

# REAL-TIME ANALYZERS

*Providing Chemical Information When & Where You Need It*

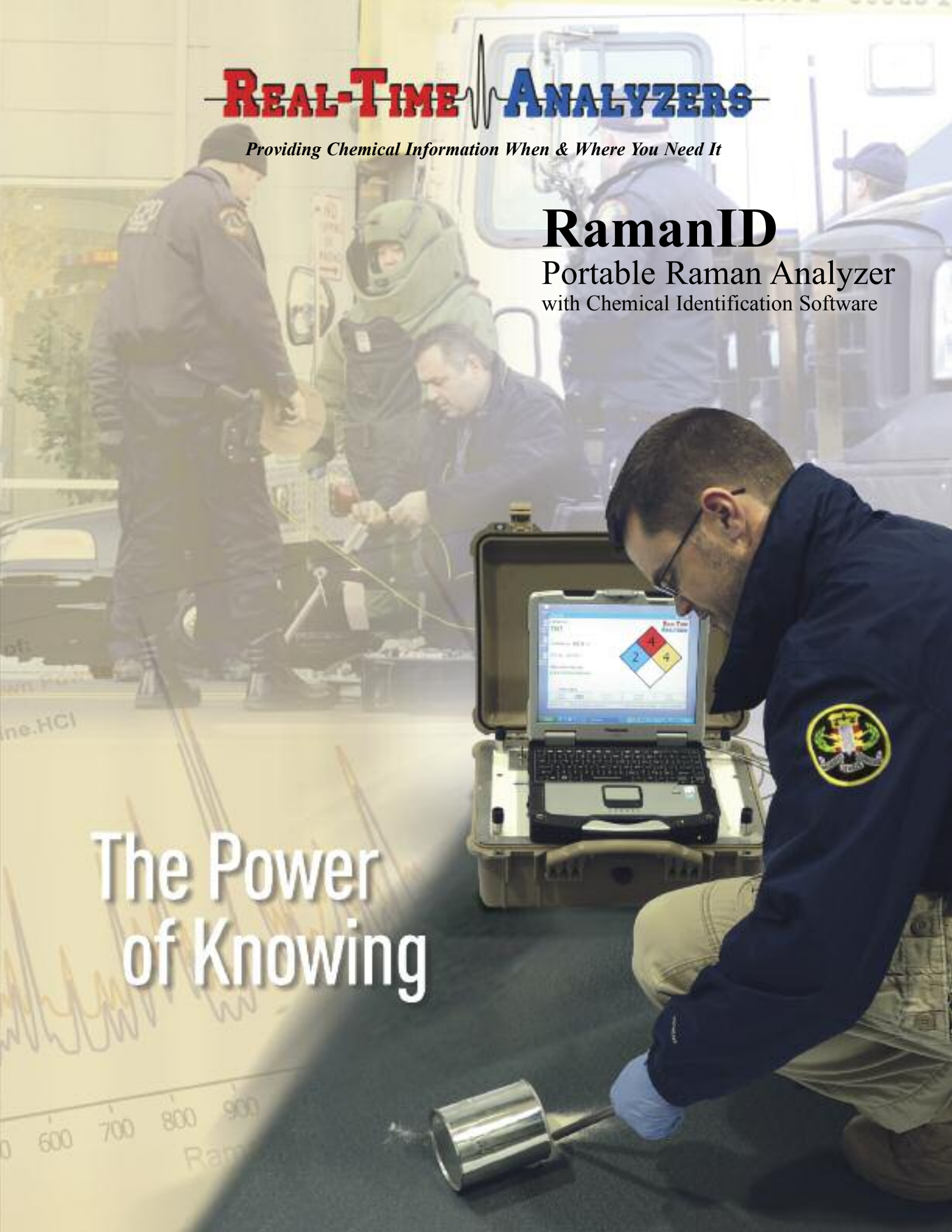
## RamanID

Portable Raman Analyzer  
with Chemical Identification Software

The Power  
of Knowing

0 600 700 800 900  
Raman

ne.HCl



# The RamanID Answers Crucial Questions

***Rapid, positive identification of unknown solid or liquid materials  
“in-the-field” can be critical, even a matter of life or death.***

Hoax powders, thought to be anthrax, continue to appear on mail sorting equipment world-wide. Is it anthrax or powdered sugar? Suspicious containers of liquids and gels are constantly being discarded at airport security. Are these liquids a soft drink, water or poisonous chemicals? More and more natural remedies are sold over the internet. Are they authentic or frauds containing actual drugs. Trucking and rail accidents, although infrequent, can result in spills of unknown liquids. Is the liquid a petroleum product or a toxic industrial chemical? State police constantly find unlabelled plastic bags of pills and powders. Are these prescription medicine, illicit drugs, or explosives? Agricultural, biochemical, chemical, petrochemical, and pharmaceutical manufacturers receive raw materials to make their products every day. The quality and safety of these products depend on the use of the proper raw materials. Is the 55 gallon drum the correct solvent, and is it pure?

