

WATER & WASTEWATER TREATMENT



**COOPER**<sup>®</sup>  
SPLIT ROLLER BEARINGS

**KAYDON**<sup>®</sup>

# Maximize your uptime

In the water and wastewater treatment plants that supply the world with clean water, downtime is a dirty word. And to avoid downtime, the simplest solution is often a split roller bearing from Cooper Bearings.

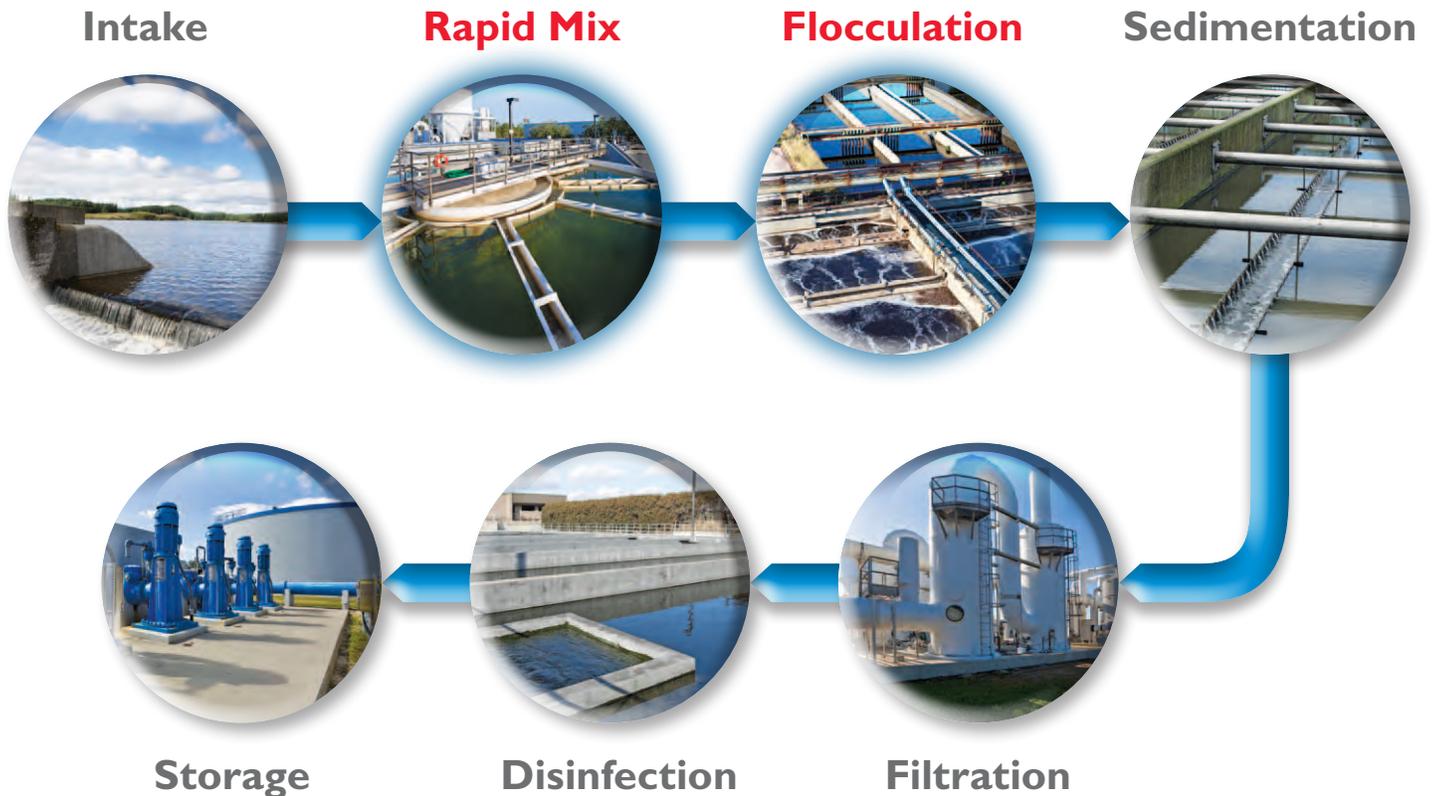
Cooper bearings keep equipment running smoothly at many stages in these treatment processes, especially flocculators, rotary aerators and rotating biological contactors (RBCs). Their split-to-the-shaft design significantly reduces replacement time, while a triple-labyrinth seal keeps out sediment and retains lubricant.

