TECHNICON ACOUSTICS
SOUND SCIENCE

THERMAL SOLUTIONS GUIDE

The Challenges for Heavy Equipment OEMs

Industrial engines generate a great deal of heat under standard operating conditions. While a necessary byproduct of combustion, this thermal energy creates challenges for operators of vehicular and heavy equipment. Excess heat makes a work environment uncomfortable or even dangerous, putting workers at risk of burns or heat exhaustion. Heat loss may also damage any nearby sensitive equipment and lead to unnecessary energy expenditures. To avoid these outcomes, equipment manufacturers should consider installing thermal solutions to insulate hot components and protect against the harmful effects of heat exposure.

In this guide, we consider some of the most common applications that require thermal solutions, as well as the options available to mitigate risk around combustion engines.

Methods of Controlling Thermal Energy

There is no one-size-fits-all solution for containing heat, due in large part to the huge diversity of applications requiring thermal solutions. It's crucial to partner with an experienced supplier with the capabilities to identify and tailor a solution that specifically addresses a facility's needs.

Proper material selection is imperative for heat control. Some thermal solutions sit between two surfaces to prevent heat transfer, while others employ reflective material to redirect the movement of thermal energy. Controlling heat within a given application requires an understanding of the methods by which heat transfers.

- **Conduction.** Heat transfer from one solid material through another is known as conduction. Conduction occurs when the engine or heat source contacts a surface with low insulative characteristics, causing the heat to spread through the contacting material. A layer of insulation between the two solids can help to mitigate the risk of heat conduction. In practical terms, this is comparable to using an oven mitt to protect your hand or table against a hot baking sheet. In an industrial setting, a thermal sleeve is analogous to a baking mitt, fitting over an exhaust pipe to protect nearby equipment.

- **Reflection.** In the context of thermal solutions, reflection is the phenomenon in which infrared radiation bounces off reflective surfaces, changing the path of energy movement through the environment. Some thermal solutions take advantage of this property by applying a reflective facing to surfaces surrounding a heat source. In doing so, it's possible to redirect the heat so that it dissipates into the air instead of being absorbed into surrounding machinery.

Where Thermal Solutions are Needed

Thermal solutions are necessary in any application with a heat source in the vicinity of heat-sensitive components, or where excess heat poses health and safety risks. In this guide, we consider a subset of these applications, focusing primarily on vehicular and heavy equipment applications.

Application 1 : Vehicle Exhausts

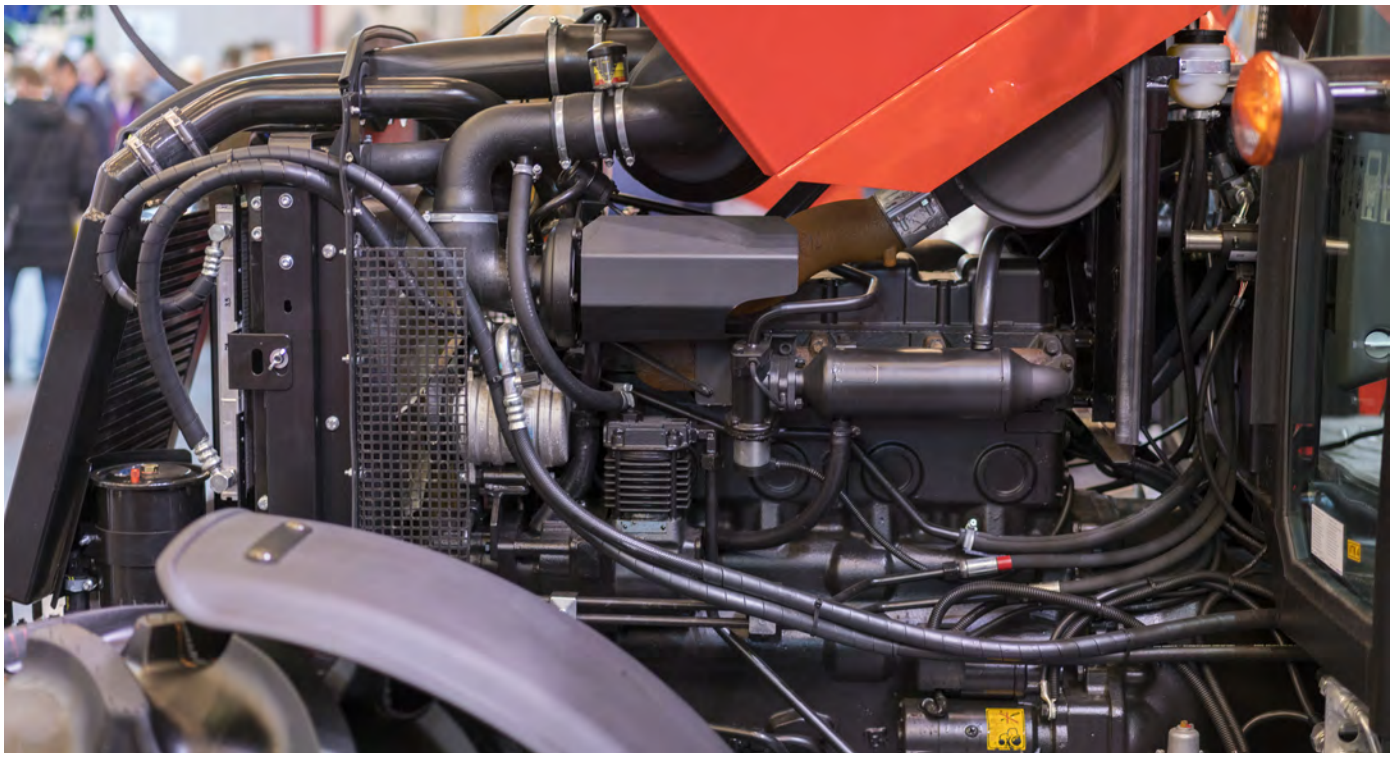
Vehicle exhausts often radiate extreme temperatures, but their cramped installation makes it challenging to insulate all nearby components. Rather than worrying about identifying and insulating all at-risk ancillary components, it's much easier to focus on the exhaust system itself. Installing a sleeve around the exhaust is the simplest way to ensure that most of the heat generated remains inside the exhaust system rather than escaping into the surroundings.

