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TITLE OF INVENTION

54 FLUE GAS PURIFICATION DEVICE HAVING AN IMPROVED OXIDATION DEVICE IN THE SCRUBBING LIQUID SUMP

57 ABSTRACT (NOT MORE THAN 150 WORDS)

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Abstract:

A flue gas purification device comprising a receptacle, which has a scrubbing liquid sump comprising an oxidation device for introducing oxygen, wherein the introduction of oxygen is realized by at least one plate aerator.

RS/AT/sn

Flue gas purification device having an improved oxidation device in the scrubbing liquid sump

The present invention relates to a flue gas purification device, in particular for purifying flue gas of a coal power station or the like.

Purification devices are already known. Normally they comprise a scrubbing column having scrubbing liquid nozzles, which are often arranged on several levels, a scrubbing liquid sump, in which scrubbing liquid is collected, and an absorption zone, which extends inside a cylindrical receptacle of the scrubbing column from the scrubbing liquid sump towards the upper scrubbing liquid nozzle level. Flue gas is introduced into a lower section of the absorption zone in the scrubbing column, flows substantially vertically upwards from there and leaves the scrubbing column through an outlet provided above the scrubbing liquid nozzles. On its way through the scrubbing column, the flue gas gets into contact with scrubbing liquid emerging from the scrubbing liquid nozzles and is desulfurized, which is described in the following. Such a purification device is for example known from DE-A-100 58 548.

The scrubbing liquid preferably contains, apart from water, alkaline earths, which react with the sulphur oxides present in the flue gas and the sulphur oxides generated in the scrubbing column. Lime in form of calcium oxide, calcium hydroxide, calcium carbonate or the like is in particular used.

The alkaline earths react with the sulphur oxides present in the flue gas essentially to calcium sulphate, which is bound in the scrubbing liquid. In this manner, the flue gas is purified from the undesirable sulphur oxides and flows out of the purification device afterwards. However, the scrubbing liquid containing the calcium sulphate particles, which are kept floating in this one, flows into the scrubbing liquid sump and is collected there.

Calcium sulphate has similar positive properties as natural gypsum. It is thus a desired by-product of the flue gas purification process, which is won from the scrubbing liquid collected in the scrubbing liquid sump. The calcium sulphate particles are removed together with the scrubbing liquid from the scrubbing liquid sump and are then extracted from the scrubbing liquid in a subsequent process. The calcium sulphate can then be further processed to materials, in particular construction materials.

A problem in the winning of calcium sulphate is that not only calcium sulphate is

generated by the reaction of the scrubbing liquid with the flue gas, but also undesirable by-products, such as for example sulphites, in particular calcium sulphite, which render the calcium sulphate impure and thus worsen the quality of the by-product.

In order to reduce the portion of these undesirable sulphites in the scrubbing liquid present in the scrubbing liquid sump, it is proposed in US-A-4 539 184 to introduce oxygen in form of air or the like into at least one zone of the scrubbing liquid sump, in order to oxidize calcium sulphites, which are present there, to calcium sulphate.

CA-A-2 135 430 also describes a flue gas purification device comprising an oxidation device, which is provided in the scrubbing liquid sump and which has the form of a horizontally arranged grid, which is composed of oxygen supply pipes having corresponding openings, via which the oxygen can be introduced into the scrubbing liquid collected in said scrubbing liquid sump. The horizontal grid is positioned in said scrubbing liquid sump, such that this one is divided into two zones.

It is an object of the present invention to improve the oxidation process in the scrubbing liquid sump.

According to the present invention, this aim is achieved by a flue gas purification device according to claim 1 and by a method for flue gas purification according to claim 7.

Actually available plate aerators generate a high number of very small air bubbles (diameter of < 1 mm). Small air bubbles have the advantage that they have a longer residence time in the scrubbing liquid sump than large air bubbles, whereby the introduction of oxygen into the scrubbing liquid is improved. The increase of the number of bubbles enlarges the contact surface between the oxygen bubbles and the scrubbing liquid and thus increases the oxygen exchange by means of diffusion and/or solution at this contact surface. The longer residence time finally increases the way of the bubbles and thus the contact time.

Thus, the oxygen contained in each oxygen bubble leaving the plate aerator can be delivered to the scrubbing liquid in an optimum way. Accordingly, the efficiency of the oxygen introduction and thus the efficiency of the oxidation are optimized.

Preferably, the plate aerator is essentially disk-shaped and even better parallelepiped. In comparison to the disk-shaped form, the parallelepiped geometry

Claims

1. A flue gas purification device comprising a receptacle, which has a scrubbing liquid sump comprising an oxidation device for introducing oxygen, wherein at least one plate aerator is provided for the introduction of oxygen.
2. A flue gas purification device according to claim 1, wherein the plate aerator is essentially disk-shaped.
3. A flue gas purification device according to claim 1, wherein the plate aerator is essentially parallelepiped.
4. A flue gas purification device according to one of the preceding claims, wherein the plate aerator has a perforated membrane.
5. A flue gas purification device according to claim 4, in which the membrane is mounted in a replaceable manner on the plate aerator.
6. A flue gas purification device according to claim 3, wherein the perforation of the membrane comprises slots.
7. A flue gas purification device according to claim 3 or 4, wherein the membrane is an EPDM membrane.
8. A flue gas purification device according to one of the preceding claims, wherein several plate aerators are arranged in the receptacle in an annular or radial way.
9. A method for flue gas purification, in which for the oxidation process, which takes place in the scrubbing liquid sump, at least one plate aerator is used for introducing oxygen.
10. A flue gas purification device according to claim 1, substantially as herein described and exemplified.
11. A method according to claim 9, substantially as herein described and exemplified.

Dated this 07 day of MARCH 06


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