Using blanks and interferents to ensure effective detection dog training

What is this note about?

This note provides guidance on how to maximise training efficiency and operational effectiveness through the appropriate use of blanks (non-target odours related to the training sample) and interferents (other non-target odours).

Who is this note relevant for?

All dog handlers or instructors training and deploying detection dogs.

Why use blanks and interferents?

Training samples for detection dogs should always contain the target odour of interest (e.g. explosives, drugs, firearms). However, many will also contain other non-target background odours relating to the preparation, packaging, handling and storage of the samples. Selecting high quality training samples and using good contamination control practices will help to minimise these unwanted background odours [1, 2], but it is almost impossible to avoid them entirely. When conducting any form of detection dog training, it is therefore vital to ensure the dog learns to reliably detect the target odour rather than any background/contaminant odours that might be associated with the samples.

Dogs will also encounter a wide range of other background odours in the environment when searching, some of which the dog may find particularly interesting. It is important that the dog does not indicate on non-target odours and is not overly distracted by them.

For these reasons, it is important to train regularly and effectively using 'blanks' and 'interferents' alongside training samples. Doing so:

- Helps ensure that the dog can reliably detect and indicate the target odour, and is not indicating only on packaging and/or other background odours associated with it (i.e. ensures your dog has a genuine detection capability). This is particularly important for low-odour targets.
- Ensures that the dog learns to ignore common non-target odours, therefore minimising the risk of false indications during operational searches (which are often costly and time consuming to resolve).

What are blanks?

Blanks are specifically designed to match the non-target background odours present on training samples. Blanks should be identical to the training sample in terms of the packaging and preparation process, but must not contain the training sample substance or any odour contamination from it.

Examples of training samples and their equivalent blanks are shown in Figure 1. The aim is to train the dog to indicate reliably on the training samples and not indicate on the blanks, therefore ensuring the dog is focusing on detection of the target odour substance only.

Use of blanks is particularly important:

- For low odour target substances, where other background odours may dominate.
- Where the target odour is on some sort of inert material (e.g. explosives on a filter paper), in which case separate uncontaminated samples of the inert material (filter paper in this example) should be used as blanks.

Training Sample	Blank
Sample in clip seal bag and plastic container	Clean, empty, identical clip seal bag and identical plastic container with matching label odours
Sample in glass vial and clip seal bag	Clean, empty, identical glass vial and identical clip seal bag with matching label odours
Sample wrapped in clingfilm inside clip lock plastic container	Clean, identical clingfilm inside identical clip lock plastic container with matching label odours

Figure 1: Examples of training substance packaging and corresponding blanks. Blanks should never contain any odour or contamination from the training substance.

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What are interferents?

Interferents (also known as distractors) are a range of other non-target odours that are likely to be encountered by dogs in training and/or operational environments. It is important to use a range of strong and weak interferent odours during training, to ensure the dog is adequately prepared to encounter (and correctly ignore) the wide range of distracting non-target odours of different types and strengths that they may encounter operationally. The aim is to train the dog to indicate reliably on the training samples and not indicate on the interferents.

Care should be taken to read the instructions and hazard warnings for any household chemicals that are used as interferents, to ensure they are presented safely (e.g. small quantities soaked onto a swab and contained in a manner to minimise risk of the dog accidentally ingesting it).

Examples of interferents (not an exhaustive or mandatory list):

'Strong' odours	'Weak' odours
Nitrile gloves	Handler odour (e.g. clothes)
Tennis ball/toy	Plastic bags
Odour of other dogs (e.g. bedding)	Plastic containers
Aftershave/perfume	Paper
Soap	Cotton wool
Hand wash	Sticky tape
Shower gel	Paper clips
Hand sanitiser alcohol gel	Soil
Deodorant	Sand
Baby wipes	Gravel
Shoe polish	Wood/MDF/chipboard
Bread	Filter papers
Herbs and spices	Elastic bands
Chewing gum	Cling film
Coffee	Tin foil
Tea	Fabric
Dishwasher tablets	Dish sponge
Washing powder	Uncooked pasta
Air freshener	Rice
Cleaning wipes	Leaves

It is important to use a wide variety of 'low odour' and 'high odour' substances as interferents. These should be stored in separate containers (to avoid cross contamination) and replaced regularly with both fresh samples and different odours (at least once every three months and more regularly if possible).

It is important to include interferent odours that are generally related to the preparation of the training samples (e.g. clean gloves of the type used to handle samples), as well as odours that the dogs might closely associate with the training environment (e.g. tennis ball odour, handler/instructor odour).

How to introduce blanks and interferents during odour learning/recognition training

The following example of a training process can take place within a stand-based system such as the canine odour identification test (Figure 2) [3]. It may be necessary to conduct this training over several sessions/days depending on the needs of the individual dog and difficulty of target odour detection.

1. **Train the dog to reliably detect the target odour**

   Over several short sessions, build the dog's association of the training sample with a reward. Do not use interferents or blanks at this stage. Use fast rewards or a 'bridge' (e.g. clicker) to reward any initial interest on the target odour. Once the dog is showing strong interest, encourage the dog to indicate if they do not do this of their own accord. Repeat until the dog can reliably indicate the target odour in a range of positions without assistance.

