CLAIMS

1. A waste gas treatment apparatus having a dust collector for dust removal treatment of a mercury-containing waste gas that is discharged from a furnace, and an activated carbon supply device that injects activated carbon into a waste gas flow path conducting the waste gas from the furnace to the dust collector,

the waste gas treatment apparatus comprising an upstream side mercury concentration meter that measures the concentration of mercury in the waste gas on the downstream side of the furnace and on the upstream side of the location where activated carbon is injected, and a controller that controls the activated carbon supply rate of the activated carbon supply device,

the controller maintaining the activated carbon supply rate at a value equal to or greater than a predetermined minimum value of activated carbon supply rate, while controlling the activated carbon supply rate such that, on the basis of the mercury concentration measurement that is given by the upstream side mercury concentration meter, the concentration of mercury in the waste gas on the downstream side of the dust collector is held at a value equal to or smaller than a set value,

controlling by the controller being performed such that, in the range of the measurement of the concentration of mercury in the waste gas from zero or a value smaller than the measurable limit minimum value to a first predetermined mercury concentration, activated carbon is supplied at a predetermined minimum value of activated carbon supply rate, and after the measurement of the mercury concentration has reached the first predetermined mercury concentration, the activated carbon supply rate is linearly increased from the predetermined minimum value of activated carbon supply rate in accordance with

an increase in the concentration of mercury in the waste gas, then, upon the measurement of the mercury concentration having reached a second predetermined mercury concentration, the activated carbon supply rate is set at a predetermined maximum value of activated carbon supply rate, and then, after the activated carbon supply rate having been increased to the predetermined maximum value of activated carbon supply rate, the activated carbon supply rate is constantly kept at the predetermined maximum value of activated carbon supply rate for an increase in the concentration of mercury in the waste gas.

2. A waste gas treatment apparatus having a dust collector for dust removal treatment of a mercury-containing waste gas that is discharged from a furnace, and an activated carbon supply device that injects activated carbon into a waste gas flow path conducting the waste gas from the furnace to the dust collector,

the waste gas treatment apparatus comprising an upstream side mercury concentration meter that measures the concentration of mercury in the waste gas on the downstream side of the furnace and on the upstream side of the location where activated carbon is injected, and a controller that controls the activated carbon supply rate of the activated carbon supply device,

the controller maintaining the activated carbon supply rate at a value equal to or greater than a predetermined minimum value of activated carbon supply rate, while controlling the activated carbon supply rate such that, on the basis of the mercury concentration measurement that is given by the upstream side mercury concentration meter, the concentration of mercury in the waste gas on the downstream side of the dust collector is held at a value equal to or smaller than a set value,

controlling by the controller being performed such that,

in the range of the measurement of the concentration of mercury in the waste gas from zero or a value smaller than the measurable limit minimum value to a first predetermined mercury concentration, activated carbon is supplied at a predetermined minimum value of activated carbon supply rate that provides a first activated carbon supply rate, and after the measurement of the mercury concentration has reached the first predetermined mercury concentration, the activated carbon supply rate is increased in a step-like manner to a second supply rate, thereafter, for an increase in the concentration of mercury in the waste gas, the activated carbon supply rate is constantly kept at the second supply rate, then, upon the measurement of the mercury concentration having reached the second predetermined mercury concentration, the activated carbon supply rate is increased to a third predetermined activated carbon supply rate, thereafter, in this way, an operation of constantly keeping the activated carbon supply rate and then increasing it in a stepwise manner for an increase in the concentration of mercury in the waste gas is repeated, then, after the activated carbon supply rate having been increased to a predetermined maximum value of activated carbon supply rate, the activated carbon supply rate is constantly kept at the predetermined maximum value of activated carbon supply rate for an increase in the concentration of mercury in the waste gas.

