

TIMKEN®



TIMKEN® AP-2™ BEARING

A Better Design... A Better Bearing



**better
performance**
under today's
heavier loads

THE TIMKEN COMPANY

A Better Design... A Better Bearing

The Difference is in Design

When Timken introduced the AP™ bearing and incorporated changes to meet new performance challenges, it quickly became the design of choice for the industry. As the rail industry evolved, Timken developed new seals and other unique components that not only make the AP-2™ bearing design distinctly different from competitor bearings, but increase the performance capability of the bearing.

This design provides for reduced journal axle flexure, which means less fretting wear between components (Figure 1).

Its compact design incorporates fewer components and reduces bearing weight. The weight savings per car using the AP-2 bearings in place of their predecessor AP bearing can reduce the light weight of your railcar up to 456 pounds or even more for special truck designs (Figure 2).

The AP-2 bearing offers improved safety and reliability and runs at lower operating temperatures and lower torque.

AP VS AP-2 BEARING FRETTING INDEX COMPARISON CHART

AXLE CLASS	F	K	E	L	G	M
BEARING LOAD (LBS.)	34,400	34,400	26,300	26,300	38,000	38,000
GROSS RAIL LOAD (LBS.)	286,000	286,000	220,000	220,000	315,000	315,000
FRETTING INDEX	1.09	0.30	1.00	0.27	0.60	0.23

FIGURE 1 – This table calculates the fretting index and provides a comparison among axle designations according to the Association of American Railroads standards. NOTE: The Timken AP-2 Class K bearing index (0.30) is 39% lower than the major alternative bearing design index (0.49).

WEIGHT SAVINGS COMPARISON TIMKEN AP BEARING VS. TIMKEN AP-2 BEARING

(Weights in pounds)

AP-2 CLASS K (6 1/2 X 9) FOR 286,000 LBS GRL CARS

	BEARINGS(2)	ADAPTERS(2)	AXLE	TOTAL
CLASS F NON-SHROUDED	201.5	70.5	1175.0	1447.0
CLASS K	178.0	64.0	1168.0	1410.0

SAVINGS PER WHEELSET 37.0

SAVINGS PER CAR 148.0

CLASS F SHROUDED	223.5	70.5	1175.0	1469.0
CLASS K	178.0	64.0	1168.0	1410.0

SAVINGS PER WHEELSET 59.0

SAVINGS PER CAR 236.0

AP-2 CLASS L (6 X 8) FOR 220,000 LBS GRL CARS

	BEARINGS(2)	ADAPTERS(2)	AXLE	TOTAL
CLASS E	137.0	55.6	931.4	1124.0
CLASS L	124.8	51.4	923.8	1100.0

SAVINGS PER WHEELSET 24.0

SAVINGS PER CAR 96.0

AP-2 CLASS M (7 X 9) USING STANDARD CLASS G (7 X 12) FRAME FOR 315,000 LBS GRL CARS

	BEARINGS(2)	ADAPTERS(2)	AXLE	TOTAL
CLASS G	260.0	111.0	1330.0	1701.0
CLASS M	202.0	102.0	1283.0	1587.0

SAVINGS PER WHEELSET 114.0

SAVINGS PER CAR 456.0

SAVINGS PER WHEELSET 114.0

SAVINGS PER CAR 456.0

SAVINGS PER WHEELSET 114.0

SAVINGS PER CAR 456.0

FIGURE 2 – The AP-2™ bearing's compact design weight savings.



The AP-2™ bearing has a shorter journal which reduces axle flexure.

History of the AP-2™ Bearing

The Timken Company first applied tapered roller bearings to freight and passenger cars in 1923 and, throughout the years, has redesigned their railroad bearings to meet the needs of rail customers. Timken was the first to introduce a self-contained, pre-lubricated bearing package, called the Timken AP bearing, to its rail customers in 1954.

As the rail industry struggled to improve efficiency and productivity and to lower costs, freight car weights and wear and tear on equipment increased. As loads on

journal bearings increased, fretting wear increased, causing decreased bearing reliability. Aware of the greater demands being placed on freight car bearings by heavier loads, higher speeds and extended wheel lives, Timken developed the AP-2 bearing for freight cars. Today, over a quarter of a million AP-2 bearings are in service.

less fretting wear

WHY THE AP-2 IS THE BEARING OF CHOICE

Reduction in bearing failure due to water ingress. The HDL seal, standard on all Timken AP-2 bearings, provides the best protection against water and other contaminants entering the bearing cavity.

Reduces bearing set outs. In addition to the HDL seal providing excellent sealing, it also lowers seal operating temperatures.

