

Effects of Heat and Acclimatization on the Capability of Detection Canines

A Guide for Detection Canine Handlers



Introduction

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T), in its continued support of the working dog community, sought to examine the impact of abrupt search starts (and the often notable changes in environmental setting/conditions as a result) on detection canine performance.

Dogs in the study were trained and housed under comfortable conditions (72°F, 60% RH) but tested under a range of temperature and humidity combinations (32°F to 104°F and 40% RH to 85% RH). Each test began with the dog held under the comfortable conditions, then rapidly introduced into an extreme environment to conduct a search – similar to moving quickly from a climate-controlled patrol car to a vehicle search as part of a traffic stop. Detection responses were repeatedly measured so that time dependent performance could be tracked.

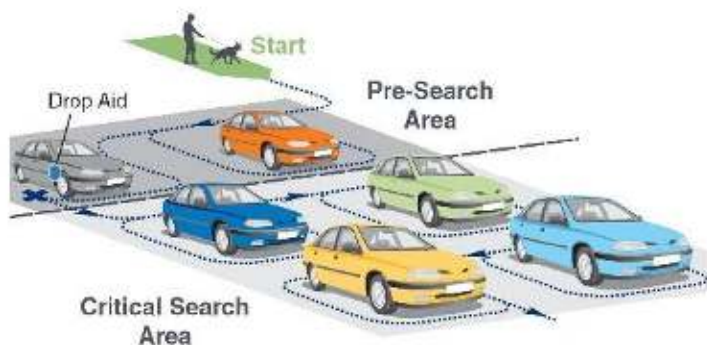
Key Findings

- Performance remained high when transitioning quickly into **cold** extremes. Oppositely, although the dogs appeared to work well in the **hot/low humidity** and **warm/humid** conditions, their performance was adversely impacted.
- Moving higher on the heat/humidity index, dogs unaccustomed to **hot/humid** conditions showed a substantial reduction in search behavior and performance in those extremes.
- Dogs take several moments to fully engage in a search, and performance during those first moments is reduced (i.e., a "warm-up period" does exist, and was present even when moving from comfortable hold conditions to comfortable test conditions!).

Recommendation #1:

Canines should be allowed a "pre-search" to mitigate any adverse effects of the warm-up period:

1. Settle the canine into the environmental conditions – allow them to roam/break.
2. Work the canine as much as 2 to 5 minutes before entering the critical area (this could include the exterior of a building, or several neutral vehicles, before arriving at the targeted vehicles).
3. When feasible and permitted, employ the common practice of a drop aid - where a target/training aid is knowingly present in the pre-search area to motivate and check on the canine.



Recommendation #2:

	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	138
45	80	82	84	87	89	93	96	100	104	108	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	88	93	100	108	117	127										
100	87	95	103	112	121	132										

Caution
Danger
Extreme Caution
Extreme Danger

Canines should be trained and evaluated under all environmental conditions in which they will work.

1. Systematic exposure and conditioning to the local environment are essential.
2. Collect the heat index rating at the start, end, and throughout the day; exert caution if the heat index exceeds conditions under which the canine has not been formally evaluated as decrements may exist.
3. Even with these precautions, note that performance under extreme conditions may be lowered even when canines exhibit adequate search behaviors.

This guide was prepared by Battelle Memorial Institute and disseminated with funding from DHS S&T under contract 70RSAT19CB000014. For more information, contact us at: STK9@hq.dhs.gov