



# Automotive Protection Products

*Product Catalog*

*Driving the Future  
Through Leading Technology*



# Systems Protection (SP) is the world's foremost supplier of protective sleeving and shielding solutions for wires, hoses, and mechanical assemblies.

As the proud designer and manufacturer of Bentley-Harris products, we offer a comprehensive line of high quality solutions intended to protect or improve system performance across a broad range of applications.

SP's automotive and heavy truck product lines include a comprehensive portfolio of products used across all segments of the light and commercial vehicle markets including: cars, SUVs, and commercial trucks as well as hybrid and electric vehicles.



Focused on reducing the effects of mechanical wear, impact damage, and thermal degradation, SP can help to extend component life and reduce service cost. Additionally, complementary product families target thermal insulation, reduction of electromagnetic interference, and noise attenuation, as well as bundling and routing control, to ensure that systems operate at optimum levels and deliver the ideal user experience.



ABRASION/  
MECHANICAL



IMPACT RESISTANCE/  
CRASH



THERMAL REFLECTIVE  
& CONTAINMENT



ELECTROMAGNETIC  
INTERFERENCE



NOISE / VIBRATION  
& HARSHNESS



ELECTRICAL  
INSULATION



WIRE  
BUNDLING

## Engineering and Technology

Systems Protection (SP) takes pride in being a solution provider and partner to our customers. Utilizing a customer focused approach to quickly solve technical problems and support customer challenges, we aim to deliver the right solution for each application. From engineering in the field through new product design and testing, we strive to provide excellent [engineering & technical support](#) in all aspects of the engineering process.

SP's world-class technology centers utilize state-of-the art test equipment to simulate real-life conditions, identify root causes, and evaluate product performance.

Our continually expanding [testing capabilities](#) help to support our customers' needs including qualification, validation, and application specific testing.

SP is committed to listening to its customers and continually evolving its product portfolio to meet the challenges and demands of the ever-changing marketplace. Drawing from a broad range of capabilities, and utilizing a variety of different materials, constructions, and design features, we can create [new innovative product designs](#) to meet the needs for performance, survivability, and installation.

**As a solution provider, we want to be the first call you make when you have a problem.  
Please contact your local sales representative to help find the best solution for you.**





Product Description	Product	Purpose	Unique Features	Temp. Rating*	Design	Construction	Typical Applications
<b>FlexWrap®</b> is a flexible, wrappable sleeve that offers various unique performance solutions for specialized applications while continuing to deliver an excellent level of protection.	 <b>FlexWrap® 2004</b>	Bundling and high abrasion specifically for sharp edge applications		+125°C (+257°F)	Wrappable	PET (polyester) monofilaments and PA6 (nylon 6) multifilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Tubing, Hose &amp; Cable Assemblies</li> </ul>
	 <b>TwistTube® 2420F</b> <b>TwistTube® 2420</b>	Bundling and moderate abrasion	<ul style="list-style-type: none"> <li>Multiple versions available with integrated closure and/or locating adhesive systems</li> <li>Primarily for North American OEMs (TwistTube® 2420)</li> </ul>	+150°C (+302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Tubing, Hose &amp; Cable Assemblies</li> </ul>
<b>TwistTube®</b> is a flexible, wrappable sleeve that offers an excellent level of protection combining abrasion resistance with noise suppression capabilities.  Versions also available with EMI shielding capability.	 <b>TwistTube® 2421</b>	Bundling and moderate to high abrasion		+150°C (+302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Tubing, Hose &amp; Cable Assemblies</li> </ul>
	 <b>TwistTube® 2424</b>	Bundling and light to moderate abrasion	Orange color for identification of high voltage cables - ideal for hybrid vehicles	+150°C (+302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>High voltage cables</li> <li>Hybrid vehicles</li> </ul>
	 <b>TwistTube® 2424XT</b>	Bundling and moderate to high abrasion	Orange color for identification of high voltage cables - ideal for hybrid vehicles	+150°C (+302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>High voltage cables</li> <li>Hybrid vehicles</li> </ul>
	 <b>TwistTube® 2425F</b>	Bundling and moderate abrasion	Yellow color for identification of critical assemblies	+150°C (+302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Airbag Harness</li> <li>Specialty Harnesses</li> </ul>
	 <b>TwistTube® 2426</b>	Bundling and moderate to high abrasion specifically for sharp edge applications	Special construction provides superior noise suppression	+150°C (+302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Seat Harnesses</li> <li>Instrument Panel Harnesses</li> <li>Engine Compartment Harnesses</li> </ul>
	 <b>TwistTube® 2427</b>	Bundling and moderate abrasion	Blue color for identification of intermediate voltage cables - ideal for hybrid vehicles	+150°C (+302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Intermediate Voltage Cables</li> <li>Hybrid Vehicles</li> </ul>
	 <b>TwistTube® 2428</b>	Bundling and moderate to high abrasion		+150°C (+302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Tubing, Hose &amp; Cable Assemblies</li> </ul>
	 <b>TwistTube® 2439</b>	Bundling and light abrasion	High temperature and excellent long term resistance to automotive fluids (Specifically transmission fluids)	+200°C (+392°F)	Wrappable	PPS (polyphenylene sulfide) monofilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Tubing, Hose &amp; Cable Assemblies</li> </ul>
	 <b>TwistTube® 2440</b>	Bundling and light to moderate abrasion	High temperature and excellent long term resistance to automotive fluids	+200°C (+392°F)	Wrappable	Aramid multifilaments and PPS (polyphenylene sulfide) monofilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Tubing, Hose &amp; Cable Assemblies</li> </ul>
<b>TwistWrap™</b> is a wrappable, flexible sleeve that is designed to offer fast and easy wire harness bundling.	 <b>TwistWrap™ 2401</b>	Bundling and light abrasion		+150°C (+302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Tubing, Hose &amp; Cable Assemblies</li> </ul>
	 <b>TwistWrap™ 2403</b>  <i>Replacement for FlexWrap® 2003</i>	Bundling and light to moderate abrasion		+150°C (+302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Tubing, Hose &amp; Cable Assemblies</li> </ul>