Clarifiers are another area of expertise. Here we offer large slewing ring bearings from Kaydon — like Cooper, one of the world's leading bearing manufacturers — to keep major equipment rotating reliably.

The next few pages show how Cooper and Kaydon bearings can enhance the productivity of water and wastewater treatment processes. For more details, or to discuss a specific application, please give us a call.



## Water treatment process



# Water treatment solutions

Before water from lakes and reservoirs can be disinfected and made available to homes and businesses, solids and particles must be filtered out. Cooper split roller bearings play key roles at two points in this treatment: Rapid Mix and Flocculation.

## Rapid Mix



**Rapid Mix** is the process of screening incoming water for debris and adding coagulant (e.g. aluminum sulfate, iron chloride) to help solids agglomerate, or clump together. Fans and blowers pump in air to mix the coagulants at high speed, and split roller bearings are often used to reduce the time needed for maintenance or replacement.

Cooper bearings have also proven highly reliable in these applications. One water department has had 140 Cooper bearings in service for 15 years without a single failure, and another that recently switched expects to save \$100,000 a year in replacements.

Since radial load is minimal in a flocculator, the Cooper 01 Series (medium-duty) split unit is usually the best choice. To discuss a specific application, please consult your Cooper-Kaydon territory manager. He'll ask you about the speed, size and length of the lineshaft, as well as its drive arrangement (direct or chain-driven) and location (at the end of the shaft or in the middle).

Cooper bearings are by no means limited to these two applications. They are often found in pumps, fans and motors at other stages of the treatment process.

## Flocculation



**Flocculators** gently stir the water, helping coagulated particles cling together to form larger particles, known as "floc," that can be removed easily. The common flocculator styles — horizontal paddle wheel, vertical paddle wheel, walking beam, oscillating, and impeller — feature a series of connected shafts with multiple paddles, supported by housed bearing units.

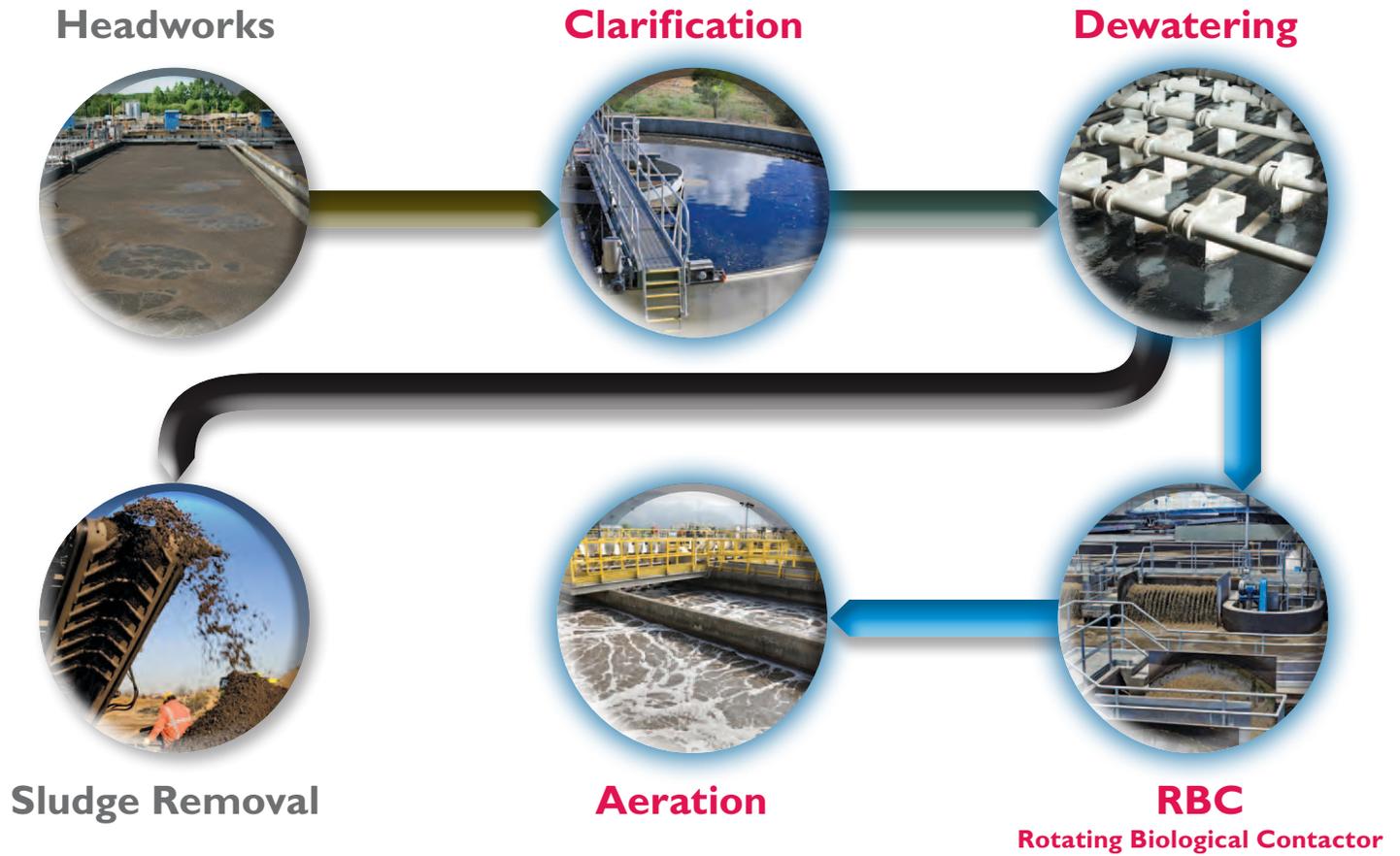
It's not unusual for a flocculator to have as many as 100 bearings, and when

