

**Preventing Transmission of Viruses
with Uniform Swimming Pool, Spa and Hot Tubs (USPSHTC)**

Since the viruses like COVID-19 are easily transmitted and may result in life threatening respiratory symptoms, any measures which utilize effective practices to minimize the spread and likelihood for survival of the virus should be employed. The following guidance is being shared in efforts to aid the public during this health emergency.

Disinfection (Chapter 5): Through proper operation, maintenance, and disinfection of swimming pools, spas, hot tubs, and aquatic venues, viruses can be made inactive. Within Chapter 5 of the USPSHTC, safe and effective water quality parameters for chlorine, bromine, ozone, and turnover times can be found.

Ozone, or trioxygen, is an ideal disinfectant for single and multicellular organisms like bacteria and viruses. Ozone is effective, rapidly reacts, and serves as a strong germicide. Provisions pertaining to ozone disinfection systems are located in Chapter 5. Chlorine and bromine are also proficient at killing a broad spectrum of pathogens in pool water when the content falls within the listed acceptable range.

Turnover time is also provided to ensure that the entire volume of pool water is adequately circulated, disinfected, and filtered for safe use. Furthermore, viruses which may be transmitted through debris and oils on the pool water surface, must be made inactive by means of surface skimmers and overflow systems which effectively collect any contaminants and draw water into the recirculation system for disinfection. Provisions for installation and operation of surface skimmers and overflow systems may also be found in the USPSHTC.

Ventilation (Chapter 4): Reducing the transmission of airborne pathogens within natatoriums like those associated with COVID-19 can be done through proper mechanical ventilation. As learned from the SARS outbreak, ventilation serves as a vital key to controlling cross infection or transmission by removing air from the contaminated space and replenishing the supply of outdoor air. The USPSHTC not only provides a means for determining the required outdoor airflow but also lists the required pressure differential and humidity control.

As laid out in the USPSHTC, natatoriums are required to maintain a negative pressure in relation to the outdoors so that the ventilation system may exhaust and dilute the contaminated air and supply pathogen free air for those within the space. Utilizing these measures and provisions, which mimic that of hospital wards, has proven to make an ideal environment for natatoriums, bathers, and spectators. The required total outdoor airflow to be provided to the space can be determined utilizing the equation and table provided within the USPSHTC which considers various factors pertaining to the venue and water agitation.

Since humidity also plays a significant role in the survival of the airborne pathogen, it must also be strictly controlled within a natatorium to ensure the specified range within the USPSHTC is met. Although, viruses thrive in low humidity which typically is not the condition of a natatorium, maintaining the space as defined within Chapter 4 of the USPSHTC prohibits transmission of the virus and aids in making the virus inactive within the space.

Fixtures (Chapter 4): Aquatic facilities often serve as places for community activities. This causes concern for easy transmission of the virus. An important factor to consider in aquatic facilities is the cross-contamination of the virus with the potable water supply or surrounding surfaces within lavatories. Since handwashing is the primary method for preventing transmission, such venues must be equipped with enough washing facilities. Additionally, current studies have shown that the virus is able to spread through wastewater making viable concern for contamination of the potable water supply if proper protection is not provided. The USPSHTC offers requirements for potable water protection along with provisions for proper installation of fixtures.

In Chapter 4 of the USPSHTC, various industry standards for fixtures are listed to ensure proper application and promote public health and safety. These standards are applicable to urinals, lavatories, water closets, showers and drinking fountains. Furthermore, requirements for hose bibbs utilized for cleaning and disinfection of the pool area and toilet facilities are provided along with methods of protection for the potable water supply. Utilizing these provisions ultimately minimizes the likelihood for transmission of the virus and gives protection to clean sources of water.