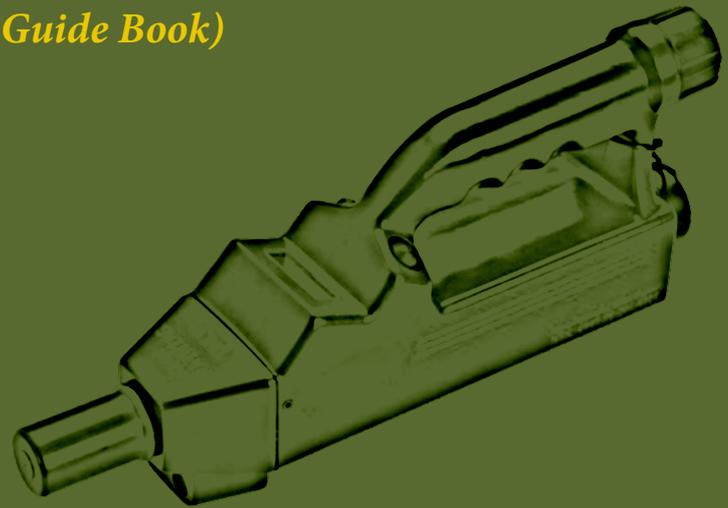


Chemical Detectors in Defence

Equipment & Accessories

(A Guide Book)



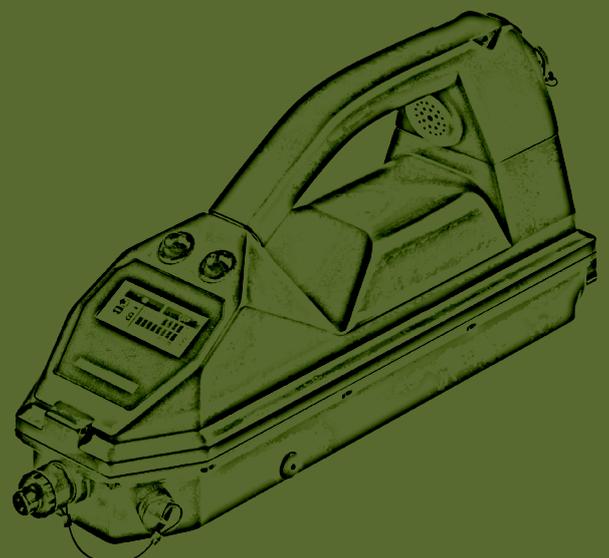
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Chemical Detectors in Defence

Equipment & Accessories

(A Guide Book)



Editor:

Brij M. Gandhi

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Chemical warfare agents under the Chemical Weapons Convention (CWC) are considered as the Weapons of Mass Destruction because the destructive effects of these chemicals are toxic enough to be used as chemical weapons. This may include non-living toxic products from living organisms such as botulinum toxin, ricin, saxitoxin etc. Defence industry is dedicated to providing solutions for detection and protection against these chemical warfare agents and explosives. Current efforts focus intensively on development of advanced knowledge, instrumentation and identification systems, technologies for early, rapid, accurate, and sensitive detection and identification of the chemical threats in battlefield or urban settings.

This report provides a review of the open-source literature (unclassified) and summarizes information from manufacturers regarding commercially available instruments, technologies and computer-based laboratory systems for environmental alerts, sampling, detection, and identification of chemical warfare agents including explosives and gases. An exhaustive list of over 1100 gadgets, instruments, devices and technologies available from leading global providers is provided with links.

Information provided in the book is meant for reference purposes providing useful information to educate the defence industry, homeland security agencies, local, state and national governments on defence matters and R & D institutions regarding equipment and technologies available to combat WMDs, terrorism, and homeland security for safety of citizens and critical infrastructure. It also helps the end-users to make informed decisions about the equipment and technologies to be used for detection of chemical weapons agents and explosives, their procurement and use.

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* Companies' products listed

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Executive Summary

Hundreds of companies are dedicated to providing solutions for the military defence against chemical, biological, nuclear, radiological, and high-yield explosive (CBRNE) weapons of mass destruction (WMD). Domestic preparedness against current and emerging threats of WMDs meets the requirements of the International treaties for detection of Biological Warfare Agents (BWA), Chemical Warfare Agents (CWA), Toxic Industrial Chemicals (TIC), or in the monitoring of food, air, soil, and water.

The present report presents information on compatible instruments, consumables, and computer-based laboratory systems available for detections of chemical warfare agents. This includes explosives for applications in safety needs and analytical chemistry, adhering to the requirements of the Chemical Weapons Convention (CWC) and other related treaties around the world.

