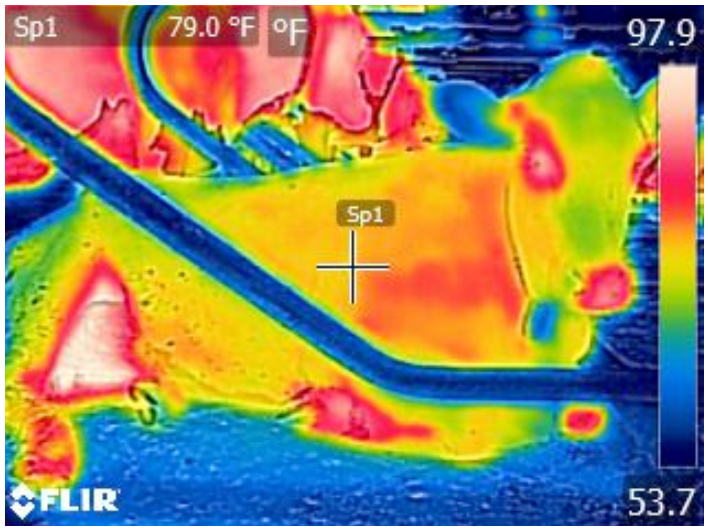
DCC Waterbeds®

Dual Chamber Cow Waterbeds

HOT COWS NEED COOL SOLUTIONS

THE DAYS OF SUMMER ARE GETTING HOTTER, AND THEY'RE STAYING AROUND FOR A LOT LONGER THAN THEY USED TO.



There's plenty of research and information that talks about how heat affects your cows. You'll read about changes in DMI as temperature and humidity rises. Nutritionists suggest adjustments to the ration to compensate for the cow's needs and the changes in intake.

Some talk about cow behavior as they try to deal with heat stress. Cows stand more. They crowd in the shade to escape the sun – even in well ventilated barns. They do whatever they can to try and cool down. Others talk about lost production and delayed recovery, as well as missed breeding cycles and the related carryover effects.

Experts agree – anything you can do to lessen the heat stress in your cows is good for them, and good for you. You know these things and **you've been dealing with heat issues for years**.

You've added fans, put in soakers and misters, and maybe shade cloth or curtains. You've given your cows better access to fresh water, and maybe reduced crowding during the hot months. Some have even built new barns, or remodeled existing ones, and made sure that the cows' environment was improved.

You've done all these things because **no one knows the effects of heat stress on your bottom line better than you**.

One area of the barn you may not have considered is the stall base. Aside from the recommendations on sizing your stalls to fit your cows, have you thought about how the temperature of the stall bedding might be affecting your cows? Is that bedding working with your other cooling systems? Or, is it actually contributing to the heat-related stress in your cows?

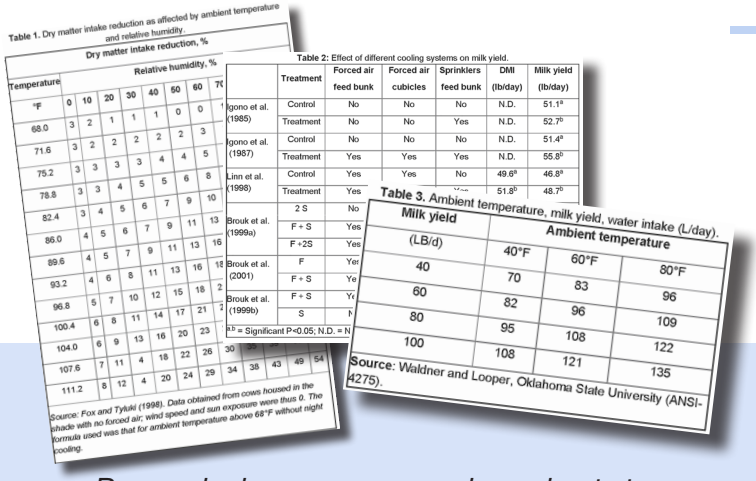


Table 1. Dry matter intake reduction as affected by ambient temperature and relative humidity.