\* Temperature ratings may vary due to alternate OEM test requirements



Product Description	Product	Purpose	Unique Features	Temp. Rating*	Design	Construction	Typical Applications
<b>FlexFit®</b> is a flexible, expandable tubular sleeve designed to provide abrasion protection while having an attractive appearance.	 <b>FlexFit® 2010</b>	Bundling and light abrasion	High temperature and excellent long term resistance to automotive fluids (Specifically transmission fluids)	200°C (392°F)	Tubular	PPS (polyphenylene sulfide) monofilaments	<ul style="list-style-type: none"> <li>Electrical Distribution Systems</li> <li>Hose and Cable Assemblies</li> </ul>
	 <b>FlexFit® 2101</b>	Bundling and light abrasion	Available in multiple colors for identification purposes	150°C (302°F)	Tubular	PET (polyester) monofilaments	<ul style="list-style-type: none"> <li>Electrical Distribution Systems</li> <li>Hybrid Vehicles</li> <li>Hose and Cable Assemblies</li> </ul>
	 <b>FlexFit® 2101XT</b>	Bundling and moderate to high abrasion	Orange color allows identification of key components	150°C (302°F)	Tubular	PET (polyester) monofilaments	<ul style="list-style-type: none"> <li>Electrical Distribution Systems</li> <li>Hybrid Vehicles</li> <li>Hose and Cable Assemblies</li> </ul>
	 <b>FlexFit® 2112</b>	Bundling and light abrasion		150°C (302°F)	Tubular	PET (polyester) monofilaments	<ul style="list-style-type: none"> <li>Tubing, Hose &amp; Cable Assemblies</li> <li>Wire Harnesses</li> </ul>
	 <b>FlexFit® 2114</b> <b>FlexFit® 2118</b>	Bundling and moderate to high abrasion	<ul style="list-style-type: none"> <li>Good aesthetics</li> <li>High coverage</li> <li>Primarily for North American OEMs (<b>FlexFit® 2118</b>)</li> </ul>	150°C (302°F)	Tubular	PET (polyester) multifilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Interior Panels/ Harnesses</li> <li>Door Lock Rods</li> <li>Tubing, Hose and Cable Assemblies</li> </ul>
	 <b>FlexFit® 2115</b>	Bundling and moderate to high abrasion		125°C (257°F)	Tubular	PA66 (nylon 66) monofilaments	<ul style="list-style-type: none"> <li>Tubing, Hose &amp; Cable Assemblies</li> <li>Wire Harnesses</li> </ul>
<b>FlexGuard®</b> is a flexible, expandable tubular sleeve designed to provide abrasion protection while having an attractive appearance.  Customizable (Fit, coatings, etc.)	 <b>FlexGuard® 2120</b>	Bundling and moderate abrasion	Also available in a dipped end version ( <b>FlexGuard® 2120LD</b> ) designed specifically for fray resistance	150°C (302°F)	Tubular	PET (polyester) and PA66 (nylon 66) monofilaments	<ul style="list-style-type: none"> <li>Tubing, Hose &amp; Cable Assemblies</li> <li>Wire Harnesses</li> <li>Sensor Assemblies</li> </ul>
	 <b>FlexGuard® 2129</b>	Bundling and moderate abrasion	Round profile facilitates installation	150°C (302°F)	Tubular	PET (polyester) and PA66 (nylon 66) monofilaments	<ul style="list-style-type: none"> <li>Tubing, Hose &amp; Cable Assemblies</li> <li>Wire Harnesses</li> <li>Sensor Assemblies</li> </ul>
	 <b>FlexGuard® 2130</b>	Bundling and moderate to high abrasion	Also available in a dipped end version ( <b>FlexGuard® 2130LD</b> ) designed specifically for fray resistance	150°C (302°F)	Tubular	PET (polyester) and PA66 (nylon 66) monofilaments	<ul style="list-style-type: none"> <li>Tubing, Hose &amp; Cable Assemblies</li> <li>Wire Harnesses</li> <li>Sensor Assemblies</li> </ul>
	 <b>FlexGuard® 2131</b>	Bundling and light to moderate abrasion		150°C (302°F)	Tubular	PET (polyester) monofilaments	<ul style="list-style-type: none"> <li>Tubing, Hose &amp; Cable Assemblies</li> <li>Wire Harnesses</li> <li>Sensor Assemblies</li> </ul>
	 <b>FlexGuard® 2135</b>	Bundling and light to moderate abrasion	High temperature and excellent long term resistance to automotive fluids	200°C (392°F)	Tubular	PEEK (polyetheretherketone) and PPS (polyphenylene sulfide) monofilaments	<ul style="list-style-type: none"> <li>Tubing, Hose &amp; Cable Assemblies</li> <li>Wire Harnesses</li> <li>Sensor Assemblies</li> </ul>
	 <b>FlexGuard® 2150</b>	Bundling and high abrasion	Passes Cat. D per S21 5101	125°C (257°F)	Tubular	PET (polyester) multifilaments and PA66 (nylon 66) monofilaments	<ul style="list-style-type: none"> <li>Brake Lines</li> <li>Fuel Lines</li> </ul>

