CLAIMS

[Claim 1]

A covered electrode comprising:

a core wire; and

a coating agent that covers the core wire,

wherein the coating agent contains at least one of a metal carbonate and a metal fluoride,

a total of a content (CO_2 conversion value) of a metal carbonate having a grain diameter of 75 μm or more ($C_{CO2,\ 75\ \mu m}$) and a content (F conversion value) of a metal fluoride having a grain diameter of 75 μm or more ($C_{F,\ 75\ \mu m}$) relative to a total mass of the coating agent ($C_{coat,\ total}$) is 6.0 mass% or more (where a case of at least one of the $C_{CO2,\ 75\ \mu m}$ and the $C_{F,\ 75\ \mu m}$ being 0 mass% is included),

a content of C in the coating agent relative to the total mass of the coating agent ($C_{coat,\ total}$) is 0.01 mass% or more and 0.15 mass% or less,

the content (CO_2 conversion value) of the metal carbonate having a grain diameter of 75 μm or more ($C_{CO2,\ 75\ \mu m}$) relative to the total mass of the coating agent ($C_{coat,\ total}$) is 4.6 mass% or more, and

a total of a content (CO_2 conversion value) of a metal carbonate having a grain diameter of 150 μm or more ($C_{CO2,\ 150\ \mu m}$) and a content (F conversion value) of a metal fluoride having a grain diameter of 150 μm or more ($C_{F,\ 150\ \mu m}$) relative to the total mass of the coating agent ($C_{coat,\ total}$) is 2.5 mass% or more and 4.0 mass% or less.

[Claim 2]

The covered electrode according to claim 1,

wherein in a cross section perpendicular to a longitudinal direction of the electrode,

a ratio of S_2 to S_1 (S_2/S_1) satisfies 0.06 or more and 0.15 or less,

wherein S_1 is a cross-sectional area of the entire coating agent, and

S_2 is a total area of at least one of the metal carbonate and the metal fluoride, each having an equivalent circle diameter of 30 μm or more.

[Claim 3]

The covered electrode according to claim 1 or 2,

wherein the coating agent contains at least one selected from $CaCO_3$, $BaCO_3$, $SrCO_3$, $MgCO_3$ and $MnCO_3$ as the metal carbonate, and

a total content (CO_2 conversion value) of the metal carbonate in the coating agent ($C_{CO2, total}$) relative to the total mass of the coating agent ($C_{coat, total}$) satisfies 6.0 mass% or more and 26.0 mass% or less.

[Claim 4]

The covered electrode according to any one of claims 1 to 3,

wherein the coating agent contains at least one selected from CaF_2, BaF_2, SrF_2 and MgF_2 as the metal fluoride, and

a total content (F conversion value) of the metal fluoride in the coating agent ($C_{F, total}$) relative to the total mass of the coating agent ($C_{coat, total}$) is 15.0 mass% or less (including 0 mass%).

[Claim 5]

The covered electrode according to any one of claims 1 to 4,

wherein the coating agent contains both the metal carbonate and the metal fluoride, and

a ratio of a total content (F conversion value) of the metal fluoride in the coating agent ($C_{F, total}$) relative to a total of a total content (CO_2 conversion value) of the metal carbonate in the coating agent ($C_{CO2, total}$) and the total content (F conversion value) of the metal fluoride ($C_{F, total}$) in the coating agent $\{C_{F, total}/(C_{CO2, total} + C_{F, total})\}$ satisfies 0.10 or more and 0.30 or less.

[Claim 6]

The covered electrode according to any one of claims 1 to 5,

wherein the coating agent further contains at least one of Si and a Si compound, and

a total content (Si conversion value) of the Si and the Si compound ($C_{Si, total}$) relative to the total mass of the coating agent ($C_{coat, total}$) is 6.0 mass% or more and 9.0 mass% or less.

