CLAIMS

1. A method for making a phosphate-treated galvanized steel sheet, comprising forming a phosphate film on the surface of a galvanized layer of a galvanized steel sheet using a phosphate treatment solution containing Zn^{2+} and Mg^{2+} so as to satisfy $2.0 < Zn^{2+} \leq 5.0$ g/L, $2.0 \leq Mg^{2+} \leq 5.0$ g/L, and $0.4 \leq Mg^{2+}/Zn^{2+} \leq 2.5$, and satisfying $0.020 \leq$ free acidity/total acidity < 0.10.

2. The making method of claim 1, wherein the phosphate film is formed by contacting the galvanized layer surface with the phosphate treatment solution for 3 to 15 seconds.

3. A phosphate-treated galvanized steel sheet made by the making method of claim 1 or 2, the galvanized steel sheet having thereon a phosphate film containing Mg in an amount of $0.2 \leq Mg < 2.0\%$ by mass at a coating weight of 0.2 to 3.0 g/m^2.

1. A method for making a phosphate-treated galvanized steel sheet, comprising treating a galvanized steel sheet with a phosphate treatment solution to form a phosphate film on the surface of the galvanized steel sheet,

wherein the phosphate treatment solution contains Zn^{2+} in an amount of more than 2.0 g/L and 5.0 g/L or less, Mg^{2+} in an amount of from 2.0 to 5.0 g/L, the concentration ratio of the Mg^{2+} to Zn^{2+} (Mg^{2+}/Zn^{2+}) is from 0.4 to 2.5, and the ratio of the free acidity to the total acidity in the treatment solution is 0.020 or more and less than 0.10,

wherein the source of magnesium ion in the treatment solution is magnesium nitrate, and the phosphate film is formed by contacting the galvanized layer surface with the phosphate treatment solution for 3 to 15 seconds.

2. A phosphate-treated galvanized steel sheet made by the making method of claim 1, the galvanized steel sheet having thereon a phosphate film containing Mg in an amount of $0.2 \leq Mg < 2.0\%$ by mass at a coating weight of 0.2 to 3.0 g/m^2.