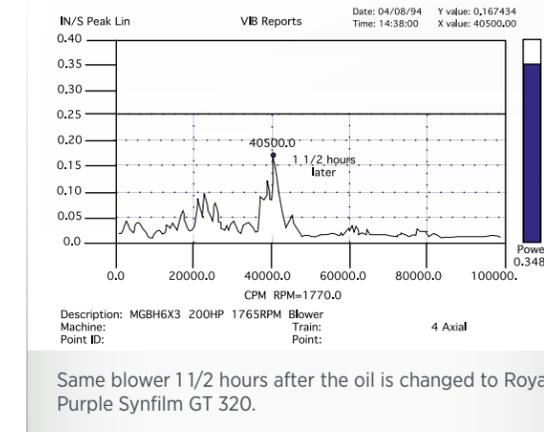
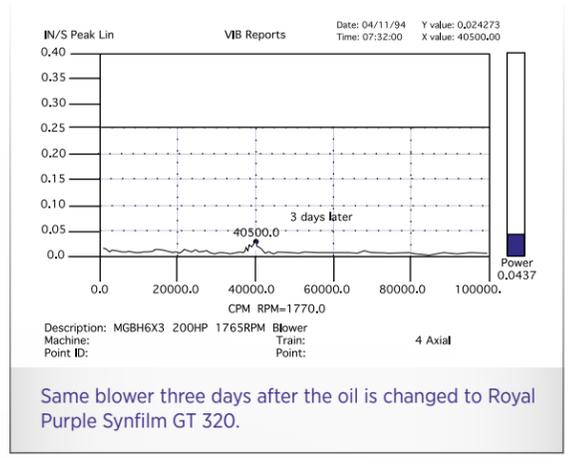
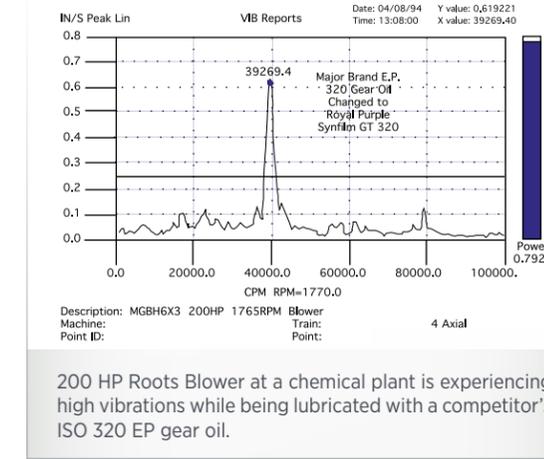
BEARING LIFE IS GREATLY INCREASED BY A COMBINATION OF BOTH A & B.

Note: Less than 10 percent of bearings in service ever reach their design life; however, improving relative oil film thickness can increase bearing life up to 4 times its design life.

Royal Purple's oils with Synerlec additive technology greatly increases bearing life by both increasing oil film thickness and smoothing bearing surfaces.

"Our vibration analyst predicted bearing failure was imminent, so we decided to try Royal Purple. We replaced the SAE 30 Shell oil with Royal Purple Synfilm 100 and the vibration and noise abated immediately and ran for eleven months."

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Impact of Vibration Reduction on Bearing Life		
Assumes dynamic load is the major force component		
% Reduction in Vibration	Percent Increase in Bearing Life	
	Ball Bearing Types	Other Rolling Element Bearing
5	17	19
10	37	42
15	63	72
20	95	110
25	137	161
30	192	228
40	363	449
50	700	908

Table provided courtesy of L. Douglas Berry, Reliability Magazine

MICROSCOPIC PHOTOS OF MICRO-MENDING

