

What is a decontamination unit?

A transportable shower unit with a series of separate 'cleaning' compartments which personnel proceed through in order to remove contaminants/pollutants they may have been exposed to in the course of their work.



The air inside the unit is maintained at a lower (negative) pressure when compared to the outside atmosphere and it is filtered to HEPA grade before being passed outside. Depending on the application, the shower waste water stream may also be filtered to remove particulate matter before disposal.

Decontamination Units normally come supplied as a towable unit but can also be completely collapsible (known as Modular Decons) which are usually formed of individual panels which clip together.

Where are decontamination units used?

The more common industrial sectors for applications of DCU's are:

- Contaminated land remediation
- Lead paint removal
- Surface preparation and coating
- Anti-pollution work
- Asbestos management & control
- Environmental & HVAC ductwork cleaning
- Tank cleaning & purging
- Chemical handling



The objective in using a 'Decon' is to ensure that a person is sufficiently 'cleansed' that they can return to normal day-to-day activity free of contaminants that may be detrimental to themselves or others.

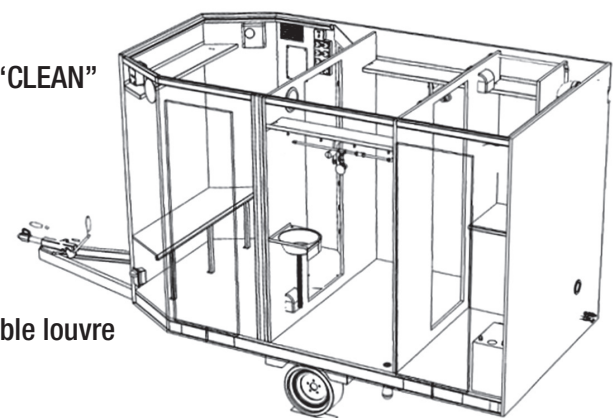


Summary of Features

A decontamination unit has a significant number of component parts, divided up into the three key compartments plus functional services.

CLEAN COMPARTMENT

1. Entry / Exit door to outside – clearly marked "CLEAN" on the outside.
2. 1 x locker per person
3. Seating
4. RPE battery charging point
5. Clothes hanging hooks
6. Mirror
7. High level ventilation from outside with closable louvre
8. Low level vent to shower compartment
9. Self-closing door to shower compartment
10. Space heating
11. Electric Lighting
12. Readily cleanable impervious surfaces for walls, ceiling, floor.



SHOWER COMPARTMENT

1. Thermostatically regulated shower (permitted ratio: 4 users per shower point)
2. Hanging hooks or rails for RPE and towels
3. Body wash/shampoo – bar soap is not recommended as it will prematurely block waste-water filtration systems, especially in hard-water areas.
4. Low-level vents / louvers from clean compartment.
5. High level vents exiting to dirty compartment.
6. Two self-closing doors, one to clean compartment and one to dirty compartment.
7. Sink for handwash.
8. Electric lighting.
9. Readily cleanable impervious surfaces for walls, ceiling, floor

DIRTY COMPARTMENT

1. Low level HEPA grade air filtration/extract unit (NPU) with filtration test certificate (see image).
2. High level ventilation from the shower compartment, equipped with non-return flaps
3. Seating
4. Clothes hanging hooks
5. Self-closing door to shower compartment
6. Self-closing Entry / Exit door to work area clearly marked "DIRTY" on the outside.
7. Electric lighting
8. Readily cleanable impervious surfaces for walls, ceiling, floor



FUNCTIONAL SERVICES FOR DECONTAMINATION UNITS

1. Water heater delivering hot water to the shower (if LPG then room-sealed balanced-flue water heater)
2. Electrical circuits protected by 30mA RCCD
3. Waste water filtration (dependant on application)

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When is a shower a 'decontamination shower'?

It's often assumed that a decontamination shower is just an ordinary shower, which perhaps has been allocated for use by personnel undertaking particularly dirty work – that's not the case!

Decontamination showers have a number of key features you need to look for; these features are described in technical guidance documents.

1. A negative pressure ventilation system which draws air through the compartments, filtering the air to HEPA grade before discharging it outside, capturing airborne particles shed from operatives PPE and preventing spread. Extraction systems have a filter removing at least 99.995% of particles down to 0.3 micron and will have a filtration efficiency test certificate.
2. The pattern of ventilation through the decontamination unit is specified as air intake through high level vents in the front clean compartment, low level internal vents into the shower compartment, high level internal vents into the 'dirty' compartment, equipped with non-return flaps. The only external wall vents permitted are in the 'clean compartment' – if the shower or dirty compartments have external wall vents or opening windows – it is not a decontamination shower.