Temperature	Dry matter intake reduction, % Relative humidity, %						
°F	0	10	20	30	40	50	60
68.0	3	2	1	1	1	0	0
71.6	3	2	2	2	2	2	3
75.2	3	3	3	3	4	4	5
78.8	3	3	4	5	5	6	8
82.4	3	4	5	6	7	9	10
86.0	4	5	6	7	9	11	13
89.6	4	5	7	9	11	13	16
93.2	4	6	8	11	13	16	18
96.8	5	7	10	12	15	18	21
100.4	6	8	11	14	17	21	25
104.0	6	9	13	16	20	23	30
107.6	7	11	4	18	22	26	34
111.2	8	12	4	20	24	29	38

Source: Fox and Tylutki (1998). Data obtained from cows housed in the shade with no forced air; wind speed and sun exposure were thus 0. The formula used was that for ambient temperature above 68°F without night cooling.

Table 2: Effect of different cooling systems on milk yield.

	Treatment	Forced air feed bunk	Forced air cubicles	Sprinklers feed bunk	DMI (lb/day)	Milk yield (lb/day)
Igono et al. (1985)	Control	No	No	No	N.D.	51.1[a]
	Treatment	No	No	Yes	N.D.	52.7[b]
Igono et al. (1987)	Control	No	No	No	N.D.	51.4[a]
	Treatment	Yes	Yes	Yes	N.D.	55.8[b]
Linn et al. (1998)	Control	Yes	Yes	No	49.6[a]	46.8[a]
	Treatment	Yes	Yes	Yes	51.8[b]	48.7[b]
Brouk et al. (1999a)	2 S	No				
	F + S	Yes				
	F +2S	Yes				
Brouk et al. (2001)	F	Yes				
	F + S	Yes				
Brouk et al. (1999b)	F + S	Yes				
	S	No				

[a,b] = Significant P<0.05; N.D. = Not determined.

Table 3. Ambient temperature, milk yield, water intake (L/day).

Milk yield (LB/d)	Ambient temperature 40°F	60°F	80°F
40	70	83	96
60	82	96	109
80	95	108	122
100	108	121	135

Source: Waldner and Looper, Oklahoma State University (ANSI-4275).

Research shows cows experience heat stress with themperatures as low as 68° F.

Maybe you've heard about the **long life, reliable performance of DCC Waterbeds.**

But, did you know that they can **provide a cooler lying surface for your cows** during the hot, summer months?

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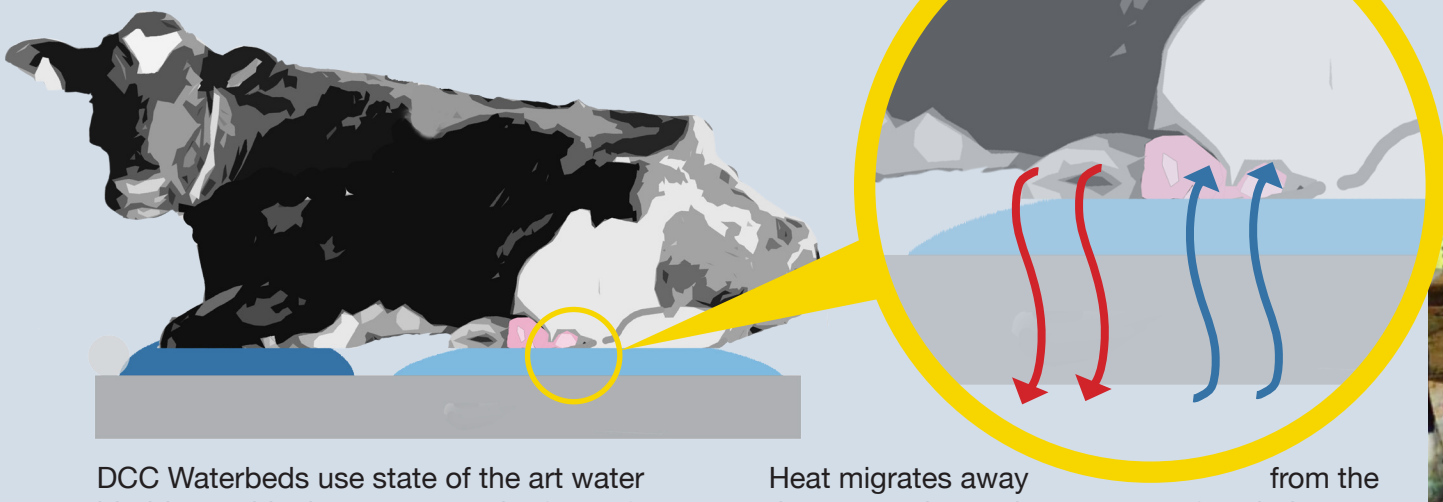
DCC Waterbeds®

