example of a fume cupboard that is equipped with support jet-stream technology is described in DE 101 46 000 A1, EP 1 444 057 B1 and US 9,266,154 B2.

For the first time, in the case of fume cupboards equipped with conventional support jet-stream technology, the inventors of the present invention were able to observe that, in contrast to experiments performed beforehand with mist, where no significant flow displacement of the wall jet streams could be detected, during the examination of the flow field of the wall jet streams using PIV measurements ("Particle Image Velocimetry" measurements), a current displacement took place already at a relatively short distance behind the front sash level, subsequently resulting in dangerous backflow areas being able to form at the side walls.

Embodiments of the present invention seek to further improve outbreak safety of a fume cupboard equipped with support jet-stream technology and further reduce its power consumption at the same time.

An aspect of the present invention provides a fume cupboard for a laboratory space, which has a housing, in which a work space is located, which is limited on its front side by a front sash, on its base by a base plate and by a side wall on each of its sides. Furthermore, the fume cupboard comprises a first hollow profile arranged on a front side of each side wall, wherein each hollow profile has a first pressure chamber, which is fluidically connected to a plurality of first openings, out of which air jet streams in the form of wall jet streams consisting of pressurised air can be emitted along the respective side wall into the work space. The fume cupboard is characterized in that at least one of the first openings is fluidically connected to the first pressure chamber via a first longitudinal duct, and that the first duct has a length L in the direction of flow that is at least three times the hydraulic diameter of a cross-sectional surface of the first opening, from the perspective perpendicular to the direction of flow, in order to prevent flow displacement of the wall jet stream coming out of the first

opening of the side wall in an area of the front side of the work space up to at least 25% of the depth of the work space.

Another aspect of the present invention provides a fume cupboard for a laboratory space, which has a housing, in which a work space is located, which is limited on its front side by a front sash, on its base by a base plate and by a side wall on each of its sides. Furthermore, the fume cupboard comprises a second hollow profile arranged on a front side of the base plate, wherein the second hollow profile has a second pressure chamber, which is fluidically connected to a plurality of second openings, out of which air jet streams in the form of base jet streams consisting of pressurised air can be emitted along the base plate into the work space. The fume cupboard is characterized in that at least one of the second openings is fluidically connected to the second pressure chamber via a second longitudinal duct, and that the second duct has a length L in the direction of flow that is at least three times the hydraulic diameter of a cross-sectional surface of the second opening, from the perspective perpendicular to the direction of flow, in order to prevent flow displacement of the base jet stream coming out of the second opening of the base plate in an area of the front side of the work space up to at least 25% of the depth of the work space.

It is advantageous if the fume cupboard has both a first hollow profile as well as a second hollow profile.

According to a preferred embodiment of the invention, the first and/or the second duct has a length L in the direction of flow, which is at a range of four times to eleven times the hydraulic diameter of the cross-sectional area of the first and/or the second opening.

Preferably, no flow displacement of the wall jet stream coming out of the first opening from the side wall and/or of the base jet stream coming out of the second opening from the base plate occurs in an area of the front side of the work space up to at least 50% of the depth of the work space.

Even more preferably, no flow displacement of the wall jet stream coming out of the first opening from the side wall and/or of the base jet stream coming out of

Patent claims

1. Fume cupboard for a laboratory space, having a housing, in which a work space is located, which is limited on the front side by a front sash, on the base by a base plate and on the side by a side wall respectively and a first hollow profile arranged on a front side of each side wall, wherein each hollow profile has a first pressure chamber, which is fluidically connected to a plurality of first openings, out of which air jet streams in the form of wall jet streams consisting of pressurised air can be emitted along the respective side wall into the work space,

   wherein at least one of the first openings is fluidically connected to the first pressure chamber via a first longitudinal duct, and wherein the first duct has a length L in the direction of flow that is at least three times the hydraulic diameter of a cross-sectional surface of the first opening, from the perspective perpendicular to the direction of flow, in order to prevent flow displacement of the wall jet stream coming out of the first opening of the side wall in an area of the front side of the work space up to at least 25% of the depth of the work space.

