

OPX Revilator – Handheld Device for Explosive Detection and Identification

Objective:

To absorb technology and production of OPX-Revilator- an Optronics Explosive Detector

Introduction:

Detection and identification of explosives for security has been an area of global concern since decades. Concerted efforts have been focused on the detection of explosives which is a vitally challenging task, as the criminal use of explosives and improvised explosive devices (IEDs) by anti-social elements for the destruction of public life and property is increasing day by day. The threat of IEDs has proliferated to civilian areas in addition to military installations. IEDs are used for large scale destruction causing tragic casualties.

High Energy Materials Research Laboratory (HEMRL) Pune, a premier laboratory of the Defence Research and Development Organisation (DRDO), Ministry of Defence, has designed and developed OPX Revilator - an Optronic trace Explosives Detector for detection and identification explosives. This device has the capability to identify more than 22 types of pure explosives and explosive mixtures even in presence of contaminants like mud, sand, sugar, salt, diesel oil etc. The OPX Revilator is capable of identifying a wide range of explosives in solid and liquid phase reliably. It can be operated in laboratory and field conditions. The OPX Revilator is a portable, miniaturized, electronic detector capable of identifying explosives mostly used by antisocial elements and used in Improvised Explosive Devices (IEDs). The explosives important explosives identified are CL-20, FOX-7, NTO, RDX, HMX, CE, PETN, TNT; inorganic compounds of class nitrates like ammonium nitrate (AN) and combinations thereof ANFO, Composition A, Composition B, Composition C-4, Octol, Cyclotol, PEK-I, LTPE, Amatol, Ammonal, Pentolite, Dentex, Torpex and Tritonal. It is vitally useful after a bomb blast for identification of trace explosives from debris. It is also useful for identification of suspect, unknown samples as explosives.

The OPX Revilator is highly useful for Homeland Security and Civil security operations at Airports, Railway Stations, Shopping malls, Multiplexes, Schools, Colleges, Universities and all strategic locations. Agencies like Paramilitary Forces (BSF), Army, Navy, Air Force, Bomb Detection and Disposal Squad (BDDS), CISF and CRPF can use Revilator for trace level detection during Pre and Post blast analysis.

Technical Specification of OPX-Revilator:

Parameter	Values / Description
Dimensions	: 185 mm (L) x 126 mm (W) x 75 mm (H)
Weight	: 480 g (including battery)
Power Requirement	: Mains Adaptor Rechargeable Battery
Display	: LCD screen (60 mm x 30 mm)
Battery Backup	: 6-8 hours
Display of results	: Name(s) of explosive(s) displayed on LCD screen
Form of explosive sample for identification	: Pure or with Contaminants

Parameter	Values / Description
Classes of explosive identified	: <ul style="list-style-type: none"> ○ Nitramines ○ Nitro-aromatics ○ Nitrate Esters ○ Inorganic Nitrates
Minimum quantity of explosives required for identification	: Depends on types explosives and type of contaminants Pure Explosives : ~ 5 mg Explosive with mud : ~ 10 mg Explosive with Diesel : ~ 20 mg Explosives with Sand/Sugar/Wheat/Maida : ~ 10 mg Explosive compositions : 10 mg – 40 mg
State of explosive for identification	: Explosive in solid and liquid state
Time taken for identification	: < 3 minutes
Suitability	: Laboratory & Field
Adaptability	: Extendable library for identification of more explosives
Usefulness	: Identification of explosives for Pre or Post blast scenario
Trace Collection	: Direct Collection / Swab
Packing List	: <ul style="list-style-type: none"> ○ Reagents ○ Trays ○ Charger / Power cord ○ Instruction manual ○ Carry case
List of explosives identifiable	: <ul style="list-style-type: none"> ○ RDX ○ HMX- seen as RDX/HMX ○ FOX-7 ○ CL-20 ○ ANFO (AMMONIUM NITRATE/FUEL OIL) ○ NTO ○ PETN ○ TETRYL (CE) ○ TNT ○ AMATOL ○ AMMONAL ○ COMPOSITION A ○ COMPOSITION B ○ COMPOSITION C-4 ○ CYCLOTOL ○ DENTEX ○ LTPE (LOW TEMP PLASTIC EXPLOSIVE) ○ OCTOL ○ PENTOLITE ○ PEK- I (PLASTIC EXPLOSIVE KIRKEE - I) ○ TORPEX ○ TRITONAL

Further Detail of System:

OPX-Revilator is a micro-controller based embedded system housed in a designer plastic cover. The essential sensors are mounted on the single motherboard. There is a LCD screen of required size and resolution for display of results and necessary instructions. A Li-Ion battery is also placed inside for battery backup and charging port is provided for charging the battery. A USB 2.0 port is provided for external communication. The necessary codes are written on to the controller memory for execution of the algorithm for operation of the system along with the data processing. The trays provided with the system are used to place the specimens for testing and the same are inserted in the system for obtaining the test result.