Air grilles

Designing

Diffusers and grilles are one of the most important elements of ventilation and air conditioning. Whatever the system used have a decisive influence on the distribution of velocity and temperature, and hence, the comfort of the occupants. The main task of these devices is to provide the required air flow, with appropriate parameters in the occupied zone and the low level of noise in the room.

Selection of supply air diffusers and grilles comes down to the selection of the concept of air distribution in a room, determine the appropriate number of devices and their operating parameters such as flux per unit (per one diffuser), range jet, the pressure loss, noise.

Air distribution and selection of diffusers is one of the most difficult tasks in all ventilation, the correct solution requires a lot of experience. You can not always accurate, and also set strict rules for selecting the type of diffuser.

Here are some of the most important tips for designing the air distribution system in the room:

- Streams of air in the room can be carried from the top down, bottom up and from top to top.
- If you design a ceiling diffusers and grilles upper intake if there is a temperature difference between supply air and room air, consider the lifting and lowering of stream due to gravity forces occurring due to differences in air density. When the installation is designed for room air conditioning during the summer and the losses of heat in the heating season when the temperature difference DT> 5 [K] it is difficult to avoid the "lake of cold air near the floor," and at the same time not to exceed the maximum air velocity in the occupied zone. A partial solution to this problem can be applied with high induction diffusers. It should, however, incompatible with the fact that there will occasionally excessive air velocity at the height of the human head. Best results are achieved by the use of diffusers are adjustable.
- Grilles and diffusers are not equipped with air deflectors can be used as diffusers only conditionally, these are often exhaust openings.
- Avoid uncontrolled formation of the Coanda effect.
- Designing to avoid blowing lower high air velocity. Speeds greater than 0.5 m / s, depending on the distance from the diffuser can cause the feeling of draft.
- In the case of floor diffusers should be taken into account that accumulate in the dust, which is then entrained air stream and blown into the room.
- Diffusers in the low-pressure system should be able to adjust in order to balance the network and thus achieve an adequate separation of air.
- The location of the exhaust grilles at the premises where the tobacco is burning should take place at the top.
- In areas where pollution emit exhaust openings should be located as close as possible sources of pollution.
- For the selection of diffusers, grilles and air intake and exhaust should always take into account the air flow velocity and the associated noise.

The occupied zone

The area occupied room space shall be located 1.8 meters above the floor.

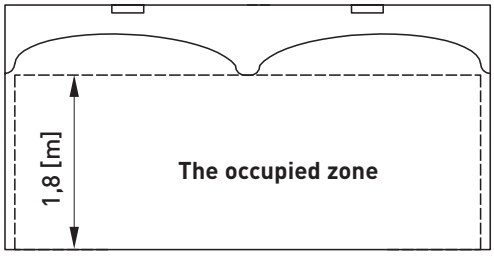

Figure a)

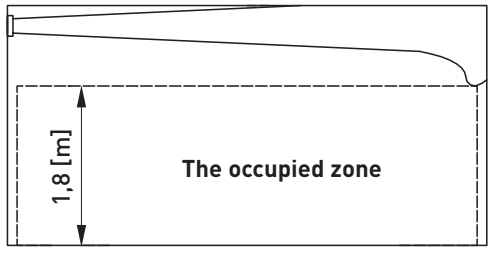

Figure b)

Occupied zone in the case of supply a) slab and b) the wall

Flow per unit

The required flow rate of air flowing out of the diffuser [m3 / h]

The range of stream

The distance L [m] between the center of the diffuser and the point where the average air speed drops to a desired value. For comfort cooling rate should not exceed 0,20-0,30 [m / s]. The extent of the jets is strongly influenced by air temperature and the related phenomenon of sinking or floating in the air stream.

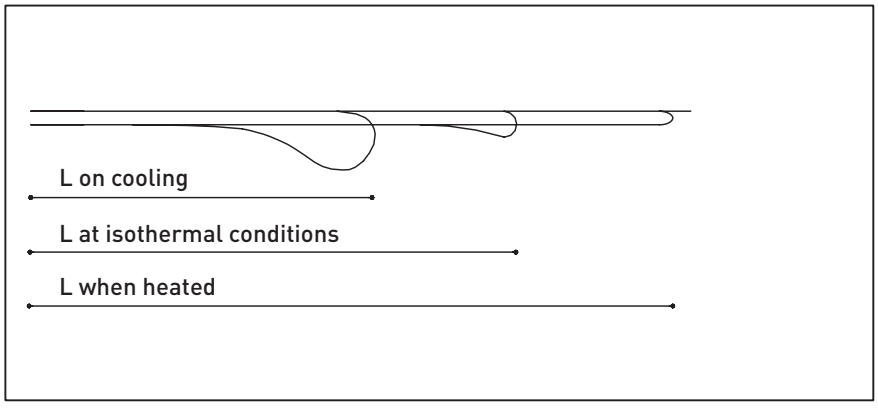

Figure range horizontal air stream flows from discharge grille wall

The pressure loss

The difference between the pressure in the duct before the air inlet and air pressure for the diffuser (indoor). The data in the directory determine the total pressure loss for different diffusers and intake grille.

The sound power level

Data contained in the directory aksutycznej determine the power level in dB (A) with respect to the grid or diffuser.

Ventilation grilles

This type of air supply equipment in the room creates a horizontally penetrating streams. In the case of blowing a stream of the same temperature as the air in the room, the force of gravity do not affect the deviation of the stream. This is known as isothermal streams. In the case of blowing horizontal flow into the room with a temperature different from the indoor air temperature is decreased range of stream and its deviation in the direction which depends on the temperature difference (up - streams of warm, down - cold streams).

Ceiling diffusers

These units distribute air in a direction more or less horizontal to the surface,

in which they are installed. Another solution is to swirl. Through the swirling stream reaches a high induction which leads to rapid equalization of temperature and a decrease in stream velocity. Solution

This allows the use of higher air temperature differences. If you use the same ceiling diffuser for supply air in summer (air conditioning) and winter (heating), there is danger of a layered distribution of temperature in the room. If the temperature difference between supply air and room air exceeds 5 [K], even if the swirl is difficult using the same air supply device to reach the occupied area, while avoiding drafts for cooling in summer. In this case, successfully apply diffusers with variable geometry air stream. The design of these diffusers allows for smooth adjustment of the position with the steering actuator or a manual lever. It is possible to supply in the form of a concentrated stream of air down the heating and air distribution suitable for cooling, depending on the variant of the installation.

Coanda Effect

If the stream is not directly blown into the ceiling, but at a distance h of no more than 30-50 times the thickness of the stream and, because of the turbulence-induced higher vacuum and flow unilaterally adhere to the ceiling. Just keep the stream flowing to the surface at an angle and less than or equal to 45 °. When individual streams or short slits, the flow does not "stick" to the surface even at lower values of the angle a should therefore be used rather than a short single continuous streams and long. They are characterized by a greater induction of the air, thanks to their speed drops more quickly and the temperature equalization occurs at a shorter distance from the outlet. The phenomenon also occurs when two adjacent air streams if their distance is sufficiently close. Then produce two whirlpools. Sometimes this phenomenon is known as the effect of boundary surface vortices. Generally you should avoid Coanda effect, it may happen that formed as a result of the occurrence of streams (especially isothermal) follow along the ceiling or floor (depending on the instantaneous thermal currents in the room), evoke the phenomenon of drafts in the room. There are cases in which you can use the Coanda effect deliberately to increase the reach of the stream. This is especially useful for blowing streams with a temperature of less the air temperature in the room.