

Application Description

Most drinking water is stored in surface reservoirs where the water picks up materials such as dirt and plant matter. To remove these materials a method called flocculation is used.

Water is pumped from the reservoir into a basin about 8' deep, 15' wide, and 80 to 100' long. Chemicals called flocculants are added that cause the dirt and plant matter to bind together into larger particles so they can be more easily filtered out. To thoroughly mix the flocculants with the water, a lineshaft in the bottom of the basin has a number of paddle wheels turning at a slow speed (usually 10-12 rpm)

The 2 to 5" diameter lineshaft runs the length of the basin and is supported by up to a dozen bearings. Typically there is a chain drive at one end, or in the middle of the shaft, supported by one fixed bearing, and the remaining bearings are all expansion bearings.

The three common arrangements are horizontal paddle wheels, walking beams, and vertical mixers. The horizontal paddle wheel is the most common arrangement.

Advantages of Cooper

There are several advantages to choosing a Cooper bearing for use on flocculators. The split design of the bearing allows for ease of inspection and the ability to change a bearing without removing other components from the shaft.

The aluminum triple labyrinth seal, along with a full pack of grease, will prevent any chemicals, sediment, crustacean from Zebra mussels, or other foreign materials from entering the bearing, while submerged in the flocculator basin.

Due to inadequate sealing, other bearings fail from these contaminants and destroy the shaft as they fail. This not only requires a lengthy down time to fix the problem but a costly maintenance item to replace the worn shafts. With a Cooper, the bearings and shaft can be inspected when the basin is drained once a year for routine maintenance.

Fast Facts

Where To Find Flocculators...

Flocculators can be found at water filtration plants in medium to larger size towns and cities where dirty water may be a problem. The smaller cities generally buy their water from adjacent larger cities, and do not require their own filtration plants.

Note: flocculators are not found in the waste water industry.

What To Look For...

Typical horizontal paddle wheel flocculator.

Bearing Selection Data

In most flocculators the radial load is minimal, so the 01 series bearing is used. It is still important to note the shaft speed and shaft size. The length of the lineshaft is necessary.

The drive arrangement, direct or chain driven, along with its location (at the end of the shaft or in the middle of the shaft) is required.

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A water filtration plant where flocculators are found

The type of couplings used, rigid or flexible, must also be known. The maximum water temperature in the summer and the minimum water temperature in the winter would also be helpful.

A rough sketch of the arrangement (see lineshaft data sheet) is also needed.

Additional Information - Bearing Life

The biggest factors in bearing life are the condition and alignment of the shaft. An undersized or rusted shaft reduces the "grip" of the seal to the shaft. A poorly aligned shaft "cranks" at the bearing, opening and closing seal contacts.

In one city, where all the shafts were within tolerance and laser alignment was performed, they have experienced no Cooper failures in 15 years with 140 Cooper bearings in service.

Lubrication

For flocculator applications we recommend using an aluminum complex food grade grease. While aluminum complex resists wash out, it is not compatible with many other types of grease. Prior to adding aluminum complex grease, the bearing should be solvent cleaned of other greases.

Due to the slow speeds and submerged location, a full pack of grease should be used.

For routine greasing, grease lines should be run from the surface down to the bearing.

A typical horizontal paddle wheel flocculator