Original equipment manufacturers (OEMs) often install exhaust heat wraps or blankets in under-hood applications or along the exhaust pipe itself to avoid unwanted heat transfer and maintain appropriate gas temperatures within the system. Exhaust sleeves can also extend to sections that run outside of the vehicle to protect against accidental burns.

Thermal Solution

Vehicle exhaust wraps such as our **Tech Shield Sleeve™** are an ideal choice for confining unsafe heat within the exhaust system while minimizing heat transfer and damage to nearby components. Our sleeves also help to maintain the necessary heat levels required for diesel particulate filtration.

Application 2 : Engine Compartments, Firewalls, and Underbodies



Larger vehicles, including emergency vehicles and buses, tend to pack their engine components into cramped underbody environments that can become extremely hot. The heat does not remain trapped with the engine, but instead radiates into the cabin of the vehicle through the floorboards, generating an uncomfortable and potentially unsafe working environment. To combat this, OEMs often install heat shielding between the vehicle cabin and the engine compartment to trap radiating heat before it becomes dangerous.

Thermal Solution

Our **Tech Shield™** is made from a flexible and lightweight inorganic core that is naturally flame-retardant and thermally insulating. Installing a heat shield made from this material offers a noticeable drop in cold side or body side temperatures, improving operator comfort within the vehicle cabin and passenger areas.

Application 3 : Fuel Tank Shielding

Specialty and off-road vehicles need to keep fuel tanks at a carefully controlled temperature to prevent fuel from boiling. If the fuel tank temperature fails to remain below a safe level, certain components within the fuel will boil off and evaporate.

Thermal Solution

Tech Shield™ is an excellent fit for fuel tank shielding, as our material can be placed as close as one inch away from a 1,000°F heat source.

Other Applications

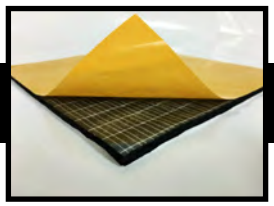
There are numerous other components that benefit from performance shielding, such as:

1. Gaskets
2. HVAC systems
3. Hoses and tubing

Whatever your product, Technicon's skilled representatives can work with you to identify a thermal solution that fits your unique needs.

