

Finally, unforgettable cinema moments again

How big is the risk of infection in the cinema?

Rust, May 2021, through an initiative of Europa-Park and a big ticket platform, there was finally an “open to the public” cinema evening again on 12.03.2021. A Corona-compliant event concept was tested in a pilot project. The technology of Palas GmbH, located in Karlsruhe, was applied. The good news is that cinema visits can also be arranged safely.

For the first time since the beginning of November 2020, 150 people were able to meet again at the Magic Cinema Theater located at the Europa-Park in Rust on 12 March 2021. The viewers were allowed to see a film in a theater again. This was a pilot project – and was granted special permission through the state of Baden-Württemberg. The aim was to test whether and how an event concept could be implemented under Corona conditions.

"There is a lot of uncertainty among everyone involved," stated Dr. Maximilian Weiß, Managing Director of Palas GmbH. "What has to be done to make events possible again? How many people can enjoy watching films together? What ventilation measures have to be taken? Facts and clear statements are missing. The only way to gain clarity is to take further measurements."

Does the ventilation concept work?

Exhaled aerosols are very small and remain in the air for a very long time. They are formed in the lungs, among other places. Viruses, such as the Corona virus, can attach themselves to these suspended, tiny particles and are exhaled with them. A person suffering from Covid-19 exhales up to 100 times more of these aerosols than a healthy person. People who are in the proximity of an infected person can inhale these aerosols which in turn will make them become infected.

How could this danger be minimized in daily life at the cinema? The concept of the amusement park was carried out as followed: A room with the size of 550 m² permits 140 people to enter the auditorium - under normal circumstances, up to 440 people enjoy the cinema films here. Each visitor to the cinema is given a fixed, assigned seat. Masks are compulsory. The auditorium is continuously supplied with fresh air from outside via a ventilation system.

CO₂ concentration and aerosol separation efficiency

For the model test, three AQ Guards from the Palas® company in Karlsruhe were distributed in the hall. The AQ Guard is the only measuring device in the world that offers the necessary aerosol resolution in combination with a CO₂ measuring cell. This enables a more precise determination of the risk of infection.

First, the reproduction number is calculated based on a recognized scientific model and the CO₂ concentration in the room. Palas GmbH has extended this model to include the influence of aerosol deposition. While the CO₂ concentration is a measure of the proportion of exhaled air - and thus contaminated with potentially infectious aerosols - the aerosol concentration provides information on the extent to which these potentially infectious aerosols are separated by the air, for example by sedimenting on walls or being actively drawn out of the air by filter systems. "The combination of the two values enables a much more meaningful calculation of the risk of infection, since the risk of infection, in reality, comes from the aerosols and not from the CO₂," explains Ann-Kathrin Goßmann, Project Engineer in the Research and Development department at Palas GmbH.

These measurements do not take into consideration other protective measures which are currently being used such as the wearing of masks or the age and or physical health of the cinema visitor.

Fresh air supply ensures low values

The positive results give cause for hope! The values are uncritical at all measurement locations in the room over the entire duration of the event. The reproduction number determined from the measured values remains below 0.6 for the entire 90 minutes. Furthermore, wearing high-quality respiratory masks reduces the risk again by up to 90%. This means that if one person in the room breathes out infectious aerosols, no other person would be infected by them. Also: Compared to other measurements by Palas GmbH, for example, in offices the values are low. "One reason for this is certainly the large room volume in relation to the number of people and the continuous supply of fresh air which leads to a constant dilution of the aerosols" explains Dr. Weiß. "These results even show that even more people could attend such an event without the risk of infection becoming critical."

Palas GmbH was founded in 1983 and has approximately 100 employees at its location in Karlsruhe. Palas GmbH is a subsidiary of Brockhaus Capital Management AG, which is listed in the Prime Standard on the Frankfurt Stock Exchange (BKHT, ISIN: DE000A2GSU42).

Pressecontact:

Palas GmbH
Sarah Kunath
Corporate Communication
Phone: +49 721 96213132
E-Mail: Sarah.Kunath@palas.de



Figure 1: The AQ Guard in Magic Cinema 3D