RADICAL APPROACH TO AIR DECONTAMINATION

Tri-Air Developments has helped develop a machine that naturally and safely decontaminates indoor air and surfaces to protect against viruses, bacteria and superbugs, including MRSA, SARS and influenza.

The decontamination device, known as the Tri-Air T250, was originally created by the Worcestershire based inventor and microbiologist, Alan Mole. In 1991 he created an early and partially effective prototype of the machine which he developed over the next 10 years exploring the necessary microbiology, atmospheric chemistry and physics to progress the technology.

Tri-Air Developments, the UK-based joint-venture company was formed in 2006 to fund and further develop the device. It has patented the technology in 36 jurisdictions in anticipation of its success and manufactures the product using sub-contractors, after which it is sent to licensed distributors.

The product works by creating a continuous supply of hydroxyl radicals to destroy harmful microbes. High levels of hydroxyl radicals are found in outdoor fresh air; forested mountain areas have particularly high levels. These radicals are made by ultra violet light reacting with low levels of ozone in the outdoor air, which mix with volatile hydrocarbons to create the hydroxyl radicals.

The Tri-Air T250 air purification system can be used as a stand-alone system in a room or be fully integrated into ventilation systems

Tri-Air Developments' technology differs from other decontamination devices in that it doesn't use a filter but replicates the natural process of 'scrubbing' the air clean using the hydroxyl particles. This is done through three distinct components; in the first the device draws in air which passes through a non-thermal plasma, the plasma cells create hydroxyl radicals and ozone as well as breaking bugs down. In the second stage a UV tube surrounded by a titanium dioxide mesh, kills pathogens and catalyses the reactions that go on. Finally these reactions create a 'cascade' of hydroxyl radicals that kill viruses and bacteria in the air and on surfaces within an enclosed environment.

The UK Government's Health Protection Agency's Centre for Emergency Preparedness and Response has successfully tested the technology. Tests in 2007 achieved an almost complete kill on airborne MRSA in less than three minutes, and on MRSA on glass in 24 hours. The company has found the product to be 100 times more effective than any comparative method of de-contamination.

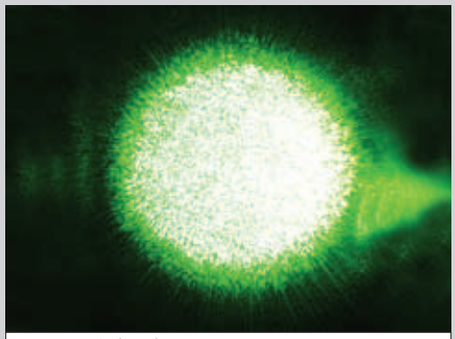
The Tri-Air T250 treats an area of around 250 cubic metres and is proving successful in hotels, casinos and cruise ships. A second product, the Tri-Air T35, which will treat an area of over 35 cubic metres is currently in development.

WHY DOES THAT HAPPEN?

SPECKLED MOBILES

The effect: Has your mobile handset ever disconnected itself during a call as you turn your head? That tiny movement on the edge of a reception area can cause a disconnection.

The cause: Wireless signals that power mobiles experience shadows and patterns from obstructing objects just like any other radiation. But the tiny ripples in reception strength are mostly due to 'multi-path' effects where fragments of signal reach the handset by a multitude of routes, bouncing off buildings and trees. These signals 'interfere' with each other like waves to give peaks and troughs of signal strength.



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Similar effects can be seen using light, which is also electromagnetic radiation but with a much shorter wavelength. Laser light characteristically shows as fine-grained bright-and-dark sandy pattern called 'laser speckle', but speckle can also be seen in sunlight on anodised aluminium. Look closely and it is coloured, with the graininess different for each colour. The graininess 'washes out' under white light on rougher surfaces like paper, though with a very narrow-band laser it can still be seen.

A solution: With wireless, 'white light' can be simulated by using broad band radio illumination that makes the graininess wash out. A technique called 'ultra wide band' wireless uses this approach, but wholesale transfer to an ultra-wide-band approach would be difficult. Another idea is to spread the effective position of the handset by fitting it with several antennas – this is called 'MIMO' (multi-input-multi-output) by wireless engineers. This is now starting to be used, mostly for WiFi systems at present.