

3M Information to Help With Fentanyl Personal Protective Equipment Selection.

Increased illicit use of opioids, including synthetic opioids such as fentanyl and its analogue carfentanil, is a source of potential risk to law enforcement, first responders, and public health teams. To help guide these responders, this document provides information to help with personal protective equipment selection for various situations.



Photo Courtesy of the DEA

What is Fentanyl?

Fentanyl is a powerful synthetic drug that is similar to morphine and heroin but is 50 to 100 times more potent. Fentanyl and its analogs are members of the class of drugs known as rapid-acting synthetic opioids that alleviate pain. Other drugs in this class include fentanyl analogs, such as acetylfentanyl, butyrfentanyl, carfentanil, alfentanil, sufentanil and remifentanil. Fentanyl acts quickly to depress central nervous system and respiratory function. Exposure to fentanyl may be fatal.

Responders are most likely to encounter synthetic opioids in powder, tablet or liquid form.

<https://www.cdc.gov/niosh/topics/fentanyl/default.html>

Occupational Exposure Levels for Fentanyl

Fentanyl and its analogues such as Carfentanyl do not have established occupational exposure limits (OELs).

https://www.cdc.gov/niosh/ershdb/emergencyresponsecard_29750022.html

Pharmaceutical manufacturers have developed internal OELs based on their own risk assessments. The common time-weighted average exposure limits used by the pharmaceutical industry are reported as 0.0001 mg/m³ for Fentanyl, 0.00032 mg/m³ for Carfentanyl, and 0.001 mg/m³ for Alfentanyl (Van Nimmen et al.).

<https://www.cdc.gov/niosh/hhe/reports/pdfs/2014-0039-3246.pdf>



Photo Courtesy of the DEA: Illustration of 2 milligrams of fentanyl, a lethal dose in most people.

Exposure Routes



Potential exposure routes of greatest concern include Inhalation, Mucous Membrane Contact (Eyes/Nose), Ingestion and Percutaneous (Needlestick)

Any of these exposure routes can potentially result in a variety of symptoms that can include the rapid onset of life-threatening respiratory depression.

Skin contact is also a potential exposure route, but is not likely to lead to overdose unless large volumes of concentrated powder are encountered over an extended period of time. If visible contamination is promptly removed, brief skin contact is not expected to lead to toxic effects.

<https://www.cdc.gov/niosh/topics/fentanyl/default.html>

Personal Protective Equipment – NIOSH

Identifying the PPE appropriate for the risk is done by first selecting the correct job category and then the level of exposure anticipated.

Who is at Risk?

NIOSH has identified the following job categories as positions where responders might come into contact with fentanyl or its analogues:

- **Pre-Hospital Patient Care:** Emergency medical services (EMS) providers, including first responders, fire department and private companies who attend to individuals with suspected fentanyl overdose. Responders may encounter drugs or drug paraphernalia on or near the patient.
- **Law Enforcement:** Law enforcement officers who perform day-to-day law enforcement duties. Law enforcement officers may come into contact with fentanyl during the course of their daily activities such as traffic stops, apprehending and searching subjects, and responding to fentanyl overdose calls.
- **Investigation and Evidence Handling:** Law enforcement personnel who conduct investigations related to fentanyl. Activities may include executing search warrants and collecting, transporting, and storing evidence. Evidence collection activities in the field have the potential to aerosolize powders. Also, law enforcement personnel who handle evidence in the chain of custody have the potential to come into contact with fentanyl unless controls are in place to prevent exposures.
- **Special Operations and Decontamination:** Workers who conduct special operations where exposure to large amounts of fentanyl are expected. Examples include hazardous material incident response teams responding to a release or spill, and law enforcement officers executing search warrants on opioid processing or distribution sites, or participating in other tactical operations. These activities may aerosolize powders

Exposure Levels Defined by NIOSH as Follows:

Minimal: Response to a situation where it is suspected that fentanyl may be present but no fentanyl products are visible

- Example: An EMS response to a suspected fentanyl overdose or law enforcement operation where intelligence indicates fentanyl products are suspected but are not visible on scene

Moderate: Response to a situation where small amounts of fentanyl products are visible

- Example: An EMS response to a suspected fentanyl overdose or law enforcement operation where fentanyl products are suspected and small amounts are visible on scene

High: Response to a situation where liquid fentanyl or large amounts of fentanyl products are visible

- Example: A fentanyl storage or distribution facility, fentanyl milling operation, or fentanyl production laboratory

Personal Protective Equipment Recommendations for Protection Against Fentanyl

Personal Protective Equipment	Pre-Hospital Patient Care			Law Enforcement Routine Duties			Investigations and Evidence Collection			Special Operations and Decontamination				
Exposure Level	Minimal	Moderate	High	Minimal	Moderate	High	Minimal	Moderate	High	Minimal	Moderate	High		
Respiratory Protection														
Disposable N100, R100, or P100 FFR ¹		✓	Not recommended		✓	Not recommended		✓			✓			
Elastomeric APR ²								●	✓		●	✓		
PAPR ³									●		●	●		
SCBA ⁴									■			■		
Face and Eye Protection														
Safety goggles/glasses ⁵		✓	Not recommended		✓	Not recommended		✓	✓		✓	✓		
Hand Protection														
Nitrile gloves ⁶	✓	✓		✓	✓		✓	✓		✓	✓			
Nitrile gloves, double or use of thicker gloves		●			●			●	●		●	✓		
Dermal Protection														
Wrist/arm protection ⁷		✓	Not recommended		✓	Not recommended		✓			✓			
Particulate hazards protective ensemble (i.e., NFPA 1999 Single or Multi-Use or NFPA 1994 Class 4 Ensemble)									✓			✓		
Chemical hazards protective ensemble (i.e., NFPA 1994 Class 3 Ensemble or Higher)									●			●		

