HOW HOT IS THAT SIDEWALK?

A temperature study of walking surfaces, burn potential for a dog, and preventing and treating paw burns Marcia Breithaupt, www.LHAPS.com

While walking one of my customer's dogs, a black haired Belgian Shepherd, I noticed on his afternoon walks he would tend to skip across the pavement and concrete. Living the past six years in South Florida I have certainly become aware of the heat and the impact on animals but I was surprised to see how this particular dog was extra sensitive to the temperature along his path.

Although I have found several articles on dog paw pad injuries from summer heat I wanted to get a better understanding as to what kind of temperatures my dogs were experiencing and how to avoid these. Also, some customers may demand to have their pets walked but we need to explain to them it may be an unsafe condition. In addition, should injuries occur, I have noted some actions to take.



I worked with an engineer to take temperature data over several days along my walking paths. I also researched temperature impacts on animals and found some startling information. Simply stated, in the heat of the summer we are nearly burning many dogs feet walking across hot pavement and cement and all pet sitters must rethink how and where we walk our animals on these hot days. In addition, when transporting animals we must also pay attention to the temperatures getting into a hot car which can be even worse on an animal.

TEMPERATURE LIMITS FOR ANIMALS (and people)

Surprisingly the research is limited regarding temperature impact on animals but what I did find was alarming. Experimental tests on live animals for thermal burns had been done by several researchers in the 1940's. The data showed several key temperatures and are noted below. I have added about 10°F which the pads on dogs feet offer:

- 120°F: the initial pain threshold for direct skin contact without permanent damage.
- 140°F: burns, permanent damage, and scarring appear after one minute contact
- 150°F: rapid burns and blistering.

Humans have similar temperature limits but they can vary substantially with age, skin condition, and contact method compared to most animals. Below are several key temperatures:

- 120°: burns after five to ten seconds in hot water for small children and the elderly.
- 140°: burns after one minute contact or hot water immersion for average adult. (Adults with calloused skin can tolerate longer but still achieve burns.)
- 160°: rapid burns and blistering after contact with firm surface or water immersion. Nerve damage is possible.

Just like a human's callused hands larger dogs may be able to tolerate these high temperatures for several minutes but you will eventually cause permanent damage or blistering with continuous exposure.

TEMPERATURE MEASUREMENTS

Although South Florida may seem to be a severe thermal environment the temperatures we measured often occur in Southern California, Arizona, New Mexico, Texas, Louisiana, Alabama, Georgia, and often up the eastern coast on summer days. In the heat of the summer it is also common for middle latitude states like Tennessee, Missouri, Oklahoma, and others to achieve such temps. This collection of states easily touches one half of the population of the United States in the summer months.



To measure this data an infrared thermometer was held about one foot out above the ground. It's highly recommend all pet sitters purchase such a device to ensure the safety of their animals in not walking them on a surface that is not too hot.

The unit is available on Amazon.com for under \$30 but other similar units can be purchased at hardware stores. Their accuracy is surprisingly good, are about the size of a tube of lipstick, and they are a great tool to be used for other purposes such as measuring the bath water temperature or in-car temperatures.

TEMPERATURE DATA

The pavement temperature data I measured on the 95° day in South Florida was simply stunning. During the peak overhead sun periods, black pavement temperatures hit 140°F in mid afternoon between 2:00 and 4:00pm. They exceeded 120° on blacktop between 11 AM and 6 PM which is still above the pain thresholds for most dogs. I also tested a red brick sidewalk area but it was only about five degrees cooler than the blacktop.



Since most animals walk on the sidewalk I assumed the white concrete surface would be much cooler since light colors reflect heat more. Surprisingly it was still dangerously hot. Between 1:00 and 4:00pm the cement was over 115° which is still a painful experience for most dogs. Even the adjacent grass was over 105° in the sun at midday. Temperatures in the Desert Southwest and south Texas can be even higher. In general the darker the surface, the more heat it absorbs, and the more intolerant for the dog.