Thermal Solution Products from Technicon Acoustics

Tech Shield Sleeve™

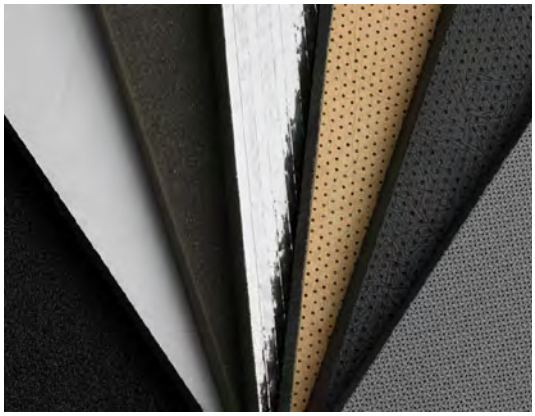


Tech Shield™

Features & Benefits	
Cold side temps are as much as 70% cooler than on the exhaust pipe itself	Protection from 1000ºF heat sources as close as 1" away
Reduced vibration of the pipes due to resonance and airflow	Overall thickness of 0.125" allows for installation in tight spaces
Proprietary cords are flexible during installation, but cure in place with heat present from exhaust pipes, making sure the wrap doesn't unravel even if some fibers are damaged from rocks/debris or if hose clamps fall off	Naturally fire-retardant core material
Unique braided structure allows some range in the pipe diameters one sleeve can cover while also not allowing open space for heat to escape, making application onto pipes effective and quick	Low tooling costs and short production lead time
Proprietary fiber denier and sizing combination reduces irritation over competitive fiberglass products	High-temp PSA with EZ Peel liner for installation on a variety of substrates
Supplied in spools of 2", 4" and 6.5" diameters	Supplied in rolls, sheets, or fabricated parts

Acoustic Materials for Passive Insulation

Technicon offers custom acoustic solutions that can also serve a purpose in controlling heat. Although not geared for extreme heat, our acoustic products can still assist with passive insulation in hot environments.



When lining either an operator cab or an engine compartment with acoustic absorbers, it will do its job as a noise reducer and will simultaneously insulate to protect operators and components.

There does not need to be a tradeoff of thermal or acoustic solutions in some cases. If you are also looking for acoustic treatments, read more about our products:

Acoustic Absorber	Acoustic Barrier	Vibration Damping Material

Combining our acoustic solutions with reflective film also allows OEMs to manage noise and heat with a single installation. **Composites** such as aluminized polyester film or reinforced aluminum film create a reflective layer on the surface of sensitive components, preventing them from absorbing heat that escapes from the source.

Why Partnering with Technicon Acoustics Benefits OEMs

When selecting a partner for thermal solutions, OEMs look for suppliers who have the experience and capabilities to effectively meet their needs. Technicon Acoustics has been at the forefront of thermal product development for over four decades, and our knowledge of thermal treatments is unmatched in the industry. We offer an extensive range of thermal products suitable for all manner of applications, environments, and markets. Our broad product line means that we can satisfy OEM clients with materials that have been rigorously tested for durability.

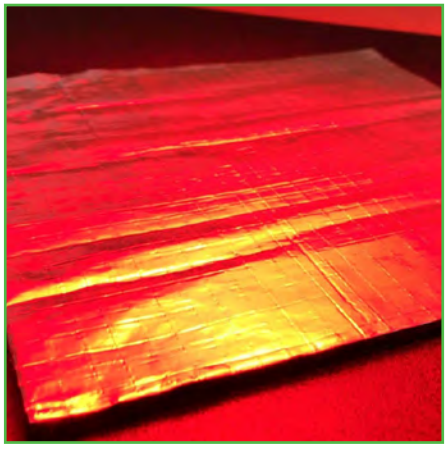
If none of our standard solutions offer a good fit, our experienced staff can develop customized solutions to address more specific challenges. Technicon has developed a time-tested methodology to reliably fabricate high-performance custom thermal products, drawing from our decades of experience in the field. Our custom solutions are comprehensive, cost-effective, and reliable, offering a custom-tailored means of reducing the impacts of harsh operating conditions and improving workplace safety. That means you can be confident in your results, whether you choose a standard or custom design.

Turn to Technicon for Thermal Solutions

Installing the right thermal solution instantly makes a product safer and often extends the lifespan of surrounding components that could otherwise become damaged by prolonged exposure to excessive temperatures. Given the importance of thermal wraps and sleeves, it's imperative to partner with an experienced supplier.

Technicon Acoustics is a leading producer of thermal solutions for OEMs across North America, including our celebrated Tech Shield™ and Tech Shield Sleeve™ options. We have decades of experience in the thermal solutions market, and we take pride in developing economical solutions to even the most complex thermal problems.

To see how our premium thermal solutions can make your products safer, please **contact us** or **request a quote** today.



About Us

We are the leading producer of Acoustic and Thermal Solutions for Original Equipment Manufacturers throughout North America.

With decades of experience in the market, we can help OEMs solve even the most complex noise pollution problems. Our economical solutions will improve your products marketability, enhance customer brand perception, and help you maximize value for your customer.

We design, develop, manufacture, and deliver parts and materials that absorb, block, and isolate sound and thermal energy. Our dedicated team of Engineering, Manufacturing, and Administrative Professionals utilize the latest systems, processes, and technologies in our state-of-the-art facility to meet and exceed your expectations.

Learn More

Request Quote

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