Dual Chamber Cow Waterbeds

THE ONLY STALL BEDDING SURFACE THAT DOES NOT TRAP THE COW'S BODY HEAT IN THE BED SURFACE

DCC Waterbeds

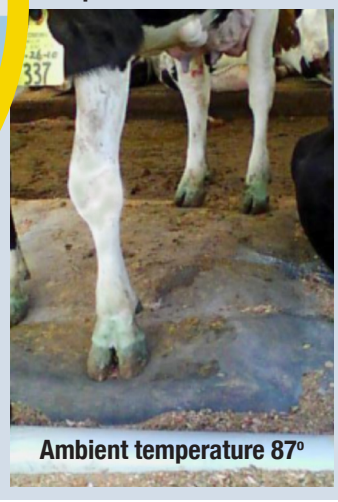


DCC Waterbeds use state of the art water bladder cushioning to protect the frame from immediate deterioration under rigorious barn conditions. The bottom surface of the DCC waterbed lies directly in contact with the consistently cool concrete.

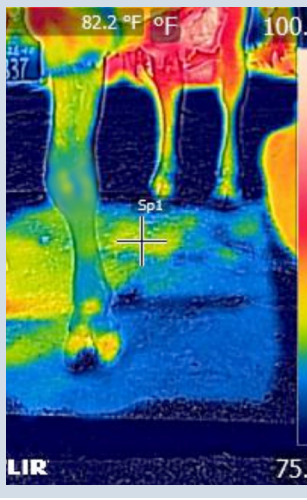
Heat migrates away from the the cow to the cool concrete surface below. Because concrete is not an insulator, it will continue to absorb and disperse heat away from the cow's body, keeping the bed surface cool.

Using a heat-sensing thermal camera, we captured the surface temperatures of various bedding materials. Hotter surfaces are seen in varying shades of red and white. Cooler surfaces display as yellow, green, and blue.