they're conventional bearings that require complete shaft disassembly, downtime can really add up. With a Cooper split roller bearing, however, the shaft and bearings can simply be inspected when the basin is drained once a year for routine maintenance.



Cooper bearings save hours of disassembly and re-assembly when tanks are drained for maintenance.

# Wastewater treatment solutions



Cooper and Kaydon bearings deliver the same advantages for wastewater treatment as they do for fresh water treatment: rugged performance and maximum uptime. In these applications and many other wet, dirty environments, they have proven themselves time and time again.

Removing contaminants and separating wastewater into effluent and sludge is a continuous process that depends on rotating components at every stage. Our split-to-the-shaft bearings and slewing ring bearings provide critical support at most of them, while mostly eliminating the need to completely disassemble complex machinery. Here are some examples.

**Clarifiers** remove particles and color from the wastewater. As the particles settle to the bottom of the tank, they are scraped to the middle for drainage by blades that rotate on a large slewing ring bearing. With models up to 20 feet in diameter and radial load capacity of over one million lbs., Kaydon XT Series bearings are ideal for this application.

## Clarification



## Dewatering



After the particles are scraped to the drain, they are typically taken away by screw conveyors, which commonly feature Cooper housed bearing units.

The next stage is **Dewatering**, where sludge is separated from the water by a centrifuge or belt press. The sludge goes one way and the water, or effluent, goes another. During dewatering, split roller bearings make a different kind of contribution to uptime by helping rake screens keep large solids out of the machinery.

## Aeration



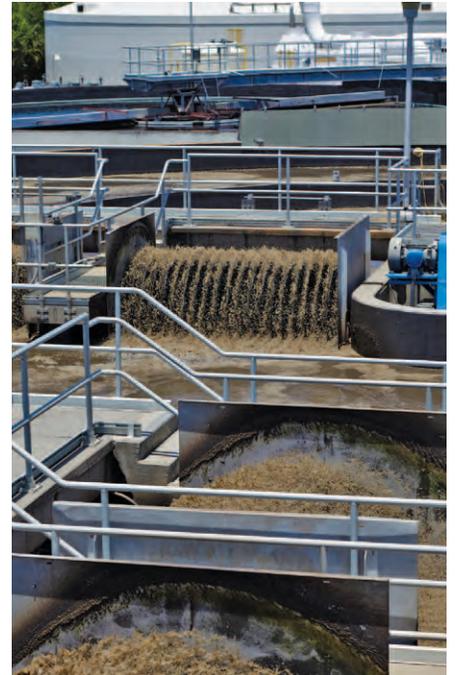
**Aeration**, or agitation, is another important step. This exposes the water to air to release any foul-smelling gases and replenish the oxygen that is lost whenever organic matter decays. This agitation also forces grit (e.g., sand, coffee grounds) to settle where it can be removed more easily.