\* Temperature ratings may vary due to alternate OEM test requirements



Product Description	Product	Purpose	Unique Features	Temp. Rating*	Design	Construction	Typical Applications
<b>CrushShield®</b> is a lightweight and flexible sleeve that offers superior cut-through resistance. During crash situations the construction enables the product to absorb and disperse energy, thus preventing damage to the electrical cable inside.	 <b>CrushShield® 2442</b>	Extreme abrasion and crash situations	<ul style="list-style-type: none"> <li>Orange color for identification of high voltage cables - ideal for hybrid vehicles</li> <li>Product is also available in <b>black</b></li> <li>Unique multilayer construction specifically designed for extreme energy absorption</li> </ul>	150°C (302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>High Voltage Cables</li> <li>Wire Harnesses</li> </ul>
	 <b>CrushShield® 2448</b>	Extreme abrasion and crash situations	<ul style="list-style-type: none"> <li>Self locating</li> <li>High shrinkage ratio for increased installation benefit</li> </ul>	125°C (257°F)	Tubular	PET (polyester) multifilaments and shrinkable yarns	Aluminum pipes
<b>NyloGard®</b> is a durable, tightly woven sleeve providing superior abrasion and cut-through protection for severe environments.  Available in an adhesive backed patch - see section: Abrasion/Mechanical Special Solutions	 <b>NyloGard® 2452</b>	Extreme abrasion	Crash applications	125°C (257°F)	Tubular	PA6 (nylon 6) multifilaments	<ul style="list-style-type: none"> <li>Hoses</li> <li>Cables and Wires</li> <li>Fuel Filler Tubes</li> <li>Impact Resistant Tubes</li> </ul>
	 <b>NyloGard® 2453</b>	Extreme abrasion	<ul style="list-style-type: none"> <li>Crash applications</li> <li>Hook and loop closure</li> </ul>	125°C (257°F)	Wrappable	PA6 (nylon 6) multifilaments	<ul style="list-style-type: none"> <li>Hoses</li> <li>Cables and Wires</li> <li>Fuel Filler Tubes</li> <li>Impact Resistant Tubes</li> </ul>
	 <b>NyloGard® 2454</b>	Extreme abrasion	<ul style="list-style-type: none"> <li>Crash applications</li> <li>Available in <b>orange</b></li> </ul>	150°C (302°F)	Tubular	PET (polyester) multifilaments	<ul style="list-style-type: none"> <li>Hoses</li> <li>Cables and Wires</li> <li>Fuel Filler Tubes</li> <li>Impact Resistant Tubes</li> </ul>
	 <b>NyloGard® 2455</b>	Extreme abrasion	<ul style="list-style-type: none"> <li>Crash applications</li> <li>Hook and loop closure</li> <li>Available in <b>orange</b></li> </ul>	150°C (302°F)	Wrappable	PET (polyester) multifilaments	<ul style="list-style-type: none"> <li>Hoses</li> <li>Cables and Wires</li> <li>Fuel Filler Tubes</li> <li>Impact Resistant Tubes</li> </ul>
<b>QuietGard™</b> is a flexible, tubular sleeve designed to provide an excellent level of noise suppression combined with a high level of mechanical protection.	 <b>QuietGard™ 3602</b>	Acoustics and crash situations	<ul style="list-style-type: none"> <li>Unique multilayer construction specifically designed for increased impact resistance</li> <li>Primarily for European OEMs</li> </ul>	125°C (257°F)	Tubular	PET (polyester) multifilaments and PA66 (nylon 66) monofilaments	<ul style="list-style-type: none"> <li>Polyamide Fuel Lines</li> <li>Tubing</li> </ul>
<b>ThermGuard™</b> is a flexible tubular sleeve designed with materials and constructions to provide superior thermal protection and increased durability.	 <b>ThermGuard™ 1280</b>	<ul style="list-style-type: none"> <li>Thermal containment/insulation</li> <li>Reduces thermal radiation</li> </ul>	<ul style="list-style-type: none"> <li>Three layer construction with aramid middle layer for increased mechanical protection</li> <li>Primarily for European OEMs</li> </ul>	225°C (437°F)	Tubular	Silicone coating, aramid and fiberglass multifilaments	<ul style="list-style-type: none"> <li>Engine Wire Harnesses</li> <li>Fuel and Hydraulic Lines</li> <li>Tubings and Hoses</li> </ul>