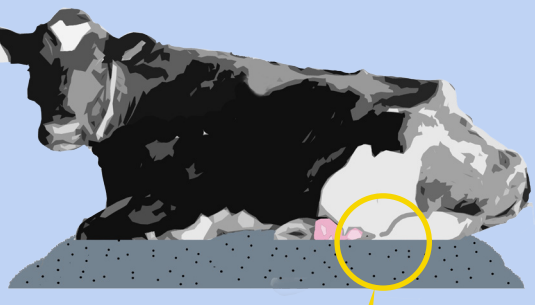
Stall photo as cow rises



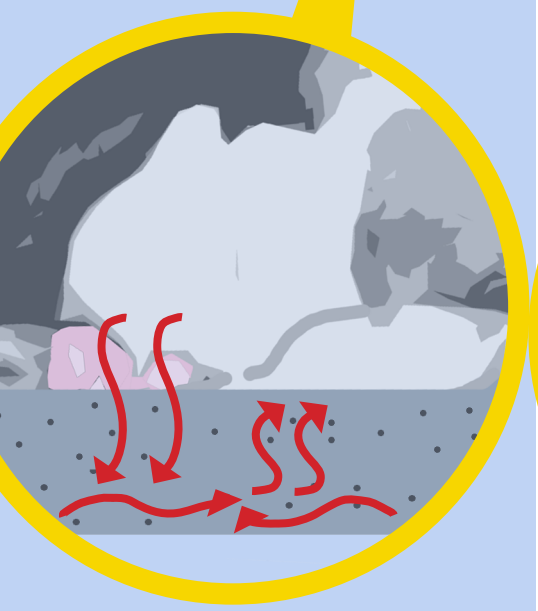
Thermal image



Sand Bedding

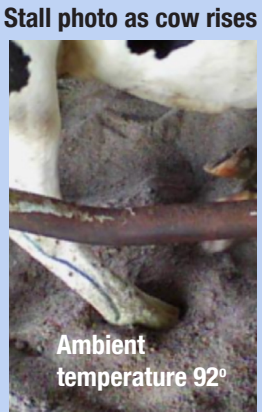


Inorganic sand and other small inorganic particles in a sand stall, coupled with the manure solids that build up in the sand bedding, hold the heat generated by the cows.

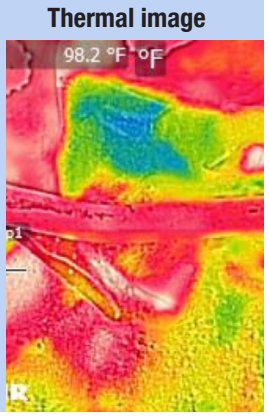


The cow settles and digs into position, trapping heat and liquid. Like an insulator, the sand bedding warms up and contains the heat beneath the cow.

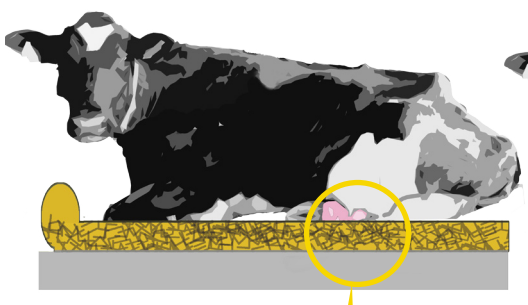
Stall photo as cow rises



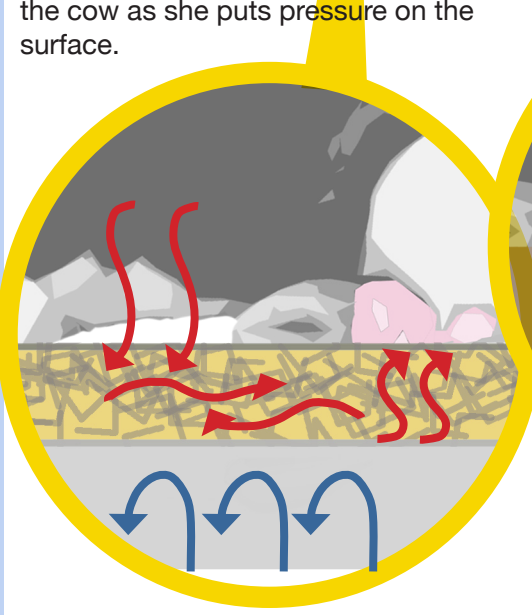
Thermal image



Foam / Crumb Rubber Flat Mattresses

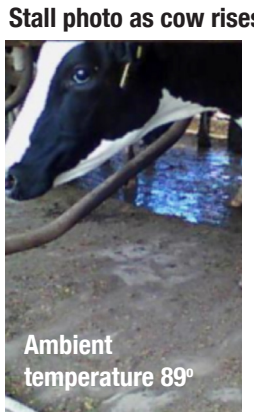


Man-made bedding systems using high-density materials such as thick rubber, crumb rubber, foam, or plastic wrapped in synthetic cover materials. Each of these materials compress around the cow as she puts pressure on the surface.