It took less than two hours to replace the bearing on this aerator shaft with a Cooper split-to-the-shaft bearing.

Cooper split roller bearings are widely specified in rotary aerators to support their long, rotating shafts while allowing speedy access for installation. They have also proven popular as replacements for conventional solid bearings, with changeover usually possible in as little as two hours. They are not used in cascade aerators, an alternate style that depends mostly on gravity and does not need bearings.

## RBC Rotating Biological Contactor



Before the effluent can be released into the environment, remaining pollutants are removed by **Rotating Biological Contactors (RBCs)**. RBCs biologically degrade them with microorganisms that grow on large plastic discs that are closely spaced on rotating shafts. The shafts, in turn, are mounted above the water's surface so that about 40% of each disc's surface is immersed at any given time.

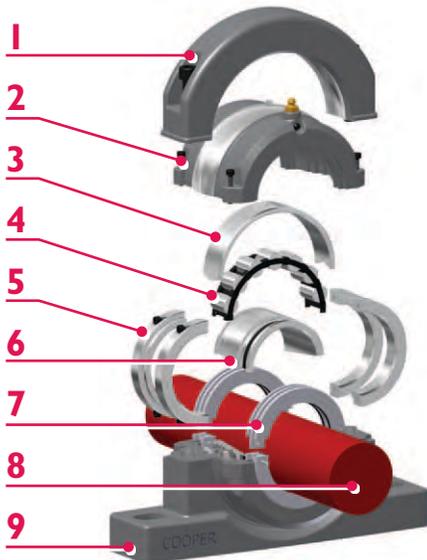
Cooper split-to-the-shaft bearings are a common choice to support RBC shafts and discs (which are subject to build-up, increasing the load), and eliminate the need for complete disassembly for bearing installation or maintenance.

# Design advantages

Cooper split roller bearings are designed for complete accessibility and trouble-free operation. Although more complex than standard bearings, they pay for themselves quickly with savings in downtime and replacements. These rugged, reliable bearings have many advantages over conventional bearings, especially in harsh operating conditions.

## Advantage #1: Easy assembly/disassembly

Every Cooper component — bearing and cage assemblies, cartridges, pedestals, inner and outer races, and our triple labyrinth seals — is split to the shaft for easy installation. This means the bearing can be installed and inspected without disturbing any other components on the shaft, dramatically reducing downtime and associated costs.



1. Pillow Block Cap
2. Cartridge
3. Outer Race
4. Cage and Roller Assembly
5. Clamping Ring
6. Inner Race
7. Seals (Various options available)
8. Shaft
9. Pillow Block Base

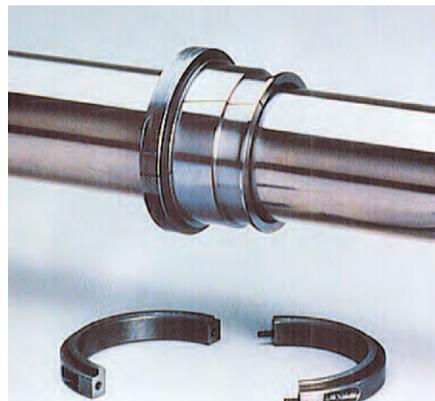
## Advantage #2: Superior seals

If a submerged seal is inadequate, sediment builds up between the bearing and shaft, causing wear. Our standard ATL (Aluminum Triple Labyrinth) seal has a concentric, non-contact seal that rotates with the shaft, plus two rows of o-rings that compress onto the shaft for 100% sealing. Seals are available to keep out water at depths of up to 30 feet. Precision-machined labyrinth grooves, filled with grease at installation, provide another barrier to contamination.



