

# SPECIAL APPLICATIONS

## Introduction

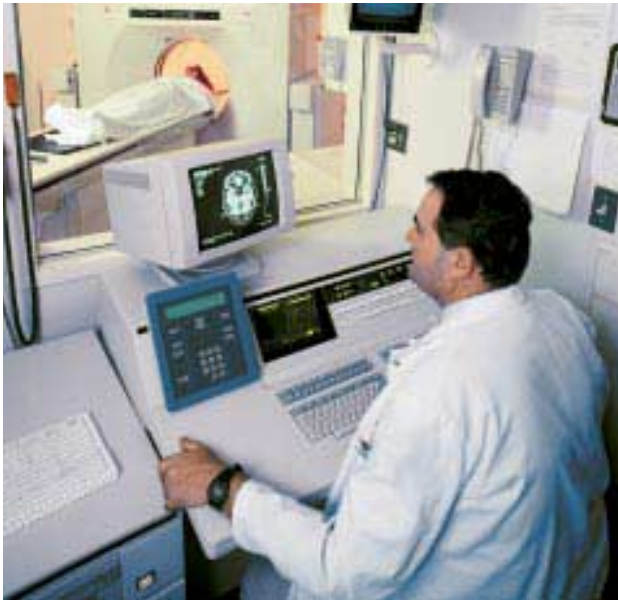
Barden innovations in special bearings range from nearly standard bearings with slightly modified dimensions, to intricate assemblies which integrate the bearing function into a complete mechanism. Our engineers work closely with customers to develop unique bearing designs with specialised features to meet application requirements and solve functional problems.

In many cases the overall cost of a piece of equipment can be reduced by incorporating special or customised bearings particularly when mating components are integrated into the bearing such as mounting flanges, gear teeth, spring carriers and integral O-ring grooves. The performance and installation benefits to be gained from using bearings specifically designed for individual applications are as follows:

- Improved assembly reliability
- Enhanced rigidity or stability of the system
- Better location control through proper bearing orientation
- Reduction in handling operations and contamination
- Improved alignment of the rotating assembly
- Weight reduction
- Improved resistance to temperature extremes
- Reduction in tolerance stack-up

## SPECIAL APPLICATIONS

### X-Ray



*Barden super precision x-ray bearings enable medical scanner applications to provide images of the highest resolution.*

Barden continues to keep pace with advances in X-ray and CT technology with new, improved X-ray tube bearing designs. These bearings, which are used to support the spinning X-ray anode, operate at speeds in excess of 10,000 rpm under harsh conditions. In addition to withstanding the passage of high voltage, the bearing must also operate in a vacuum environment down to  $10^{-8}$  torr and at temperatures of 400–500°C.

Barden X-ray cartridge bearings are full ball complement designs, incorporating a flanged shaft with integral races to which the target anode is attached. A separate flange made of lower thermal conductivity material can be welded to the shaft in order to reduce heat transfer from the anode. The bearings are built with controlled axial clearance in order to compensate for thermal growth at the operating temperature. Conventional outer rings are separated by spacers with either solid or spring preloading that is designed to meet specific application requirements.

In order to provide effective lubrication under these extreme conditions Barden utilises advanced surface engineering technologies such as plasma and ion-beam assisted deposition. Working closely with specialist organisations in these fields, Barden is developing a range of advanced solid lubricants some 2000 times thinner than the human hair to compliment its high-temperature X-ray bearing materials.

With its dedicated “in-house” X-ray Bearing Test Facility, Barden is able to evaluate and verify the performance of its X-ray tube bearing designs and developments under simulated thermal-vacuum test conditions.

With the emphasis on improved patient care resulting from faster data acquisition and high-resolution imagery, Barden precision bearings provide a clear choice for advanced X-ray and medical scanner applications.

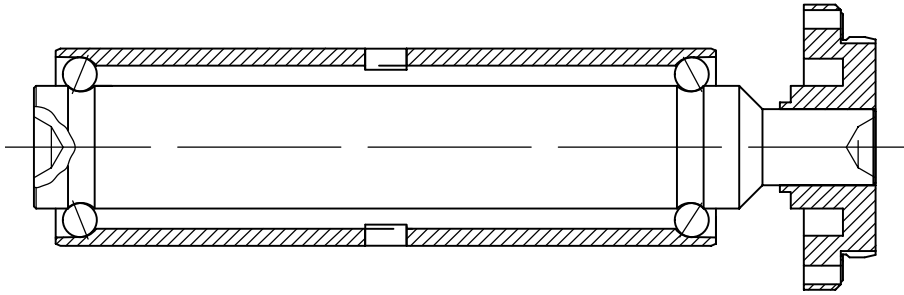


*Designed to operate under high vacuum at elevated temperatures, Barden bearings are an integral part of high-speed x-ray tubes.*

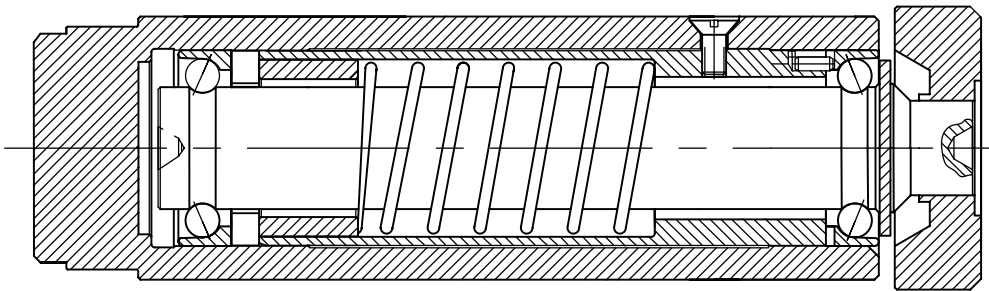
## SPECIAL APPLICATIONS

Examples of various x-ray bearing cartridge design configurations

CARTRIDGE DESIGN



SPRING PRELOADED CARTRIDGE DESIGN WITH ENCLOSED HOUSING



SPRING PRELOADED CARTRIDGE DESIGN WITH OPEN HOUSING