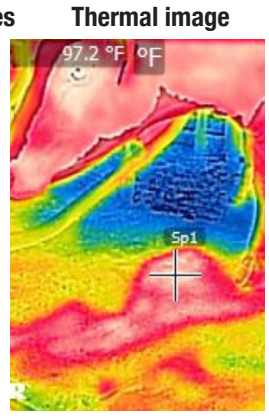


Foam is a good insulator. So, it's easy to understand how foam mats do the same thing. The bedding materials collect and hold the heat, keeping the cow from getting any cooling relief.

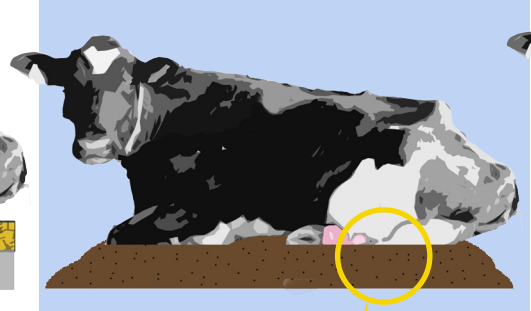
Stall photo as cow rises



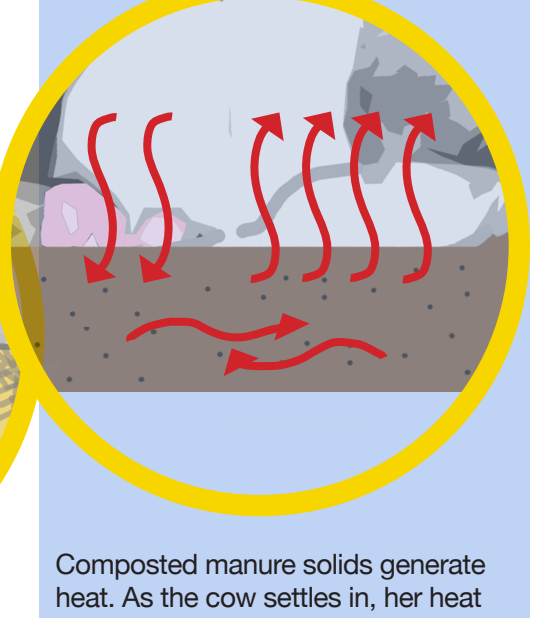
Thermal image



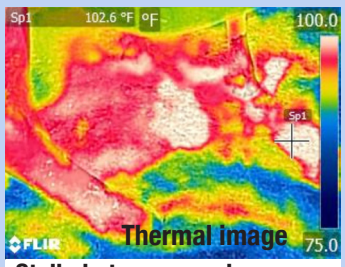
Manure Solid Compost Deep Bedding



Organic material and other small inorganic particles in a deep-bedded stall hold the heat generated by the cows.

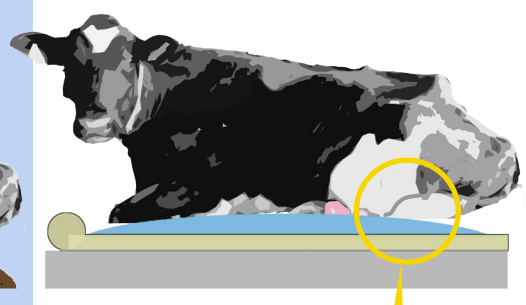


Composted manure solids generate heat. As the cow settles in, her heat has nowhere to go. Plus, she feels heat from the bedding.