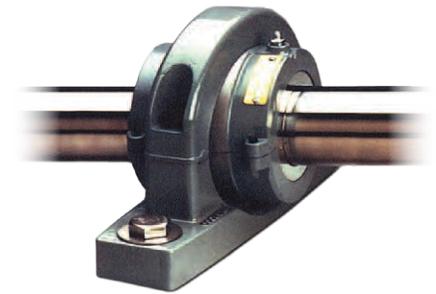
## Advantage #3: Shaft protection

Unlike sleeve bearings, a Cooper bearing has an inner race to protect the shaft. This race is clamped to the shaft and moves axially with it to absorb wear and damage.



## Advantage #4: Adjusts for misalignment

Since a Cooper split roller bearing is designed with a spherical O.D. for both the cartridge and pedestal, it can accommodate up to 2-1/2 degrees of initial shaft misalignment.



## Advantage #5: Ease of expansion

Axial expansion in a Cooper bearing is dynamic instead of static, between the polished, lubricated surfaces of the outer race and rollers. This minimizes the stress placed on any other components along the shaft.

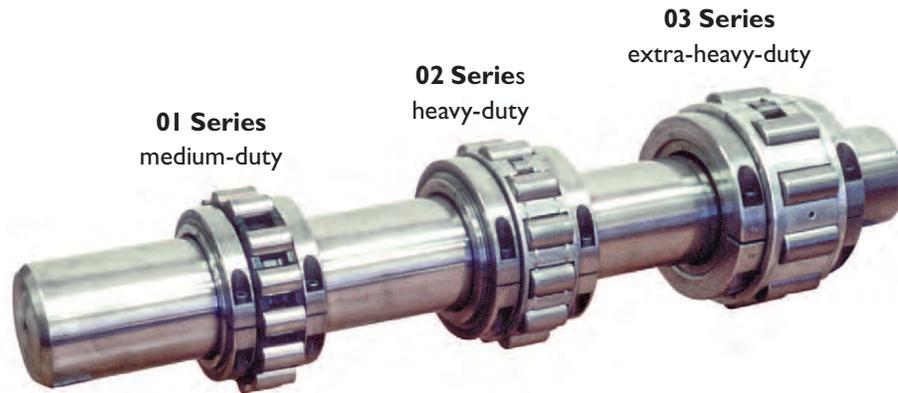
## Advantage #6: Energy-efficient

Due to their ease of rotation and minimal friction losses, Cooper bearings draw less amperage from motors or drives. Over time, this results in lower energy costs.

## Range of standard models

Cooper offers a wide range of standard split roller bearings, all available in sizes to suit specific application needs. Three

of them are typically in water and wastewater treatment:



## Kaydon slewing ring bearings



For applications requiring a slewing ring bearing, the Kaydon XT Series is a proven workhorse. It features a rectangular cross-section for exceptional stiffness and deep-groove gothic arch raceways with maximum ball complement. The resulting 4-point contact delivers exceptional moment, thrust and radial load capacities.

The XT Series is available in diameters up to 20 feet, with integral seals that improve performance in underwater applications.

## Mounting options

### Flanges



#### Round Flange Units

1-3/16"/30mm to 12"/300mm  
Available in cast iron or steel



#### Square Flange Units

1-11/16"/50mm to 3"/75mm  
Available in cast iron, ductile iron or steel

### Pillow Blocks



#### Pillow Block Units

1-3/16"/30mm to 24"/600mm  
Available in cast iron, ductile iron or steel

### Take-Up & Rod Ends



#### Rod-End Shoe Units

1-3/16"/35mm to  
6"/155mm



#### Take-Up Tension Units

1-3/16"/35mm to  
6"/155mm

### Hangers



#### Hanger Units

1-3/16"/35mm to  
5-1/2"/140mm



**The Cooper Split Roller Bearing Corp .**

5365 Robin Hood Road, Suite B  
Norfolk, VA 23513

**Tel: 757 460 0925**

**Fax: 757 464 3067**

**email: [CoopersalesUS@kaydon.com](mailto:CoopersalesUS@kaydon.com)**

**[www.CooperBearings.com](http://www.CooperBearings.com)**

**Kaydon Bearings Division**

2860 McCracken Street  
Muskegon, Michigan 49441

**Tel: 231 755 3741**

**Fax: 231 759 4102**

**email: [bearings@kaydon.com](mailto:bearings@kaydon.com)**

**[www.KaydonBearings.com](http://www.KaydonBearings.com)**