2. **Introduce a blank once target odour recognition is established**

   Introduce the blank at least 1m away from the training sample to ensure their odours are kept separate. The dog may 'false alarm' on the blank at first and should be allowed to come away from the blank by itself and move back towards the training sample to then receive a reward. Continue this process, varying the position of the training sample and blank, until the dog is reliably indicating on the training sample and not on the blank. Conduct further training with the handler 'blind' (i.e. they do not know the location of the training sample so cannot inadvertently influence the dog).

3. **Introduce additional blanks and a range of interferents**

   To ensure the dog has developed a reliable detection capability, training should continue (handler blind) with additional blanks and interferents present, in a range of positions. With repetition, the dog should learn to reliably indicate the target odour and ignore the blanks and interferents.

4. **Expand search scenarios**

   Once the dog is performing as required in an odour identification test scenario, more realistic search scenarios can be conducted using training samples, blanks and interferents.
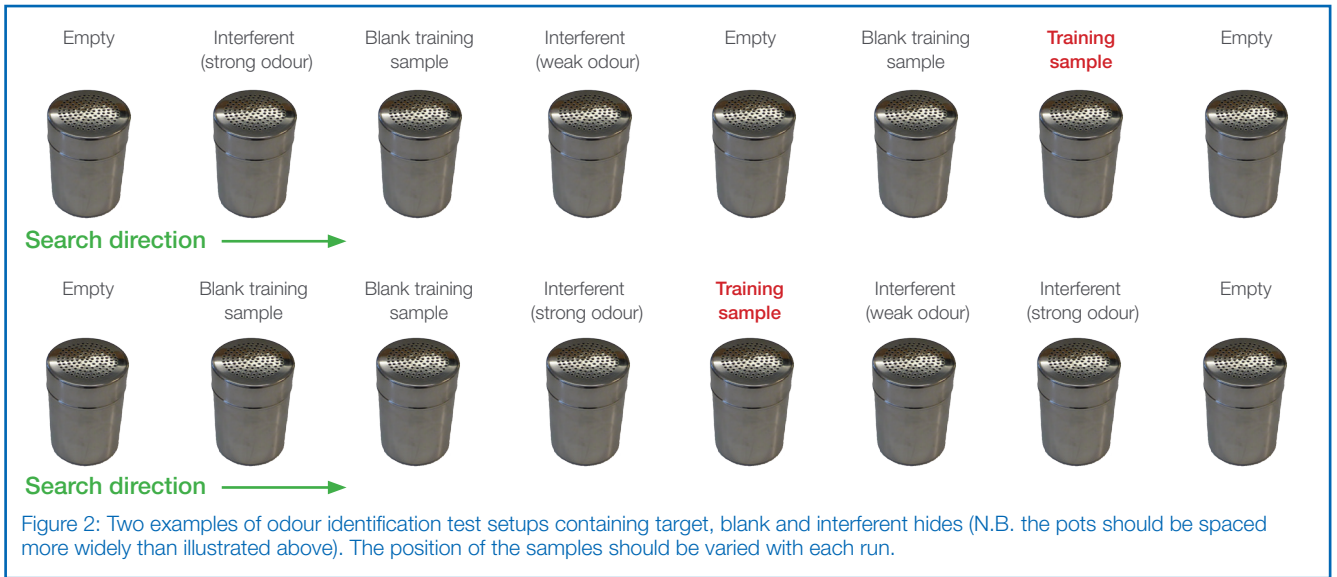
Empty	Interferent (strong odour)	Blank training sample	Interferent (weak odour)	Empty	Blank training sample	**Training sample**	Empty

Search direction ⟶

Empty	Blank training sample	Blank training sample	Interferent (strong odour)	**Training sample**	Interferent (weak odour)	Interferent (strong odour)	Empty

Search direction ⟶

Figure 2: Two examples of odour identification test setups containing target, blank and interferent hides (N.B. the pots should be spaced more widely than illustrated above). The position of the samples should be varied with each run.

Placing out blanks and interferents during search training

Adding blank and interferent items to a search environment is important because it introduces trainer/instructor odours and disturbance to the venue in addition to the positive target odour. Some blanks or interferents should be concealed in a similar manner to the target odour. For example, if the target odour is concealed in a rucksack in a cupboard, it is good practice to include at least one blank or interferent concealed in a similar rucksack in a different, but similar, cupboard. An example of a realistic search setup using training samples, interferents and blanks is shown in Figure 3.

