



THERMOSOX[®]

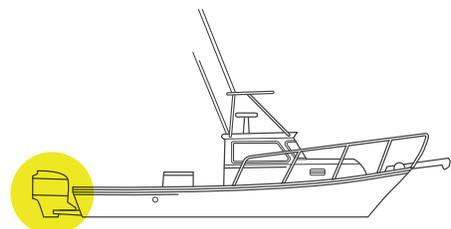
DESCRIPTION

ThermoSox[®] is an advanced insulating sleeve designed for high-heat applications. Innovative technology is used to create an extremely durable outer shell over underlying layers of insulation. As an engineered system, ThermoSox[®] can be customized to meet customer specific challenges. The multi-layer system can be formulated to withstand sustained exhaust temperatures up to 600°C (1112°F).

With a team supported by our vast engineering expertise and testing lab, we are able to formulate advanced product solutions to meet a variety of customer needs.

APPLICATION EXAMPLES

- ▶ EGR components
- ▶ Exhaust tubes
- ▶ Header tubes
- ▶ Mufflers
- ▶ Supercharger components



INDUSTRIES

- ▶ Agriculture
- ▶ Automotive
- ▶ Defense
- ▶ Heavy trucking
- ▶ Marine
- ▶ Oil and gas

PRODUCT BENEFITS

- ▶ High insulating performance
- ▶ Durable, road-tested outer covering
- ▶ Adaptable to a wide variety of diameters, lengths
- ▶ Zero to minimal tooling costs
- ▶ Quick lead times and prototype development

PREMIUM PROVEN QUALITY SOLUTIONS

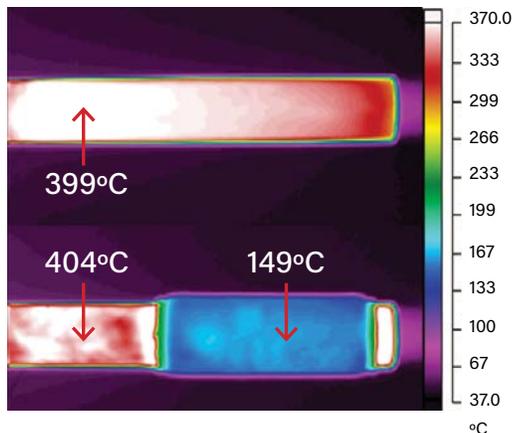
THERMOSOX®



TESTING MATRIX

ATTRIBUTE	VALUE	STANDARD
Flammability	Did not ignite	FMVSS302 Horizontal Burn
Chip Resistance	No damage	SAE J400
Impact Resistance	Maximum indent of 2.5mm with no cracking or tearing	ASTM D2794 (Modified)
Cold Drop Impact	External denting only was observed at a 3' drop height and below	ASTM D2794 (Modified)
Chemical Resistance	No degradation in chip resistance or flammability performance to the following chemicals: agricultural disinfectant, aluminum cleaner, truck wash fluid, engine cleaner, diesel fuel, bio-diesel, engine oil, transmission fluid, brake fluid, fertilizer solution, windshield washer fluid, engine coolant and DEF	OEM Standard
Resistance to Environmental Degradation	No degradation in insulation or loss of thermal performance	OEM Standard
Resistance to Thermal Cycling	No degradation	OEM Standard
Corrosion Resistance	No pitting through tube cross section	OEM Standard
Long Term Heat Aging	No change at 2,000 hours at 180°C	OEM Standard
Dyno Temperature Drop Thermal Testing	Passed OEM after treatment specifications for temperature drop	OEM Standard
Emissivity	0.95	ASTM E1933-99A
Thermal Conductivity	0.069 W/m-k at 288°C, 0.081 W/m-k at 453°C, 0.090 W/m-k at 592°C	External Lab Standard
Field Peak Operating Temperature	Passed OEM on vehicle testing	OEM Standard
Field Rapid Mileage Accumulation (RMA)	Passed OEM on vehicle testing	OEM Standard
Field Winter Exposure	Passed OEM on vehicle testing	OEM Standard
Field Durability	Passed OEM on vehicle testing	OEM Standard

THERMAL PERFORMANCE



COMPLIMENTARY SERVICES

- ▶ Thermal analytics testing
- ▶ CFD software (computational fluid dynamics)

INFRARED CASE STUDY

- ▶ Internal gas temperature: 649°C (1200°F)
- ▶ Internal gas velocity: ≈2855 ft/min
- ▶ Internal gas flow: ≈249 CFM
- ▶ Fuel type: natural gas
- ▶ Ambient temperature: 35°C (86°F)
- ▶ Relative humidity: 21.3%
- ▶ External wind speed: 23 ft/min

Note: For the most accurate IR reading, tubes have been coated with flat black paint to reach emissivity value of approximately 1.

OPTIONS

- ▶ Thickness: ¼" to 1", per customer requirements
- ▶ Length: 4" to 10'
- ▶ Clamp over: customer specifications
- ▶ Exhaust temperature: up to 600°C (1112°F)

This document provides a general description of a Lincoln Industries product(s) and is not intended to form a part of any contract. The information provided is for reference only and is believed to be correct. Lincoln Industries makes no warranties as to its accuracy. Changes may be made to the product and/or information contained herein at any time.