

CBRN Decontaminability of Detection Equipment

CBRN hardness and decontaminability of mission-essential sensitive equipment

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The current CBRN threat has increased the likelihood that military personnel and systems will be exposed to CBRN contaminants. Military success depends on the effective use of electronic or other sensitive equipment (incl. CBRN detection equipment). Therefore, there is an urgent need for CBRN detection systems that meet the requirements of "decontaminability", "hardness" and "compatibility" according to the AEP-7.

CBRN Hardness & Decontaminability

According to the AEP-7 **CBRN contamination survivability** is defined as the capability of a system and its crew to withstand a CBRN contaminated environment, including decontamination, without losing the ability to accomplish the assigned mission. Against this background in the interest of CBRN contamination survivability the material must meet criteria of all three characteristics "decontaminability", "hardness" and "compatibility".

Sensitive equipment includes those items that can not be decontaminated by commonly used methods and decontaminants, without degradation of the item's performance. In recon vehicles, labs etc. sensitive equipment can also be detection equipment which can be considered as "critical" for mission performance, such as their functions being indispensable to the effective operation of the system. The **decontamination of CBRN detectors** should be planned early during the systems design phase. The components and materials of the detection equipment should be as CBRN resistant as possible.

CBRN Hardness

CBRN hardening of equipment increases their susceptibility to decontamination. Construction measures could mitigate damaging effects by the decontamination process. Closely related to decontaminability, hardening is a distinct characteristic. **The equipment to be tested and evaluated for hardness will be exposed to five contamination and decontamination cycles.**

CBRN Decontaminability

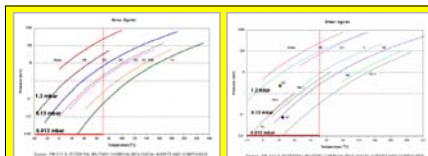
Decontaminability is primarily the ability of a system to be cleaned to reduce the hazard to personnel operating, maintaining, or re-supplying a particular piece of equipment. **Decontaminability criteria** are mainly related to physiological effects from CB agents and residual radiation. Both vapour and contact hazards must be considered.

Vacuum CB Decontamination of detection equipment



Vacuum C Decontamination

- by removing chemical warfare agents up to 10 g/m² by evaporating and desorption from the surface of the equipment
- immobilization of the CWA vapour in the CBRN filter unit
- temperatures up to 70 °C limited by the thermal resistance of the detection equipment
- vacuum down to 1 Pa (vapour pressure of VX: 14 Pa at 20 °C)



$$p_g = f(T^\circ)$$

Decon effects based on
 - evaporation of CWA
 - volatilisation of CWA
 - desorption of CWA



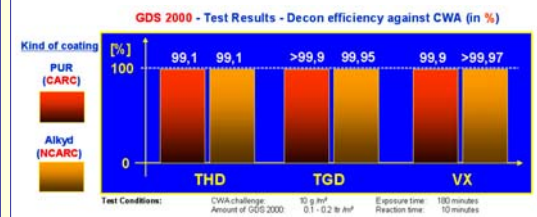
Vacuum B Decontamination

- by degrading biological warfare agents and vectors (insects etc.) by pressure induced impact of gaseous B decontaminants
- temperatures up to 70 °C limited by the thermal resistance of the personal equipment
- vacuum down to 1 Pa, dosing of gaseous B decontaminants, depending on their specific properties at higher pressure levels



CBRN Decontaminants

C Decon	B Decon	RN Decon	Special C Decontaminant
GDS 2000	BDS 2000	RDS 2000	EDS-G
(NSN 6850-12-366-1321)	Wofasteril SC 250 (NSN 6850-12-373-5844)	alcapur (NSN 6850-12-373-5664)	(NSN 6850-12-366-2488)
Part no. 6.294-005.0	Part no. 6.292-145.0	Part no. 6.292-145.0	Part no. 6.291-211.0
20 ltr	5 kg	10 ltr	15 ltr (10 ltr + 5 ltr)



Kärcher Futuretech GmbH – Partner for special decontamination aspects of CBRN detection equipment

Consulting in the planning and design phase concerning

- CBRN hardness and decontaminability
- Engineering CBRN design consulting
- Studies about CBRN decontamination relevant aspects
- Integration of protection measures
- Special protection material (CBRN protection foils, etc.)

Testing and evaluation of CBRN hardening

- of detection equipment concerning
- CBRN resistancy
- Material compatibility concerning decon agents
- Compatibility to CB vacuum decon procedures
- Testing and evaluation of special aspects of CBRN hardening
- Resistancy to thermal decontamination procedures (hot gas/hot steam)

Testing and evaluation of CBRN decontaminability of detection equipment concerning

- CB vacuum decontamination technology
- CBRN wet chemical decontamination technology
- decon procedures and chemicals for detection equipment (in the temperature range from -32 °C to + 49 °C)
- with different decontamination procedures and chemicals
- with thermal decontamination procedures (hot gas/hot steam)
- cross-sensitivity to decontamination chemicals
- in the frame of restoration measures **etc.**

For questions please contact us:

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Future missions make it necessary to take all relevant aspects into consideration. Gaps in the abilities of the detection equipment concerning CBRN hardness and decontaminability should be thoroughly checked and assured as quickly as possible in an acceptable way.

Kärcher Futuretech GmbH can assist by consulting and testing.