

CLAIMS

1. A method for separating particles according to their sizes via a cambered hydrofoil, wherein said hydrofoil is asymmetric about a chord line connecting a leading edge (le) and a trailing edge (te) of the hydrofoil, characterized in that it comprises the steps of forwarding particles to the cambered hydrofoil on a streamline
 - (i) coincident with a main axis (4) parallel to a stream and passing through the leading edge (le) of the hydrofoil;
 - (ii) said leading edge having an attack angle of α with the chord line.

2. A method for enhancing the separation of two particle-carrying parallel streamlines where one streamline is above the main axis of the cambered hydrofoil and the other streamline being below the main axis of cambered hydrofoil and there is a distance (a) between the streamlines at the upstream of the cambered hydrofoil, which is less than the projected height (h) of the cambered hydrofoil, characterized in that forwarding two particle-carrying parallel streamlines to meet the cambered hydrofoil, then since the particles past the cambered hydrofoil cannot drift into the vortex-region (8) formed at the downstream of the flow separation point (7) on the cambered hydrofoil, distance between streamlines (d) at the close proximity at the downstream of the vortex region will be greater than distance (a).

3. A method for increasing the separation extent (R) of two distributions of two different sized particles coinciding at the main axis according to below formula

$$R = 1.18 \frac{d_{p,2} - d_{p,1}}{w_{0.5h,1} - w_{0.5h,2}}$$

where, $d_{p,2}$ is the location of the peak of smaller or larger particles along the channel width,

$d_{p,1}$ is the location of the peak of larger or smaller particles along the channel width,

$w_{0.5h,1}$ is the width of the distribution of larger or smaller particles at half height of its distribution peak, and $w_{0.5h,2}$ is the width of the distribution of smaller or larger particles at half height of its distribution peak, where one distribution peak is above the main axis of

the cambered hydrofoil and the other distribution peak is below the main axis of cambered hydrofoil,

characterized in that it comprises the steps of forwarding a flow having two particle distributions to a cambered hydrofoil, forming larger velocity on one side of the asymmetric hydrofoil, and smaller velocity on the other side of the asymmetric hydrofoil, the particles on the streamlines above the main axis follow a path through the upper side of the cambered hydrofoil, and the particles on the streamlines below the main axis follow a path through the lower side of the cambered hydrofoil, wherein the particles are free from drift into a vortex-region (8) formed downstream of a flow separation point (7) on the cambered hydrofoil,

wherein the particles on the streamline coincident with the main axis follow a path such that larger particles on the streamline tend to flow through a side of the cambered hydrofoil with smaller average velocity and smaller particles flow through the side of the cambered hydrofoil with larger average velocity.

4. A method for preventing mixing of different sized particles, resolution of which is already increased according to Claim 2, by the cambered hydrofoil, characterized in that it comprises the steps of forming a separation wall (13), which divides the stream into two distinct streams, and is located downstream of the asymmetric hydrofoil behind a vortex region, formed behind the flow separation point of the cambered hydrofoil, wherein the separation wall (13) tip (T) is located at the downstream end of the vortex region (8), and forwarding the streamlines comprising larger particles and the streamlines comprising smaller particles to the separation wall, which divides them into two distinct streams.
5. A device for preventing mixing of separated different sized particles for implementing the method according to Claim 3, comprising
an upstream channel for situating therein streamlines carrying different sized particles with distance (a) in between, such that one streamline is above and the other is below the main axis,
a cambered hydrofoil located in the upstream channel,
two downstream channels located behind the asymmetric hydrofoil, and
a separation wall (13) between these two downstream channels,
wherein said separation wall (13) has a separation wall tip (T) located at the downstream end of the vortex region.