In one aspect, the disclosure relates to a self-emptying separator comprising a rotatable centrifugal drum that has a vertical axis of rotation and is provided with solids discharge openings, to which an emptying mechanism having a piston valve is assigned, which piston valve can be moved into an opening position and into a closing position in a fluid-actuated manner, wherein the emptying mechanism further comprises a control assembly which is assigned to the piston valve for controlling its opening and closing movements, which is provided with a control unit and with a metering device for metering and dispensing the quantity of fluid, in particular the amount of liquid, required for the opening process, wherein the metering device has a metering element which is displaceable in a metering chamber and which subdivides the metering chamber into a fluid chamber and a pressure chamber for the application of compressed air, wherein the metering device has an adjusting system for metering the amount of fluid, in particular the amount of liquid, required for the opening process in the fluid chamber, which adjusting system has a pressure measuring device, wherein the pressure measuring device is based on a fluidic measuring principle and wherein the adjusting system with the pressure measuring device, which is based on a fluidic measuring principle, is arranged in the pressure chamber and with which the pressure in the pressure chamber can be determined, wherein the pressure in the pressure chamber forms a basis for the metering of the amount of fluid required for the opening process.

According to the disclosure, which is particularly easy to implement and yet works precisely, it is further provided that the measuring device is based on a fluidic measuring principle. Preferably, no mechanical actuators, such as a threaded spindle, are required to adjust the opening fluid volume. Thus, the metering device can advantageously meet even very high dynamic requirements of the regulating processes for solids discharge.

According to the disclosure, it is further provided that the adjusting system with the measuring device, which is based on a fluidic measuring principle, has a pressure measuring device arranged in the pressure chamber, with which the pressure in the pressure chamber can be determined, wherein the pressure in the pressure chamber is or forms a basis of or for metering the amount of fluid required for the opening process. In this way, the feature of the contactless measuring principle is implemented in a particularly advantageous and constructively simple manner.

The fluid used for the opening process is a liquid, preferably it is water or another liquid can be used, such a flowable product to be processed in the separator or a phase of

device and the measured pressure is compared with a predetermined pressure as default value manually or with a control device;

d) closing the filling valve when the measured value corresponds to the default value; so that a metered opening fluid volume is present in the fluid chamber, wherein in step d) a closing of the filling valve takes place when the measured pressure corresponds to the predetermined pressure, so that a metered opening fluid volume is present in the fluid chamber, and

e) opening the opening fluid valve and the valve of a compressed air line to inject the metered opening fluid volume in the fluid chamber into the separator via an opening fluid supply and an injection chamber for opening fluid and thereby moving a piston valve from a closed position to an open position so that the solids discharge openings are released and the solids phase is discharged from the centrifugal drum.

In another aspect, the disclosure relates to a method for performing a solids discharge in a processing of a flowable product with the self-emptying separator as defined herein, characterized by the method steps of:

a. providing the self-emptying separator as defined herein and processing a flowable product to be processed, separating it at least into a liquid phase and a solid phase;
b. opening of a filling valve, causing the metering element to move towards of the pressure chamber due to the incoming fluid, wherein the pressure in the pressure chamber increases;
c. carrying out a measurement or repeated measurements in or on the pressure chamber with a pressure measuring device and comparing the measurement result with a preset value manually or with a control unit, wherein in step c) the pressure (P) in the pressure chamber is measured with the pressure measuring device and the measured pressure is compared with a predetermined pressure as default value manually or with a control device;
d. closing the filling valve when the measured value corresponds to the default value; so that a metered opening fluid volume is present in the fluid chamber, wherein in step d) a closing of the filling valve takes place when the measured pressure corresponds to the predetermined pressure; so that the metered opening fluid volume is present in the fluid chamber;
e. opening the opening fluid valve and the valve of a compressed

air line to inject the metered opening fluid volume in the fluid chamber into the self-emptying separator via an opening fluid supply and an injection chamber for opening fluid, to open the piston valve and to thereby move a piston valve from a closed position to an open position so that the solids discharge openings are released and the solids phase is discharged from the centrifugal drum.

This simple and precise method offers at least the advantages which are also given with regard to device as defined herein and also leads to a precise adjustability of the metering volume.

Further advantageous designs of the disclosure can be found in the remaining parts as defined herein.

