



## U.S. ARMY CHEMICAL MATERIALS AGENCY

### Sarin

#### *Military designation: GB*

**Description:** Sarin (GB) is a man-made chemical warfare agent classified as a nerve agent. Originally developed in 1938 in Germany as a pesticide, GB is named after its creators, Shrader, Ambros, Rudrigger and van der Linde. Pure GB, in both a liquid and gas form, is colorless, odorless and tasteless. It remains the most volatile of the nerve agents because it can easily and quickly evaporate from a liquid into a vapor and spread into the environment. When in vapor form, GB is heavier than air and sinks to low lying areas near the ground. It can be made more persistent through the addition of certain oils or petroleum products. Like all nerve agents, GB is considered extremely toxic and lethal even in small doses.

**Non-military uses:** GB has no known commercial use.

**Military uses:** In mid-1939, the formula for GB was given to the German Army Weapons Office chemical warfare section and ordered into mass production. By World War II the Germans possessed GB-filled artillery shells; however, they did not use them against Allied forces. In the early 1950s, the North Atlantic Trade Organization (NATO) adopted GB as a standard chemical warfare agent and both the United States and Russia developed it for military purposes. The United States ceased production of GB in the late 1950s. GB was also used by Iraq against Iran in the 1980-1988 war, and Iraq was known to possess the agent though the early 1990s. Most recently the Japanese religious sect Aum Shinrikyo committed terrorist attacks on civilians using GB in 1994 and again in 1995 on the Tokyo subway.

**Health effects:** Nerve agents are man-made, fast-acting, lethal, organophosphate compounds similar to insecticides. They affect the body by inhibiting or deactivating cholinesterase, an enzyme found throughout the body. When cholinesterase is inhibited, muscular and glandular hyperactivity occurs. Exposure to nerve agents can occur through inhalation, ingestion, eyes, skin and mucous membranes. They attack the nervous system causing glands to over-secrete, creating a buildup of fluid in the lungs and causing the muscles to convulse uncontrollably. Symptoms may appear immediately or within minutes or hours depending on the dose and route taken by the agent. Symptoms may include blurred vision and watery eyes, headache, runny nose, salivation, foaming at the mouth, tightness of chest, nausea, vomiting, extreme anxiety, difficulty in thinking and sleeping, muscle spasms, tremors, abdominal cramps, diarrhea and involuntary urination and defecation. Exposure to relatively large doses will result in loss of consciousness, convulsions, paralysis and respiratory failure resulting in death.

**Environmental fate:** In the environment, GB is considered non-persistent. GB reacts with water to form toxic vapors, and because of its rapid hydrolysis it is not considered a long-term water contaminant. Most GB spilled will be lost by evaporation and therefore has no long-term impact on health and environment. Open-pit burning or burying of GB is prohibited.

For more information,  
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