Key	
✓	Minimum protection recommended.
●	When an on-scene health risk assessment is conducted and higher protection is warranted.
■	If particulate + gas/vapor hazard is expected above the immediately dangerous to life or health (IDLH) values or concentration is unknown, SCBA is recommended.
	Not recommended, refer scene to special operations response workers (such as local hazmat team)

1. FFR: filtering facepiece respirator, N: not resistant to oil, P: oil=proof, R: resistant to oil.
2. APR: air-purifying respirator; configurations recommended: half facepiece APR with N-, P-, or R100 cartridges; full facepiece APR with N-, P-, or R100 cartridges or a chemical, biological, radiological, and nuclear (CBRN) canister.
3. PAPR: powered air-purifying respirator, configuration recommended: PAPR with high efficiency particulate air (HEPA) filter.
4. SCBA: self-contained breathing apparatus; certified to NFPA 1981: Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services.
5. Face and eye protection is recommended when the respirator does not provide this type of protection, e.g., when wearing a disposable N-, P-, or R100 respirator or an elastomeric half facepiece APR with N-, P-, or R100 cartridges.
6. Powder-free nitrile gloves should be worn with a minimum thickness of 5+- 2 mil (i.e. 0.127 +- 0.051 millimeters; 1 mil=0.0254 millimeters), unless manufacturer data provides performance breakthrough data for thinner gloves.
7. Wrist/arm protection may include one or more of the following: on-duty uniform with sleeves, sleevecovers, gowns, or coveralls.

3M Product Solutions

Exposure Level	Respiratory Protection	Filters	Eye Protection	Body Protection	Hand Protection
High: Response to a situation where liquid fentanyl or large amounts of fentanyl products are visible	3M™ Powered Air Purifying Respirator (PAPR), TR300 and TR 600 Versaflo Series	3M™ HE Filter TR-3712N, TR-6710N	3M™ S-Series (400,500,600,800) Hoods	3M™ Protective Coverall 4565 Or	3M™ Nitrile Gloves, 90012 Or
	3M™ Powered Air Purifying Respirator (PAPR), RBE Breathe Easy Series	3M™ HE (P3) Filter 450-00-01R12 or FR-57	3M™ Hood BE-10, S-403	3M™ Protective Coverall 4570	Double glove - Nitrile single use exam gloves* (5 mil thick)
		3M™ Cartridge RBE-57	3™ Hood BE-10BR	3M™ Disposable Protective Overboot Cover 450	
	Self Contained Breathing Apparatus: Visit www.3M.com/Scottsafety				
Moderate – Response to a situation where small amounts of fentanyl products or drug paraphernalia are visible	3M™ Disposable Particulate Respirator, 8233 or 8293		3M™ Safety Splash Goggle 334AF 3M™ Centurion™ Safety Splash Goggle 454AF 3M™ Goggle Gear 500 Series GG501SGAF	3M™ Protective Coverall 4510 3M™ Disposable Protective Oversleeve, 444 3M™ Disposable Protective Overboot Cover 450	Nitrile single use exam gloves* (5 mil thick)
	All 3M Reusable Half and Full Face Respirators, including:	3M™ Particulate Filter P100 2091, 2291, or 7093			
	3M™ Rugged Comfort Quick Latch Half Facepiece Reusable Respirator, 6500QL				
	3M™ Full Facepiece Reusable Respirator, 6000 Series				
	3M™ Ultimate FX Full Facepiece Reusable Respirator, FF-400 Series, with 3M™				
	3M™ Full Facepiece FR-7800B	CP3N, FR-15-CBRN			
Minimal – Response to a situation where it is suspected that fentanyl may be present but no fentanyl products are visible	Follow Standard/Universal Precautions No additional PPE required				Nitrile single use exam gloves (5 mil thick)*

Key Resources

<https://www.cdc.gov/niosh/topics/fentanyl/risk.html>

<https://www.dea.gov/druginfo/fentanyl.shtml>

<https://www.interagencyboard.org/articles/fentanyl-safety-first-responders>

https://www.3m.com/3M/en_US/worker-health-safety-us/

Suggestions contained in this document are intended for law enforcement officials that may come into contact with Fentanyl in its manufactured form, such as a powder, pill, and/or liquid form.

This document DOES NOT provide suggestions for law enforcement officials that may enter a Fentanyl manufacturing environment, such as a clandestine lab.

All statements, technical information and recommendations contained herein are based on data we believe to be reliable, but the accuracy or completeness thereof is not guaranteed. There is no representation, warranty, guarantee or other obligation of 3M or its employees arising out of this literature. Please refer to specific products packaging, user instructions and related documents for complete details. 3M shall not be liable for any loss and/or damage, whether direct, indirect, incidental, special or consequential arising out the sale, use or misuse of 3M Personal Safety products or the user's inability to use such product.

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