Protec Fire Detection plc is a UK based manufacturer of fire detection and alarm systems. Protec is a 50 year old company started by its Chairman Mr. Barrie Russell in 1968. Protec manufacturer, install, commission and service thousands of building fire alarm systems throughout the UK. Protec also manufacture and supply our products to around 60 export companies and partners throughout the world.

Protec Fire Detection plc has no vested interest in the E-cigarette industry.

My name is Michael Calvert and I have been the Specialist Detection Systems Manager for Protec Fire Detection plc, for around 15 years.

In 1996 Protec purchased from an American company the worldwide rights to a very specialist fire detection system product/technology. Protec have continued manufacturing this technology since that time and now have a fifth generation product. Protec are the only manufacturers of this technology for use in fire detection systems in the world.

In very recent years this specific technology has gained some prestigious accreditation from a number of sources. These include the Nuclear Regulatory Commission (NRC) in the US, which after a four year investigation the technology was proven by scientists, to be the best technology they could employ for early warning fire detection within their most critical areas, when compared to all other early warning technologies.

The technology is presented within an aspirating detector (also known as an air sampling detector), where air is drawn from a risk area and delivered to a wall mounted detector by a network of pipes. The detector then analysis a small percentage of this air for products of combustion.

The technology is known technically as condensation nuclei monitoring or in its most simple format ‘Cloud Chamber’ particle detection. This technology uses Condensation Nuclei/Particle techniques to mechanically enlarge optically invisible particles to monitor for any increase in particle count.

The Cloud Chamber detector monitors the very earliest stage of a fire event by detecting 0.002µm particulate which are produced in massive quantities whenever a material reaches its thermal particulate point. This event is the true incipient stage of fire, with the known generation of optically invisible particles created by the thermal breakdown of material. This generation of optically invisible particles is a continuous process throughout the full fire cycle i.e. the more a fire progresses - the more material is thermally destroyed - the more 0.002µm particles are produced.

The Cloud Chamber detector identifies this change of state between a known background level of particles and the enormous quantity increase generated through material overheat. Typically this quantity increase is of the scale of 10 billion particles per cubic centimetre/per second.

At this point you may well be wondering what this has to do with E-cigarettes!

Very recently we have been looking for a safe and readily available tool for our engineers to carry out site testing of our aspirating detectors. A colleague suggested using an E-cigarette. Being a non-smoker I knew very little of the products available other than the use of these seems to be much more prevalent in recent years.

We decided E-cigarettes could be a potential solution to our problem and some internal none scientific testing was carried out at our Nelson, Lancashire head office. From the testing we established that as expected, our ‘optical’ aspirating systems respond to the visible vapours given off by the vaping process. For reference ‘optical’ technology is a different technology to Cloud Chamber technology as it only detects visible smoke, steam and dust type particles.

What we did not expect to see however, is that our Cloud Chamber detector also responds to the vaping process, as generally speaking the Cloud Chamber does not respond to visible smoke, steam and dust type particles.

Having investigated this further the Cloud Chamber would seem to be responding to the burnt oils that are used within the E-cigarettes to create the vapours. The e-cigarette we tested has an electrical coil which holds a cotton wick. Carrier and scented oils are soaked up by the cotton wick, which is then electrically overheated by the battery to create the vapour, the fumes from which are all inhaled by the smoker.

As our cloud chamber responded to this process we came to the conclusion that we are detecting invisible combustion particles of an oil based solution. This therefore could mean that each smoker is constantly inhaling and therefore more than likely coating their lungs with invisible burnt oil particles. It would be interesting to see if
Written evidence submitted by Protec Fire Detection plc (ECG0010)

this could be proven scientifically and to gauge if this creates a negative impact on human lungs or creates other respiratory problems.

I am sure that e-cigarettes have undergone a number of tests by the manufacturers to establish the products as 'safe', however I am also reasonably sure they have never been scientifically tested using a Cloud Chamber detector. Only the Cloud Chamber can see and measure these invisible particles.

As previously stated Protec Fire Detection plc has no vested interest in the E-cigarette industry, however we would be willing to assist in this research task if requested to do so.

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