DRESSER Waukesha **SERVICE BULLETIN**

VHP

TOPIC: Cooling Systems
IDENT NO: 4-1947E
SUPERSEDES: 4-1947D
DATE: October 15, 1998

SUBJECT: Coolant Recommendations To Minimize Cylinder Sleeve Cavitation Damage

MODELS AFFECTED: VHP

The purpose of this Service Bulletin is to present our latest coolant recommendations to minimize cylinder sleeve cavitation damage. These recommendations have been determined by Waukesha through extensive laboratory testing. They provide a significant reduction in cavitation damage under controlled conditions.

WHAT IS CAVITATION?

Cavitation is a particular type of erosion occurring on the cylinder sleeves and other metal surfaces in contact with liquid. Mechanical vibrations cause dissolved gas and vapor bubbles to collapse. The resultant shock forces reach high levels in local areas where they remove protective films and coatings and erode the metal surfaces. Where the environment is corrosive, severity of cavitation damage increases.

Today it is generally acknowledged that:

- The initial damage due to cavitation attack is mechanical in nature.
- Corrosion accelerates cavitation erosion.
- Damage occurs almost exclusively under loaded operation rather than during warmup or idling periods.
- The rate of cavitation is not constant.
- All wet type cylinder sleeves are subject to cavitation.
- The formation and collapse of vapor bubbles is affected by both temperature and pressure.
- Pressurized systems are less likely to exhibit cavitation problems.

Shown in Figure 1 are the effects of cavitation erosion and corrosion on a piece of steel cut from a cylinder sleeve.

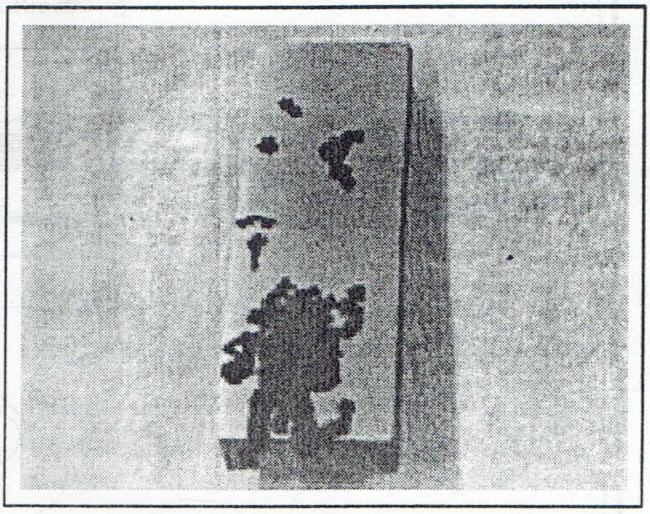

Figure 1. Cavitation Eroded Steel

Figure 2 illustrates the cavitation cycle. The collapse of vapor bubbles over a small area generates enormous pressures.

Waukesha chrome plates the OD of the 9-1/8 inch and 9-3/8 inch bore cylinder sleeves. This puts a fine grain, exceptionally hard barrier between the bubble collapse and the sleeve material to retard cavitation and corrosion. The 8-1/2 inch bore engine cylinder sleeves are not chrome plated due to greater wall thickness and the resultant greatly reduced vibration.

Waukesha recommends the use of additives or anti-freeze to further reduce or prevent cavitation damage.

Distilled water is recommended as the base solution. However, if distilled water is not available, an acceptable field substitute is deionized water.

