

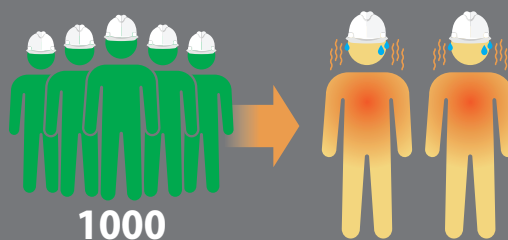
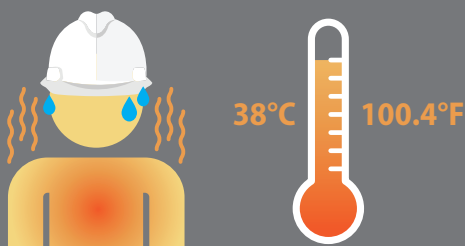


# WHICH FULL-BODY HARNESS KEEPS ITS COOL?

We put top safety harnesses to the test.

## HEAT STRESS: RISK FACTORS & OCCUPATIONAL HAZARDS

Heat stress is a physical condition in which the body cannot get rid of excess heat. It causes the body's core temperature to go up, increasing heart rate and making it difficult for a person to focus on a task. In severe instances, heat stress causes irritability, sickness, fainting, and even death.



According to the Occupational Safety and Health Administration (OSHA) Heat Stress Guide, "Any process or job site that is likely to raise the workers deep core temperature (often listed as higher than 100.4°F [38°C]) raises the risk of heat stress."

OSHA says factors, such as high air temperatures, radiant heat sources, high humidity, direct physical contact with hot objects, and strenuous physical activities have a high potential for inducing heat stress.

In addition to health and safety concerns, heat-related illnesses lead to poor performance and lost productivity. According to NIOSH, for every 1,000 workers, 2 are at risk for heat stress. That number goes up, too, depending on occupation. For example, those working in construction, mining, and manufacturing are at even greater risk for occupational exposure to heat stress due to the combination of a hot environment and high physical demand.

## HELPING TO PREVENT HEAT STRESS

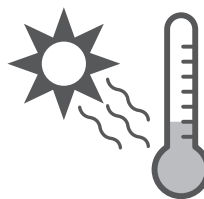
Appropriate PPE can help to play a role, too. The key however, is to equip workers with PPE that is:



*Lightweight*



*Enables Mobility*



*Allows for the Utmost Comfort—  
Even in Hot Environments*

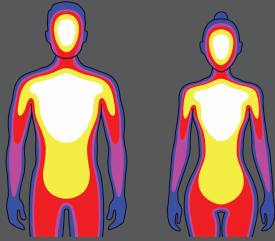
**WE KNOW WHAT'S AT STAKE.**

# COOLER, MORE COMFORTABLE SAFETY HARNESS

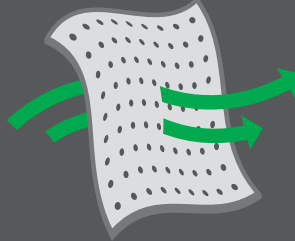
To address the “hot-and-heavy” harness issue, leading PPE manufacturer MSA talked to workers who wear full-body safety harnesses on the job. One of the primary complaints that came out of the research was no surprise: Full-body safety harnesses can be uncomfortably hot.

Taking the research one step further, MSA also employed a methodology that involves human factors and participatory ergonomics. This is a type of research that starts with understanding wearer needs and expectations, then using those learnings to inform a new design.

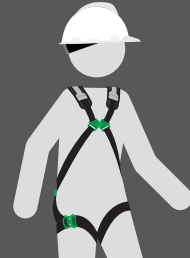
## THREE KEY FINDINGS EMERGED FROM THE RESEARCH



The body radiates more heat in certain areas because of the density of soft tissue and the proximity of major arteries to the surface of the skin.



The body's high-heat areas can inform the ideal size and location of breathable materials, hence, helping to provide more comfort for the wearer.



Maintaining enough material, density, and coverage keeps the structural support of the safety harness intact, thereby helping support the wearer's physical safety.