3. There must be full height partitions and internal doors dividing the shower compartment from the adjacent clean and dirty compartments and these doors and the external door from the dirty compartment must be self-closing.

4. The shower compartment must provide a minimum of 1m2 of space for each shower point, the shower must be thermostatically regulated and there must be hooks for RPE. Health and safety guidance is a ratio of 4 people per shower point – so for up to 4 people you need a single shower or for up to 8 people you need a twin shower.

5. The water heater must deliver a warm shower and a decent spray pattern; LPG water heaters are most commonly used – if installed in the occupied space of the trailer these must be room-sealed balanced flue appliances.

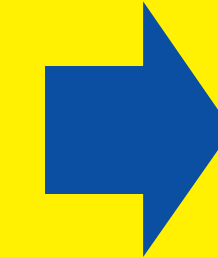
6. Waste water – a 4-shower unit catering for up to 16 people can use a cubic metre of water an hour. You may need to filter that waste water of contaminants before disposing of it (ask your water authority). If you do need to filter it – use a waste water filtration system with adequate capacity.

How does decontamination unit air filtration work?

The negative pressure air filtration unit (NPU) is fitted in the 'dirty' compartment. When in use the NPU creates a unidirectional air-flow within the compartments by extracting air from the dirty compartment, drawing it through a very fine filter (HEPA) and discharging the cleaned air outside.

The negative pressure achieved and the arrangement of self-closing doors, ventilation louvres and non-return vents ensures that the 3 chambers of the unit are continuously purged with outside make-up air moving uni-directionally from the clean compartment, through the shower, to the dirty compartment. Airborne particles are carried to the NPU.

The NPU must be fitted with a device to indicate filter condition and must be periodically tested and certified to validate its filtration efficiency.



How to use a Decontamination Unit

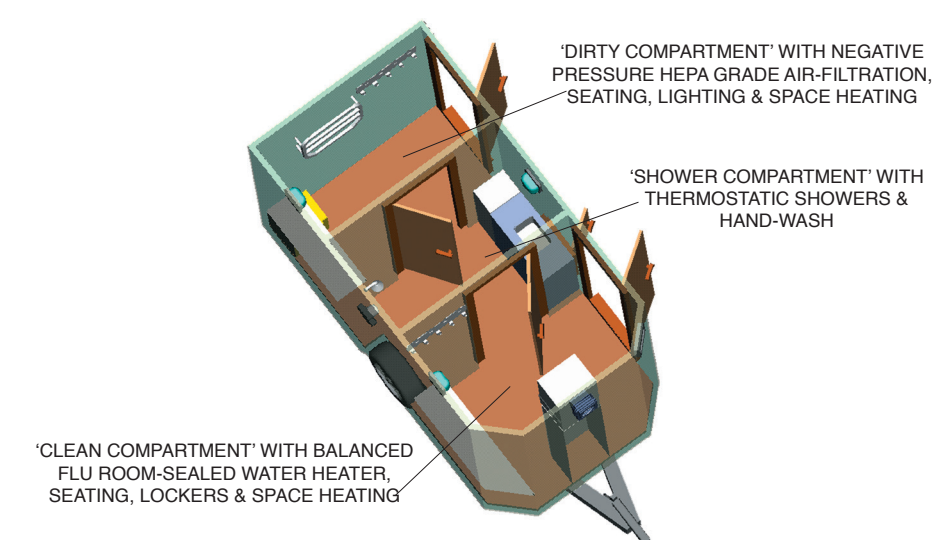
A typical decontamination unit (DCU) has separate access doors clearly marked "Clean" and "Dirty" which allow access to the three internal compartments. At the start of the work period the operative should enter through the "Clean" door and change into coveralls, footwear and appropriate Personal Protective Equipment (PPE), including (if necessary) Respiratory Protective Equipment (RPE).

Once dressed they should proceed through the "Shower compartment" and the "Dirty compartment" then exit through the external door along the route to the work area.

Upon return, the procedure is as follows (modified according to specific hazards being addressed):

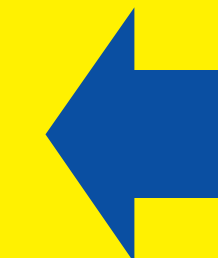
- 1 Proceed to the door that accesses the "Dirty Compartment". Where appropriate, clean footwear at the bootwash station before entering the "Dirty Compartment".