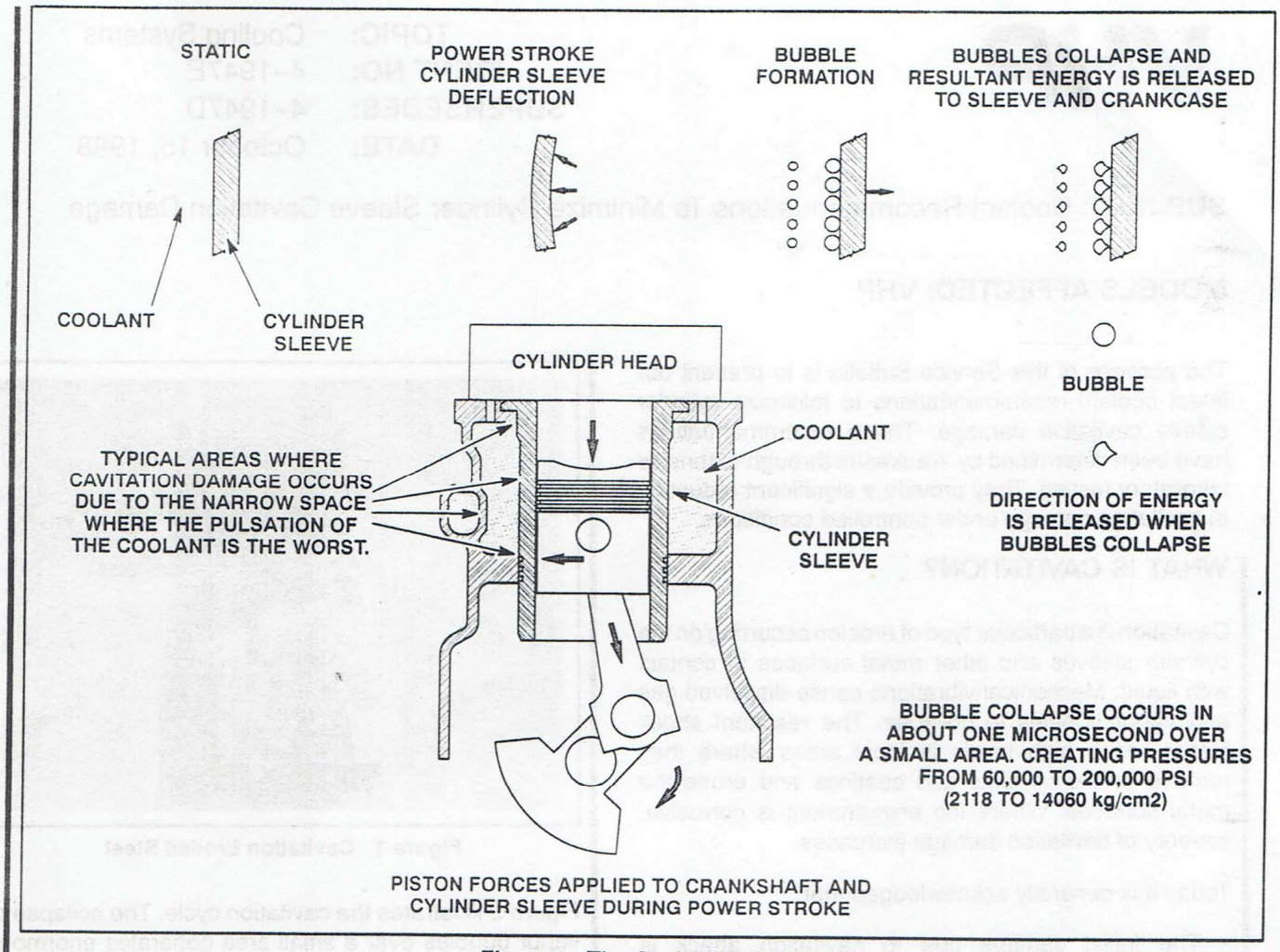

Figure 2. The Cavitation Cycle

ADDITIVES

In geographical areas where freeze protection is not necessary, cavitation damage can be controlled by using the additives listed below in the recommended concentration.

Table 1. Additives

TRADE NAME	MANUFACTURER	RECOMMENDED CONCENTRATION BY VOLUME
Dowtherm™ Conditioner	Dow Chemical	6% (1 pint in 2 gallons) (1 litre in 16 litres)
Sodium MBT	Flexsys	5% (1 quart in 5 gallons) (1 litre in 20 litres)
Maxigard®	Drew Industrial Division Of Ashland Chemical	1.63% (1 pint in 7-1/2 gallons) (0.5 litres in 31 litres)

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