#### Thermal

Thermal Heating or Thermal Disinfection is an example of an emerging technology to combat SARS-CoV-2. Thermal Disinfection involves heating surfaces for prolonged periods of time to deactivate viruses and bacteria. ~~can be inactivated (die off) when exposed to heat for a certain peri+od of time.~~ Thermal disinfection also prevents the risk of moisture ingress posed by liquid-based disinfectants and limits the potential for missed spots and ergonimic issues that may occur when maually disinfecting surfaces by hand. The specific thermal inactivation temperature with associated relative humidity, and length of heat exposure required to be effective for each virus and bacteria is different. Studies have been conducted ~~are ongoing~~ to show the functional capability and efficacy for thermal heating against SARS-CoV-220. Efficacy of thermal disinfection is related to a combination of other environmental factors.

Specifically, ~~it appears~~ humidity plays a major role in the relationship between temperature, time, and kill rate for SARS-CoV-2. Studies have shown that thermal inactivation temperatures for SARS-CoV-2 can be achieved at 40 degrees C to 55 degrees C depending on the amount of time surfaces are exposed to these temperatures. ~~. Currently, studies are showing at certain relative humidity ranges that SARS-CoV-2 thermal inactivation can be achieved from around 50 degrees C at 30 minutes exposure to around 70 degrees C at 10 minutes exposure.[[1]](#footnote-1)~~ Airplane manufacturers and the U.S. military are studying thermal heating as a potential disinfection solution for the flight deck, ~~cabin, and cargo compartment~~. ~~More testing is needed before conclusions can be made about the efficacy and viability of thermal heating for an aircraft~~. ~~Testing~~ Operators performing thermal disinfection also need to address safety of equipment and parts after repeated heating cycles, functional inspection after testing, and proper safety guidelines.

While the testing may prove heat and humidity can eliminate biological contamination, for aircraft operations, the operational heat limits still need to be addressed to ensure safety. Thermal disinfection should be performed using external heaters and in an airplane depowered state so as to avoid cooling air being introduced from the on board aircraft cooling systems which may prevent surface temperatures to rise to the thermal disinfection temperature. Electrical heater blankets are not recommended for thermal disinfection due to potential for overheat and damage.

As the process evolves or the suspect pathogen changes, operators wishing to utilize thermal heating should coordinate with knowledgeable entities such as safety regulators, aircraft, and equipment OEMs to research the viability of the option, including conducting a SMS and SRA process.

20 Heir, Laib, Nene. Thermal Disinfection of SARS-CoV-2 within an Airplane. https://www.boeing.com/confident-travel/research/thermal-disinfection-of-SARS-CoV-2-within-an-airplane.html

1. Chin, Chu, Perera et al. Stability of SARS-CoV-2 in different environmental conditions. https://doi.org/10.1016/S2666-5247(20)30003-3 [↑](#footnote-ref-1)