

AEROSOLS DETECTION AND PROTECTION



TNO innovation
for life

Often a terrorist attack with chemical or biological agents only becomes apparent when people get sick or die.

Sensors are able to detect these threats very early but in order to do so they have to detect low concentrations of the agents quickly and reliably.

AEROSOLS

The aerial CBRN threat often presents itself as a vapour or as large droplets for chemical agents and as an aerosol for biological agents.

Nowadays, aerosolized chemical agents are increasingly becoming a concern. Users often require expert assistance to set

requirements for aerosol detection and protection equipment to prevent over- or under protection.

Procurement agencies are not always able to adequately appreciate claims of performance by suppliers. Industry has difficulties in determining the required performance their products should meet, as they are often not allowed or able to perform live agent tests.

TNO offers to assist users, buyers, manufacturers and other stakeholders in defining test and evaluation requirements and in validating the performance of detection and protective equipment against these requirements.

More specific TNO services include:

Experimental testing:

- Testing and evaluation of samplers and detectors;
- Testing and evaluation of protective equipment such as masks, clothing, gloves or their constituent materials;
- Determination of respiratory and dermal toxicology.

Consultancy:

- Consultancy on defining operational use and performance requirements for detectors and protective equipment;
- Knowledge or evidence based advice regarding equipment and material improvement;
- Support in all phases of the procurement processes.

Experimental testing

The capabilities of the TNO laboratory in Rijswijk include live agent testing facilities and an aerosol test chamber for chemical and biological exposures, facilities for skin and respiratory exposure and supportive chemical and microbiology facilities up to Biological Safety Level 3.

Detector and sampler evaluation

The extent to which a detector or sampler complies with pre-set requirements can best be verified by experiments. On top of live agent laboratory tests TNO offers the use of an in-house laboratory facility consisting of a 12 m³ Dycor® aerosol test chamber, which allows both dynamic and static exposures of both chemical and biological materials. This product serves to evaluate the performance of aerosol detection or sampling equipment against non-toxic or non-pathogenic simulant agents.

As a crucial final step in the detector evaluation process, TNO can offer access to field trials, due to TNO's strategic collaborations with reputable (inter-) national, private and governmental partners.

Protective material evaluation

In case of protective material evaluation TNO has the possibility to evaluate materials over a range of wind speeds and a variety of monodisperse particle sizes or a broad particle size range.



Fabrics of protective gear are evaluated by swatch testing. Material is exposed to a well characterised aerosol. Penetration through the fabric is measured as a function of particle size and wind speed. In this way the penetration of the fabric for the relevant size range is evaluated

Filter evaluation

TNO has the ability to evaluate the protective properties of a broad range of gas filters against especially biological aerosols. Not only gas mask filters, but also filters with a pressure drop up to 1 bar can be evaluated.

Toxicological studies

TNO has the ability to study the effects of aspiration of aerosols. Various aerosols of chemical and biological origin can be generated in the nano- to micro meter range. Effects of variation in the aerosol parameters as well as the environmental circumstances on the toxicological consequences can be studied. TNO can also study the toxicological effects of dermal exposure of these aerosols.

Consultancy

TNO can provide technical and conceptual support in design, procurement and development of aerosol detection systems, samplers and protective equipment. Consultancy could also include translation of anticipated operational scenario's into defining functional requirements.

TNO experts can give conceptual and technical advice to developers and suppliers, regarding improvements of equipment design or efficacy.

TNO experts may also advise users with regard to optimal implementation and application of detection systems. For that purpose TNO products such as operational modelling of dispersion and detector architectures are available.

TNO

The 3000 TNO professionals put their knowledge and experience to work in creating smart solutions to complex issues. These innovations help to sustainably strengthen industrial competitiveness and social wellbeing. We are partnered by some 3000 companies and organisations, including SMEs, in the Netherlands and around the world.

For more information: www.tno.nl

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