Using a combination of anthropometric data, ergonomic and range of motion studies, plus heat mapping, MSA engineers developed the harness to help maximize wearer comfort and minimize pressure and pinch points. The results of these studies were put into the design of the V-FLEX™ Harness, which includes:

Contoured padding to fit the body's normal curves



Closed cell foam reduces moisture build-up—keeping your pad from getting soggy and extending the life of your harness



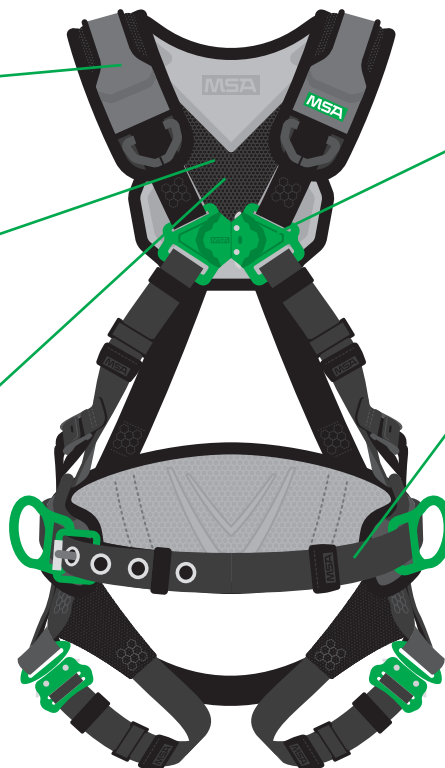
Integration of lightweight, breathable materials where possible to support the human body's natural cooling capabilities and reduce heat stress



Athletic cut and racing style buckle to enable upper torso mobility



First of its kind adjustable waist belt can be moved higher, or lower on the body depending on your application and comfort preference



# PUT TO THE TEST—THE HARNESS HEAT TEST

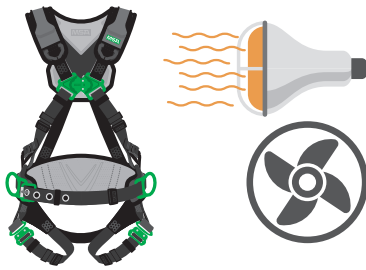
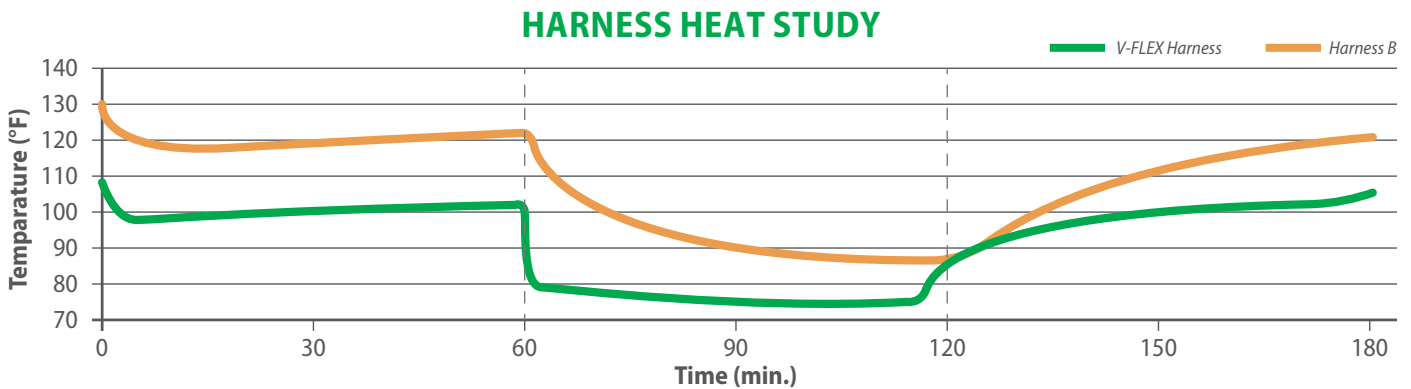
Because it's costly and time consuming for the average employer to purchase different safety harnesses, along with performing due diligence to find out which harness is the coolest, MSA conducted an unbiased comparison test of two harnesses, its own V-FLEX™ Safety Harness and a competitor's.

Each harness was tested for overall temperature comfort, temperature fluctuations over extended wear time, and the speed at which the harness heats up and cools down.