[Claim 7]

A shielded metal arc welding method using a covered electrode including a core wire and a coating agent that covers the core wire,

wherein the coating agent contains at least one of a metal carbonate and a metal fluoride,

a total of a content (CO_2 conversion value) of a metal carbonate having a grain diameter of 75 μm or more ($C_{CO2, 75 \mu m}$) and a content (F conversion value) of a metal fluoride

having a grain diameter of 75 μm or more ($C_{F,\ 75\ \mu m}$) relative to a total mass of the coating agent ($C_{coat,\ total}$) is 6.0 mass% or more (where a case of at least one of the $C_{CO2,\ 75\ \mu m}$ and the $C_{F,\ 75\ \mu m}$ being 0 mass% is included),

a content of C in the coating agent relative to the total mass of the coating agent ($C_{coat,\ total}$) is 0.01 mass% or more and 0.15 mass% or less,

the content (CO_2 conversion value) of the metal carbonate having a grain diameter of 75 μm or more ($C_{CO2,\ 75\ \mu m}$) relative to the total mass of the coating agent ($C_{coat,\ total}$) is 4.6 mass% or more, and

a total of a content (CO_2 conversion value) of a metal carbonate having a grain diameter of 150 μm or more ($C_{CO2,\ 150\ \mu m}$) and a content (F conversion value) of a metal fluoride having a grain diameter of 150 μm or more ($C_{F,\ 150\ \mu m}$) relative to the total mass of the coating agent ($C_{coat,\ total}$) is 2.5 mass% or more and 4.0 mass% or less.

[Claim 8]

The shielded metal arc welding method according to claim 7,

wherein, on an electrode distal end side after use of the covered electrode, a ratio of D_2 to D_1 (D_2/D_1) satisfies 0.40 or less (including the case where the ratio is 0),

wherein D_1 is a distance between a distal end portion of the core wire and the most distal end portion of the coating agent remaining around the core wire in a longitudinal direction of the electrode, and

D_2 is a distance between the most distal end portion of the coating agent remaining around the core wire and the rearmost portion of the coating agent remaining around the core wire in the longitudinal direction of the electrode.

[Claim 9]

The shielded metal arc welding method according to claim 8, wherein arc welding is performed such that the D_1 satisfies 2.2 mm or less.

[Claim 10]

The shielded metal arc welding method according to claim 8 or 9, wherein arc welding is performed such that a ratio of the D_1 to a diameter d of the core wire in the covered electrode (D_1/d) satisfies 1.3 or less.

[Claim 11]

The shielded metal arc welding method according to any one of claims 7 to 10,

wherein arc welding is performed in a welding position in which the covered electrode is perpendicular to a base metal or has a drag angle of more than 0° and 30° or less.

[Claim 12]

The covered electrode according to any one of claims 1 to 6, wherein a total of a content (CO_2 conversion value) of a metal carbonate having a grain diameter of 106 μm or more ($C_{CO2,\ 106\ \mu m}$) and a content (F conversion value) of a metal fluoride having a grain diameter of 106 μm or more ($C_{F,\ 106\ \mu m}$) relative to the total mass of the coating agent ($C_{coat,\ total}$) is 5.0 mass% or more and 9.0 mass% or less.

[Claim 13]

The covered electrode according to any one of claims 1 to 6, wherein a content of Al_2O_3 in the coating agent relative to the total mass of the coating agent ($C_{coat,\ total}$) is 0.02 mass% or more and 3.0 mass% or less.

[Claim 14]

The shielded metal arc welding method according to any one of claims 7 to 11, wherein a total of a content (CO_2 conversion value) of a metal carbonate having a grain diameter of 106 μm or more ($C_{CO2,\ 106\ \mu m}$) and a content (F conversion value) of a metal fluoride having a grain diameter of 106 μm or more ($C_{F,\ 106\ \mu m}$) relative to the total mass of the coating agent ($C_{coat,\ total}$) is 5.0 mass% or more and 9.0 mass% or less.

[Claim 15]

The shielded metal arc welding method according to any one of claims 7 to 11, wherein a content of Al_2O_3 in the coating agent relative to the total mass of the coating agent ($C_{coat,\ total}$) is 0.02 mass% or more and 3.0 mass% or less.