2. Fume cupboard for a laboratory space, having a housing, in which a work space is located, which is limited on the front side by a front sash, on the base by a base plate and on the side by a side wall respectively and a second hollow profile arranged on a front side of the base plate, wherein the second hollow profile has a second pressure chamber, which is fluidically connected to a plurality of second openings, out of which air jet streams in the form of base jet streams consisting of pressurised air can be emitted along the respective base plate into the work space.

   wherein at least one of the second openings is fluidically connected to the second pressure chamber via a second longitudinal duct, and wherein the second duct has a length L in the direction of flow that is at least three times the hydraulic diameter of a cross-sectional surface of the second opening,

from the perspective perpendicular to the direction of flow, in order to prevent flow displacement of the base jet stream coming out of the second opening of the base plate in an area of the front side of the work space up to at least 25% of the depth of the work space.

3. Fume cupboard, that has the features of Claims 1 and 2.

4. Fume cupboard according to any one of the preceding claims, characterized in that the first and/or the second duct has a length L in the direction of flow, which is at a range of four times to eleven times the hydraulic diameter of the cross-sectional area of the first and/or the second opening.

5. Fume cupboard according to any one of the preceding claims, characterized in that no flow displacement of the wall jet stream coming out of the first opening from the side wall and/or of the base jet stream coming out of the second opening from the base plate occurs in an area of the front side of the work space up to at least 50% of the depth of the work space.

6. Fume cupboard according to any one of the preceding claims, characterized in that no flow displacement of the wall jet stream coming out of the first opening from the side wall and/or of the base jet stream coming out of the second opening from the base plate occurs in an area of the front side of the work space up to at least 75% of the depth of the work space.

7. Fume cupboard according to any one of the preceding claims, characterized in that a first and/or a second pressure transducer is /are provided, which is/are fluidically connected to the first and/or the second pressure chamber.

8. Fume cupboard according to Claim 7, characterized in that the first and/or the second pressure transducer comprises a first and/or a second pressure transducer line, which is arranged in such a way that a pressure-chamber end of the first and/or second pressure transducer line

ends in being flush with an inner surface of the first and/or the second pressure chamber.

9. Fume cupboard according to any one of the preceding claims, characterized in that a control device is provided which adjusts the pressure in the first and/or the second pressure chamber at a range from 50 Pa 500 Pa during intended uses of the fume cupboard, preferably at a range from 150 Pa to 200 Pa.

10. Fume cupboard according to Claim 9, provided that this is dependent on one of the Claim 7 or 8, characterized in that the control device is electrically connected to the first and/or second pressure transducer.

11. Fume cupboard according to Claim 9 or 10, characterized in that the control device is a pressure reducer or a mass flow controller that is arranged upstream to the first and/or the second pressure chamber.

12. Fume cupboard according to Claim 11, characterized in that the pressure reducer or mass flow regulator is arranged within the housing.

13. Fume cupboard according to any one of the preceding claims, characterized in that a cross-sectional surface at least of a first and/or a second opening, viewed perpendicular to the direction of flow, preferably all first and/or second openings, is at a range of 1 mm^2 to 4 mm^2.

14. Fume cupboard according to any one of the preceding claims, characterized in that a cross-sectional surface, viewed perpendicular to the direction of flow, at least of a first and/or a second opening, preferably all first and/or second openings, is at a range of 1.8 mm^2 to 3 mm^2.

15. Fume cupboard according to any one of the preceding claims, characterized in that at least a first or a second opening, preferably all first or second openings are/is designed in such a way that the pressurised-air jet stream coming out of the first and/or

the second opening is emitted into the work space as a periodically oscillating wall jet stream and /or as a periodically oscillating base jet stream.

16. Fume cupboard according to Claim 15 characterized in that the periodicity is at a range of 1 Hz to 100 KHz, preferably at a range of 200 Hz to 300 Hz.

17. Fume cupboard according to one of the Claims 15 or 16, characterized in that the periodic oscillation of the wall jet stream and/or the periodic oscillation of the base jet stream is generated by merely non-moving components of the first and/or the second hollow profile, which are preferably designed as a single piece.

18. Fume cupboard according to one of the Claims 15 to 17, characterized in that the periodic oscillation of the wall jet stream and/or the periodic oscillation of the base jet stream is generated by auto-stimulation.

19. Fume cupboard according to one of the Claims 15 to 18, characterized in that at least a first and/or a second fluidic oscillator is/are provided, which comprise/comprises the first and/or the second opening, preferably a plurality of first and second fluidic oscillators are provided, which comprise a first and/or a second opening respectively and, which generates/generate the periodic oscillation of the wall jet stream/wall jet streams and/or the periodic oscillation of the base jet stream/base jet streams.

20. Fume cupboard according to any one of the preceding claims, characterized in that the first and/or the second openings have a circular, round, oval, rectangular or polygonal shape.