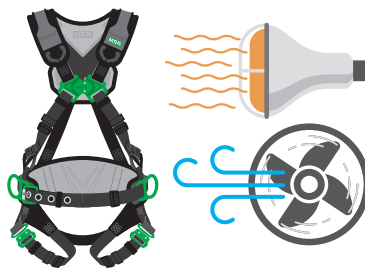
This test was conducted by MSA, at its Fall Protection Lab, accredited by the ANSI National Accreditation Board to ISO/IEC 17025:2017 for testing.

## TEMPERATURE VS. TIME

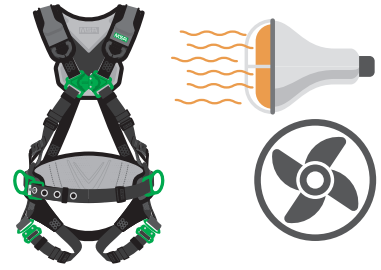
Both harnesses were pre heated in advance to replicate sitting in a hot tool crib. Using heat lamps to simulate the sun's rays, and a fan to simulate a slight breeze during a portion of the test, each harness was tested for 3 hours. Data points were recorded by an automatic thermocouple recording device every 30 seconds. The graph below depicts the temperature range experienced throughout the test for each harness.



*Heat Lamp On, Fan Off*



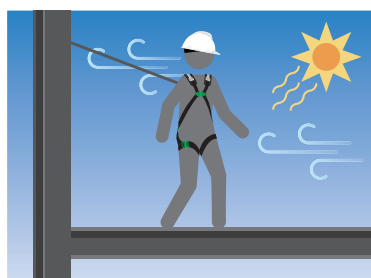
*Heat Lamp On, Fan On*



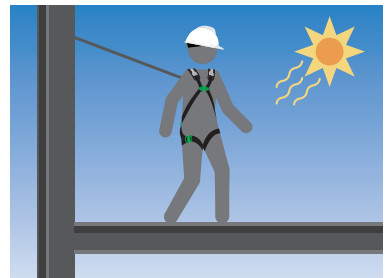
*Heat Lamp On, Fan Off*



*Simulates Harness in Storage*



*Simulates Worker Wearing Harness  
in Sun, with Breeze*



*Simulates Worker Wearing Harness  
in Sun, without Breeze*



## RESULTS

Statistically speaking, here are the test temperatures, as well as the difference in coolness measured as a percent:

TIME	MSA V-FLEX HARNESS	HARNESS B	% DIFFERENCE
@ 0 minutes	107.3°F	128.2°F	17.7%
@ 60 minutes	86.9°F	120.7°F	17.9%
@ 65 minutes	77.4°F	107.2°F	32.3%
@ 90 minutes	74.7°F	89.9°F	18.5%
@ 180 minutes	104.5°F	119.7°F	13.6%
3 Hours Total Average	90.96°F	106.37°F	15.6%

## CONCLUSIONS

While both harnesses did track up and down in response to the application of heat and cooling, the observed differences were more than marginal in favor of the V-FLEX Harness.

Specifically, the V-FLEX Harness absorbed less heat (even when exposed to heat for a long period of time), cooled down very quickly when overheated, and was, on average, almost 16% cooler than *Harness B* (top competitor).

The lighter weight padding used, reduced profile of the pad itself, and intelligently positioned venting all enabled the V-FLEX Harness to get cool faster and stay cooler longer.

For more information about keeping workers safe, compliant, cooler, and more comfortable for longer periods of time with the MSA V-FLEX Full-Body Harness, visit [msasafety.com](https://www.msasafety.com).

Source List:

<https://www.cdc.gov/niosh/topics/heatstress/default.html>

<https://www.cdc.gov/niosh/docs/2016-106/pdfs/2016-106.pdf>

[https://www.osha.gov/OshDoc/data\\_Hurricane\\_Facts/heat\\_stress.pdf](https://www.osha.gov/OshDoc/data_Hurricane_Facts/heat_stress.pdf)

<https://www.osha.gov/SLTC/heatstress/index.html>

<https://www.osha.gov/SLTC/emergencypreparedness/guides/heat.html>

<https://ehs.research.uiowa.edu/occupational/heat-stress>

Note: This Bulletin contains only a general description of the products shown. While product uses and performance capabilities are generally described, the products shall not, under any circumstances, be used by untrained or unqualified individuals. The products shall not be used until the product instructions/user manual, which contains detailed information concerning the proper use and care of the products, including any warnings or cautions, have been thoroughly read and understood. Specifications are subject to change without prior notice.

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