

- 12 -

Claims

1. Apparatus for treating a process exhaust gas stream from a process device, comprising a plasma abatement device having a reaction chamber,
5 a plasma torch for generating a plasma stream for injection into the chamber for treating a process exhaust gas stream, a first inlet for conveying the process exhaust gas stream into the plasma abatement device for treatment; and a second inlet which, in a normal condition of the apparatus, is in flow communication with a source of reagent for conveying
10 reagent into the plasma device for improving the efficiency of the treatment and which, in a back-up condition of the apparatus, is in flow communication with a process exhaust gas stream source for conveying a process exhaust gas stream into the device for treatment.
- 15 2. Apparatus according to claim 1, wherein in the normal condition, the first inlet is in flow communication with a first process chamber for conveying into the device a first process exhaust gas stream for treatment and in the back-up condition the second inlet is in flow communication with a second process chamber for conveying into the device a second process exhaust
20 gas stream for treatment.
3. Apparatus according to claim 2, comprising a first duct arranged to convey reagent from the reagent source to the second inlet, a second duct arranged to convey the second process exhaust gas stream from the
25 second process chamber to the second inlet, and a valve arrangement for allowing reagent to be conveyed through the first duct in the normal condition of the device and allowing the second process exhaust gas stream to be conveyed through the second duct in the back-up condition of the device.
- 30 4. Apparatus according to claim 3, wherein the valve arrangement comprises first and second valves located in respective first and second ducts, the first

valve being operable to allow flow communication through the first duct and the second valve being operable to allow flow communication in the second duct.

- 5 5. Apparatus according to any of the preceding claims, comprising a plurality of said plasma abatement devices having a respective plurality of said first inlets arranged to be in flow communication with a plurality of process chambers, and in the normal condition of the apparatus, the plasma abatement devices having a respective plurality of said second inlets
- 10 arranged to be in flow communication with a source of reagent in the normal condition of the apparatus, wherein in the back-up condition of the apparatus at least one second inlet is arranged to be in flow communication with one of said process chambers for receiving a process exhaust gas stream from said process chamber for treatment.
- 15 6. Apparatus according to claim 5, wherein in the back-up condition of the apparatus the first inlet is arranged to be in flow communication with a said process chamber and the second inlet is arranged to be in flow communication with a different one of said process chambers.
- 20 7. Apparatus according to claim 5, wherein in the normal condition of the apparatus the first inlet is arranged to be in flow communication with a said process chamber and in the back-up condition the second inlet is arranged to be in flow communication with the same said process chamber such that
- 25 if flow is restricted to the first inlet the process exhaust gas stream from said process chamber can be conveyed through the second inlet for treatment.
- 30 8. Apparatus according to claim 5, wherein at least one of the plasma devices comprises at least three inlets and one of said inlets only conveys a process exhaust gas stream or reagent into the plasma abatement device in the back-up condition of the apparatus.

9. Apparatus according to claim 8, wherein in the back-up condition of the apparatus, at least one of the plasma abatement devices comprises a said first inlet which is arranged to be in flow communication with a first process chamber for conveying a first process exhaust gas stream into the device for treatment, a said second inlet which is arranged to be in flow communication with a second process chamber for conveying a second process exhaust gas stream into the device for treatment, and a third inlet which is arranged to be in flow communication with a third process chamber for conveying a third process exhaust gas stream into the device for treatment.
10. Apparatus according to claim 9, wherein at least one of the plasma abatement devices comprises the same number of inlets as there are process chambers, such that in the back-up condition of the apparatus, the process exhaust gas streams from all of the process chambers can be conveyed to said at least one device through respective said inlets for treatment in said device.
11. Apparatus according to claim 10, wherein each of the plasma abatement devices comprise the same number of inlets as there are process chambers, such that in the back-up condition of the apparatus, the process exhaust gas streams from all of the process chambers can be conveyed to any one of the devices through respective said inlets for treatment in said any one device.
12. Apparatus according to any of the preceding claims, wherein the first inlet and the second inlet of a said plasma abatement device are configured to convey fluid into plasma abatement device in respective directions selected so that fluid from conveyed through the first inlet or the second inlet is directed away from the second inlet or the first inlet respectively to reduce mixing of the fluids in either of the inlets.

