CLAIMS

[Claim 1] A hot-dip Al-Zn-Si-Mg coated steel sheet comprising a coating layer, wherein

the coating layer has a composition containing Al: 45 mass% to 65 mass%, Si: 1.0 mass% to 4.0 mass%, and Mg: 1.0 mass% to 10.0 mass%, with the balance being Zn and inevitable impurities, and

diffraction intensities of Mg_2Si and $MgZn_2$ in the coating layer as measured by an X-ray diffraction method in which a part of the coating layer is mechanically scrapped off in powder form and subjected to X-Ray diffraction and which satisfy the following relation (1):

$$Mg_2Si(111)/MgZn_2(100) \leq 2.0 \quad (1),$$

where $Mg_2Si(111)$ represents a diffraction intensity for a (111) plane of Mg_2Si with an interplanar spacing d of 0.3668 nm, and

$MgZn_2(100)$ represents a diffraction intensity for a (100) plane of $MgZn_2$ with an interplanar spacing d of 0.4510 nm.

[Claim 2] The hot-dip Al-Zn-Si-Mg coated steel sheet according to claim 1, wherein the diffraction intensity of Si in the coating layer as measured by the X-ray diffraction method satisfies the following relation (2):

$$Si(111) = 0 \quad (2),$$

where Si(111) represents a diffraction intensity for a (111) plane of Si with an interplanar spacing d of 0.3135 nm.

[Claim 3] The hot-dip Al-Zn-Si-Mg coated steel sheet according to claim 1 or 2, wherein the coating layer further contains Sr: 0.01 mass% to 1.0 mass%.

[Claim 4] The hot-dip Al-Zn-Si-Mg coated steel sheet according to any one of claims 1 to 3, wherein a content of Al in the coating layer is 50 mass% to 60 mass%.

[Claim 5] The hot-dip Al-Zn-Si-Mg coated steel sheet according to any

one of claims 1 to 4, wherein a content of Si in the coating layer is 1.0 mass% to 3.0 mass%.

[Claim 6] The hot-dip Al-Zn-Si-Mg coated steel sheet according to any one of claims 1 to 5, wherein a content of Mg in the coating layer is 1.0 mass% to 5.0 mass%.

[Claim 7] A surface-treated steel sheet comprising the coating layer as recited in any one of claims 1 to 6 and a chemical conversion layer formed on the coating layer, wherein

the chemical conversion layer contains: at least one resin selected from the group consisting of an epoxy resin, a urethane resin, an acrylic resin, an acrylic silicon resin, an alkyd resin, a polyester resin, a polyalkylene resin, an amino resin, and a fluororesin; and at least one metal compound selected from the group consisting of a P compound, a Si compound, a Co compound, a Ni compound, a Zn compound, an Al compound, a Mg compound, a V compound, a Mo compound, a Zr compound, a Ti compound, and a Ca compound.

[Claim 8] A pre-painted steel sheet comprising a paint layer formed either directly on the coating layer as recited in any one of claims 1 to 6 or on a chemical conversion layer on top of the coating layer, wherein

the chemical conversion layer contains: a resin component containing (a) an anionic polyurethane resin having an ester bond and (b) an epoxy resin having a bisphenol skeleton, in a total amount of 30 mass% to 50 mass%, in which a content ratio of (a) to (b), (a):(b), is in the range of 3:97 to 60:40 by mass; and an inorganic compound containing 2 mass% to 10 mass% of a vanadium compound, 40 mass% to 60 mass% of a zirconium compound, and 0.5 mass% to 5 mass% of a fluorine compound, and

the paint layer has at least a primer paint layer, the primer paint layer containing: a polyester resin having a urethane bond; and an inorganic compound containing a vanadium compound, a phosphoric acid compound, and a magnesium oxide.