3. A waste gas treatment apparatus having a dust collector for dust removal treatment of a mercury-containing waste gas that is discharged from a furnace, and an activated carbon supply device that injects activated carbon into a waste gas flow path conducting the waste gas from the furnace to the dust collector,

the waste gas treatment apparatus comprising an upstream

side mercury concentration meter that measures the concentration of mercury in the waste gas on the downstream side of the furnace and on the upstream side of the location where activated carbon is injected, and a controller that controls the activated carbon supply rate of the activated carbon supply device,

the controller maintaining the activated carbon supply rate at a value equal to or greater than a predetermined minimum value of activated carbon supply rate, while controlling the activated carbon supply rate such that, on the basis of the mercury concentration measurement that is given by the upstream side mercury concentration meter, the concentration of mercury in the waste gas on the downstream side of the dust collector is held at a value equal to or smaller than a set value,

the predetermined minimum value of activated carbon supply rate being established on the basis of a correspondence relationship that, for a value of the upstream side mercury concentration ratio, which is a value of the ratio of the mercury concentration measurement that is given by the upstream side mercury concentration meter to a set value of the concentration of mercury in the waste gas on the downstream side of the dust collector, establishes a predetermined minimum value of activated carbon supply rate for each division of the range of the value of the upstream side mercury concentration ratio, and

as the correspondence relationship between the value of the upstream side mercury concentration ratio and the predetermined minimum value of activated carbon supply rate, a correspondence relationship as given in Table 1 below being specified, thereby, upon the value of the upstream side mercury concentration ratio being in the range of 20 to 200, the predetermined minimum value of activated carbon supply rate being established within the range of 10 to 200 mg/Nm^3.

Table 1

Value of upstream side mercury concentration ratio	Predetermined minimum value of activated carbon supply rate in mg/Nm^3
20 to under 40	10 to 160
40 to under 60	20 to 200
60 to under 80	30 to 200
80 to under 100	40 to 200
100 to under 120	60 to 200
120 to under 140	70 to 200
140 to under 160	80 to 200
160 to under 180	90 to 200
180 to under 200	100 to 200

4. A waste gas treatment apparatus having a dust collector for dust removal treatment of a mercury-containing waste gas that is discharged from a furnace, and an activated carbon supply device that injects activated carbon into a waste gas flow path conducting the waste gas from the furnace to the dust collector,

the waste gas treatment apparatus comprising an upstream side mercury concentration meter that measures the concentration of mercury in the waste gas on the downstream side of the furnace and on the upstream side of the location where activated carbon is injected, and a controller that controls the activated carbon supply rate of the activated carbon supply device,

the controller maintaining the activated carbon supply rate at a value equal to or greater than a predetermined minimum value of activated carbon supply rate, while controlling the activated carbon supply rate such that, on the basis of the mercury concentration measurement that is given by the upstream

side mercury concentration meter, the concentration of mercury in the waste gas on the downstream side of the dust collector is held at a value equal to or smaller than a set value, and further, upon the value of the upstream side mercury concentration ratio, which is a value of the ratio of the mercury concentration measurement that is given by the upstream side mercury concentration meter to a set value of the concentration of mercury in the waste gas on the downstream side of the dust collector, being equal to or greater than a predetermined value of the ratio, controlling the activated carbon supply rate so as for it to be kept at a predetermined maximum value of activated carbon supply rate,

the predetermined maximum value of activated carbon supply rate being established on the basis of a correspondence relationship that, for a value of the upstream side mercury concentration ratio, establishes a predetermined maximum value of activated carbon supply rate for each division of the range of the value of the upstream side mercury concentration ratio, and

as the correspondence relationship between the value of the upstream side mercury concentration ratio and the predetermined maximum value of activated carbon supply rate, a correspondence relationship as given in Table 2 below being specified, thereby, upon the value of the upstream side mercury concentration ratio being in the range of 20 to 200, the predetermined maximum value of activated carbon supply rate being established within the range of 300 to 1000 mg/Nm^3.

