Bactericide Injector for H_2O Systems

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For years water hydraulic systems have seen increased use. Water is of course cheaper than oil and is also cleaner and safer in many applications. One specific example where a water hydraulic system is advantageous is golf course maintenance equipment, i.e. lawnmowers. When leakage or problems with the machine occur, an oil system can cause severe damage to greens and fairways. With a water system, however, these damages do not occur.

PROBLEMS WITH H20 HYDRAULIC SYSTEMS:

Corrosion
Freezing
Lubrication

BACTERIA GROWTH AND DEVELOPMENT

Brought on by contact to the outside environment and organic carbon sources

Can clog components of system and cause the machine to malfunctions

OBJECTIVES AND GOALS:

1. Design a cost effective system to inject selected bactericide into the water hydraulic system without exposing the reservoir to the outside environment

2. To develop a series of quick and easy tests to determine the level of bacteria in the water hydraulic system when using "tap" water or distilled water

Smart Products, Inc. 300 series check valve, model # 308

1/2 in barbed fitting, both ends

Cracking pressure 0.5 PSI

Check Valve Device:

- A small plastic check valve is installed on the lid of the reservoir.
- The check valve is manufactured by Smart Products, Inc. based out of San Jose, California
- It is a 300 Series, model # 308
- The valve has a ½ in. barbed fitting on both ends
- The valve has a cracking pressure of 0.5 PSI
- The valve is installed and designed so that it's parts can be removed and replaced quite easily

Injection Device:

- The device used to inject the bactericide into the reservoir is a simple pre-packaged syringe.
- The syringe is filled with TROYSAN 174, a water soluble liquid designed to control and terminate bacteria in hydraulic systems
- The syringes are package in boxes of six or twelve (purchase 6 for distilled system and 12 for tap water system) and are sealed until use

The check valve, mounted on the lid of the reservoir

The valve can be disassembled for easy replacement and repair

Outlet end of check valve on under side of reservoir lid

Smart Products, model 308 check valve mounted and capped

Simple Tests for H_2O Systems

Regular Tap H2O

1. Visual Test – Weekly
   a. Floating pieces
   b. Color Changes (green/yellow tints)
   c. Build-up on edges/walls

IF VISUAL TEST IS POSITIVE . . .
OR RECOMMENDED monthly

2. Bacteria Growth Test Strips
   a. Soak strip in water and let sit 48 hours
   b. Determines level of bacteria based on color chart

IF TEST STRIP IS POSITIVE . . .

3. Apply 1 injector of Troy Corporation's "Troysan 174"
   a. Repeat visual test after 24 hours
   b. If necessary repeat Bacteria Growth Tes Strip
   c. If necessary apply 2nd injector of Troy Corporation's "Troysan 174"

IF EXCESS USE OF BACTERICIDE IS NECESSARY (MORE THAT 3 INJECTORS PER MONTH, IT IS RECOMMENDED THAT THE SYSTEM BE SWITCHED TO DISTILLED

Distilled H2O

1. Visual Test – Monthly
   a. Floating pieces
   b. Color Changes (green/yellow tints)
   c. Build-up on edges/walls

IF VISUAL TEST IS POSITIVE . . .
OR RECOMMENDED EVERY 6 MONTHS

2. Purtest Bacteria Test Kit
   a. 1 test per kit
   b. Fill cup with H2O and let sit 48 hours
   c. Determines level of bacteria based on color chart

IF TEST KIT IS POSITIVE . . .

3. Apply 1 injector of Troy Corporation's "Troysan 174"
   a. Repeat visual test after 24 hours
   b. If necessary repeat Purtest Bacteria Kit
   c. If necessary apply 2nd injector of Troy Corporation's "Troysan 174"

IF EXCESS USE OF BACTERICIDE IS NECESSARY (MORE THAT 6 INJECTORS PER YEAR, IT IS RECOMMENDED THAT THE SYSTEM BE FLUSHED AND TREATED, THEN REFILLED WITH DISTILLED

Special Thanks to:

TROY
Performance Products... Worldwide

Smart Products, Inc.
THE SMART SOLUTION

Professor Gary Krutz – ABE
Carol Sikler – ABE

Conclusions:

This design is cost effective and practical due to the minimal production of new products.

The check valve is $0.50 to produce. The syringe pre-packaged with TROYSAN 174 will be $3.00 to produce. The testing kits are $1.00 per use for the tap system and $10.00 per use for the distilled system.

Total cost for the tap system is $4.50 per use recommended 12 times per year.

Total cost for the distilled system is $13.50 per use recommended 2 times per year.

The check valve is simple to install and only requires a seal on the lid of the reservoir. It also allows for replacing of parts and seals within the check valve. This design solves one of the main problems plaguing the growing water hydraulic industry.