

SWEDE *Decontamination*

SWEDEN - THE SWEDISH DECONTAMINATION CONCEPT

A Short Presentation of the Swedish Concept



SWEDE

The concept of decontamination

The decontamination of chemically contaminated casualties is a problem that can arise anywhere in the world. The Swedish National Board of Health and Welfare have, in their General Advice 1990:10 "Care of Casualties in Chemical Accidents" stressed the importance of decontamination facilities being available both at the scene of the incident at all hospitals and health care centres in the area where the incident takes place. The responsibility for the decontamination of casualties at the scene of the incident lies with the Fire Rescue Service, but the decontamination of casualties arriving at a hospital should be possible regardless of whether decontamination has been carried out at the incident scene. The risk of chemical incidents in contaminated casualties is already large and is increasing. Many types of chemicals are used in industry, large quantities are transported daily by road, sea, rail and air, and a significant proportion of them have the potential in an accident to cause serious injury to persons and to contaminate the environment. To clarify the need to meet this potential threat by the use of decontamination facilities both at the scene of the incident and at hospitals, the National Board of Health and Welfare produced a SoS-report number 1995:15, entitled "Chemical Protection within Medical Care" and SoS-report 1998: written by study team known as the ABC Group. Representation on this team included:



-The National Board of Health and Welfare, The National Rescue Services Board, The Swedish National Defence Research Institute, The Poison Information Centre. Swedish Emergency Disaster Equipment is indebted to the ABC Group, to Emergency Medical Superintendent Ulf Andersson, the NBC School of Total Defence, and many others, who contributed their knowledge and expertise to enable the design and development of a Mobile Decontamination Unit. The Unit we have produced has been subjected to rigorous testing and evaluation by a variety of agencies. In considering the need for decontamination facilities three questions must be answered:

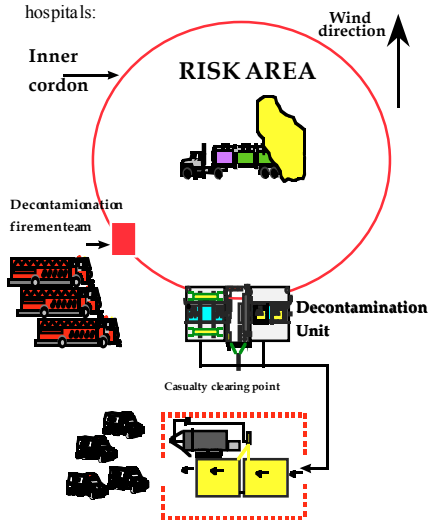
WHY?

The risk of a chemical accident within industry or during the transportation of chemicals on roads, rail, or air or sea is already very great and as the volumes of chemicals used and transported increase, so do the risks. Again, while the likelihood of chemical warfare has receded the risk of terrorist action involving the use of toxic chemicals is ever present; as was demonstrated in Tokyo in 1995. Similarly, the possibility of radioactive contamination resulting from an industrial accident, or even terrorist action, cannot be ignored because the result of any of these events will inevitably be:

CONTAMINATED CASUALTIES

WHERE?

The requirement is that decontamination facilities are provided both at the scene of the incident and at casualty receiving hospitals:



At the scene of the incident: It is clearly to the advantage of casualties that toxic contamination is removed from their bodies with the minimum of delay, and it is also a necessity to decontaminate casualties before transporting them to hospitals thereby avoiding the contamination of ambulance vehicles. By sitting a Mobile Decontamination Unit upwind of the area of extreme toxicity, and by utilising a standard operating procedure which allows for the casualties to be brought to the Unit by those dressed in appropriate protective clothing, the medical specialists can provide aid to the casualties without delay in a safe area, while requiring a much lower level of protection for themselves against toxic substances. The Unit will be the only exit from the risk area.

At Casualty Receiving Hospitals: It is axiomatic that in an incident involving large number of casualties there will be some who will by-pass the casualty collection system and self-refer to hospitals, and this applies as much to large numbers of chemical injuries as to incidents where chemicals are not involved. Similarly, in a small incident involving only a few chemically contaminated casualties it is likely that the injured will be delivered to hospitals without them having been decontaminated. In these circumstances it is essential that decontamination facilities are available, mobile or built in.

Method of Working in Decontamination

HOW ?

Effective decontamination requires that it is carried out in an area safe from further contamination, in warm surroundings to avoid increasing the amount of trauma suffered by the casualties, and with a plentiful supply of warmed water to ensure that the contaminant is easily removed. The decontamination process must also allow for the use of decontamination detergents and other substances, such as Personal Decontamination Substance.

SPECIFIC REQUIRMENTS for mobile decitamination units.

*It must include a capability to provide large quantities of heated water. (+35 degrees centigrade) *It must be capable of producing its own warm environment for casualties. (+20 degrees centigrade) *It must have the capacity to decontaminate stretchered and ambulant casualties simultaneously. *It must have the capacity to decontaminate several persons within a limited time. *Its design must permit a satisfactory decontamination procedure so that casualties passed through without risk of further contamination after being decontaminated.