13. Apparatus according to claim 12, wherein the inlets of a said plasma abatement device are configured to convey fluid into the device in directions which are generally parallel one direction with another direction.
- 5 14. Apparatus according to claim 13, wherein the inlets are arranged with one inlet vertically above an adjacent inlet.
- 10 15. Apparatus according to claim 13 or 14, wherein each inlet is mechanically separated from the other inlets.
- 15 16. Apparatus according to any of the preceding claims, comprising a control configured for selective switching between the normal condition and the back-up condition.
17. Apparatus according to claim 16, wherein the control which is manually operable for switching between the normal condition and the back-up condition.
- 20 18. Apparatus according to claim 16, comprising a plurality of said plasma abatement devices and a sensor for sensing a reduction in treatment of a gas stream by any one of the plasma abatement devices and outputting a signal to the control which in response conveys the gas stream to a second or further inlet of another of said plasma abatement devices.
- 25 19. A system comprising an apparatus according to any of the preceding claims, further comprising at least one processing chamber, a primary gas duct for conveying a process exhaust gas stream from the process chamber to the first inlet of the plasma abatement device for treatment and
- 30 a reagent gas duct connected between a source of reagent and the second inlet of the plasma abatement device for conveying reagent into the device for improving the efficiency of the treatment in the normal condition of the

- 16 -

apparatus, a secondary gas duct connected between one of said at least one process chambers and the second inlet for conveying a process exhaust gas stream to the device for treatment in a back-up condition of the apparatus, and a control for selectively switching between the normal condition and back-up condition.

- 5
20. A system according to claim 19, comprising a plurality of process chambers, wherein in the normal condition of the apparatus a plurality of process exhaust gas streams are conveyed from the process chambers to the first inlets of respective plasma abatement devices, and in the back-up condition the process exhaust gas stream from a said process chamber is conveyed to the second inlet of one of said plasma abatement devices.
- 10
21. A system according to claim 20, wherein in the normal condition of the apparatus a process exhaust gas stream is conveyed from the process chamber to the first inlet of a said plasma abatement device, and in the back-up condition the process exhaust gas stream is diverted to the second inlet of device for treatment.
- 15

Claims

1. An apparatus comprising:

a plasma abatement device having a reaction chamber, a plasma torch, a first inlet and a second inlet;

a valve arrangement connected to the second inlet, a source of reagent, and a process device, wherein the valve arrangement is selectively controllable between a first condition, in which the valve arrangement provides a flow path from the source of reagent through the second inlet into the plasma abatement device, and a second condition, in which the valve arrangement provides a flow path from the process device through the second inlet into the plasma abatement device.

2. The apparatus according to claim 1, wherein the first inlet is in flow communication with a first process chamber that produces a first process exhaust gas stream and the process device comprises a second process chamber that produces a second process exhaust gas stream.

3. The apparatus according to claim 1, wherein the valve arrangement comprises first and second valves, the first valve on a reagent conduit between the second inlet and the source of reagent; the second valve on a primary conduit between the first valve and the process device, and a secondary conduit extending from the first valve to the second valve.

4. The apparatus according to claim 2, further comprising:

a second plasma abatement device having a reaction chamber, a plasma torch, a first inlet and a second inlet; and

wherein the valve arrangement is further connected to the second inlet of the second plasma abatement device, and the first process chamber, such that in the first condition, the valve arrangement provides a flow path from the source of reagent to the second inlet of the second plasma abatement device and the valve arrangement is selectively

controllable to be in a third condition , in which the valve arrangement provides a flow path from the first process chamber to the second inlet of the second plasma abatement device.

5. The apparatus according to claim 1, wherein the first inlet and the second inlet of the plasma abatement device are configured to convey fluid into plasma abatement device in respective directions so that fluid conveyed through the first inlet is directed away from the second inlet to reduce mixing of the fluids in either of the inlets.
6. The apparatus according to claim 5, wherein the first inlet and the second inlet of the plasma abatement device are configured to convey fluid into the device in directions which are generally parallel one direction with another direction.
7. The apparatus according to claim 6, wherein the first and second inlets are arranged with one of the first and second inlets vertically above and adjacent the other of the first and second inlets.
8. The apparatus according to claim 6, wherein each of the first and second inlets is physically separated from the other of the first and second inlets.
9. The apparatus according to claim 1, wherein a control is manually operable to switch the valve arrangement from the first condition to the second condition.
10. The apparatus according to claim 4, comprising a sensor for sensing a reduction in treatment of a gas stream by the plasma abatement device and outputting a signal to a control which in response places the valve arrangement in the third condition.
11. A system comprising a plasma abatement device having a reaction chamber, a plasma torch, a first inlet ; and a second inlet,

the system further comprising a process chamber, and a valve arrangement, the valve arrangement such that a duct from the process chamber to the first inlet of the plasma abatement device is closed by the valve arrangement, a duct from a source of reagent to the second inlet of the plasma abatement device is closed by the valve arrangement, and a duct from the process chamber to the second inlet is open through the valve arrangement .

12. The system according to claim 11, further comprising a plurality of process chambers and a plurality of plasma abatement devices, wherein ducts from all but one of the process chambers to respective first inlets of the plasma abatement devices are open through the valve arrangement and a duct from the one process chamber to a second inlet of one of the plurality of plasma abatement devices is open through the valve arrangement.