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Whitepaper

A photograph of a library or study area. Several students in white school uniforms are seated around a long wooden table, reading books. The room features wooden bookshelves filled with books, a blue wall, and track lighting on the ceiling. A door with a frosted glass panel is visible on the right side of the image.

The role of UV-C in protecting schools and classrooms

Schools need effective ways to ensure good air quality, helping to prevent coronavirus, flu, and other infections. Research conducted with educational staff in 2022* indicated that 89% of educational institutions simply open the windows for good ventilation. In this way, they hope to reduce the spread of viruses and

bacteria through the air. In practice, however, this strategy mainly results in heat loss and cold classrooms. Especially considering the current energy crisis and its unprecedentedly high energy prices, this has to be done differently. UV-C offers a solution.

* Research into the preparation of schools for a possible emerging flu or coronavirus wave and the awareness of air cleaning technologies was carried out by independent research agency PanelWizard from 11 to 15 August 2022. A total of 742 Dutch people aged 18 years or older who work in the education sector completed the questionnaire.



UV-C: a proven technology

UV-C provides cleaner air in an effective, reliable, and cost-saving way, minimizing the risk of viral or bacterial infection. UV-C light renders many pathogens harmless, such that they are no longer a source of contagion.

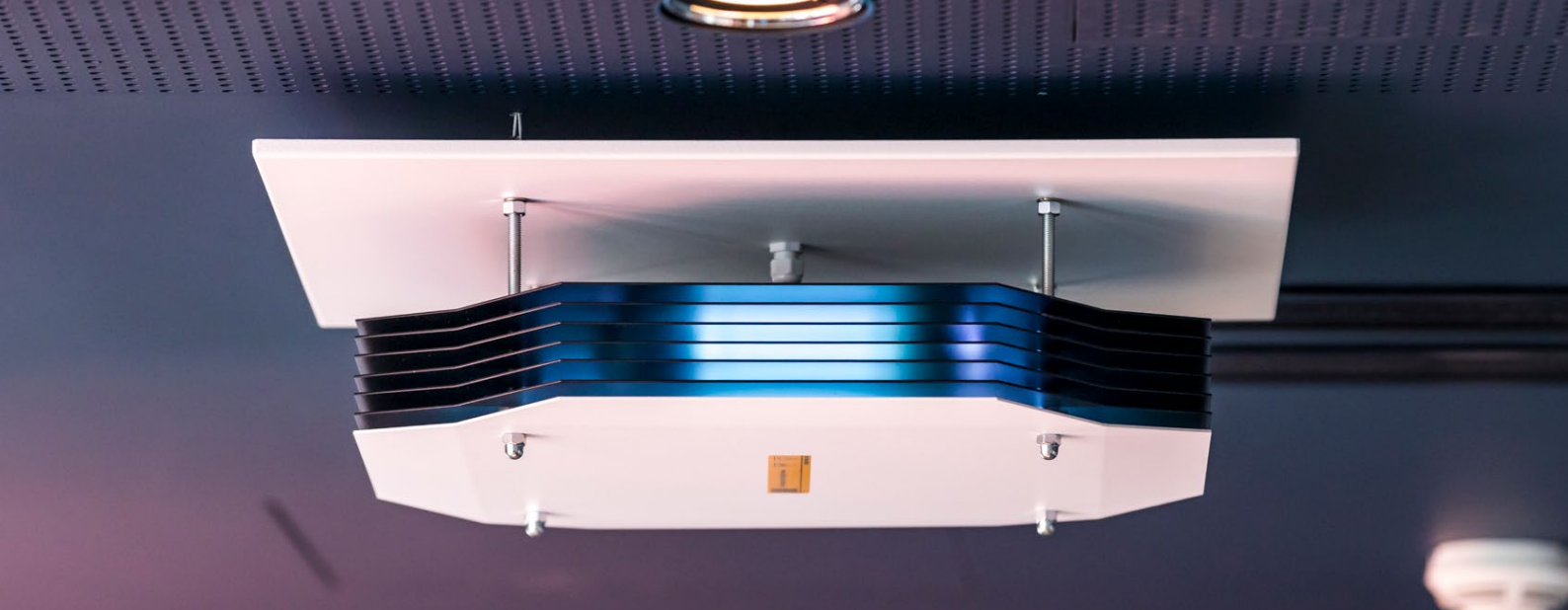
All bacteria and viruses that have been tested to date respond to disinfection with UV-C, including the coronavirus.

[A study](#) conducted with certified reference laboratory Innovative Bioanalytics shows that upper air UV-C devices inactivate 99.99% of airborne SARS-COV-2, the virus that causes COVID-19, in less than 10 minutes.