Chemical agents are of major concern as many of them are manufactured, transported, and dispensed with ease; and symptoms are immediate and mortality is very high. Rapid detection enables faster, efficient and tailored response by military, first responders and homeland security. The knowledge allows assessment of the severity and extent of a hazard. Areas that are clean or contaminated are identified. The information acquired by these systems help in donning of individual protective equipment (IPE), sampling, handling and analysis of situations.

Fully automated chemical detectors have been devised for real-time aerosol sample collection, concentration, detection, and identification in the field while taking care to maintain the highest level of sensitivity and low levels of detection. Many of the commercially available CWA detectors utilize technologies that are adapted from classical analytical chemistry techniques. Chemical detectors are designed for fixed and 24/7 outdoor and indoor monitoring and surveillance, which use principles of flame photometry, gas chromatography / mass spectrometry, infra-red spectroscopy, ion mobility spectrophotometry, photo ionization and flame ionization, laser, Raman spectroscopy, surface acoustic wave, fluorescence and other technologies for detection and identification of the chemical agents including toxic gases and explosives. Technologies and equipment are available to counter the effects of chemical agents and a number of protective gadgets and equipment for protection and decontaminating materials are in application. A brief description of the well-known, commercial-off-the-shelf instruments that employ these technologies is provided in the guide.

This report provides a review of the open-source literature (unclassified) and summarizes information obtained from manufacturers regarding the available technologies and commercially available equipment currently employed for the detection of chemical warfare agents (CWAs) and toxic industrial chemicals (TICs). The focus of this report is on available equipment, and technologies for environmental alerts, sampling, detection, and identification of chemical warfare agents including information on decontaminants and protective equipment for first responders. This includes commercially available technologies that can be used by first responders to investigate an unusual event that has happened in the environment by collecting, screening and identifying the chemical materials from the field. The aim of the report is to provide useful information about available technologies to help end-users make informed decisions about the technologies used for detection of chemical weapons agents and explosives, their procurement and use.

Information provided in the book is meant for reference purposes for educating the general public, defence industry, homeland security agencies, local, state and national governments on chemical and biological defence matters regarding available equipment and technologies to combating WMDs, terrorism, and homeland security for safety of citizens and critical infrastructure and respond to incidents of CBRNe incidents. Efforts have been made

to list range of available gadgets, instruments, devices and technologies available from leading global providers of instrumentation and technologies providing options best suited to these agencies to meet their requirements.

The purpose of this guide is to provide information on types of detection technologies and not to compare the available technologies. The list is neither exhaustive and nor an endorsement of any technology described herein. Similar technologies may be available from other companies as well. Reviewers may verify the authenticity of the details on websites.

All efforts have been made to provide accurate information of technical specifications primarily based on vendor-provided information; however, where possible the summaries have been supplemented with additional information obtained from reports and websites. Efforts are also made to provide minimum information on the performance metrics in terms of quantity or concentration of organism detected. As far possible, reference to certification by International Organization for Standardization (ISO) has also been avoided so as to minimize the biased decisions.