\* Temperature ratings may vary due to alternate OEM test requirements



Product Description	Product	Purpose	Unique Features	Temp. Rating*	Design	Construction	Typical Applications
<b>FastWrap™</b> is a wrappable sleeve designed to offer a variable level of component protection while focusing on optimized installation speed.	 <b>FastWrap™ 2305</b>	Bundling and moderate abrasion	Flat open design with integrated adhesive closure and locating system	+150°C (+302°F)	Flat wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Hoses</li> <li>Cables</li> </ul>
<b>FlatWrap®</b> is flat wrappable sleeve engineered to facilitate the installation of round wire bundles into tight or confined spaces.	 <b>FlatWrap® 2535</b>	<ul style="list-style-type: none"> <li>Flattens tubular bundles into a flat profile.</li> <li>Bundling and light to moderate abrasion</li> </ul>	<ul style="list-style-type: none"> <li>Customizable (Tabs, clips, holes, notches, etc.)</li> <li>Primarily for North American OEMs</li> </ul>	+125°C (+257°F)	Flat wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Under Carpet Wire Assemblies</li> <li>Headliner Wire Assemblies</li> <li>Flat Wire Assemblies</li> <li>Door Harnesses</li> <li>Seat Harnesses</li> </ul>
<b>FlexWrap®</b> is a flexible, wrappable sleeve that offers various unique performance solutions for specialized applications while continuing to deliver an excellent level of protection.	 <b>FlexWrap® 2300</b>	Bundling and moderate abrasion	Flat open design with integrated hook and loop closure	+125°C (+257°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Tubing</li> <li>Hose and Cable Assemblies</li> </ul>
<b>LocatWrap®</b> is a flexible, wrappable sleeve that combines abrasion resistance and noise suppression capabilities along with self-closing and/or self-locating features.	 <b>LocatWrap® 2480</b>	Bundling and moderate abrasion	Integrated adhesive closure and locating system	+150°C (+302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Hoses</li> <li>Cables</li> </ul>
	 <b>LocatWrap® 2484</b>	Bundling and moderate to high abrasion	<ul style="list-style-type: none"> <li>Orange color for identification of high voltage cables - ideal for hybrid vehicles</li> <li>Integrated adhesive closure and locating system</li> </ul>	+150°C (+302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Body Wire Harnesses</li> <li>Instrument Panel Harnesses</li> <li>Engine Compartment Harnesses</li> </ul>
<b>NyloGard® SA</b> is a highly durable, tightly woven, adhesive-backed patch providing superior abrasion and cut-through protection for severe environments.  Sleeve version available - see section: Abrasion/Mechanical: Extreme Mechanical / Impact Resistance	 <b>NyloGard® 2451SA</b>	Extreme abrasion	<ul style="list-style-type: none"> <li>Crash applications</li> <li>Integrated adhesive locating system</li> </ul>	+125°C (+257°F)	Die-cut patch (application specific)	PA6 (nylon 6) multifilaments with adhesive backing	<ul style="list-style-type: none"> <li>Hoses</li> <li>Plastic Reservoirs</li> <li>Other components</li> <li>Places with challenging geometries</li> </ul>
	 <b>NyloGard® 2456SA</b>	Extreme abrasion	<ul style="list-style-type: none"> <li>Crash applications</li> <li>Integrated adhesive locating system</li> </ul>	+150°C (+302°F)	Die-cut patch (application specific)	PET (polyester) multifilaments with adhesive backing	<ul style="list-style-type: none"> <li>Hoses</li> <li>Plastic Reservoirs</li> <li>Other components</li> <li>Places with challenging geometries</li> </ul>
