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PROTECTION FROM PETROCHEMICALS

HOW TECHNOLOGY IMPROVEMENTS OFFER ENHANCED PROTECTION AGAINST PETROCHEMICAL HAZARDS



Petrochemicals are the base building blocks in manufacturing an incredibly broad spectrum of products across many industries. Categorised into three main chemical groups – olefins, aromatics and synthesis gases – there are hundreds of substances that fall under the petrochemical umbrella. They are used to manufacture fertilisers, polymers, solvents, pesticides, detergents, plastics, pharmaceuticals, cosmetics, furniture and appliances, electronic equipment, textiles, packaging, clothing, paints, dyes and inks, construction materials, paper, adhesives and even some food.

Despite their ubiquitous presence, petrochemicals are far from benign. There are numerous physical, chemical and biological health hazards associated with their use, necessitating the development and implementation of a strategic safety management system that incorporates the use of suitable personal protective equipment (PPE) specifically designed for the known risks and hazards associated with this industry sector.

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HAZARDS IN THE PETROCHEMICAL INDUSTRY

Think of virtually any synthetic or manufactured product and there is bound to be a petrochemical element included in its production. Each exhibits its own set of characteristics, many of which represent considerable harm to the health of workers in the petrochemical industry.

Benzene, toluene, ethylbenzene and xylene are collectively referred to as BTEX compounds and are among the worlds' most abundantly produced chemicals. They occur naturally in crude oil and are created and used during the processing of petroleum. BTEX compounds are recognised as having a carcinogenic effect on human health and additionally contributing significantly to the global greenhouse effect.

World Health Organisation (WHO) classifies benzene as a major health concern. Exposure through activities including 'the processing of petroleum products, coking of coal, production of

toluene, xylene and other aromatic compounds, and use in industrial and consumer products, as a chemical intermediate and as a component of petrol (gasoline) and heating oils' represent a significant health risk.

Acute effects of benzene exposure include narcosis (headache, dizziness, drowsiness, tremors, loss of consciousness) as well as eye and skin irritation. More concerning are the chronic effects, which include a well-established link to acute myeloid leukaemia, according to WHO. The organisation says there is also limited evidence that benzene may cause acute and chronic lymphocytic leukaemia, non-Hodgkin's lymphoma and multiple myeloma. Exposure can reduce the production of both white and red blood cells, resulting in aplastic anaemia, and is believed to be associated with B-cell and T-cell proliferation reduction, compromising the immune system.



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EXPOSURE RISKS AND EFFECTS

Exposure and absorption of petrochemicals is conducted either via the skin or ingestion. Dermal contact can cause skin irritation and lead to chronic conditions like ulcers and allergic dermatitis.

What makes these compounds particularly problematic is their capability for accumulation in tissues and organs. The longer-term effects of exposure are expansive – petrochemical contact is linked to brain and liver damage and known to cause issues with the central nervous system. That cumulative effect can also lead to the development of asthma, a range of hormonal disorders, cancer and birth defects.

Given the extreme nature of the potential harm associated with petrochemical production and exposure, the supply and use of appropriate PPE (including coveralls and gloves) that will limit any risk of dermal contact is essential.



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STRATEGIC SAFETY MANAGEMENT AND PPE

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It is impossible to avoid toxic substances in the petrochemical industry, so the development and implementation of a suitable strategic safety management system – inclusive of policy guidelines for the selection of PPE – should be a priority for members of this sector.

Strategic safety management systems not only proactively identify hazards and analyse associated risks but must also enable the efficient distribution of safety resources to ensure its successful implementation. Conventional theory suggests that the most effective systems have the support and involvement of senior management, ensure that responsibilities (including those set out in relevant legislation) are identified and known, have a planned approach to hazard identification and risk management, give high priority and consistent attention to hazard control, have a comprehensive approach to inspections and investigations and finally, have efficient purchasing systems.

Technology advances in the production of PPE continue to deliver improvements in both materials and construction methods, the upshot of which is the availability of superior protection against petrochemical hazards. A new generation of hand protection solutions now offers a greater level of safeguard against a broader range of petrochemical types. As the landscape continues to change, the purchasing aspect of safety management systems should incorporate a rigorous facility for identification and selection of the most appropriate choice, rather than adopt a reorder-by-routine approach. This encourages safety and operations managers to keep abreast of the latest technologies and to ensure the optimal protective choice is made in every case.

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