ARC WELDING JOINT FOR Zn PLATED STEEL SHEET

TECHNICAL FIELD

[0001]

The present invention relates to arc welding of Zn (zinc)-based plated steel sheets. In particular, the present invention relates to an arc welding method capable of reducing development of blowholes and the like to form a good welded joint.

BACKGROUND ART

[0002]

A Zn-based plated steel sheet in which a steel sheet is plated with Zn or a Zn alloy has excellent corrosion resistance, strength, workability, and the like, and also shows an aesthetically pleasing appearance. For these reasons, it is widely used for automobiles, housing, home appliances, and the like. In order to perform arc welding of Zn-based plated steel sheets, heat is applied while a welding wire is supplied between the Zn-based plated steel sheets which are materials to be welded. Thereby, they are joined. Consequently, the Zn-based plated steel sheets as materials to be welded are exposed to heat generated by electric arc during arc welding of them. Then, Zn vapor may be generated during welding because the boiling point of Zn (906°C) in the plating layers is lower than that of Fe in the steel sheets. The vapor

portion and a terminal end portion, the starting end portion being a region formed after the start of welding, and the terminal end portion being a region formed before the end of welding.

[0007]

After conducting extensive studies to achieve the above object, the present inventors found that discharge of a gas from a weld metal at a starting end portion and a terminal end portion of a welding section can be facilitated, and development of blowholes and pits can be reduced by providing an inter-sheet gap in a predetermined range; using welding conditions such as a welding speed, a welding heat input, a welding current, and a welding voltage in the starting end portion and in the terminal end portion, the welding conditions being different from those used in the central portion; and stopping electric arc at the terminal end portion when performing arc welding of Zn-based plated steel sheets. Then the present invention has been completed. Specifically, can provide the following.

[0008]

(1) One aspect can provide a method of arc-welding Zn-based plated steel sheets, in which an inter-sheet gap in a range of 0.2 to 1.5 mm is provided, and welding is performed by moving a welding means along an overlaid portion of the steel sheets to be welded and joined, the method including: a first step of moving the welding means

at a first

welding speed from a welding start point, and applying a first welding heat input to perform welding; a second step of, after the first step, moving the welding means at a second welding speed, and applying a second welding heat input to perform welding; and a third step of, after the second step, stopping the movement of the welding means, and performing welding for 0.1 to 2 seconds at a position where the welding means is stopped, in which the first step includes a welding section welded under conditions where the first welding speed is smaller than the second welding speed, and the first welding heat input is larger than the second welding heat input, and the third step includes performing welding at a welding current and a welding voltage lower than those used in the second step, a starting end portion corresponding to a welding section after the first step is a region covering 10 to 40% of the entirety of a welding length, and a terminal end portion corresponding to a welding section after the third step is a region covering 10 to 20% of the entirety of the welding length and the blowhole occupancies are 0 to 18% in the starting end portion, 15 to 18% in the terminal end portion, and 7% or less over the entire length of the welding section.

[0009]

(2) Various embodiments provide the method of arc-welding Zn-based plated steel sheets according to (1), in which a starting end portion corresponding to a welding section after the first step is a region covering 10 to 40% of the entirety of a welding length, and a terminal end portion corresponding

to a welding section after the third step is a region covering 10 to 20% of the entirety of the welding length.

[0010]

(3) Various embodiments can provide the method of arc-welding Zn-based plated steel sheets according to (1) or (2), in which the first step includes starting welding at one end

CLAIMS

1. An arc welded joint obtained by the following method of arc-welding Zn-based plated steel sheets, in which a blowhole occupancy over the entirety of the welding length is less than 30%,

the method of arc-welding comprising:

setting an inter-sheet gap within a range of 0.2 to 1.5 mm;

performing welding by moving a welding means along an overlaid portion of the steel sheets to be welded and joined;

a first step of moving the welding means at a first welding speed from a welding start point, and applying a first welding heat input to perform welding;

a second step of, after the first step, moving the welding means at a second welding speed, and applying a second welding heat input to perform welding; and

a third step of, after the second step, stopping the movement of the welding means, and performing welding for 0.1 to 2 seconds at a position where the welding means is stopped, wherein

the first step includes a welding section welded under conditions where the first welding speed is smaller than the second welding speed, and the first welding heat input is larger than the second welding heat input, and

the third step includes performing welding at a welding current and a welding voltage lower than those used in the second step, a starting end portion corresponding to a welding section after the first step is a region covering 10 to 40% of the entirety of a welding length, and a terminal end portion corresponding to a welding section after the third step is a region covering 10 to 20% of the entirety of the welding length and the blowhole occupancies are 0 to 18% in the starting end portion, 15 to 18% in the terminal end portion, and 7% or less over the entire length of the welding section.

2. The arc welded joint according to claim 1, wherein the first step includes starting welding at one end of the overlaid portion, and performing welding toward the other end, the welding heat input in the first step being more than 1.2 times of the welding heat input in the second step.

3. The arc welded joint according to claim 1 or 2, wherein the first step includes performing welding at the welding start point located inwardly separated from the one end of the

overlaid portion toward the end, and then turned around to perform welding from the end toward the other end,

the welding toward the one end being performed at a welding speed smaller the welding speed in the second step and with a welding heat input more than 1.2 times of the second welding heat input, and

the welding toward the other end being performed at the same welding speed as the second welding speed.

4. The arc welded joint according to any one of claims 1 to 3, wherein the Zn-based plated steel sheets each have a hot-dipped layer consisting of, by mass%, Al: 4.0 to 22.0%, Mg: 0.05 to 10.0%, Ti: 0 to 0.10%, B: 0 to 0.05 %, Si: 0 to 2.0%, Fe: 0 to 2.5%, and the remainder being Zn and unavoidable impurities.

5. The arc welded joint according to any one of claims 1 to 4, wherein the Zn-based plated steel sheets each have a plating deposition amount per side of 20 to 250 g/m^2, and a sheet thickness of 1.6 to 6.0 mm.