<b>ShrinkGard™</b> is a heat shrinkable sleeve that provides excellent protection for rubber hoses and tubing.	 <b>ShrinkGard™ 2800</b>	Light to moderate abrasion	<ul style="list-style-type: none"> <li>Self locating</li> <li>High aesthetic appearance</li> <li>Soft construction prevents damage to neighboring components</li> </ul>	+125°C (+257°F)	Tubular	PET (polyester) multifilaments and PE (polyethylene) monofilaments	<ul style="list-style-type: none"> <li>Rubber Hose</li> <li>Tubing</li> </ul>

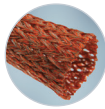
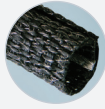
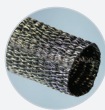
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Product Description	Product	Purpose	Unique Features	Temp. Rating*	Design	Construction	Typical Applications
<b>QuietSleeve®</b> is a flexible, tubular sleeve designed to provide an excellent level of noise suppression combined with a level of mechanical protection.	 <b>QuietSleeve® 3008</b>	High acoustics and bundling		80°C (176°F)	Tubular	PET (polyester) non-woven and PP (polypropylene) scrim	<ul style="list-style-type: none"> <li>Door Harnesses</li> <li>Instrument Panel Harnesses</li> <li>Seat Harnesses</li> <li>Roof Harnesses</li> </ul>
	 <b>QuietSleeve® 3400</b> <b>QuietSleeve® 3410</b> <b>QuietSleeve® 3430</b> <b>QuietSleeve® 3450</b>	Acoustics and bundling	<ul style="list-style-type: none"> <li>Light abrasion</li> <li>Aesthetic appearance</li> <li>Product selection will be based on application and regional availability</li> </ul>	150°C (302°F)	Tubular	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Interior Panels/Harnesses</li> <li>Tubing, Hose and Cable Assemblies</li> <li>Seat, Headliner &amp; Interior Wire Harnesses</li> </ul>
<b>QuietWrap™</b> is a flexible, wrappable sleeve designed to provide an excellent level of noise suppression combined with a level of mechanical protection.	 <b>QuietWrap™ 3002</b>	High acoustics	<ul style="list-style-type: none"> <li>Integrated adhesive closure and locating system</li> <li>External textile layer for increased durability</li> </ul>	150°C (302°F)	Wrappable	Abrasion resistant fabric and noise damping foam laminate with an adhesive backing	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>HVAC Systems</li> <li>Cables</li> <li>Hose or Tubing with Noise Conditions</li> </ul>
	 <b>QuietWrap™ 3009</b>	Dual function acoustics with abrasion	Primarily for Japanese OEMs	100°C (212°F)	Wrappable	Combination of woven and non-woven PET (polyester)	<ul style="list-style-type: none"> <li>Door Harnesses</li> <li>Instrument Panel Harnesses</li> <li>Seat Harnesses</li> <li>Roof Harnesses</li> </ul>
<b>TwistTube®</b> is a flexible, wrappable sleeve that offers an excellent level of protection combining abrasion resistance with noise suppression capabilities.	 <b>TwistTube® 2426</b>	Bundling and moderate to high abrasion specifically for sharp edge applications	Special construction provides superior noise suppression	150°C (302°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Seat Harnesses</li> <li>Instrument Panel Harnesses</li> <li>Engine Compartment Harnesses</li> </ul>
<b>FlexWrap®</b> is a flexible, wrappable sleeve that offers various unique performance solutions for specialized applications while continuing to deliver an excellent level of protection.	 <b>FlexWrap® 3500</b>	Acoustics, mechanical protection, and crash situations	<ul style="list-style-type: none"> <li>Integrated adhesive closure and locating system</li> <li>Primarily for European OEMs</li> </ul>	125°C (257°F)	Wrappable	PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Body Compartment Harnesses</li> <li>Cable Assemblies</li> <li>Tubings</li> </ul>