Companies' Products Listed

1 Detect, USA
1st Detect Inc., USA
7th Framework Program of European Union
908 Devices Inc., USA
AAR Corporate, USA
AB Sciex Pte. Ltd., Singapore
Abb Process Analytics
Abingdon Health, UK
ACE Glass Inc., USA
Acumen Detection, USA
Advanced Photonix Inc., USA
Advantest Singapore Pte. Ltd., Singapore
Agena Biosciences, USA
Agilent TechnologieInc, USA
Agilent Technologies, India
Agiltron, Inc., USA
Ahura Scientific Inc. USA
Air Boss Defence, USA
Air Techniques International, USA
AirBoss Defense, Canada
Airogistic, LLC, USA
Airsense Analytics GmbH, Germany
Alexeter Technologies, LLC, USA
Alfred Kärcher GmbH & Co. KG, Germany
Allen-Vanguard Corporation, Canada
Alluviam LLC, USA
American Gas & Chemical Co. Ltd, USA
AmScope, USA
Anachemia Inc., Canada
Analytical Solutions and Providers ASAP, USA
Analytical Technology Inc., USA
ANP Technologies Inc., USA
Ansell Occupational Healthcare, USA
Ansell Protective Solutions AB, Sweden
Ansera Analytics, USA
Applied Biosystems /MDS Sciex, USA
Applied Nanotech, Inc, USA
Applied Response Solutions, LLC, USA
Areté Associates, USA
Argon Electronics Ltd., UK
Arisense Analytics, USA
Armstrong Monitoring Corporation, Canada
Army Chemical Corp., USA
Army Gas Masks.com, USA
Army Technology, USA
Aska Equipment Ltd. India
Assay Technology, Inc USA
Aurora, USA
Avir Sensors, USA
Avon Protection Systems Inc., USA
Avon Protection Systems, UK
Avox Systems, USA
BAE Systems Inc., USA
Battelle Memorial Institute, USA
Bay Spec Inc., USA
Bertin Technologies, France
Beth-El ZikhronYaaqov Industries Ltd., Israel
Bioquell Defence, UK
BIO-RAD Laboratories Inc., USA
Biral, UK
BLauer Manufacturing Co. Inc., USA
Block Engineering, USA
BLÜCHER GmbH, Germany
Blücher Technologies, Germany
BPSI, USA
Bruhn NewTech, Denmark
Bruker Daltonics, Inc, USA
Bruker Daltonics, UK
Bruker Detection Corp., USA
Brukers Corporation, USA
Building Protection Systems, Inc., USA
BW Technologies, UK
Calgon Carbon Corporation, USA
California Analytical Instruments, Inc., USA
Calspan Corporation, USA
Carl Zeiss Microscopy, Germany
CBD SBIR Program, USA
CBI Polymers Inc., USA
CBRNe Solution, USA
CDS Analytical Inc., USA
CEA, France
CEA, France and NBC-Sys, France
ChemImage Corporation, USA
ChemImage Sensor Systems, USA
Chemring Detection Systems Inc., USA
Chemring Group PLC, UK
Chemring Sensors and Electronic Systems, USA
Chemsee Inc., USA
CIBADS, Canada
Climatronics Corporation, USA
Climet Instruments Co, USA
Constellation Technology Corporation, USA
Cristanini SPA, Italy
CyTerra Corporation, USA
Defiant Technologies, USA
Delphian Corporation, USA
Department of Defense, USA
Detectachem LLC, USA
Devices Inc., USA
Digital RF Ltd., UK
Dionex Corporation, USA
Draeger Medical, Inc, USA
Draeger Safety Diagnostics Inc., USA
Draeger Safety, Inc, USA
Draeger Safety, Inc., Germany
Drager Safety Pacific Pty. Ltd., Australia
Drager, Germany
Drägerwerk AG & Co., USA
DRDO, India
D-Tect Systems, USA
DuPont, USA
Dycor Technologies Ltd., Canada
ECA Robotics, France
ECA-SSI Simulator Systems International, USA
ECIL Rapiscan Ltd. India
Eco Sensors Inc., USA
ELBW Technology SA, Switzerland
Electronic Sensor Technology Inc., USA
em.tronic, Slovenia
Emergent Biosolutions, USA
Enmet Corporation, USA
EnviroNicsOy, Finland
Environmental Response Laboratory Network ERLN, USA
Environmental Technologies Group, Inc., USA
Enware, Australia
EPE, Australia
European CBRNE Center, Belgium
Evogen, Inc.USA
FAS Military Analysis Network, USA
Field Forensics, USA
First Line Technology, USA
FLIR Systems Inc., USA
Gasmot Technology, Finland
GE Securities, USA
General Dynamics Corporation, USA
General Monitors, USA
Global Security Solutions, Canada
Global Security, Austria
Grace Industries USA
Guild Associates, Inc, USA
GX Microscopes, UK
Hach Company, USA
HaixingEno Chemical Co., Ltd., China
Hamilton Sundstrand Corporation, USA
Haz Tech Systems, USA
HazChem, USA
Haztech Systems, Inc, USA
HDT Global, USA
Honeywell Analytics Inc, USA
HonriAirclean Technology Suzhou Co. Ltd., China
Hydro Therm, Inc., USA
ILC Dover LP, USA
IlluminaInc, USA
Immediate Response Technologies, LLC, USA
Implant Sciences Corporation, USA
Industrial Scientific Corporation, USA
INERIS, France Institut National français de Recherche de Sécurité
INFICON Holding AG, Switzerland
InnovaPrep LLC, USA
Inphotonics, USA
Intelagard, Inc, USA
Intellitec, USA
International Senor Technology, USA
International Sensor Technology, USA
Interscan Corporation, USA
IPS Securex Pte. Ltd., Singapore
ITT Corporation, USA
IVEA Solutions, France
J and N Enterprises, Inc USA
J. BlaschkeWehrtechnik GmbH, Austria
Jeol Ltd, Japan
Johns Hopkins Applied Physics Laboratory, USA
Joint development by Research International, Inc. USA and ENICS, CJSC, Russia
Kappler Inc., USA
KärcherFuturetech, Germany
KD Analytical Consulting, Inc, USA
Ketech Group Ltd., UK
KeTech Systems Ltd., UK
KNAUER WissenschaftlicheGeräte GmbH, Germany
Koch Filter Corporation, USA
L3 Communications, USA
Lakeland Industries Inc., USA
Lanx Fabric Systems, USA