The disclosure is described in more detail below by means of exemplary embodiments with reference to the drawing. The disclosure is not limited to these exemplary embodiments, but can also be realized in other ways according to the wording or in other equivalent ways, wherein:

Fig. 1: shows a partial section of a centrifugal drum in cross-section and a block diagram of an emptying mechanism of the centrifugal drum for a solid phase;

Fig. 2: shows a sectional view of a metering device according to the invention and a block diagram of the metering device, wherein the metering device is shown in a first position;

Fig. 3: shows a sectional view of the metering device and a block diagram of the metering device, with the metering device shown in a second position.

In the following description of figures, an exemplary embodiment is described. The individual features of this exemplary embodiment can also be combined with exemplary

CLAIMS

1. Self-emptying separator comprising a rotatable centrifugal drum that has a vertical axis of rotation and is provided with solids discharge openings, to which an emptying mechanism having a piston valve is assigned, which piston valve can be moved into an opening position and into a closing position in a fluid-actuated manner, wherein the emptying mechanism further comprises a control assembly which is assigned to the piston valve for controlling its opening and closing movements, which is provided with a control unit and with a metering device for metering and dispensing the quantity of fluid, in particular the amount of liquid, required for the opening process, wherein the metering device has a metering element which is displaceable in a metering chamber and which subdivides the metering chamber into a fluid chamber and a pressure chamber for the application of compressed air, wherein the metering device has an adjusting system for metering the amount of fluid, in particular the amount of liquid, required for the opening process in the fluid chamber, which adjusting system has a pressure measuring device, wherein the pressure measuring device is based on a fluidic measuring principle and wherein the adjusting system with the pressure measuring device, which is based on a fluidic measuring principle, is arranged in the pressure chamber and with which the pressure in the pressure chamber can be determined, wherein the pressure in the pressure chamber forms a basis for the metering of the amount of fluid required for the opening process.

2. Self-emptying separator according to claim 1, characterized in that the control assembly has an injection chamber for opening fluid, to which the fluid, in particular water, can be fed via an opening fluid supply, in which an opening fluid valve is arranged, for activating opening movements.

3. Self-emptying separator according to one of the preceding claims, characterized in that the metering element is designed as a piston or as a diaphragm.

4. Self-emptying separator according to one of the preceding claims, characterized in that the pressure chamber has a temperature sensor.

5. Self-emptying separator according to one of the preceding claims, characterized in that the volume of the pressure chamber is dimensioned in such a way that, even when the fluid chamber is filled to the maximum, the pressure in the fluid supply line is still higher than a counterpressure P in the pressure chamber .

6. Self-emptying separator according to one of the preceding claims, characterized in that the fluid chamber is connected between a filling valve and the opening fluid valve.

7. Self-emptying separator according to one of the preceding claims, characterized in that an orifice plate is incorporated into the fluid supply line.

8. Self-emptying separator according to one of the preceding claims, characterized in that the orifice is arranged immediately upstream of the filling valve.

9. Method for performing a solids discharge in a processing of a flowable product with the self-emptying separator according to one of the preceding claims, characterized by the method steps of:

    a. providing the self-emptying separator according to one of the preceding claims and processing a flowable product to be processed, separating it at least into a liquid phase and a solid phase;
    b. opening of a filling valve, causing the metering element to move towards of the pressure chamber due to the incoming fluid, wherein the pressure in the pressure chamber increases;
    c. carrying out a measurement or repeated measurements in or on the pressure chamber with a pressure measuring device and comparing the measurement result with a preset value manually or with a control unit , wherein in step c) the pressure (P) in the pressure chamber is measured with the pressure measuring device and the measured pressure is compared with a predetermined pressure as default value manually or with a control device;
    d. closing the filling valve when the measured value corresponds to the default value; so that a metered opening fluid volume is present in the fluid chamber, wherein in step d) a closing of the filling valve takes place when the measured pressure corresponds to the predetermined pressure; so that the metered opening fluid volume is present in the fluid chamber;
    e. opening the opening fluid valve and the valve of a compressed air line to inject the metered opening fluid volume in the fluid chamber into the self-emptying separator via an opening fluid supply and an injection chamber for opening fluid, to open the piston valve and to thereby move a piston valve from a closed position to an open position so that the solids discharge openings are released and the solids phase is discharged from the centrifugal drum.