The Cargo Decontamination Unit can cope with both ambulant and stretchered casualties at the same time. Casualties contaminated but having suffered no other form of physical injury can be decontaminated using the overhead shower portion of the Unit, but those who have suffered additional injuries may necessarily have to be decontaminated on a stretcher. The philosophy is to operate with three sections; "Dirty Part", "Decontamination Part" and "Clean Part". The sections are separated by transparency curtains.

"Dirty Part"; In this section all casualty's clothing is removed and bagged for safe disposal. Valuables will be separately bagged in transparent plastic bags for later safe decontamination. If dry powder decontamination is appropriate it will be carried out in this section.

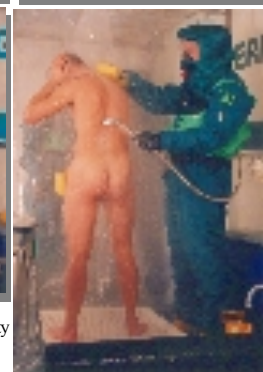
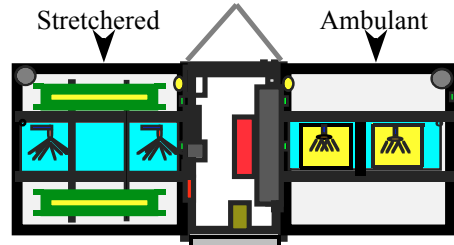
"Decontamination Part" In this section the casualty will be washed with detergent soap and large amounts of warm water while lying on a stretcher or standing in the shower.

The water in the shower is always + 35 and the surrounding temperature is always + 20 .

The stretcher stand system allows for the stretchered casualty to be moved easily from the "dirty" side to the "clean" side of the process, or, if necessary, for the stretcher to be change. The casualties stand on gratings to avoid ambulant casualties standing in a pool of contaminated water. The contaminated washings are pumped from the shower to a 3000 litre capacity collection tank for subsequent safe disposal.

"Clean Part"

After completion of decontamination process the casualties are passed into this section where they are dried and provided with clothing or blankets before being passed to the casualty clearing point. The tents can both be used for either stretchered or ambulant casualties.



Technical specification CARGO DECONTAMINATION UNIT version III.

A. Tråler

Total weight.....	2600 kg.
Total length incl. drawbar.....	6.30 m.
Total breadth.....	2.35 m.
Total height incl. down searchlight.....	2.60 m.
Bodybreadth.....	1.87 m.
Bodylength.....	4.70 m.
Length cargospace.....	4.60 m.
Breadth cargospace.....	1.80 m.
Height cargospace.....	1.85 m.
Loadingmeasure backrollerdoor.....	1.60 x 1.40 m.
Isolation.....	35 mm Isopat.
Tyredimension.....	165 x 13
Towing hook.....	50 mm (60 mm alternative)
Chassie.....	AL-KO Kober, self-supporting with crossbeam

B. Tent.

Breadth.....	4.70 m.
Deep.....	3.30 m.
Height.....	2.40 m.
Opening in gable, PVC-zipper.....	4 st. 1.0 x 2.1 m. (BxH)
Roofgradient.....	7 degree
Tentcanvas.....	Canvas of PVC-covered polyesterfabric.
Thickness.....	0,6 mm. 650 g/m2.
Weight/Tent.....	25 kg.
Fabric.....	1100 dtex, polyester.
Thread per cm2.....	4,5 x 4,5.
Tearstrength.....	DIN 53363. 250/225 N.
Drawstrength.....	DIN 53354. 177/1500 N/5 cm SFS 2984.
Adhesive.....	100 N/5 cm.
Temp.durability.....	+ 70 to - 30 degree
Qualitynumber.....	551350.
Flameprotection.....	See typeapprove 1289/87.

Floor..... PVC-polyester canvas.
Thickness..... 0,65 mm. 750 g/m2.
Qualitynumber..... 551350 S.P. 570
Flameprotection..... Selfextinguish

C. Stand.

Stand..... Pipeframe of aluminium Æ 30 mm x 3.
Pipeframe..... In aluminium in three holes

D. Wa mwa terhea ter.

Model..... Given by CARGO.
Fuel..... Dieseloil.
Fuel consumption..... 27/h in use.
Effect..... 250 KvA.
Measuredate: L x B x H..... 1640 x 730 x 1120
Weight..... 330 kg
Voltage..... 220 V, 1,1 A single-phase.
Effectconsumption useful..... 260 w.
Waterpressure..... Max. 4 bar.
Reduction valve waterpressure..... Incl. adjustable.

