HEATSTRESS GLOBAL

FAQ

Explore our 'Frequently Asked Questions' document covering ActiKewl® evaporative cooling, QOOLPAX® PCM technology, PPE integration, garment care, climate performance, safety, and independent testing.

QOOLPAX® PCM COOLING

ActiKewl®
SAF™ Powered by Super Absorbent Fibre Technology

Evaporative Cooling Products (ActiKewl® powered by SAF™)

How does the body naturally cool itself, and how does ActiKewl® support this?

The human body regulates temperature primarily through evaporation of sweat. As sweat evaporates from the skin, it removes heat, helping to cool the body.
In hot, humid, or high-exertion environments, this natural process can become less effective due to sweat saturation, limited airflow, or protective clothing. ActiKewl® powered by SAF™ enhances this natural cooling mechanism by storing water within advanced fibres and releasing it gradually, creating a controlled evaporative effect at the garment surface. This supports a more consistent cooling cycle, helping reduce heat strain and enabling the body to regulate temperature more efficiently.

Is ActiKewl® powered by SAF™ fabric safe?
Yes. It is made using non-toxic, polymer-based super absorbent fibres and is safe for direct skin contact.

How does ActiKewl® technology work?
ActiKewl® powered by SAF™ uses advanced super absorbent fibres that rapidly absorb water and release it slowly through controlled evaporation. This creates a sustained cooling effect that helps regulate body temperature in hot environments.

How is ActiKewl® different from HyperKewl™?
ActiKewl® is our next-generation cooling fabric, developed to replace HyperKewl™. It delivers improved water retention, more consistent evaporation, and enhanced durability for longer-lasting, more effective cooling performance.

How long do I hydrate the garments?
Typically soak in water for 1–2 minutes depending on the product and desired level of hydration.

Evaporative Cooling Products (ActiKewl® powered by SAF™)

How long does the cooling effect last?
Cooling duration depends on environmental conditions (heat, airflow, humidity), but ActiKewl® is engineered to deliver sustained cooling over extended periods, significantly longer than traditional evaporative materials.

Has ActiKewl® performance been independently tested?
Yes. Independent testing conducted by the Hohenstein Institute (Germany) confirms that ActiKewl® delivers market-leading evaporative cooling performance, demonstrating significantly enhanced cooling efficiency versus comparable materials.

What is the lifespan of ActiKewl® fabric?
ActiKewl® is engineered for durability and repeat use across multiple wet/dry cycles. Performance remains stable over time, although factors such as water quality, care, and usage conditions may influence long-term absorbency.

Can the products be reused?
Yes. Simply rehydrate and reuse. Always allow garments to fully dry between uses.

How much will the items weigh?

Weight depends on hydration level. For example, a cooling vest hydrated for around 2 minutes will typically weigh under 1kg. Users can adjust weight by controlling hydration time.

Does water temperature affect cooling performance?
No. ActiKewl® works through evaporation, not pre-chilling. Once hydrated (typically 1–2 minutes), the fabric stores water and releases it gradually, drawing heat away from the body as it evaporates. Cooling performance is therefore driven by airflow and evaporation rather than the initial water temperature.

Evaporative Cooling Products (ActiKewl® powered by SAF™)

How should I wash the garments?
Garments can be hand washed with light soap and water for optimal day-to-day care.
Avoid prolonged soaking in detergents and gently brush clean where required. Air drying is recommended where practical.

Importantly, ActiKewl® garments have also been independently tested to withstand industrial and machine laundering at 60°C for up to 50 wash cycles, while maintaining cooling functionality and garment integrity when cared for in accordance with instructions.

This level of wash durability exceeds the care and performance expectations typically associated with commercially available cooling garments and apparel systems, making ActiKewl® particularly suited to industrial workwear, PPE programmes, uniform rental, and commercial laundering environments where repeat wash performance is critical.
The ability to retain cooling performance through repeated high-temperature wash cycles supports long-term operational use across demanding sectors including construction, energy, logistics, manufacturing, utilities, and infrastructure projects.

Can I freeze ActiKewl® garments or accessories to enhance cooling?
No. Freezing is not advised. Subjecting the garment to sub-zero temperatures can cause excessive expansion of water within the super absorbent fibres, which may disrupt the cross-linked structure that enables controlled evaporation. Repeated freezing and thawing can compromise fibre integrity, leading to reduced performance over time.
Refrigeration is a preferable method if pre-cooling is desired, as it lowers the water temperature without damaging the material structure. However, this may create a stronger initial cooling sensation that does not reflect the normal, sustained performance of the technology.

Phase Change Cooling Products (PCM) - (QOOLPAX®)

What is Phase Change Material (PCM)?
Phase Change Material (PCM) is a substance that absorbs and releases thermal energy as it changes state (from solid to liquid and back again). In cooling applications, PCM is engineered to maintain a consistent temperature—typically 14°C—by absorbing excess body heat as it melts, helping regulate temperature and prevent overheating.