## EMI Shielding | Electromagnetic Interference


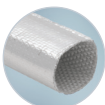
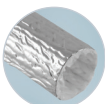
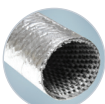
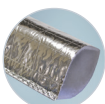

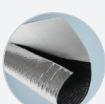
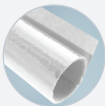
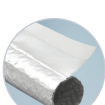
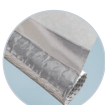
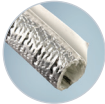


Product Description	Product	Purpose	Unique Features	Temp. Rating*	Design	Construction	Typical Applications
<b>FlexFit® EMI</b> is a flexible, expandable tubular sleeve designed to provide EMI shielding while having an attractive appearance.	 <b>FlexFit® EMI 208</b>	EMI suppression	<ul style="list-style-type: none"> <li>Orange color for identification of high voltage cables - ideal for hybrid vehicles</li> <li>Product is also available in <b>black</b></li> </ul>	150°C (302°F)	Tubular	PET (polyester) monofilaments and tinned copper wire twisted with PET multifilaments	<ul style="list-style-type: none"> <li>Xenon Lighting</li> <li>Back-up Cameras</li> <li>Engine Harness</li> </ul>
<b>TwistTube®</b> is a flexible, wrappable sleeve that offers a combination of EMI shielding along with the typical easy installation of a TwistTube product.	 <b>TwistTube® 2472</b>	EMI suppression	High corrosion resistance for extreme environments (Marine applications, etc.)	150°C (302°F)	Wrappable	PET (polyester) monofilaments and stainless steel wire twisted with PET (polyester) multifilaments	<ul style="list-style-type: none"> <li>Instrument Panel Harnesses</li> <li>Engine Compartment Harnesses</li> <li>Battery Cables</li> <li>Interior Harnesses</li> </ul>
	 <b>TwistTube® 2473</b>	EMI suppression	Available with multiple grounding options including standard integrated drain wires ( <b>TwistTube® 2473D</b> ) or custom solutions ( <b>TwistTube® 2473C-S</b> )	150°C (302°F)	Wrappable	PET (polyester) monofilaments and tinned copper wire twisted with PET (polyester) multifilaments	<ul style="list-style-type: none"> <li>Instrument Panel Harnesses</li> <li>Engine Compartment Harnesses</li> <li>Tubing, Hose and Cable Assemblies</li> <li>Battery Cables</li> </ul>

\* Temperature ratings may vary due to alternate OEM test requirements



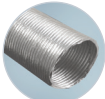
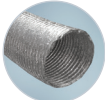
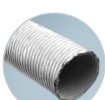
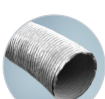
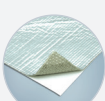



