

BOILERS

ABSTRACT:

Millions of boilers are in use throughout the world. Most of them are not properly treated for the prevention of scale and corrosion. Normally only boilers that are maintained by full time licensed boiler operators receive proper treatment. Even then most boilers will scale. Adding chemicals to boilers is the most commonly used method for preventing scale and corrosion. This practice is hazardous, as the chemicals are themselves toxic and corrosive in high concentrations. Additionally chemical treatment is dependent on the competency of the boiler operator and the chemical company that supplies the chemicals and performs the water testing required to properly maintain the correct concentration of chemicals. **MOST BOILERS FORM SCALE EVEN WITH CHEMICAL TREATMENT. MAGNETICALLY TREATING BOILERS WILL ENHANCE THE EFFICIENCY OF CHEMICALS IF THE OPERATOR CHOOSES TO CONTINUE TO USE CHEMICALS.** Scale in boilers forms on the hot internal surfaces that transfer the heat from the fuel to the water. Any time water is heated it loses its ability to hold minerals in solution. The minerals contained in the water precipitate out and crystallize on the hot tubes of the boiler. This scale forms a heat insulating barrier between the tubes and the water. Each 1/8" accumulation of scale will retard heat transfer by 15-20%. Scale build up of 1/4" to 1/2" are common. Efficiency degeneration can easily exceed 60% with an accumulation of 1/2" scale.

Applying magnetic fluid treatment to the boiler feed water line between the pump and the boiler will effectively treat all the water fed into the boiler. **NOTE: All boilers are plumbed in steel pipe. A section of the pipe (approximately 24") must be removed and replaced with a section of non-ferrous pipe, usually copper.** The magnets will prevent any further accumulation of scale and, in most cases, actually remove any existing scale over a period of 60 to 90 days depending on the use of the boiler. There are two types of boilers, steam and hot water. Steam boilers can be identified by the presence of a sight glass near the low water cut off mechanism. Hot water boilers do not normally have a sight glass. Hot water boilers circulate hot water through the system.

Magnets installed on the feed line and the outlet line of a hot water boiler system will treat and protect the entire system against scale accumulation and corrosion. Steam boilers heat water in the boiler but circulate steam through the system.

Magnets installed on the feed line to the boiler will protect the boiler from scaling but have no effect on the lines circulating the steam through the system. Therefore, the boiler still needs corrosion treatment for the steam lines.

INSTALLATION:

The magnetic fluid treatment units should be installed on the boiler water feed line between the boiler water feed pump and the boiler. All boilers are plumbed in steel pipe. A section of pipe approximately 24" long must be removed and replaced with a non-ferrous section, i.e. copper or nonferrous (300 series) Stainless Steel. The magnets are to be installed on this copper pipe. If the boiler uses large quantities of make up water, an additional magnetic units should be installed on the make up water lines.

G M X ON LINE FLUID CONDITIONING - Part IV

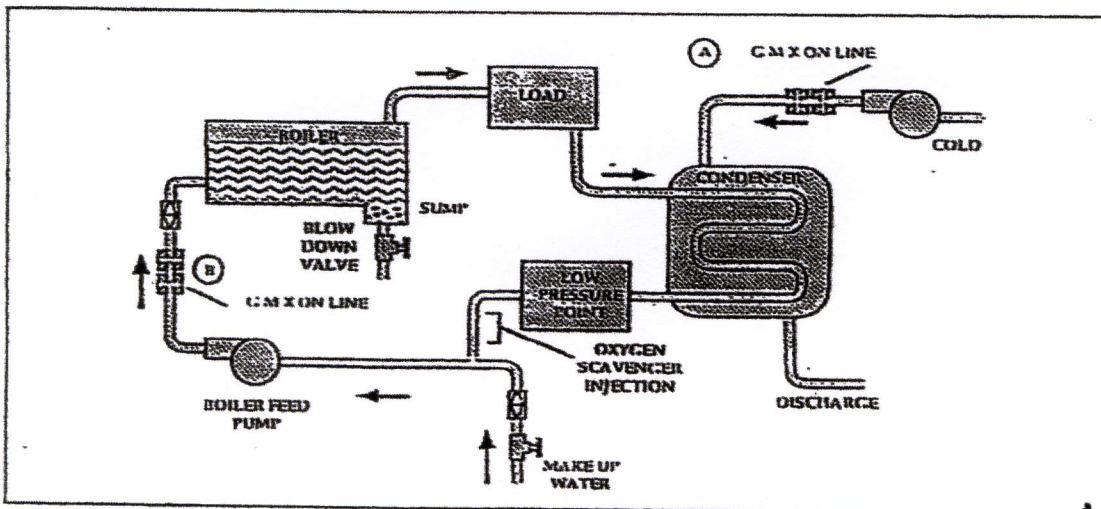
WHAT TO EXPECT:

If the boiler has existing scale when the magnets are installed, expect the total dissolved solids (t.d.s.) to show an increase in a water test. This is due to the scale being removed from the boiler. Water in the sight glass of a steam boiler will exhibit a slight turbidity the color of rusty mud. This is normal and desirable. When the boiler is opened for inspections, this same material seen in the sight glass will have formed a thin coating on the boiler tubes. This coating is easily wiped or rinsed off, and has no insulating properties. It does not inhibit heat transfer. However, this coating will help protect the boiler tubes from corrosion and oxygen damage.

After approximately four days to two weeks, the magnets will start to remove any existing scale. The residue will be visible in the blowdown water. When the water again runs clear, the boiler should be free of all scale. Temperature variation between water temperature and stack temperature should be stabilize at 150 degrees. This is another indication that the boiler is now scale free. Hot water boilers will exhibit a similar presence of removed scale in the blowdown process. The blowdown water may develop a slight reddish brown color during the first few seconds of blowdown. Again this is normal and desirable and an indication that the magnets are functioning as designed.

RESULTS / BENEFITS

Any existing scale will be removed, and no further accumulation should occur. Consequently, boilers will operate far more efficiently. Greatly improved heat transfer means a reduction of fuel needed to heat water and cost reduction. Maintenance costs will also be reduced. Since scale can cause hot spots and premature tube failure, boiler life will be extended. The need for chemicals can be greatly reduced or eliminated with a result of additional cost savings and environmental benefits.



Typical Boiler Installation

Installation of the G M X On Line units could be located between the condenser and feedwater inlet (Fig. A). Another location would be "downstream" from the condensate pump in the feedwater line before entering the boiler (Fig. B). The sump or blowdown is shown to emphasize the importance of proper cleaning to remove loosened scale and particle laden water from the boiler. NOTE: Optimum location for boiler installation is shown as Fig. B.