What temperature is the PCM designed to achieve?
A constant 14°C, designed to provide safe, comfortable cooling without risk of cold shock.

How do you activate PCM inserts?
Place them in a fridge, freezer, or ice water until solidified.

How long does activation take?
Approximately 30 minutes, depending on the cooling method.

How long does PCM cooling last?
QOOLPAX® PCM systems are designed to provide consistent temperature regulation at 14°C for up to 3 hours, depending on ambient temperature, workload, garment configuration, and exposure conditions. Cooling duration may vary in extreme environments or under heavy physical exertion.

Can PCM inserts be recharged onsite?
Yes. PCM inserts can typically be reactivated onsite using refrigerators, freezers, ice water, or chilled storage systems. This makes them suitable for rotational use programmes, multi-shift operations, and environments where workers require repeat cooling throughout the day.

What happens if the PCM fully liquifies?
As PCM absorbs heat, the material gradually changes from solid to liquid while maintaining its designed temperature regulation effect. Once fully liquified, the cooling cycle is complete and the inserts should be recharged before reuse. The inserts remain fully functional and reusable through repeated activation cycles.

Can QOOLPAX® systems be used under flame-resistant (FR) garments?
Yes. QOOLPAX® systems are specifically designed for integration with PPE and FR garment platforms. HSG cooling systems can be configured alongside certified FR, arc-flash, antistatic, and industrial workwear systems to support thermal comfort without compromising protective requirements.

Phase Change Cooling Products (PCM) - (QOOLPAX®)

Is Phase Change Material (PCM) safe?
Yes - PCM is non-toxic, non-carcinogenic, and non-flammable when used as intended within sealed inserts. Phase Change Material (PCM) The phase change material used is primarily n-octadecane and is not classified as carcinogenic, skin irritant, or sensitiser based on available data.

However, as with many hydrocarbons, it is classified as an aspiration hazard if swallowed, meaning it should not be ingested and inserts should not be damaged or opened.
In finished products, the PCM is securely encapsulated, making it safe for normal wear.
Users should avoid puncturing inserts and follow standard handling and care instructions.

Is QOOLPAX® suitable for confined space or low-airflow environments?
Yes. Unlike evaporative cooling technologies, PCM cooling does not rely on airflow or evaporation to function. This makes QOOLPAX® particularly effective in confined spaces, sealed PPE environments, high-humidity conditions, and applications where airflow is restricted.

Performance & Applications

Where are HSG cooling solutions used?
HSG technologies are deployed globally across construction, infrastructure, energy, logistics, hospitality, aviation, manufacturing, rail, utilities, and major industrial projects. Our solutions support worker safety, comfort, and productivity in high-heat environments, including large-scale infrastructure and operational deployments.

How does climate and humidity affect evaporative cooling performance?
Evaporative cooling performance is influenced by relative humidity (RH), wet-bulb temperature, and airflow. In lower humidity environments with good airflow, evaporative cooling can deliver strong and sustained performance. In high-humidity or low-airflow conditions, cooling effectiveness can reduce, and pairing evaporative systems with PCM or active airflow may be beneficial.
As a general guide:

- RH ≤ 60%: strong evaporative cooling performance
- RH 60–75%: moderate but effective cooling, improved with airflow
- RH ≥ 75%: evaporative cooling may be limited without additional airflow or PCM support

Airflow is also critical. Low airflow environments, sealed PPE, or still-air conditions can reduce evaporative efficiency regardless of humidity.

Which environments are best suited to evaporative cooling technologies?
Evaporative cooling technologies such as ActiKewl® perform particularly well in hot, dry, and airflow-supported climates, including inland Middle East regions, Australia, Southern Europe, South Africa, and the US Southwest. Mixed or seasonal performance can also be achieved across Europe, coastal regions, and elevated climates depending on humidity and airflow conditions.
In extremely humid environments, including parts of Southeast Asia, Gulf coastal regions, and tropical climates, evaporative systems may benefit from integration with PCM or active airflow solutions.

Performance & Applications

Has ActiKewl® been tested in real-world environments?
Yes. Between 2020 and 2025, Heat Stress Global conducted multiple field-based Proof of Concept (POC) evaluations across sectors including aviation, oil & gas, logistics, hospitality, and major infrastructure projects in extreme heat environments often exceeding 40–50°C.

Trials conducted at organisations and projects including NEOM, Qatar Shell, WOQOD/QJet, Deliveroo, and Hilton Salwa Beach Resort demonstrated measurable reductions in garment surface temperatures and improved thermal regulation when using ActiKewl® powered by SAF™ technology.

Can HSG cooling systems be integrated into PPE and flame-resistant garments?Yes.
HSG cooling technologies are designed for integration into certified PPE and flame-resistant garment systems, including FR, antistatic, arc-flash, and high-visibility applications. Supporting systems include compliance with standards such as NFPA 2112, NFPA 70E, IEC 61482-1-2, EN ISO 11612, EN ISO 11611, and EN 1149 depending on garment configuration.