Environmental disturbance

In addition to placing out blanks and interferents, it is good practice for the instructor/trainer/assessor to add additional disturbance to the search area prior to training or assessment. This should involve touching or disturbing items already in the search area such as branches, stones, doorknobs, cupboards, chairs etc., to add additional human odour and footsteps. This is to ensure the dog learns to search for the target odour rather than relying on following disturbance created by the person who put them out.
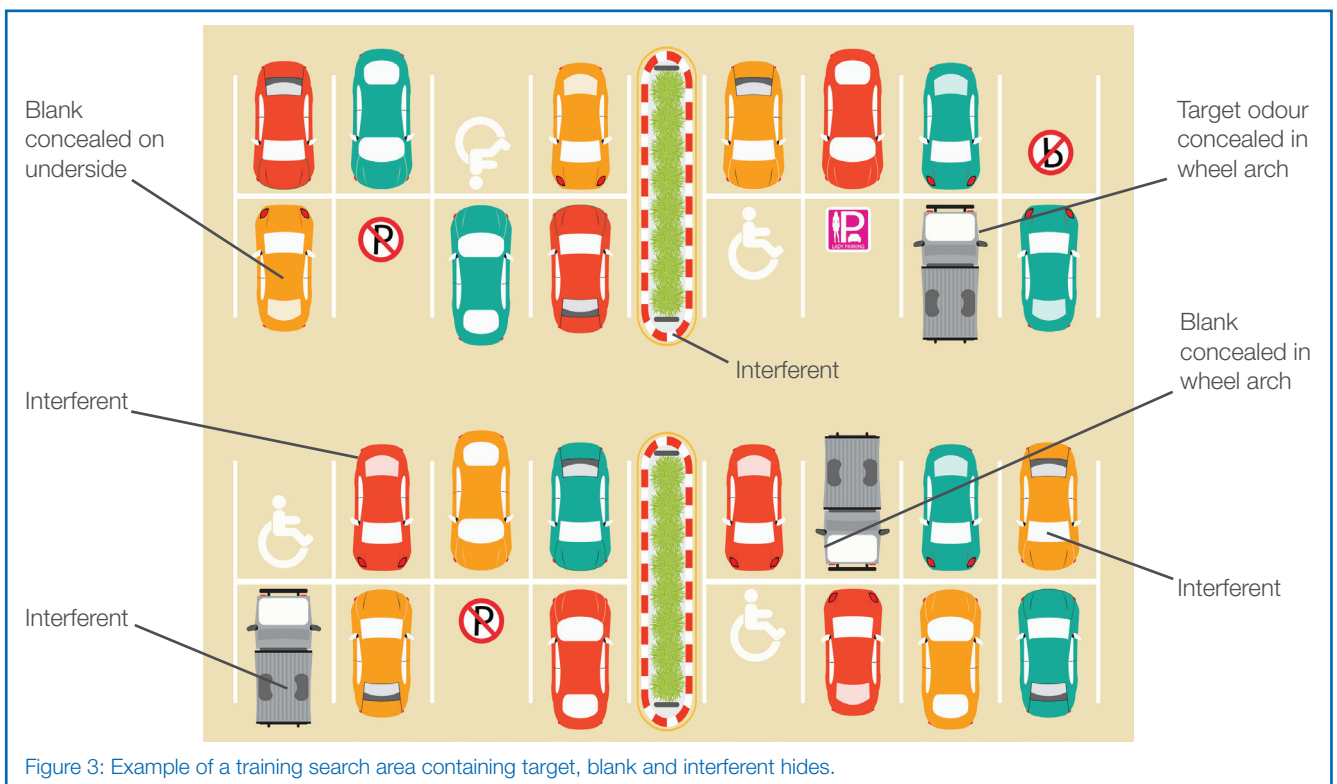

Blank concealed on underside

Target odour concealed in wheel arch

Interferent

Blank concealed in wheel arch

Interferent

Interferent

Interferent

Figure 3: Example of a training search area containing target, blank and interferent hides.

Top tips for using blanks and interferents in training

✓ During training searches, ensure that some blanks and interferents are always used and that some are concealed in a similar manner to the training sample.

✓ Indications on blanks and interferents must never be rewarded. When the dog has been trained to reliably detect the target odour, there should be no or very few indications on the blank or interferents.

✓ Continually change the order in which blanks and interferents are encountered by the dog between each search and training session, to ensure the dog does not learn to expect a regular pattern.

✓ It is good practice to use some interferents that are often found in the training/operational environment, and some that are more unusual/out of place, so that the dog is less likely to indicate on odours because they are novel.

✓ As well as using blanks and interferents, ensure that additional human activity/disturbance is randomly added to a search area prior to training, to ensure that the dog does not learn to use this as a cue to locate the training samples.

✓ Minimise contamination as far as possible. Ensure that blanks and interferents never come into contact with the training samples. Do not store blanks and interferents with, or near to, the target odours. See the "Why and how to control contamination" guidance note for further information on contamination control. [1]

✓ Interferents should be replaced with different items regularly to ensure that dogs encounter a wide variety and the interferent samples do not begin to adopt a 'corporate odour' or cross-contaminate each other.

Associated guides and Information

[1] Why and how to control contamination DSTL/PUB89644
www.cpni.gov.uk/canine-detection-guidance-notes

[2] Are your training samples giving you the capability you expect? DSTL/PUB104179
www.cpni.gov.uk/canine-detection-guidance-notes

[3] Canine Odour Discrimination Test DSTL/PUB89074
www.cpni.gov.uk/canine-detection-guidance-notes

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