HOURLY TEMPERATURE STUDY, NAPLES, FLORIDA JUNE 3, 2010 (values in degrees F)							
Time	Grass in shade	Grass in sun	Air Temp	Cement	Red Brick	Blacktop	UV (max16)
7am	70	74	76	78	78	80	1
8	72	77	77	80	81	81	2
9	78	85	88	93	95	89	4
10	82	86	90	99	105	103	8
11	85	98	92	105	115	121	10
12pm	88	100	93	112	125	130	12
1	90	103	94	115	130	135	14
2	91	105	95	125	135	140	14
3	91	105	95	124	134	140	14
4	89	102	95	118	131	137	10
5	87	98	93	112	122	131	7
6	85	96	91	106	110	122	4
7	83	86	90	100	105	112	0
8	80	80 (dusk)	87	95	98	103	0
9	78	78 (dark)	84	90	92	93	0

OTHER TEMPERATURE PROBLEM AREAS

Everyone has experienced that gush of hot air when opening their car door on a hot summer day and sitting down on a hot leather seat. After measuring these temperatures on the pavement I felt it was also a good opportunity to measure the seat temperatures with light grey leather seats. I was stunned when I saw the 152° reading on the seat surface. This would certainly burn any animal's paws and emphasizes the need to carry towels or blankets to cover the seats before allowing your pet to get in the car or let your bare skin touch it.

In addition the vehicle itself had an air temperature over 130° sitting in the daytime sun so this is further proof that leaving animals in closed cars is dangerous and against the law in Florida. Even with windows cracked open the in car temperature can rise 20 to 30° above the outside air temperature due to the suns heating thus a 70° day can feel like 90 to 100° inside a locked car.

One more surprising measurement was the thermal heating of an actual dogs' coat. On these 95° days I was also measuring over 125° on the top of the black fur of this Belgium Shepherd. Although a dog's fur keeps them warm in the winter it also

acts as an insulator in the summer. The problem with this concept is that the insulator breaks down over time. The hot temperature on the surface of their coat warms their fur eventually reaching their skin. These high sun exposures can easily create heat stroke for a dog that has been in the sun.

As an added note, the old saying of "so hot you can fry an egg on it" is almost possible. An egg requires a cooking surface of about 160° for it to congeal. We did achieve 140° on the black pavement so we are not far off. Remarkably black leather seats inside a car can easily achieve this and the black dashboards in many cars can exceed 170°.

DOG PAW BURN PREVENTION

Based upon the data above it becomes obvious that we need to be VERY cautious walking a dog after noontime and as late as 6:00 pm. Unfortunately these times coincide with typical lunch and after work walks. Many people will say the obvious and simply not walk their dogs but we all know this is not always possible. So what can we do to prevent burns?

- Walk your animals as early and as late at night as possible to allow all the surfaces to cool.
- If your dog wants to walk in the grass, let them. They are obviously in pain and you cannot force them onto a hot surface.
- Walk your dogs as often as possible on cement to build up calluses on their pads. The act as an insulator providing another few degrees of protection and helps prevent blisters.
- Moisturize their pads everyday with Vaseline© or MushersSecret© to keep their pads soft and pliable thus less prone to cuts.

TREATING PAW PAD BURN INJURIES

If a dog experiences a burn or blister several steps should be taken to prevent injury. Dog paws are also very prone to infection so immediate response is critical if you detect any burns or cuts.

- Wash the dog's paw with antibacterial soap such as Dial® and pat dry with a soft towel.
- Spray Bactine© brand spray on the burns immediately. It is an excellent antiseptic and has
 Lidocaine which is a good anesthetic which takes away the pain. You may also use Betadine which
 is the same chemical but in unbranded larger bottles. It is safe for animals and people and has
 been used for over 50 years.
- Apply antibiotic ointment over the damaged area and wrap with gauze then pull a sock up over the foot and leg to prevent the dog from chewing at the wrap.
- Immediately take the dog to a veterinarian to get checked and possibly prescribe a mild antibiotic to prevent infections.



SUMMARY

I cannot emphasize enough how dangerous a hot sunny day can be while walking animals or moving them into hot environments such as a closed vehicle. The animal may be trying to make adjustments to stop such burns which we cannot interpret. We must become more aware of these temperatures and be able to educate our customers about this.

REFERENCES

- 1) "Experimental thermal burns, especially the moderate temperature burn," E.H. Leach, R.A. Peters, and R.J.Rossiter, 1941-1943, http://ep.physoc.org
- 2) **MicroTemp**, MT100, www.Amazon.com
- 3) MushersSecret, www.MushersSecret.com

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