CHEMICAL OBSCURANT SMOKES

Obscurant smokes, designed to obstruct vision, are used to conceal movement, signal positions, or assist chemical irritant deployment in protest settings globally. Most obscurant smokes are relatively benign but are frequently misidentified as toxic, generating fear and a chilling effect on protests.

How they work

Pyrotechnic signaling smoke: These devices share similarities with pyrotechnics used for fireworks, consisting primarily of nitrocellulose, potassium chlorate, sugar, colorants, and occasionally terephthalic acid (TA). Upon ignition, an oxidizer volatilizes the combustibles, producing white or brilliantly colored smoke. These grenades burn relatively cool and in general do not emit smoke for longer than a minute.



OBSCURANT SMOKE CANISTERS OR GRENADES. MOST ARE RELATIVELY BENIGN, SUCH AS GREEN SMOKE, WHILE HC SMOKE POSES GREATER HAZARDS

Misidentification, misinformation, and chilling effects

A persistent harm is widespread misidentification of smoke type, which amplifies fear beyond the actual risk:

- Green-colored signaling smoke has been repeatedly – and incorrectly – identified as HC smoke, chlorine gas, or the obsolete vomiting agent adamsite (last in U.S. military use in 1970, no longer in domestic production).
- During protests in Minneapolis in 2026, the AI tool Grok falsely and repeatedly identified green smoke as adamsite, in one instance even hallucinating nonexistent corroborating reports by news outlets PBS and NBC.
- This misinformation may create a chilling effect on the exercise of the right to protest and assembly that is independent of – and often disproportionate to – the physical harm caused.

Types

PYROTECHNIC SIGNALING SMOKE

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A

HEXACHLOROETHANE (HC) SMOKE

A rarer and more dangerous formulation of chemical obscurant smoke consisting of aluminum, hexachloroethane, and zinc oxide. Upon ignition, these ingredients react to produce zinc chloride vapor, which condenses into a thick grey-white smoke. Unlike pyrotechnic smoke, these smokes burn hot enough for the canister to become incandescent and will emit smoke for two minutes or longer.

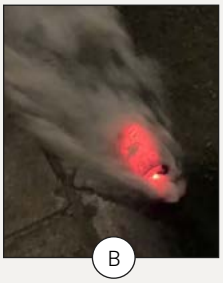
B

WHITE PHOSPHORUS (WP) AND RED PHOSPHORUS (RP) SMOKE

Rarely used in protests, white and red phosphorus are allotropes of phosphorus with military application in obscurant smoke grenades. These grenades emit a shower of phosphorus that, when combusted, produces white smoke. Acute exposures to this smoke generate an irritant effect, although studies as to the health effects of inhaled phosphorus smoke are lacking. **White Phosphorus grenades pose an extreme hazard of thermal injury, and its use has been linked to severe burns sustained by protesters in Myanmar.** Red Phosphorus grenades burn at a lower temperature but still pose significant risks.

C


A


B


C

INCLO

PHR Physicians for Human Rights

CHEMICAL OBSCURANT SMOKES

Health risks

PYROTECHNIC SIGNALING SMOKE
Combustion products are modestly irritating – comparable to common fireworks – and are not usually considered a significant health hazard.

HEXACHLOROETHANE (HC) SMOKE: SIGNIFICANTLY HAZARDOUS

- Accute exposures in enclosed spaces are potentially fatal. At least two dozen deaths are directly attributable to acute exposure to HC smoke, primarily from respiratory chemical burns and toxic effects of zinc chloride smoke.
- Multiple components are known or suspected carcinogens: arsenic, cadmium, hexachlorobenzene, and hexachloroethane itself are known to cause cancers in animal studies are considered potential human carcinogens by the US Environmental Protection Agency.
- During the 2020 Portland protests, HC smoke use coincided with a surge in unusual symptoms among demonstrators: gastrointestinal upset, shortness of breath, burning sensations, and neurological changes consistent with zinc chloride exposure.

WHITE PHOSPHORUS (WP) AND RED PHOSPHORUS (RP) SMOKE
Significant risk of thermal injury from burning phosphorus particles. Modest irritation to the upper respiratory tract and eyes with no significant documented health risk from acute inhalation, although studies are lacking.

MULTIPLICATIVE RISK WITH TEAR GAS (CS)/PEPPER AGENT (OC)
Manufacturers specification sheets describe obscurant smoke as a "carrying agent (multiplier)" for CS/OC that can "multiply the effects up to 4 times." No empirical studies evaluate this claimed synergistic effect but given CS's known inflammatory effects on the respiratory system, the risk cannot be discounted.



DEATH



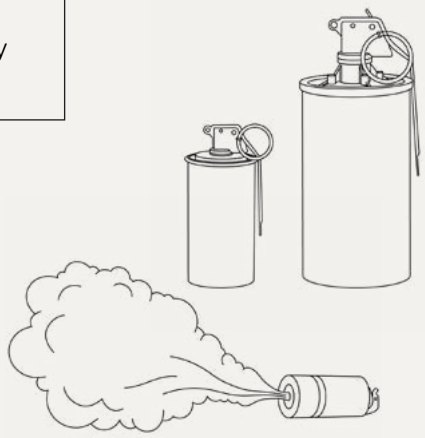
RESPIRATORY CHEMICAL BURNS



GASTROINTESTINAL UPSET



EYE INJURY



Most obscurant smokes are relatively benign but are frequently misidentified as toxic, generating fear *and a chilling effect on protests.*

Policy recommendations

- Use of Force policies must explicitly include chemical obscurants, along with circumstances of lawful and prohibited use. Currently, obscurant smokes are not classified as less lethal weapons and fall outside any published use-of-force framework.
- HC smoke should be explicitly prohibited for use in crowd control given its toxic and carcinogenic profile and the availability of safer alternatives. WP and RP smoke should be prohibited due to the danger of thermal injury.
- Any use of obscurant smoke alongside chemical irritants requires independent empirical review of combined health effects before further deployment.
- Federal agencies should be required to publicly disclose the specific munitions used at protest events, including chemical composition, to prevent dangerous misidentification.