**Real-Time Analyzer's RamanID is designed to answer these critical questions.** The user simply points the probe at a sample, clicks **Measure Sample** on the computer, and within 10 seconds, the unknown material is identified.

The **RamanID** is a portable, rugged, brief-case system weighing under 30 pounds, designed to travel and work in less-than-ideal environments. The system operates over a broad temperature range, and uses a military-grade, 5-hour rechargeable battery. Sample measurement is accomplished through the use of lightweight fiber optic probes that can be standalone or integrated into positioning systems, with fiber optic cables ranging from 3 to 25 meters in length. Samples can be identified through colored glass or plastic bags or bottles, eliminating the chance of exposure to possible harmful substances in such containers.



*RamanID with 5 meter fiber optic probe*

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## Features & Advantages

- Identify virtually any solid or liquid in 10 seconds or less
- Quantify chemicals in mixtures
- Avoid fluorescence interference
- No calibration required
- Use the same spectral libraries for all analyzers
- Obtain complete spectral coverage with every scan
- No sample preparation
- Measure through clear and colored glass and plastic
- Easy-to-use light-weight sample probes
- Portable, rugged, battery powered
- Operate from 32 to 110 °F (0 to 45 °C)
- Transmit data wirelessly
- Easy-to-use software

## Routine Applications

### Homeland Security:

Chemical Agents and Poisons, Explosives and Precursors

### Postal Security:

Suspicious Powders (e.g. Bacilli Spores)

