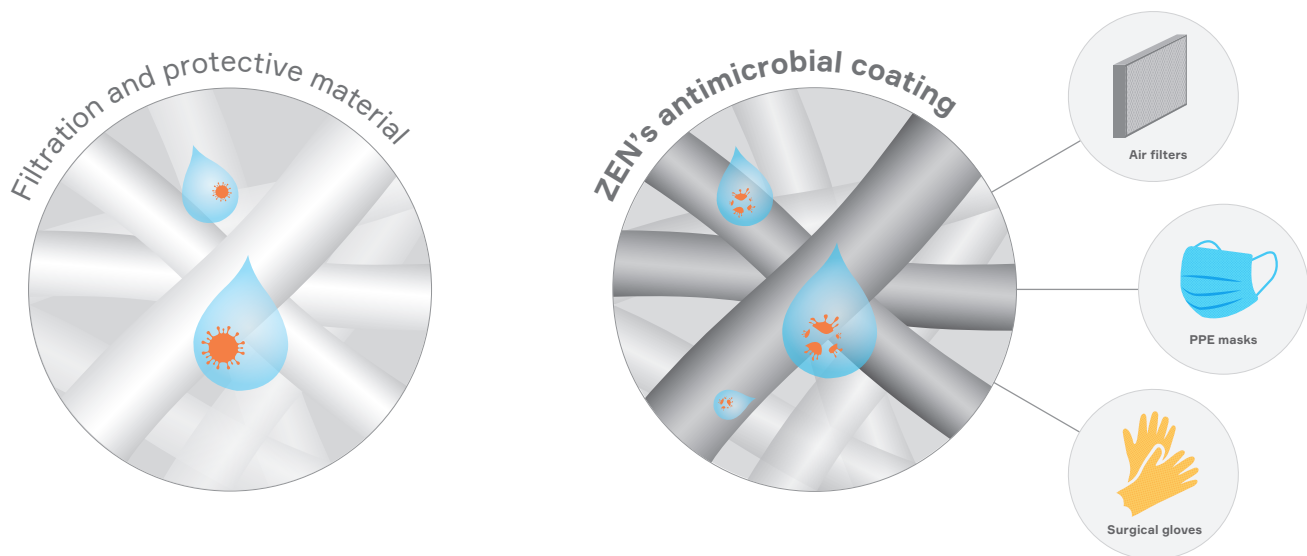




ZEN Graphene Solutions Graphene-Based Coating – 99% Antimicrobial Activity, Including Against COVID-19



Filtration and protective material prevent a large portion of particles including viruses and bacteria from penetrating; however, they will continue to stay active on the surface.

ZEN's antimicrobial coating is hydrophilic. The bacteria or virus-laden water droplets activate ZEN's coating which deactivates the pathogen (including the COVID-19 virus) with 99% efficiency.

*This illustration is an artist rendering and is not to scale.

Quick Facts:

Patent pending, antiviral, antibacterial graphene-based coating	Third-party performance validation at Health Canada accredited facilities	100% Canadian solution
99% effective against the COVID-19 virus as well as gram-positive and gram-negative bacteria in accordance with ISO testing protocols	Hydrophilic (water attracting) coating that adsorbs water droplets	Mask material treated with coating 98% effective against COVID-19 after 108 days

Independent Third-Party Validation:

Western University's ImPaKT facility Biosafety Level 3 laboratory in London, Ontario and McMaster University's Centre for Microbial Chemical Biology in Hamilton, Ontario.

Testing:

Viricidal Properties

Two samples of N95 mask filtration media were coated with two different concentrations of ZEN's graphene-based coating and then exposed to the SARS-CoV-2 virus that causes COVID-19. The antiviral properties were tested in accordance with ISO 18184:2019 – Determination of antiviral activity of textile products. Western's ImPaKT facility reported achieving 99% or higher inactivation of the virus in three separate tests verified through two rounds of testing. Significantly, the antiviral effect of the second round of testing was on material that was prepared 35 days earlier. After 108 days, inactivation was shown to remain 98% effective demonstrating the ongoing viricidal activity of ZEN's patent pending coating.

Antibacterial Properties

Testing at McMaster University's Centre for Microbial Chemical Biology was performed in accordance with ISO 20743:2013 - Determination of antibacterial activity of textile products with typical polypropylene mask material coated with ZEN's coating and exposed to both Escherichia coli and

Staphylococcus aureus (gram-negative and gram-positive strains of bacteria). Each test had three repeats and three controls to ensure accurate baselines. ZEN's coating achieved greater than 99% efficacy against both gram-positive and gram-negative bacteria.

Applications:

- PPE masks (N95, surgical and generic face masks)
- Surgical gloves
- Air filters (e.g. HVAC and HEPA)
- Other PPE or filtration materials

Production & Source Material:

- Currently scaling production of graphene oxide and antimicrobial coating for billions of masks and other filtration media
- Graphene oxide purchase agreement in place to bridge coating production requirements until production is fully established
- Wholly owned Albany deposit in Ontario, Canada hosts a large resource of graphite with potential to provide precursor material for decades
- Exploring purchase agreement options for graphite while establishing vertically integrated supply chain
- Multiple strategies to increase production in order to meet any level of coating demand

ZEN invites companies to reach out for potential partnerships to bring this new technology to market and add another much-needed layer of protection against dangerous pathogens: antiviralink@ZENGraphene.com
