

Chemistry Critical to National Priorities

U.S. chemical producers provide chemistry needed to achieve national priorities, including the manufacturing of computer chips and automobiles, energy development, rebuilding the country's infrastructure, and supporting healthcare and biotechnology. Pro-growth, science-based policies are needed to ensure we can produce more of these critical chemistries here at home and help make America the world's manufacturing superpower. For more information visit: chemistrycreates.org

Case Study: Aerospace and National Defense

U.S. chemical manufacturers produce materials used in military uniforms including protective Kevlar gear, safety helmets, shields; radar and satellite communications systems, lithium-ion batteries for portable communication equipment, automatic weapons, and GPS; missiles, satellites, and unmanned air vehicles (UAV); and in military and commercial aircraft just to name a few.

Trichlorethylene

TCE is used to produce the fluorocarbons HCFC-142b which is used for the production of polyvinylidene fluoride (PVDF).

- PVDF is used in military aircraft for seals and gaskets for corrosion resistance, as well as lithium-ion batteries for portable communication equipment, automatic weapons, and GPS.

Acrylonitrile

Acrylonitrile is used in the production of carbon fibers.

- Carbon fiber is used in military; in missiles, satellites, and unmanned air vehicles (UAV); and in military marine/boating.

1-Bromopropane

The primary uses of 1-BP by the DoD are as a solvent, and degreaser and an ingredient in adhesives, coatings, and aerosols.

- Examples of shops and operations that may use 1-BP include flight-line and equipment maintenance, engine cleaning/plating, electroplating and fire protective services.
- 1-BP is also used as a case mount sealant in small- and medium-caliber munition cartridges.

Methylene chloride

Methylene chloride is used as a solvent in the interfacial polymerization process of bisphenol A and phosgene to produce polycarbonate resin.

- Polycarbonate is used in military applications: safety helmets, shields, consoles, panels, light covers, and reflectors.

Formaldehyde

- Formaldehyde is needed to make munitions and ballistics.
- Military uniforms and gear are made with formaldehyde-based resins.

1,3-Butadiene

- 1,3-Butadiene is used to make polymers that support defense applications, including military apparel and gear.

Styrene

Styrene is used to make composite products, also known as fiber-reinforced polymer composites (FRP).

- Composite products based on styrene, also known as fiber-reinforced polymer composites (FRP); are used in military and commercial aircraft.

PFAS

A variety of high-tech applications of PFAS are found in the military: radar systems, satellite communications systems, lithium batteries, zinc batteries, circuit boards, explosives, propellants, and munitions.

N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylene diamine [6-PPD]

A common rubber antiozonant (stabilizing additive), with major application in vehicle tires.

Benzene

Benzene is used to make nylon fibers. Nylon fibers are used in the military for tents and apparel.

N-Methylpyrrolidone

NMP is a solvent used in the production of para-aramid fibers, used to make protective vests (Kevlar).

Benzamine (aniline)

- Aniline is used to make p-Phenylenediamine (PPD), which is used to make Kevlar, which is used for military body armor.

Acetaldehyde

- Acetaldehyde is used to make pentaerythritol, which is a chemical intermediate used in the production of explosives.

4,4'-Methylene bis (2-Chloraniline)

It is used as a curing agent in polyurethane production.

- Polyurethane Products for military & defense include: Helmet liners, interior uniform pads, chest protector systems, leg & knee padding, seals and shock absorber bearings, rifle & shotgun recoil buffers, arm & limb pads, rugged military boot soles.

Naphthalene

Naphthalene is used to make phthalic anhydride which is used to make polyvinyl chloride--PVC--resins. In the military, PVC is used in electrical insulation and boot soles.

Vinyl chloride

Vinyl chloride is used for PVC production. PVC is used in military applications such as electrical insulation, and boot soles.

Bisphenol A

BPA is used to make polycarbonate and polyvinyl butyral (PVB).

- Polycarbonate is used in military applications such as safety helmets, shields, consoles, panels, light covers, and reflectors.
- PVB is used to make laminated glass that is bullet proof for small arms fire. Many military vehicles employ PVB glass. Authorized and issued by the U.S. Marine Corps, U.S. Army, U.S. Air Force, and NATO, ESS Profile NVG Military Goggles with Interchangeable Lenses was developed with input from elite U.S. Special Forces units and is the most widely used military/tactical goggle globally.

Ethylbenzene

Ethylbenzene is used to make polystyrene, expandable polystyrene, ABS resin, SB latex, and SB rubber.

- Military grade SBR rubber is used for rubber gaskets and seals, and watertight and airtight closures.
- The current material that is used to manufacture the T158LL tank track pads is a carbon-black-filled Styrene-Butadiene Rubber (SBR).