### Hazardous Materials:

Toxic Industrial Chemicals

### Drug Enforcement:

Illegal Drugs, Controlled Substances, Fraudulent Internet Drugs

### Forensics and Crime Scene:

Unknown Solids and Liquids

### Imported Food:

Pesticide Contamination, Illegal Additives

### Quality Control:

Raw Materials, Intermediates and Finished Products

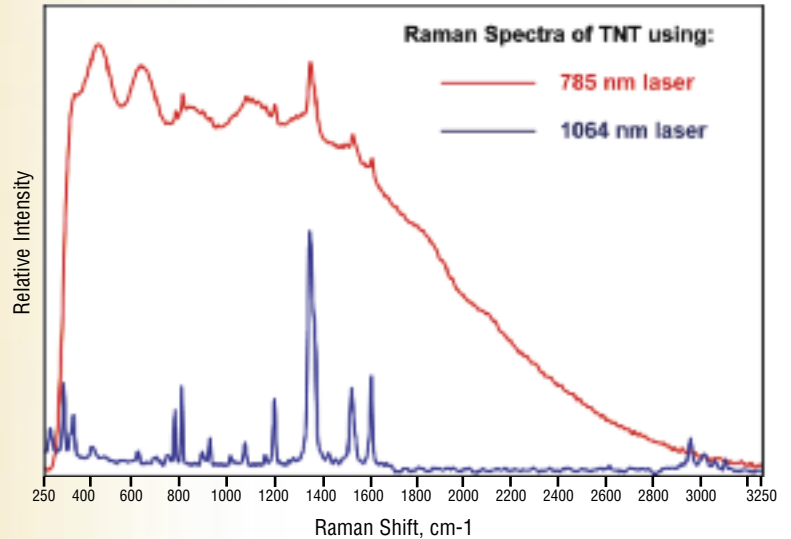


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# How It Works

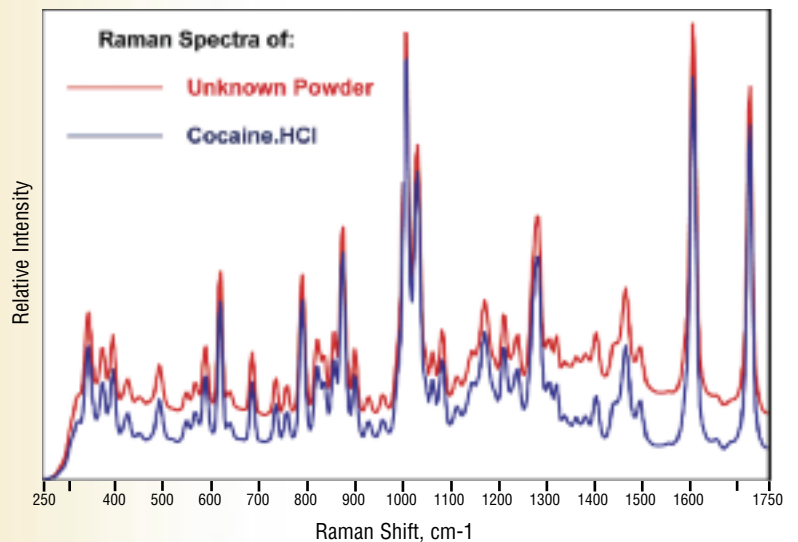
The **RamanID** is the only portable Raman analyzer that employs a rugged interferometer that provides 0.1 cm<sup>-1</sup> wavenumber (x-axis) accuracy to guarantee correct spectral matching. Furthermore, each system is calibrated at the factory and never needs to be re-calibrated. Other portable Raman analyzers require frequent calibration.

The **RamanID** is also the only portable Raman analyzer that employs 1064 nm laser excitation to avoid fluorescence interference. All other portable Raman analyzers use shorter wavelength lasers to generate Raman spectra (e.g. 785 nm), which very often generate fluorescence in the sample. This is especially true for natural substances (biological materials, petroleum products, etc), as well as most improvised explosives, common street drugs, and food products that are sometimes used as anthrax hoax powders. If a sample fluoresces, the Raman spectrum is completely lost, which makes identification impossible. *See the example in the figure to the right.*



*TNT fluoresces when excited with a 785 nm laser and the single dominant peak is insufficient information to ensure identification. Excitation with RTA's 1064 nm laser produces an easily identifiable Raman spectrum.*

The **RamanID** measures the Raman spectral signature of an unknown sample, matches it to one of thousands of Raman signatures stored in memory (spectral library), and displays the unknown identity. Every solid and liquid, including biological spores, chemicals, drugs, and explosives, has a unique Raman signature that allows a positive match, and therefore a positive identification. *See the example in the figure to the right.*



*The Raman spectrum of an unknown powder is measured then matched to a known spectrum (Cocaine.HCl) in the stored spectral library.*

## Software

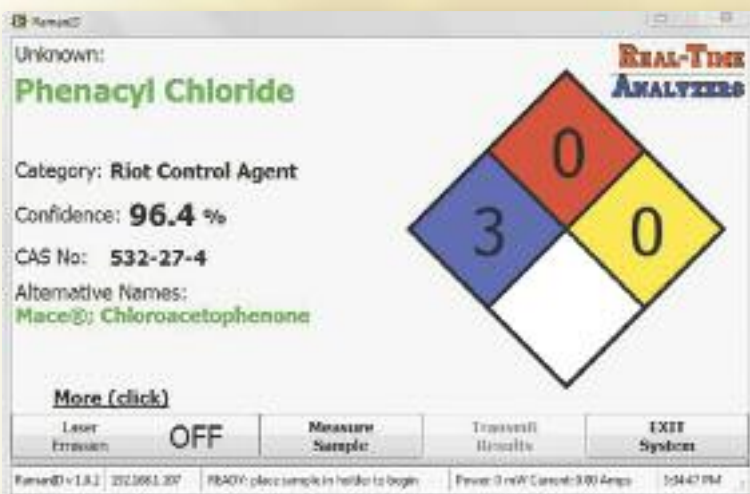
The *RamanID* (standard) software is designed for fast and simple operation. It includes three command buttons:

- **Measure Sample**
- **Transmit Results**  
(all data is automatically saved)
- **EXIT System**

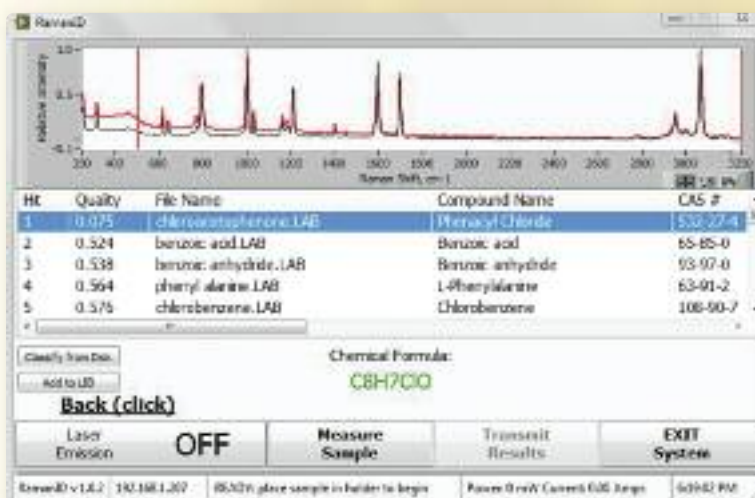
**Laser Emission** and **System Status** bars indicate when the laser is on and collecting data or off and in the standby mode. After a sample has been measured, the unknown substance is identified and categorized, along with a confidence level of identification (100% equals a perfect match), the Chemical Abstracts Service number (**CAS No.**, if it is a registered chemical compound or mixture), the National Fire Protection Association (NFPA) hazard rating diamond, and alternative names.

