larger in a region formed after the start of welding (starting end portion) and a region formed before the end of welding (terminal end portion) as compared with a central region formed between them, and thus development of blowholes is difficult to be reduced. In view of the above, improvements have been demanded.

[0004]

Patent Document 1: Japanese Unexamined Patent Application, Publication No. H07-246465

Patent Document 2: Japanese Unexamined Patent Application, Publication No. S62-179869

DISCLOSURE

[0005]

When blowholes are developed during arc welding of Zn-based plated steel sheets, and the blowhole occupancy over the entire welding section increases, the joining area in the welding section is reduced, significantly affecting the joining strength of the welding section. Further, formation of pits on the outer surface of the welding section will impair the appearance of the welding section.

[0006]

Accordingly, various embodiments provide arc welding of Zn-based plated steel sheets in which the blowhole occupancy over the entire welding section is reduced by reducing development of

blowholes in a starting end

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 various embodiments, 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 various embodiments have been completed. Specifically, various embodiments can provide the following.

[0008]

(1) One aspect provides 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.

[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 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

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.

[0011]

(4) Various embodiments provide the method of arc-welding Zn-based plated steel sheets according to (1) or (2), in which the first step includes performing welding at the welding start point located inwardly 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 than 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.

[0012]

(5) Various embodiments provide the method of arc-welding Zn-based plated steel sheets according to any one of (1) to (4), in which a blowhole occupancy over the entirety of the welding length is less than 30%.

[0013]

(6) Various embodiments provide the method of arc-welding Zn-based plated steel sheets according to any one of (1) to (5), in which 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.

[0014]

(7) Various embodiments provide the arc welding method according to any one of (1) to (6), in which 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.

[0015]

(8) Various embodiments provide an arc welded joint formed by the arc welding method according to any one of (1) to (7), in which the blowhole occupancy over the entirety of the welding length is less than 30%.

Effects of the Invention

[0016]

According to various embodiments, development of blowholes and pits in the starting end portion and the terminal end portion can be decreased to reduce the blowhole occupancy of the entire welding section when arc welding is performed with an inter-sheet gap provided between Zn-based plated steel sheets. This can prevent a decrease in the welding strength, contributing to improved safety and reliability of a welding section. Further, a welding section with good appearance can be obtained.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

Fig. 1 shows a schematic view of a T-shaped test piece

5. The method of arc-welding Zn-based plated steel sheets according to any one of claims 1 to 4, wherein a blowhole occupancy over the entirety of the welding length is less than 30%.

6. The method of arc-welding Zn-based plated steel sheets according to any one of claims 1 to 5, 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.

7. The arc welding method according to any one of claims 1 to 6, 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.