Table 2

Value of upstream side mercury concentration ratio	Predetermined maximum value of activated carbon supply rate in mg/Nm^3

20 to under 40	300 to 1000
40 to under 60	300 to 1000
60 to under 80	300 to 1000
80 to under 100	300 to 1000
100 to under 120	300 to 1000
120 to under 140	350 to 1000
140 to under 160	380 to 1000
160 to under 180	450 to 1000
180 to under 200	500 to 1000

5. A waste gas treating method that uses a dust collector to perform dust removal treatment of a mercury-containing waste gas that is discharged from a furnace, and that injects activated carbon from an activated carbon supply device into a waste gas flow path conducting the waste gas from the furnace to the dust collector,

the waste gas treating method comprising a measurement step of measuring the concentration of mercury in the waste gas on the downstream side of the furnace and on the upstream side of the location where activated carbon is injected, using a upstream side mercury concentration meter, and a control step of controlling the activated carbon supply rate of the activated carbon supply device with a controller,

in the control step, the controller maintaining the activated carbon supply rate at a value equal to or greater than a predetermined minimum value of activated carbon supply rate, while controlling the activated carbon supply rate such that, on the basis of the mercury concentration measurement that is given by the upstream side mercury concentration meter, the concentration of mercury in the waste gas on the downstream side of the dust collector is held at a value equal to or smaller than a set value,

further, the controller controlling the activated carbon

supply rate such that, in the range of the measurement of the concentration of mercury in the waste gas from zero or a value smaller than the measurable limit minimum value to a first predetermined mercury concentration, activated carbon is supplied at a predetermined minimum value of activated carbon supply rate, and after the measurement of the mercury concentration has reached the first predetermined mercury concentration, the activated carbon supply rate is linearly increased from the predetermined minimum value of activated carbon supply rate in accordance with an increase in the concentration of mercury in the waste gas, then, upon the measurement of the mercury concentration having reached a second predetermined mercury concentration, the activated carbon supply rate is set at a predetermined maximum value of activated carbon supply rate, and then, after the activated carbon supply rate having been increased to the predetermined maximum value, the activated carbon supply rate is constantly kept at the predetermined maximum value of activated carbon supply rate for an increase in the concentration of mercury in the waste gas.

6. A waste gas treating method that uses a dust collector to perform dust removal treatment of a mercury-containing waste gas that is discharged from a furnace, and that injects activated carbon from an activated carbon supply device into a waste gas flow path conducting the waste gas from the furnace to the dust collector,

the waste gas treating method comprising a measurement step of measuring the concentration of mercury in the waste gas on the downstream side of the furnace and on the upstream side of the location where activated carbon is injected, using a upstream side mercury concentration meter, and a control step of controlling the activated carbon supply rate of the activated

carbon supply device with a controller,

in the control step, the controller maintaining the activated carbon supply rate at a value equal to or greater than a predetermined minimum value of activated carbon supply rate, while controlling the activated carbon supply rate such that, on the basis of the mercury concentration measurement that is given by the upstream side mercury concentration meter, the concentration of mercury in the waste gas on the downstream side of the dust collector is held at a value equal to or smaller than a set value,

further, the controller controlling the activated carbon supply rate such that, in the range of the measurement of the concentration of mercury in the waste gas from zero or a value smaller than the measurable limit minimum value to a first predetermined mercury concentration, activated carbon is supplied at a predetermined minimum value of activated carbon supply rate that provides a first activated carbon supply rate, and after the measurement of the mercury concentration has reached the first predetermined mercury concentration, the activated carbon supply rate is increased in a step-like manner to a second supply rate, thereafter, for an increase in the concentration of mercury in the waste gas, the activated carbon supply rate is constantly kept at the second supply rate, then, upon the measurement of the mercury concentration having reached the second predetermined mercury concentration, the activated carbon supply rate is increased to a third predetermined activated carbon supply rate, thereafter, in this way, an operation of constantly keeping the activated carbon supply rate and then increasing it in a stepwise manner for an increase in the concentration of mercury in the waste gas is repeated, then, after the activated carbon supply rate having been increased to a predetermined maximum value of activated carbon supply rate, the activated carbon supply rate is

constantly kept at the predetermined maximum value of activated carbon supply rate for an increase in the concentration of mercury in the waste gas.