A complete description of the substance can be obtained by clicking “**More**”. A second screen appears that compares the measured spectrum to the library spectrum. The top 5 “**Hits**” (5 closest matches) are also listed with their Quality values. These values can be used to qualify the spectral match (0.000 represents a perfect match). Clicking on the other compounds brings up their respective Raman library spectra for further comparison.

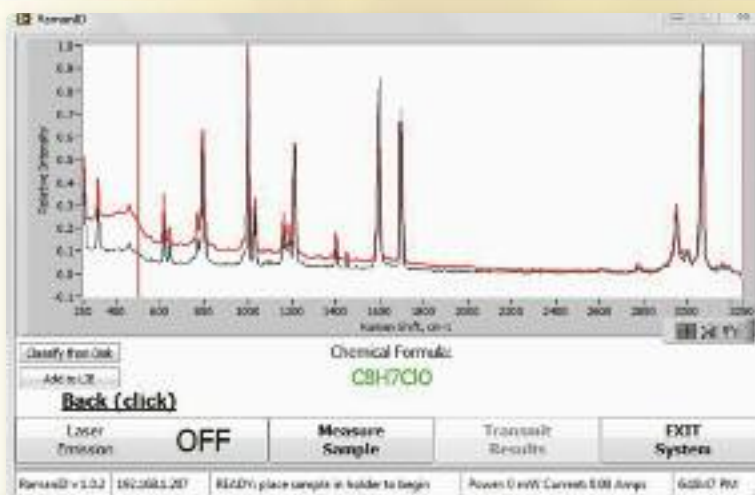
An **Add to Lib** button is also available, so that new substances can be added to the Raman spectral library. The **Classify from Disk** button allows identifying previously measured spectra. An expanded view of the spectra for more detailed comparison can be obtained by clicking on the spectra.



RamanID User Interface



RamanID “More” Information



RamanID Expanded Spectral Match Window

## Specifications

# RamanID

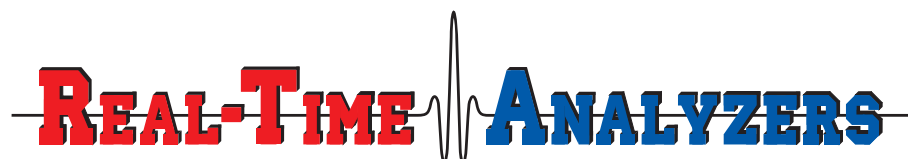
## Portable Raman Analyzer with Chemical Identification Software

Specification	RamanID
<b>Operation</b>	
Warm-up Time	30 seconds
Measurement Time	10 - 60 seconds
Sampling	Light-tight compartment holds 2 or 20 mL glass vials, or 5 m FO probe
Calibration	Factory set using NIST standard
<b>Analyzer</b>	
Measurement Principle	FT-Raman Spectroscopy
Light Source	1064 nm, 500 mW, 0.1 nm linewidth (Class 1 Laser Product)
Detector	InGaAs (thermo-electrically cooled)
Spectral Resolution	User selectable at 8, 16, or 32 $\text{cm}^{-1}$
Spectral Range	150 - 3350 $\text{cm}^{-1}$
<b>Data System</b>	
Laptop or Embedded Computer	Pentium or better >1 GHz, 128MB RAM
Operating System	Windows 2000/XP/Vista/Windows 7
Software	RamanID/ChemID (initial library with 500 spectra)
Data Export	Ethernet/USB
<b>Environment</b>	
Dimensions	19.78 x 15.77 x 7.41" (502 x 400 x 188 mm)
Weight	30 lbs (13.6kg)
Power	Battery (5 hours- rechargeable) / Electric (120/240 VAC 50/60Hz)
Operating Temperature Range	32 - 110 °F (0 to 45 °C)
Dust and Spill Proof	Surface is sealed, CBN decontamination when closed



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