Ventilation and disinfection

The coronavirus has underlined the importance of air quality. Ventilation refreshes the air, reduces the number of pathogens in a room, and lowers the CO₂ concentration. The most effective way to minimize the risk of airborne infection is to reduce the number of airborne pathogens by 99.99%. Changing the air in a room six to nine times an hour via ventilation alone can't achieve this level of reduction in practice. To ensure that air is both fresh and clean, it's important to disinfect the air. With disinfection practices in place, good air quality can be achieved at energy costs much lower than those incurred by ventilation alone.



Heat loss and the energy crisis

Government subsidies for air cleaning technologies are available in some regions, but not all schools are eligible—only 27% in the Netherlands, for example, according to a study carried out by independent research agency PanelWizard in August 2022. Opening windows for ventilation lets poor air outside and carries fresh air inside, but it results in sky-high energy costs, because the outside air must often be heated up or cooled down. Current energy prices are causing energy bills to [rise by as much as 70%](#). To keep one standard classroom of 126 cubic meters (7 m wide x 6 m deep x 3 m high) with open windows at a constant temperature of 20°C, a school in the Netherlands could pay an estimated €1,600 per year extra in energy.

By supplementing ventilation with UV-C light, windows need to be opened less often. This minimizes heat loss and saves energy, making UV-C light a better choice with positive effects on both the environment and the wallet. With this UV-C disinfection, schools can spend every euro they save from energy use reductions on their primary mission: providing a good education.



Air exchange with outside air alone is often not sufficient and is irresponsible in the context of current gas and energy prices. There is a lot of scientific evidence that good and sufficiently powerful air purification can remove up to 95 percent of the aerosols from the air, and therefore also a lot of virus particles.”

Bert Blocken
Air Technical Engineer and Professor,
KU Leuven



Some current uses of UV-C

UV-C technology is not new. Healthcare institutions have been using UV-C light for disinfection for more than 80 years. [GGD](#), the public health service in the Netherlands, and the [Sint-Pieter University Medical Center](#) in Belgium have been protecting staff and visitors with UV-C light against viruses such as tuberculosis, flu, and the coronaviruses for more than a decade. Many theaters and football stadiums also use UV-C light to control virus outbreaks.

“ I think we should use UV-C disinfection more widely. When we didn't have UV-C devices in use yet, some of our employees became infected with tuberculosis through our patients. **Since we preventively installed the devices more than ten years ago, we have not seen any infection.**”

Roxanna van Nispen-Dobrescu,
Pulmonologist at GGD Breda



Subsidies for air cleaning

Although the effectiveness of UV-C has been proven, subsidy possibilities are limited and vary from country to country. In Germany, a large subsidy program to improve air quality in schools was available in 2021, but has since ended. Similar schemes are available in Italy, Netherlands, South Korea, and several other countries. The U.S. government recommends UV-C [for crowded rooms with poor air circulation](#), and has made nearly \$500 billion available for ventilation, air filtration, and UV-C disinfection in schools, community centers, and other commercial and public institutions.

As a company committed to the idea that all educational environments and other public spaces should offer good air quality with a minimal risk of infection, Signify works to make such subsidies more effective and well understood. We work with governments to extend their subsidies to include UV-C disinfection options, and we also work to make customers aware when UV-C is an option, even if it is not the main focus of a subsidy.

Most subsidy programs are intended to improve air quality, and therefore focus on improving ventilation. Air disinfection is sometimes mentioned as an option and sometimes excluded. Some subsidies do not cover the total investment and operating costs. Adjusting existing or outdated systems is often so expensive that schools sometimes have to dig deep into their own pockets, even when subsidies are available.

In June 2022, Eindhoven became the first Dutch municipality to set up a subsidy scheme for air cleaning. The city made €700,000 available to schools to equip their classrooms with UV-C light. Peter Tijs, chairman of Scholengroep SKPO Eindhoven, the foundation that represents 35 schools in Eindhoven covered by the subsidy scheme, expresses frustration with the solutions that focus on ventilation and exclude the use of UV-C light. “Ventilation is becoming an expensive joke. We must adjust our budgets accordingly. Other solutions like UV-C are safe and responsible, and they don’t require us to open the windows and doors in winter.”

Recommendations for school administrators and governments

All things considered, UV-C technology offers enormous potential for energy-efficient air disinfection. Signify believes that the future use of UV-C should be much broader. Schools should be supported in whatever way possible to implement air disinfection solutions to ensure clean air without unnecessary energy loss.

- Schools and school administrators should embrace UV-C solutions, in addition to ventilation. UV-C minimizes virus transmission in classrooms while saving energy by ventilating less.
- Governments should broaden ventilation regulations in schools to include subsidizing recognized air purifiers in classrooms. With the large amount of funding already available, schools can implement feasible and affordable solutions for providing clean air while limiting energy loss.



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