- 4 Re-usable RPE should be thoroughly cleaned in the shower, or placed in plastic bags and sealed when leaving the shower. Single-use RPE should be sealed in bags for disposal when leaving the shower. Any towels used in the shower compartment should be sealed in bags for disposal when leaving the shower.



- 5 On completion of showering proceed to the "Clean Compartment". Where required, clean towels should be used for drying off in the clean compartment (do not carry forward towels already used in the shower for further use in the clean compartment). Personnel should dress in clean, uncontaminated clothing and footwear.

- 6 Finally, exit the DCU through the external 'Clean End' door.



Decontamination unit waste water filtration.

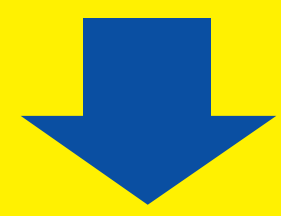
What happens to the shower water and how this is disposed of depends on what your operatives may have been exposed to, the regulations appropriate to your work activity, on local bylaws and what the local water authority is willing to accept.

Most filtration systems remove particulate matter from waste water utilizing a single-pass cartridge filter, which is disposed of after use; this normally operates in conjunction with a pump to ensure adequate flow rates. Single cartridges are sufficient for most applications but multiple cartridge systems are available for heavy loadings.



Filtering particulate matter down to 5 micron is common. However, filters are available down to 1 micron and below if required, although the penalty here is that higher pump pressures are required to maintain flow or larger banks of filters must be used.

It's important to recognize that soluble (dissolved) matter will not be removed by physical filtration. If you need to remove dissolved matter then you may need to consider specialist chemical filtration methods or off site treatment of the liquid waste stream.

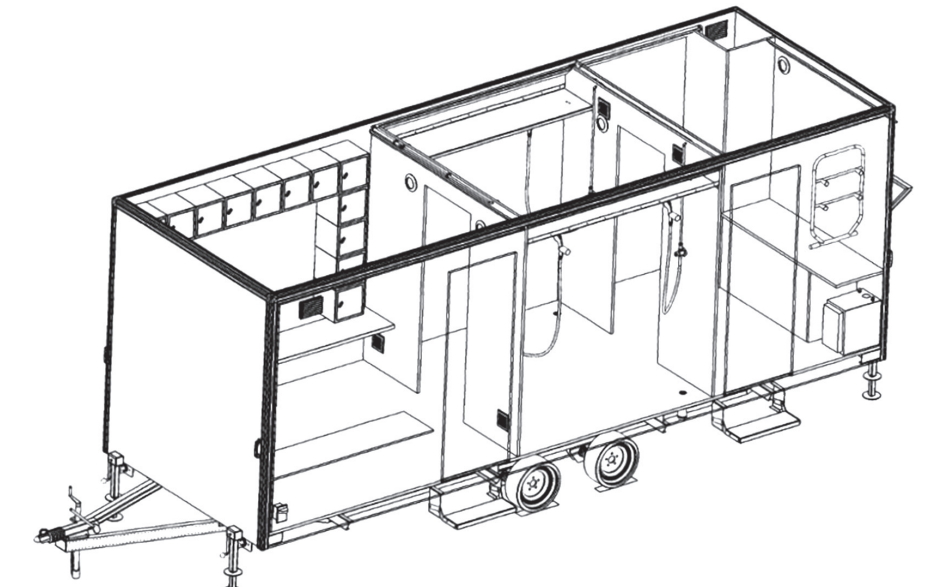


How do I set up a trailer Decontamination Unit?

Single-axle trailer versions are the easiest to maneuver and they are usually quite lightweight – most twin shower units weigh between 900kg and 1500kg. Once sited, apply the handbrake, wind down the stabilizing legs and level the unit.



'Self-Contained' decontamination units carry their own water supply and on-board generator. Turn on the water-heater, switch on the generator and connect the waste-water filtration system between the trailer and the waste disposal point.



Then turn on the integral lighting, space heating, negative pressure air filtration system (NPU) and shower & waste pumps. You are now ready to use the decontamination unit.

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Disclaimer: This document is provided as a general introduction to decontamination units for users unfamiliar with this equipment – as an aid in toolbox talks and the like. The procedures described are indicative only; the decontamination procedure that users of this equipment adopt will depend on their particular application, the regulations relevant to their application, and the materials they are encountering. This guide is not intended to be prescriptive.

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