7. A waste gas treating method that uses a dust collector to perform dust removal treatment of a mercury-containing waste gas that is discharged from a furnace, and that injects activated carbon from an activated carbon supply device into a waste gas flow path conducting the waste gas from the furnace to the dust collector,

the waste gas treating method comprising a measurement step of measuring the concentration of mercury in the waste gas on the downstream side of the furnace and on the upstream side of the location where activated carbon is injected, using a upstream side mercury concentration meter, and a control step of controlling the activated carbon supply rate of the activated carbon supply device with a controller,

in the control step, the controller maintaining the activated carbon supply rate at a value equal to or greater than a predetermined minimum value of activated carbon supply rate, while controlling the activated carbon supply rate such that, on the basis of the mercury concentration measurement that is given by the upstream side mercury concentration meter, the concentration of mercury in the waste gas on the downstream side of the dust collector is held at a value equal to or smaller than a set value,

the predetermined minimum value of activated carbon supply rate being established on the basis of a correspondence relationship that, for a value of the upstream side mercury concentration ratio, which is a value of the ratio of the mercury concentration measurement that is given by the upstream side mercury concentration meter to a set value of the concentration of mercury in the waste gas on the downstream side of the dust

collector, establishes a predetermined minimum value of activated carbon supply rate for each division of the range of the value of the upstream side mercury concentration ratio, and

as the correspondence relationship between the value of the upstream side mercury concentration ratio and the predetermined minimum value of activated carbon supply rate, a correspondence relationship as given in Table 3 below being specified, thereby, upon the value of the upstream side mercury concentration ratio being in the range of 20 to 200, the predetermined minimum value of activated carbon supply rate being established within the range of 10 to 200 mg/Nm^3.

Table 3

Value of upstream side mercury concentration ratio	Predetermined minimum value of activated carbon supply rate in mg/Nm^3
20 to under 40	10 to 160
40 to under 60	20 to 200
60 to under 80	30 to 200
80 to under 100	40 to 200
100 to under 120	60 to 200
120 to under 140	70 to 200
140 to under 160	80 to 200
160 to under 180	90 to 200
180 to under 200	100 to 200

8. A waste gas treating method that uses a dust collector to perform dust removal treatment of a mercury-containing waste gas that is discharged from a furnace, and that injects activated carbon from an activated carbon supply device into a waste gas flow path conducting the waste gas from the furnace to the dust collector,

the waste gas treating method comprising a measurement step of measuring the concentration of mercury in the waste gas on the downstream side of the furnace and on the upstream side of the location where activated carbon is injected, using a upstream side mercury concentration meter, and a control step of controlling the activated carbon supply rate of the activated carbon supply device with a controller,

in the control step, the controller maintaining the activated carbon supply rate at a value equal to or greater than a predetermined minimum value of activated carbon supply rate, while controlling the activated carbon supply rate such that, on the basis of the mercury concentration measurement that is given by the upstream side mercury concentration meter, the concentration of mercury in the waste gas on the downstream side of the dust collector is held at a value equal to or smaller than a set value, and further, upon the value of the upstream side mercury concentration ratio, which is a value of the ratio of the mercury concentration measurement that is given by the upstream side mercury concentration meter to a set value of the concentration of mercury in the waste gas on the downstream side of the dust collector, being equal to or greater than a predetermined value of the ratio, controlling the activated carbon supply rate so as for it to be kept at a predetermined maximum value of activated carbon supply rate,

the predetermined maximum value of activated carbon supply rate being established on the basis of a correspondence relationship that, for a value of the upstream side mercury concentration ratio, establishes a predetermined maximum value of activated carbon supply rate for each division of the range of the value of the upstream side mercury concentration ratio, and

as the correspondence relationship between the value of the upstream side mercury concentration ratio and the

predetermined maximum value of activated carbon supply rate, a correspondence relationship as given in Table 4 below being specified, thereby, upon the value of the upstream side mercury concentration ratio being in the range of 20 to 200, the predetermined maximum value of activated carbon supply rate being established within the range of 300 to 1000 mg/Nm^3.

Table 4

Value of upstream side mercury concentration ratio	Predetermined maximum value of activated carbon supply rate in mg/Nm^3
20 to under 40	300 to 1000
40 to under 60	300 to 1000
60 to under 80	300 to 1000
80 to under 100	300 to 1000
100 to under 120	300 to 1000
120 to under 140	350 to 1000
140 to under 160	380 to 1000
160 to under 180	450 to 1000
180 to under 200	500 to 1000