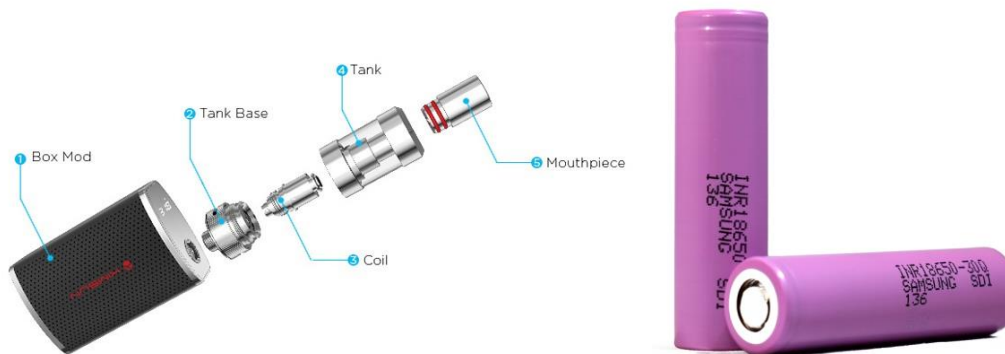
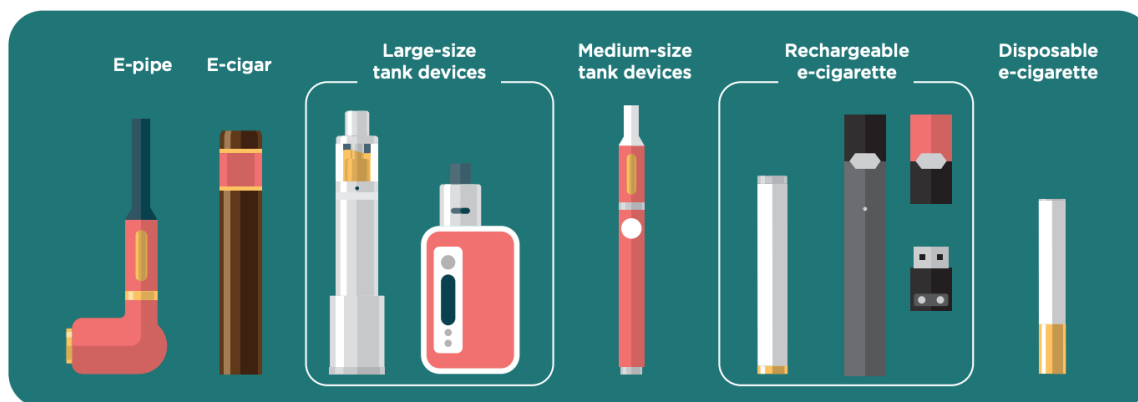


## The Root cause in Electronic Cigarettes (E-Cigarettes) failures

Electronic cigarettes, also known as e-cigarettes, e-vaporizers, or electronic nicotine delivery systems, are battery-operated devices that people use to vaporize and inhale a nicotine containing liquid in the form of an aerosol. E-cigarettes are handheld electronic devices that come in various shapes and forms, which can even resemble traditional tobacco cigarettes (cig-a-likes), cigars, or pipes, or even everyday items like pens or USB memory sticks. Regardless of their design and appearance, these devices generally operate in a similar manner and are made of similar components. As of now, more than 460 different e-cigarette brands are on the market and the market size was estimated to be around \$11.5 Billion in 2018.



The increasing popularity of e-cigarettes, which is estimated to result in further 20% market share growth by 2024, has already alerted public health officials due to concerns over nicotine addiction, particularly amongst teenagers. In addition to the health-related concerns over consumption of nicotine containing substances, e-cigarettes also pose a risk of fire and explosions, which result in serious injury and property damage. According to a recent FEMA report, there were over 250 incidents of explosion and fire related to e-cigarette use in the U.S. since 2009. Moreover, 62% of such incidences occurred during active use or transport in a pocket, resulting in serious injuries to the users.

E-cigarettes generally use rechargeable lithium-ion batteries, which offer high-energy density and lightweight for portable electronic applications. Though battery chemistries selected for e-cigarette applications show great variance between different brands and models, most of the devices require li-ion batteries. However, such batteries are conventionally designed to be used in enclosed, safety-circuit protected, and customized battery packs to provide power to devices like laptops, medical devices, and power tools. In this manner, they were never intended to be used as a stand-alone, removable power source to power e-cigarettes.

In addition, depending on the brand, the model, and the quality of the product, the modular shape and construction of the electronic cigarettes can have weak points of electrical contact and might require tedious assembly and maintenance procedures to ensure proper operation. Such complexities can expose the batteries to operating conditions outside the safety limits, which make them more likely than other products with lithium-ion batteries to behave like “flaming rockets”. Hence, the combination of an electronic cigarette and a lithium-ion battery is a new and unique hazard and there is no analogy among consumer products to the risk of a severe, acute injury presented by an e-cigarette.

Our experts at National Forensic Consultants have the expertise and the capability of diagnosis of these devices at component and system level to find out the root cause of the failures. Our experts have been involved in such cases, where they were successfully able to identify the cause of the fault in these devices, and provide useful guidance to insurance carries and legal counsels.

National Forensic Consultants is a Global Leader in Multi-disciplinary forensic investigations. We have been providing expert investigations for the insurance, legal and risk management industries for over 20 years, including Cause & Origin, Product Failure Analysis, Fire and Explosion Investigations, Construction Defect investigations, Product Liability, Litigation Support Services and much more.