CLAIMS

Claim 1

A method for producing acetic acid in acetic acid production equipment, the equipment comprising:

a reactor;

a first distillation column;

a second distillation column; and

an additional purification unit,

the method comprising:

a reaction step of subjecting a material mixture comprising methanol, carbon monoxide, a catalyst, and an iodide to a methanol carbonylation reaction in the reactor to form acetic acid;

a first purification step of subjecting a crude acetic acid stream to distillation in the first distillation column to give a first acetic acid stream, the crude acetic acid stream containing the acetic acid formed in the reaction step, the first acetic acid stream being enriched with acetic acid as compared with the crude acetic acid stream;

a second purification step of subjecting the first acetic acid stream to distillation in the second distillation column to give a second acetic acid stream enriched with acetic acid as compared with the first acetic acid stream; and

a third purification step of subjecting an acetic acid stream to purification in the additional purification unit while controlling a corrosive iodine concentration in the acetic acid stream having a water concentration of 0.001 to

2 mass percent and passing through the additional purification unit to 100 ppm or less, to give a third acetic acid stream enriched with acetic acid as compared with the second acetic acid stream.

Claim 2

The method according to claim 1,

wherein the additional purification unit comprises a third distillation column, and

wherein the third purification step comprises performing distillation in the third distillation column.

Claim 3

The method according to claim 2,

wherein the third purification step comprises

feeding at least one substance selected from the group consisting of methanol, methyl acetate, and potassium hydroxide to the acetic acid stream under the distillation in the third distillation column, so as to control the corrosive iodine concentration.

Claim 4

The method according to claim 3,

wherein the methanol is fed to the acetic acid stream under the distillation in the third distillation column at a level equal to or lower than a level at which the acetic

acid stream is introduced into the third distillation column, where the levels are defined with respect to a height direction of the third distillation column.

Claim 5

The method according to one of claims 3 and 4,

wherein the methyl acetate is fed to the acetic acid stream under the distillation in the third distillation column at a level equal to or lower than a level at which the acetic acid stream is introduced into the third distillation column, where the levels are defined with respect to a height direction of the third distillation column.

Claim 6

The method according to any one of claims 3 to 5,

wherein the potassium hydroxide is fed to the acetic acid stream under the distillation in the third distillation column at a level equal to or higher than a level at which the acetic acid stream is introduced into the third distillation column, where the levels are defined with respect to a height direction of the third distillation column.

Claim 7

The method according to any one of claims 2 to 6,

wherein the third purification step comprises at least one selected from the group consisting of:

recycling part of an overhead from the third distillation column to the first acetic acid stream before being introduced into the second distillation column; and

recycling part of the overhead from the third distillation column to the crude acetic acid stream before being introduced into the first distillation column,

so as to control the corrosive iodine concentration.

Claim 8

The method according to any one of claims 2 to 7,

wherein the acetic acid production equipment further comprises

a scrubber system that treats part of gaseous components evolved in the equipment to form a component to be recycled to the reactor, and a component to be discharged from the equipment.

Claim 9

The method according to claim 8, the method further comprising

introducing part of an overhead from the third distillation column into the scrubber system.

Claim 10

The method according to any one of claims 1 to 9,

wherein the third purification step comprises

feeding at least one substance selected from the group consisting of methanol, methyl acetate, and potassium

hydroxide to an acetic acid stream before being introduced into the additional purification unit.

Claim 11

The method according to claim 10,

wherein the at least one substance is fed to the acetic acid stream before being introduced into the additional purification unit so that the acetic acid stream has a corrosive iodine concentration of 100 ppb or less.

Claim 12

The method according to any one of claims 1 to 11,

wherein the third purification step comprises

performing the purification in the additional purification unit at a temperature of 160°C or lower.