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# Identification of Fentanyl Precursor Chemicals

## Introduction



Transnational Organized Criminal (TOC) groups and their proxies have expanded their illicit drug production capabilities to include the deadly synthetic opioid, [fentanyl](#). Fentanyl has become the drug production of choice among criminal cartels because it is 50 times more addictive than heroin, it can be produced using a small number of precursor chemicals and requires less time and space to manufacture. Additionally, fentanyl can be mixed with more traditional drugs such as heroin, cocaine, and methamphetamine, making it extremely profitable among street dealers. TOC actors and their proxies are now targeting a new demographic of prescription drug users with the distribution of counterfeit pills, such as oxycodone, containing deadly amounts of fentanyl. One tablet is enough to cause an unintentional overdose fatality. TOC actors and their proxies use their clandestine Precursor Chemical Supply Chain (PCSC) networks to transport essential fentanyl precursors from source countries in Asia to illicit drug production laboratories in Latin America. The PCSC network used to source fentanyl precursors and analogs is difficult for law enforcement to track and degrade. In recent years, some fentanyl precursors have been added to an international control list to ensure regulatory agencies are monitoring suspect international express air mail, and maritime cargo shipments.

## Handheld Raman spectroscopy for fentanyl precursor identification

The [Rigaku Series of handheld 1064 nm Raman spectrometers](#) provide a nondestructive, reliable, and safe method for analyzing and identifying dangerous chemicals, such as fentanyl. More importantly, the identification of mislabeled fentanyl precursors has become a priority for law enforcement and regulatory agencies in their attempts to disrupt the PCSC networks and street-level drug distribution. Rigaku handheld Raman analyzers can scan through translucent packaging, greatly reducing the risk of exposure to the officer.

The standard "Narcotics" library included on all Rigaku handheld 1064 nm Raman analyzers include common cutting agents, as well as the following fentanyl precursor chemicals:

- 4-Anilino-N-phenethylpiperidine (4-ANPP)
- 4-Anilinopiperidine
- Benzylfentanyl
- N-phenethyl-4-piperidone (NPP)
- Propionic anhydride
- N-phenyl-4-piperidinamine
- Norfentanyl

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## Added functionality for fentanyl detection

In addition to providing the ability to safely identify the most comprehensive list of fentanyl-related chemicals, the Rigaku CQL Series of handheld 1064 nm Raman analyzers have the ability to provide detection of non-visible amounts of fentanyl as well. With the addition of QuickDetect Mode, users are able to analyze residues on surfaces, such as plastic baggies, vehicle compartments, and other locations where fentanyl may be concealed. This integrated system provides both bulk and trace analysis for a more complete analysis method as part of drug enforcement.

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## Conclusion

The Rigaku portfolio of handheld 1064 nm Raman analyzers are a valuable tool for the identification and detection of fentanyl - including different analogs and their precursors. With the utilization of [1064 nm Raman technology](#), regulatory agencies have the ability to provide more comprehensive drug analysis through packaging, as well as non-visible surface detection, keeping first responders safe. The analyzer's onboard camera can capture barcode information, as well as images of samples or other related evidence. This information is stored with the analysis report in a tamper-proof file.



# Examples of fentanyl precursor chemical results from the Rigaku CQL Series of handheld analyzers.

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HANDHELD CONFIDENCE. 

APPLICATION NOTE

### IDENTIFICATION OF FENTANYL PRECURSORS WITH HANDHELD 1064 nm RAMAN

**Introduction**

Transnational Organized Criminal (TOC) groups and their proxies have expanded their illicit drug production capabilities to include the deadly synthetic opioid, fentanyl. Fentanyl has become the drug production of choice among criminal cartels because it is 30 times more addictive than heroin, it can be produced using a small number of precursor chemicals, and requires less time and space to manufacture. Additionally, fentanyl can be mixed with more traditional drugs such as heroin, cocaine, and methamphetamine, making it extremely profitable among street dealers. TOC actors and their proxies are now targeting a new demographic of prescription drug users with the distribution of counterfeit pills, such as oxycodone, containing deadly amounts of fentanyl. One tablet is enough to cause an unintentional overdose fatality. TOC actors and their proxies use their clandestine Precursor Chemical Supply Chain (PCSC) networks to transport essential fentanyl precursors from source countries in Asia to illicit drug production laboratories in Latin America. The PCSC network used to source fentanyl precursors and analogs is difficult for law enforcement to track and disrupt. In recent years, some fentanyl precursors have been added to an international control list to ensure regulatory agencies are monitoring suspect international express air mail, and maritime cargo shipments.

**Handheld Raman Spectroscopy for Fentanyl Precursor Identification**

The Rigaku Series of handheld 1064 nm Raman spectrometers provide a nondestructive, reliable, and safe method for analyzing and identifying dangerous chemicals, such as fentanyl. More importantly, the identification of mislabeled fentanyl precursors has become a priority for law enforcement and regulatory agencies in their attempt to disrupt the TOC networks and street-level drug distribution. Rigaku handheld Raman analyzers can scan through tamper-evident packaging, greatly reducing the risk of exposure to the officer.



The Rigaku CQL Series of handheld 1064 nm Raman analyzers have the ability to identify fentanyl precursors, such as a subset:

The standard "precursor" library included on all Rigaku handheld 1064 nm Raman analyzers include common cutting agents, as well as the following fentanyl precursor chemicals:

- 4-Aceto-N-(1-phenethyl)pyrrolidine (4-ANPP)
- 4-ANPP isopropylidene
- Benzylfentanyl
- N-phenethyl-4-piperidine (NPP)
- Propoxy-4-ethylidene
- N-phenyl-4-piperidine
- Norfentanyl

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## Related products



### CQL Narc-ID

Provides presumptive identification of narcotics, precursor chemicals, and cutting agents



### CQL Max-ID

Offers features and benefits that maximize chemical threat analysis in safety and security applications



### CQL Gen-ID

A cost-effective solution for departments looking for targeted chemical threat analysis