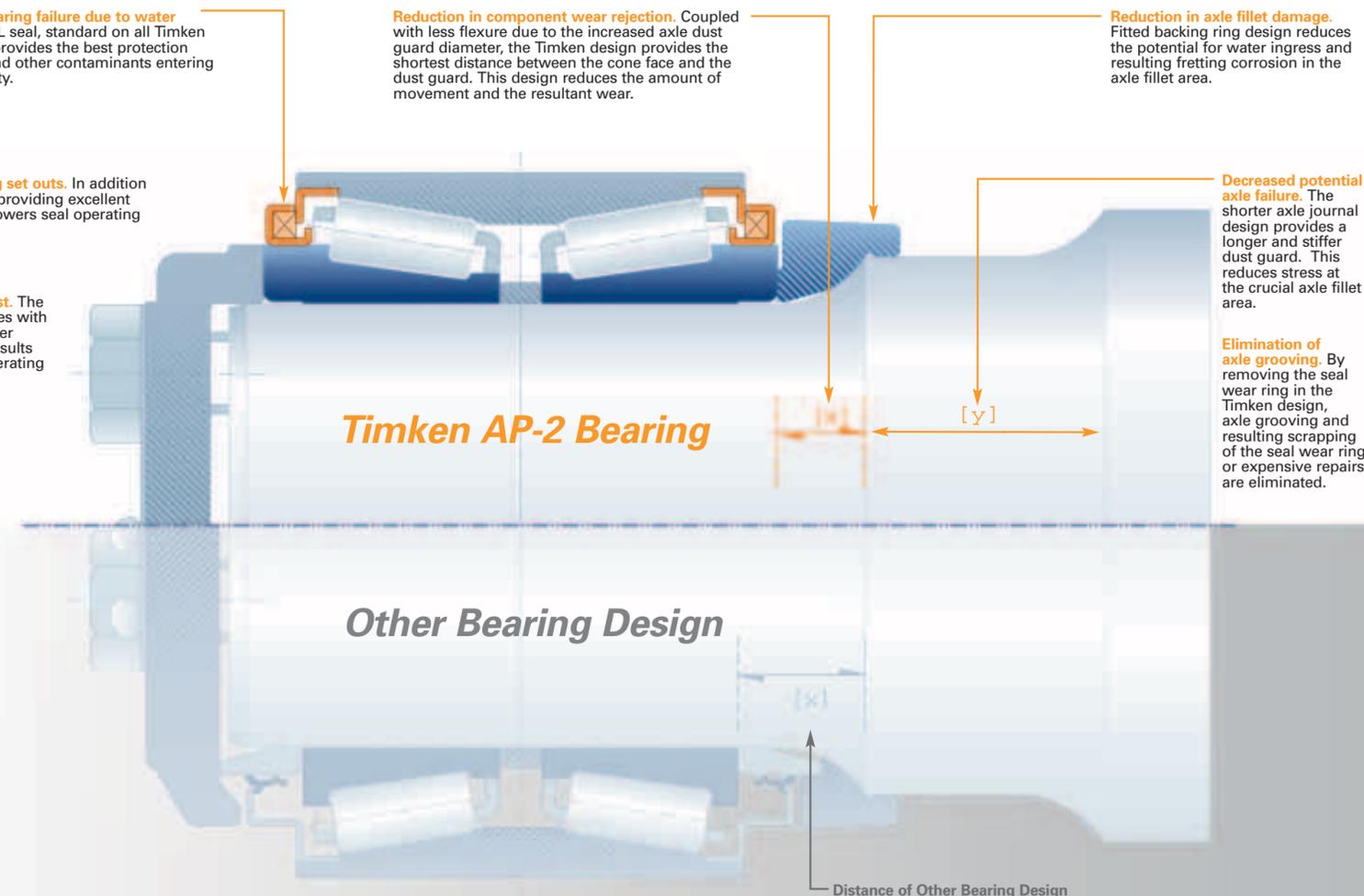
Reduces fuel cost. The HDL seal operates with significantly lower torque, which results in lower fuel operating costs.

Reduction in component wear rejection. Coupled with less flexure due to the increased axle dust guard diameter, the Timken design provides the shortest distance between the cone face and the dust guard. This design reduces the amount of movement and the resultant wear.

Reduction in axle fillet damage. Fitted backing ring design reduces the potential for water ingress and resulting fretting corrosion in the axle fillet area.

Decreased potential axle failure. The shorter axle journal design provides a longer and stiffer dust guard. This reduces stress at the crucial axle fillet area.

Elimination of axle grooving. By removing the seal wear ring in the Timken design, axle grooving and resulting scrapping of the seal wear ring or expensive repairs are eliminated.



Timken AP-2 Bearing

Other Bearing Design

Distance of Other Bearing Design

Timken: The Innovation Leader

The Timken Company is a leading global manufacturer of highly engineered bearings and alloy steels and a provider of related products and services with operations in 27 countries. A Fortune 500 company, Timken recorded 2003 sales of \$3.8 billion and employed approximately 26,000 at year-end. More than 1,200 of our associates are engineers and scientists who develop products that reduce costs, improve quality and expand application limits. Timken Research in Canton, Ohio, is one of the sites for much of the company's development, testing and training. The ongoing investment in new technology is an integral part of the company's strategy to remain a bearing technology leader today and in the future.

AP-2



To learn more about your journal roller bearing options, contact a Timken Company representative today.



For other locations or general information,
visit us at www.timken.com/rail
or call **800-964-2626, 800-368-4401**
or fax **330-471-7032**.

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