

Water Hardness Uses for Dow Chelating Agents

“Hard” water (water with high concentrations of calcium and magnesium ions) is a significant problem industrially and commercially, and in the home environment as well. The use of Dow chelating agents in control of “hardness” ions (Mg^{+2} , Ca^{+2}) in water helps overcome this widespread problem.

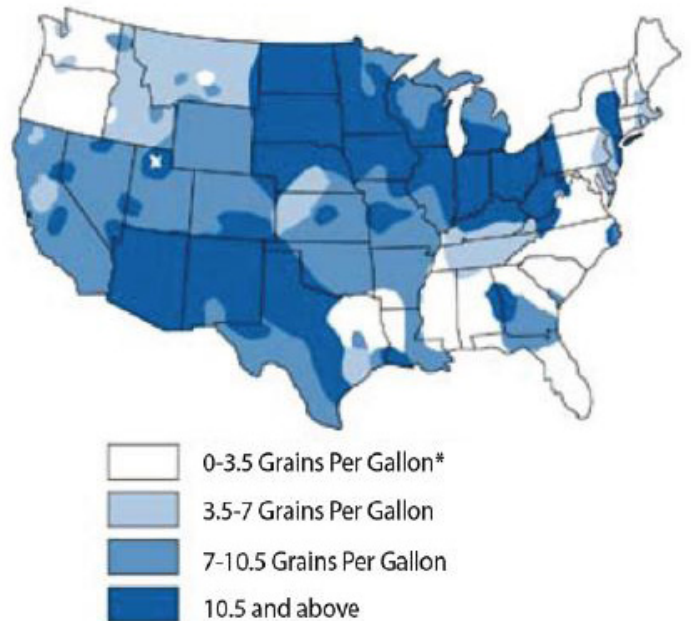
Control of Water Hardness

In many situations, water hardness problems are solved by using VERSENE™ 100 Chelating Agent. The following procedure assists in determining the quantity of chelating agent required to inactivate hardness ions.

A general estimate of water hardness in the United States is given in Figure 1. Specific data on local water hardness should be obtained from local waterworks, boiler service organizations, and similar sources. After the water hardness (grains per gallon or parts per million $CaCO_3$) and the quantity of water to be treated have been determined, Figure 2 will provide the amount of VERSENE 100 required to soften the water. For example, 1000 gallons of water at 10 grains per gallon of hardness require 15 pounds of VERSENE 100.

If a product containing VERSENE 100 Chelating Agent is diluted for use, it should be formulated with sufficient excess chelating agent to overcome the hardness of the dilution water. Figure 3 gives estimates of the amount of chelating agent required. For example, if a product is used at 8 ounces per gallon of water, if the dilution factor is 16X, and if water hardness is 100 ppm, then 1.5% of VERSENE 100 would be required in the original product.

Figure 1: Map of Water Hardness Areas in the U.S.A.



This map shows general water hardness areas in recognized variations. However, due to the nature of the water bed subsoil structure, water hardness may vary from one source to another.

Grains of hardness are expressed as calcium carbonate. Darker areas indicate harder water. Lighter areas indicate softer water.

*1 grain is equal to 17.1 parts per million.

Figure 2: Hardness Ion Control Chart

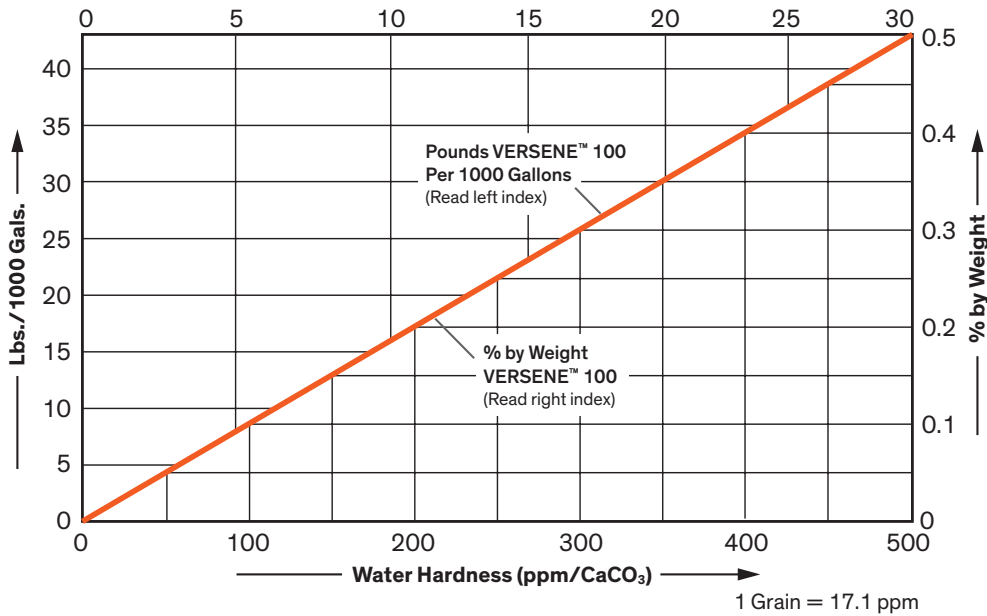
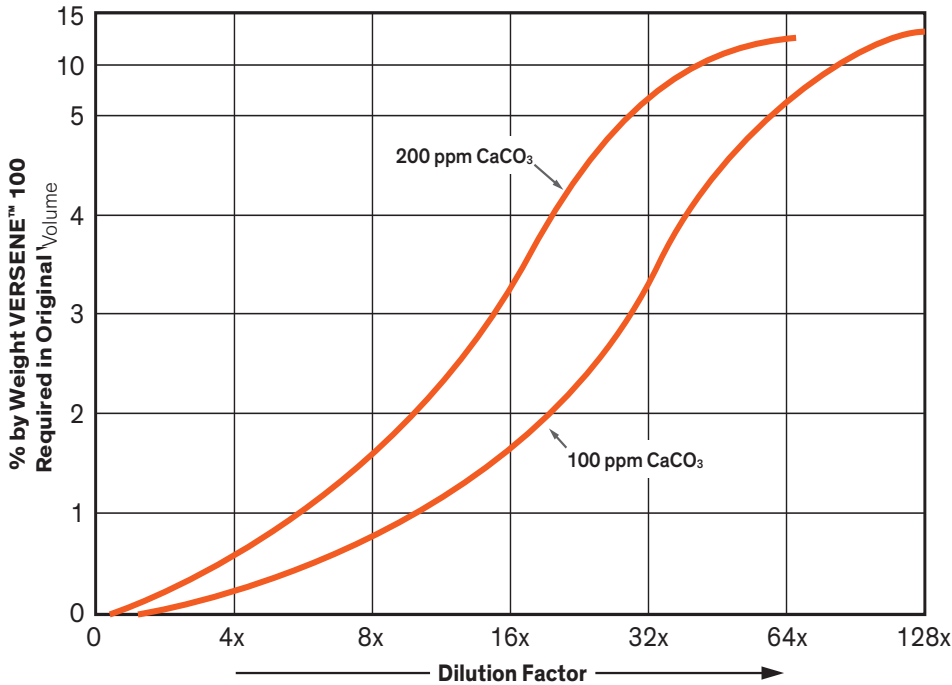


Figure 3: Hard Water Dilution



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