E. Hot-air unit.

Model..... Given by CARGO.
Fuel..... Dieseloil. (Integrated with WW-heater throw
heat exchanger, aerotemper)
Effect..... 19,8 KvA at 0 degrees.
Measuredate: L x B x H..... 450 x 355 x 45
Weight..... 25 kg.
Voltage..... 220 v single-phase.
Effectconsumption useful..... 70 w
Airflow..... 1160 kbm/h.
Temperature outgoing air..... 47 degrees at 0 degrees

H. Electric-station.

Model.....	Given by CARGO.
Effect.....	Max. 5000 W, kont. 4400W.
Voltage.....	230 v.
Power.....	19.1 A.
Powerpoint.....	2 p.c.
Tankvolume.....	16.6 litre.
Fuelconsumtion	2.9 litre/h.
Workingtime/tank.....	5.7 h.
Fuelmeter.....	Incl..
Oillevelguard.....	Incl.
Measuredate L x B x H.....	660 x 470 x 585 mm.
Start.....	El / Manual.
AC voltmeter.....	Incl.
DC point.....	Incl.
AC/DC fuse.....	Incl.
Weight.....	76 kg.

I. Showerline

Showerline with two bodyshower and two handshower.....	2 p.c.
Material.....	Stainless steel

J. Drain-pumps.

Model.....	Given by CARGO.
Capacity.....	4000 l/h.
Max. pressureheight.....	5.8 m.
Max. sinkdeep.....	6.0 m.
Levelswitch.....	Incl.
Draintube.....	2 x 12 m. Heliflex, grey, 25 mm, Incl..

K. Remaining.

Lighting mast with vane.....	220 v halogen, 2 x 300 W.
Outside lighting.....	220 V halogen, 4 x 150 W on the sides. 12 V lamp on the backside.
Inside lightning.....	220 V, 2 x fluorescent tube, 1 x lamp. 12 V, 3 x lamps.
Stretcherstand.....	1 p.c. Stainless steel.

Decontamination / Shower stretcher.....	3 p.c. Stainless steel, sleeping mat of PVC
Ladder.....	2 p.c. Aluminium.
Collecting pools for the showers.....	2 p.c. PVC inflatable.
Reservoir for contaminated water.....	1 p.c. 3000 l.
Electric cable.....	1 p.c. 20 m.
Water hose for internal use.....	1 p.c. 25 m.
Ground security bags to be filled with water....	10 p.c. PVC.
Soap holder.....	4 p.c. incl. installation.
Connection	Incl.

CAPACITY:

Capacity shower water:	100-140 l/min
Temperature shower water:	35 degrees Celsius
Maximum water temperature raising:	35 degrees Celsius (0-35 is possibly)
Body showers:	4
Water flow in body showers:	20-25 l /min
Hand showers:	4
Water flow hand showers	15-20 l /min
Temperature hot water:	80-90 degrees Celsius
Water flow hot water:	40-60 l /min



CARGO DECONTAMINATION UNIT version III.

- The Cargo Decontamination Unit is totally mobile and flexible. It can be set up in almost any situation, needing only 100 square metres of space, and is suitable for use either at the scene of the incident as the exit point from the inner cordon, or in the grounds of casualty receiving hospitals. - The Cargo Decontamination Unit produces its own plentiful supply of water heated from as low as 0°C to + 35°C for use through the shower heads providing a maximum delivery capacity of 120 litres/minute. This allows for 20 litres/minute simultaneously through each of the four shower heads, which is at least double that available in a domestic shower. The Unit can also heat water to about 90°C for decontaminating of it self, vehicles and equipment provide 50 litres/minute at that temperature through a high pressure nozzle. - The Cargo Decontamination Unit has the ability to control the environment within the Unit. Even with external temperatures as low as -20°C the internal environment can be maintained at +20°C. The heating system also creates an internal overpressure which exhausts air containing toxic gases out of the Unit and into the "dirty" side of the decontamination process. - The Cargo Decontamination Unit trailer is fitted with two identical tents which are quickly and easily erected when the Unit is located on site. Each tent is divided into three sections and each section is divided from the others by heavy duty plastic curtaining to avoid cross-contamination within the Unit.

- The Cargo Decontamination Unit has the following capacities, depending on the chemical and the rate of contamination; 60-120 ambulant casualties per hour and 15-30 stretchered casualties per hour.
- The Cargo Decontamination Unit fulfils the demands of a satisfactory decontamination chain:
- It prevents cross contamination during the decontamination process.
- It is a simply matter to change stretchers when appropriate.
- The Unit's equipment allows for the collection of contaminated washings for subsequent safe disposal.
- The internal environment control system ensures that contaminated air is vented to the "dirty" side of the operation. Decontamination of the Unit after use, or replacement of some of its parts after heavy contamination, is simple because of its construction which allows for it to be dismantled section by section. Thus if some of its parts are heavily contaminated, only those parts will have to be replaced.
- The Cargo Decontamination Unit is completely self-supporting, needing only a supply of water.
- The Cargo Decontamination Unit is easy to erect on site; it takes only ten minutes for the complete unit with a warmed interior and washing water to +35°C to be set up ready for use.
- The Cargo Decontamination Unit trailer includes sufficient space for all necessary additional equipment to be taken to the scene of the incident, including protective clothing for the operator, blankets, sponges, soap and towels, bandage material etc.

Please contact us for more information, technical specification demonstration video and the report from the National Board of Health and Welfare.



SWEDISH EMERGENCY DISASTER EQUIPMENT

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