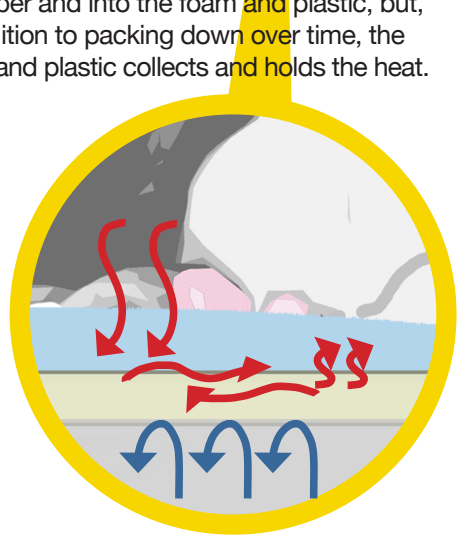


Stall photo as cow rises

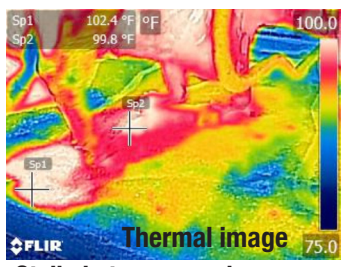
Single-Chamber Waterbed w/ Foam Base + Plastic Lining



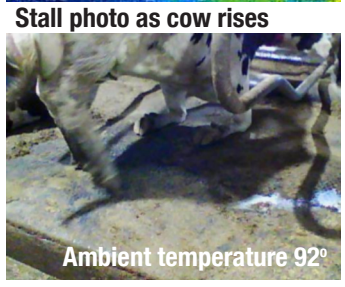
Single chamber waterbeds use a foam base under the small water chamber. The foam base is completely wrapped in a plastic liner. Initially, as the cow generates heat, some of the heat is transferred through the water chamber and into the foam and plastic, but, in addition to packing down over time, the foam and plastic collects and holds the heat.



The heat generated by the cow gets held by the foam and plastic, just like with mats, resulting in the water volume getting warmer and warmer. The cool temperatures of the concrete platform never get to the cow.



Stall photo as cow rises



To see video of our thermal camera reading temperatures in cold and warm barns, visit

www.dccwaterbeds.com/heatstress

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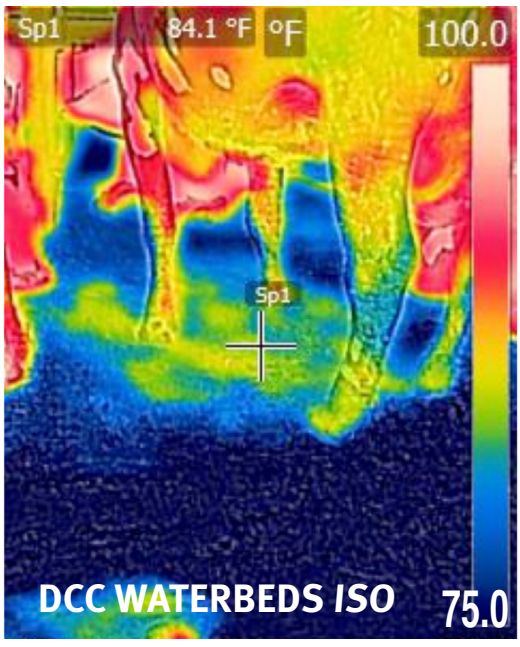
REDUCING HEAT STRESS

When warm weather hits, DCC WATERBEDS STAY COOL

No one can hide from the heat. Misters, fans and water availability all help reduce heat stress. But have you thought about the temperature of your bedding? We find DCC Waterbeds are 5-10F degrees cooler than sand, manure solids, and other mattresses in hot weather. That is a lot of extra heat your cow is exposed to up to 12 hours a day when she is lying in the stall.

To see more temperature readings with a thermal reader, visit: **www.dccwaterbeds.com/heatstress**



Outdoor temperature: 87F
Temperature of DCC Waterbeds *ISO* under cow: 84F

DCC WATERBEDS MEASURED IN BARNS WERE 5-10° F COOLER THAN SAND, MANURE SOLIDS, SINGLE-CHAMBER WATERBEDS, OR MATTRESSES.

Thermal Camera Image SHOWS COOL SURFACE

This photo shows the temperature of a DCC Waterbeds ISO surface beneath the cow immediately after she stands up.

Using a heat-sensing thermal camera, we captured the temperature ranges. The hotter the surface, the more red and orange there will be in the image. The cooler areas are blue, green, and yellow. During hot weather, the ground temperature conducted through the concrete beneath DCC Waterbeds, ensures the cows remain cool.

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