

# WALKER PROCESS EQUIPMENT

Division of McNish Corporation

Information  
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## AUTOMATIC CONDENSATE REMOVAL SYSTEM US Patent No. 6,926,022

January 2006

The Automatic Condensate Removal System developed and patented by Walker Process is an innovative and effective evacuation system for oil reservoirs that allows release of water automatically. This device frees operators from the task of manually opening valves to check for and remove any accumulation of water in an oil reservoir.

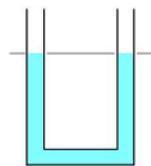
Condensation forms when the temperature of air falls below the dew point. Equipment in a water or wastewater treatment facility operates in a naturally high-humidity environment with temperature variations that cause condensation. Any moisture that forms within a sealed oil chamber must be removed to prevent contamination of the lubricant and corrosion of the gears and bearings.

Since the specific gravity of water is greater than oils used for lubrication, any water will collect in the lowest point of the oil reservoir where it may be removed by means of manually opening a drain valve.

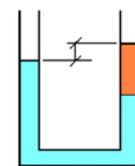
Walker Process has developed and patented an innovative and effective water removal system for oil reservoirs that allows release of water automatically to a collection point. This device frees operators from the task of manually opening valves to check for and remove any accumulation of water in an oil reservoir.

### HOW IT WORKS

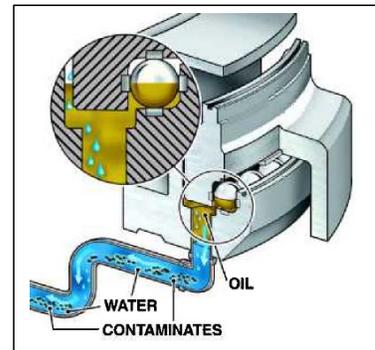
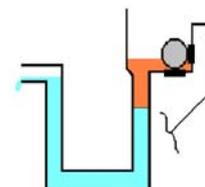
*A simple open-ended U-tube, held in a vertical direction and filled with a liquid, will develop a liquid surface in each vertical leg at the same elevation.*



*In a similar manner, a U-tube filled with liquids of different density, will develop liquid surfaces in each leg that are at different elevations. The liquid of greater density will have the lower elevation. The liquid of lower density will be supported at a higher elevation by the higher density liquid. The result is that the total weight of liquid in each vertical leg is equal but the volume is not.*



*The Walker Process Condensate Removal system controls the level of a higher density liquid (water/condensate) by means of a discharge spout. The lower density liquid (oil bath) is supported above the high-density liquid at the proper elevation determined by the differences in density of the different liquids.*



## Application to Clarifier Drives

An oil bath is the best and preferred choice for the lubrication of gearing (see Walker Process Paper *Lubrication of Clarifier Drives - Why Oil is Preferred over Grease*). The whole concept of lubrication is based on providing a friction-reducing film, and liquid lubricants in the form of oil to provide the optimum distribution of a film.

Contaminants are inevitable in any non-sealed lubrication system making any void area in the gearing or bearing subject to the formation of condensation caused by daily temperature fluctuations. The Walker Process Condensate Removal system allows effective and automatic removal of any water that may enter the oil reservoir.

Spur gear assemblies are particularly vulnerable in the area of the lower pinion bearing because that is the lowest point of the oil reservoir. The Condensate Removal system assures that water is continually removed from this low point.

The Walker Process Automatic Condensate Removal System utilizes a patented arrangement that includes a slip tube and seal assembly. The design allows elevation adjustment of the discharge spout to accommodate the precise specific gravity of various oils and a special seal arrangement that provides a positive means to prevent loss of water by sealing the discharge when condensate is not being removed.

**Walker Process Spur Gear Drives are precision class 6, gear assemblies with a split spur gear ring that allows access to replaceable bearing race inserts.**

### **FEATURES:**

**Cast Iron Housing** – Providing exceptional rigidity, structural support, and corrosion resistance.

**Main Bearing** – Through-hardened and ground alloy steel replaceable race liners and the highest quality chrome steel bearing balls assembled to precision tolerances optimize bearing performance.

**Pinion** - The alloy steel pinion and shaft is of a single piece construction with a minimum AGMA class 8 quality. Designed with a conservatively low aspect ratio the pinion and shaft are straddled mounted between roller bearings to eliminate any overhung load design.

**Lubrication** – Walker drive units are oil lubricated - the preferred method of lubricating machine parts.

**Materials** – Walker Process spur gear rings are machined from ASTM A536 ductile iron. Ductile iron has superior corrosion resistance to that of steel.

**Spur Gear Ring** - Machined from ASTM A536 ductile iron, *grade 80-55-06 or 120-90-02*. The spur gear teeth are cut to a minimum AGMA *quality 6*. The split spur gear ring design allows complete replacement of the main bearing and race liners without removing the walkway bridge/drive platform.