Companies' Products Listed

LataEnvirotech Services, India
Lauer Manufacturing Co. Inc., USA
Laurus System, USA
Leidos, USA
Life Safety Systems, Inc., USA
Lincoln Laboratories, USA
Lindon Defense, USA
Livermore Instruments, Inc., USA
Lockheed Martin, USA
Lumasense Technologies, Inc., USA
Lumidor Safety Products, USA
Luxfer Magtech Inc., USA
Magna BioSciences LLC, USA
Malt Industries Inc, USA
MAS Instrument Division, NASA, USA; Sensidyne, USA
MassTech Inc., USA
Matheson Safety Products, UK
Matheson Tri-Gas, Inc., USA
Medscape, LLC, USA
MGP Instruments, USA
Microsaic Systems Plc., UK
Microsensor Systems Inc., USA
Ministry of Defence, Israel
Mistral Inc., USA
Mistral Security Inc., USA
MITRE Corporation, USA
MMIC EOD Ltd., UK
Morphix Technologies, USA
MS Tech, USA
MSA Instrument Division, USA
MSA Safety Inc, USA
MultiRAE Systems, USA
NanoScaleCopperation, USA
Nanoscience Instruments, USA
Nanosurf, Switzerland
Naval Sea Systems Command NAVSEA , USA
NBC-Sys, France
Nester group, France
New Pac Safety AB, Sweden
Nexter Group, France
Nextteq LLC, USA
Nikon Instruments Inc, USA
Northrup Grumman, USA
Oak Ridge National Laboratory, USA
OI Analytical, USA
Olympus, USA
OptiMetrics Inc., USA
Optra Inc., USA
Oritestspol S R.O, Czech Republic
ORTEC, USA
OSHO Defence, USA
Owlstone Nanotech, USA
Owlstone, UK
OWR AG, Germany
Pacific Advanced Technology, USA
Particle Measuring Systems USA
Parvus Corporation now Curtiss-Wright, USA
Paul Boye Technologies, France
PerkinElmer, Inc., USA
Photonics, USA
Photovac, Inc., USA
Physical Sciences Inc., USA
Physical Sciences Inc., USA, Smiths Detection Inc., USA
PID Analyzers LLC, USA
Pimco sp. Z.o.o., Poland
Portendo AB, Sweden
Princeton Gamma Tech Instruments, USA
Proengin, France
Project of European CBRNE Centre, Sweden
Pursuit Dynamics PLC, UK
Q Scan, USA
Quant Technologies LLC, USA
Quantitech Ltd., UK
Quantum Design, USA
Quest Technologies, Inc., USA
RAE Systems Inc, USA
Rafael Advanced Defense Systems Ltd., Israel
Rapiscan System, UK
Raptor Detection Technologies, LLC, USA
Real-Time Analyzers, Inc, USA
RedX Defense, USA
Remploy Frontline, UK
Research International Inc., USA
Research Support Instruments, Inc, USA
Respirator ZRT, Hungary
Rigaku Corporation, Japan
S.E.A. Group, Australia
Safety Solutions, Inc, USA
Safran Identity and Security, USA
Sandia National Laboratories, USA
Savannah River Technology Center, USA
Sceptor Industries, Inc
SciAps Inc., USA
Science & Engineering Services, Inc., USA
Scintrex Trace Corp, Canada
Scintrex Trace Corporation, Japan
Scintrex, Canada
Scott Safety, UK
Seacoast Science Inc, USA
SELEX Galileo and Owlstone Inc., USA
Sensidyne, USA
Shalon Chemical Industries Ltd, Israel
Shimadzu Corp, Japan
Shimadzu Scientific Instruments, USA
SIBEL Ltd., Russia
Siemens Industries Inc., USA
Siemens Industries Inc., USA
Sierra Monitor Corporation, USA
SKC Inc., USA
Smith Detection, Inc., USA
Snowy Range Instruments SnRI USA
Sodern, France
Spartan Bioscience, Canada
Spearhead Innovations, USA
Spectrex Corporation, USA
Spectrum Photonics, Inc, USA
Sperian Protection Americas Inc., USA
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