Summary of the invention

Embodiments of present invention provide a fluidizing unit for efficient removal of accumulated solids/sand in a separator (desander), in particular vessel desanding systems. The unit requires a low consumption of liquid – just what is needed for fluidization, it can be operated in both online, as well batch-wise mode, and can be retrofitted into existing separator vessels as well as configured for new built vessels. The invention is further defined in the attached claims, and in the following:

In a first aspect, the invention concerns a fluidizing unit for use in a desanding system, comprising a discharge pipe and a supply duct, the discharge pipe comprises a discharge inlet and a discharge outlet, and the supply duct is formed by a housing arranged around the discharge pipe defining an annular space between an outer surface of said pipe and an inner surface of the housing, the supply duct comprises a pressurized liquid inlet and a pressurized liquid outlet, wherein the pressurized liquid outlet comprises one end of the annular space, said end having an elliptic cross-section in a plane being perpendicular to a centerline of the discharge pipe, such that the pressurized liquid outlet, during use, is able to provide a pressurized liquid flow having a elliptic cross-section.

In some embodiments of a fluidizing unit according to the invention, the elliptic cross-section of the pressurized liquid flow is in a plane being substantially perpendicular to a centerline of the discharge pipe.

In some embodiments of the fluidizing unit according to the invention, the housing is substantially shaped as a truncated cone, having the pressurized liquid inlet arranged close to the larger base plane, and the pressurized liquid outlet arranged at the smaller base plane.

In some embodiments of the fluidizing unit according to the invention, the cross-section of the housing and the discharge pipe, in a plane being substantially perpendicular to a centerline of the discharge pipe, is circular at the pressurized liquid inlet.

In some embodiments of the fluidizing unit according to the invention, the cross-section of the housing and the discharge pipe, in a plane being substantially perpendicular to a centerline of the discharge pipe, is elliptic at the pressurized liquid outlet.

In some embodiments of the fluidizing unit according to the invention, the pressurized liquid outlet comprises an annular flange arranged close to the discharge inlet, such that pressurized liquid exiting the outlet during use is led in a direction being substantially perpendicular to the centerline of the discharge pipe.

In some embodiments of the fluidizing unit according to the invention, the discharge inlet has an elliptic cross-section, the major axis of said cross-section aligned with the major axis of the elliptic cross-section of the pressurized fluid outlet, or the elliptic cross-section of the pressurized liquid flow.

In some embodiments of the fluidizing unit according to the invention, the pressurized liquid inlet is arranged such that pressurized liquid will enter off-center to the centerline of the discharge pipe during use, causing said liquid to swirl around said pipe.

A second aspect of present invention provides a desanding system comprising a vessel and at least one fluidizing unit as defined in the first aspect, wherein said unit is arranged within the vessel having the pressurized fluid outlet close to the bottom of the vessel, and such that the major axis of the elliptic cross-section of the pressurized liquid flow is aligned with the longitudinal axis of the bottom of the vessel.

Claims

1. A fluidizing unit for use in a vessel desanding system, comprising a discharge pipe and a supply duct, the discharge pipe comprises a discharge inlet and a discharge outlet, and the supply duct is formed by a housing arranged around the discharge pipe defining an annular space between an outer surface of said pipe and an inner surface of the housing, the supply duct comprises a pressurized liquid inlet and a pressurized liquid outlet, wherein the pressurized liquid outlet comprises one end of the annular space, said end having an elliptic cross-section in a plane being perpendicular to a centerline of the discharge pipe, such that the pressurized liquid outlet, during use, is able to provide a pressurized liquid flow having a elliptic cross-section.

2. A fluidizing unit according to claim 1, wherein the elliptic cross-section of the pressurized liquid flow is in a plane being substantially perpendicular to a centerline of the discharge pipe.

3. A fluidizing unit according to claim 1 or 2, wherein the housing is substantially shaped as a truncated cone, having the pressurized liquid inlet arranged close to the larger base plane, and the pressurized liquid outlet arranged at the smaller base plane.

4. A fluidizing unit according to any of the preceding claims, wherein the cross-section of the housing and the discharge pipe, in a plane being substantially perpendicular to a centerline of the discharge pipe, is circular at the pressurized liquid inlet.

5. A fluidizing unit according to any of the preceding claims, wherein the cross-section of the housing and the discharge pipe, in a plane being substantially perpendicular to a centerline of the discharge pipe, is elliptic at the pressurized liquid outlet.

6. A fluidizing unit according to any of the preceding claims, wherein the pressurized liquid outlet comprises an annular flange arranged close to the discharge inlet, such that pressurized liquid exiting the outlet during use is led in a direction being substantially perpendicular to the centerline of the discharge pipe.

7. A fluidizing unit according to any of the preceding claims, wherein the discharge inlet has an elliptic cross-section, the major axis of said cross-section aligned with the major axis of the elliptic cross-section of the pressurized fluid outlet, or the elliptic cross-section of the pressurized liquid flow.

8. A fluidizing unit according to any of the preceding claims, wherein the pressurized liquid inlet is arranged such that pressurized liquid will enter off-center to the centerline of the discharge pipe during use, causing said liquid to swirl around said pipe.

9. A vessel desanding system comprising a vessel and at least one fluidizing unit according to any of the preceding claims, wherein said unit is arranged within the vessel having the pressurized fluid outlet close to the bottom of the vessel, and such that the major axis of the elliptic cross-section of the pressurized liquid flow is aligned with a longitudinal axis of said bottom.