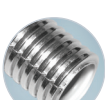



Product Description	Product	Purpose	Unique Features	Temp. Rating*	Design	Construction	Typical Applications
<b>ReflectSleeve®</b> is a flexible, tubular sleeve designed to provide thermal protection.  Customizable (Notches, holes, etc.)	 <b>ReflectSleeve® 1400</b>	Radiant protection	Thick fiberglass substrate helps delay time required to reach steady state	150°C (302°F)	Tubular	Aluminum and fiberglass multifilaments	<ul style="list-style-type: none"> <li>Hoses</li> <li>Fuel Lines</li> <li>Brake Lines</li> <li>Control Cables</li> <li>Wire Harnesses</li> </ul>
	 <b>ReflectSleeve® 1450E</b>	Radiant protection	<ul style="list-style-type: none"> <li>Open design aids in installation</li> <li>Primarily for North American OEMs</li> </ul>	200°C (392°F)	Tubular	Aluminum and fiberglass multifilaments	<ul style="list-style-type: none"> <li>Hoses</li> <li>Fuel Lines</li> <li>Brake Lines</li> <li>Control Cables</li> <li>Wire Harnesses</li> </ul>
	 <b>ReflectSleeve® 1451</b>	Radiant protection	High flexibility	225°C (437°F)	Tubular	Aluminum and fiberglass multifilaments	<ul style="list-style-type: none"> <li>Tubing and Hoses</li> <li>AC Lines</li> <li>Fuel Lines</li> <li>Control Cables</li> <li>Wire Harnesses</li> </ul>
	 <b>ReflectSleeve® 1452</b>	Radiant protection	<ul style="list-style-type: none"> <li>Superior flexibility</li> <li>Open design aids in installation</li> </ul>	200°C (392°F)	Tubular	Aluminum, fiberglass multifilaments and PET (polyester) monofilaments	<ul style="list-style-type: none"> <li>Tubing and Hoses</li> <li>AC Lines</li> <li>Fuel Lines</li> <li>Control Cables</li> <li>Wire Harnesses</li> </ul>
	 <b>ReflectSleeve® 1501</b>	Radiant protection	Fluids resistance	150°C (302°F)	Tubular	Aluminum and PET (polyester) non-woven	<ul style="list-style-type: none"> <li>Tubing and Hoses</li> <li>AC Lines</li> <li>Fuel Lines</li> <li>Control Cables</li> <li>Wire Harnesses</li> </ul>
<b>ReflectWrap®</b> is a flexible, wrappable self-closing sleeve designed to provide thermal protection.  Customizable (Notches, holes, lashes, tabs, etc.)	 <b>ReflectWrap® 1490</b>	Radiant protection	<ul style="list-style-type: none"> <li>Combination of adhesive and hook and loop closure systems</li> <li>Abrasion resistance</li> </ul>	150°C (302°F)	Wrappable	Aluminum and PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Battery Cables</li> <li>Chassis Harnesses</li> <li>Jumper Harnesses</li> <li>Cable Assemblies</li> <li>Engine Compartment Hoses</li> </ul>
	 <b>ReflectWrap® 1492</b>	Radiant protection	<ul style="list-style-type: none"> <li>Adhesive closure system</li> <li>Abrasion resistance</li> </ul>	150°C (302°F)	Wrappable	Aluminum and PET (polyester) monofilaments and multifilaments	<ul style="list-style-type: none"> <li>Battery Cables</li> <li>Chassis Harnesses</li> <li>Jumper Harnesses</li> <li>Cable Assemblies</li> <li>Engine Compartment Hoses</li> </ul>
	 <b>ReflectWrap® 1502</b>	Radiant protection	<ul style="list-style-type: none"> <li>Adhesive closure system</li> <li>Fluids resistance</li> </ul>	150°C (302°F)	Wrappable	Aluminum and PET (polyester) non-woven	<ul style="list-style-type: none"> <li>Tubing and Hoses</li> <li>AC Lines</li> <li>Fuel Lines</li> <li>Control Cables</li> <li>Wire Harnesses</li> </ul>
<b>ReflexWrap™</b> is a highly flexible, wrappable self-closing sleeve designed to provide thermal protection.  Customizable (Notches, holes, lashes, tabs, etc.)	 <b>ReflexWrap™ 1463</b>	Radiant protection	<ul style="list-style-type: none"> <li>Available in a closed version for increased installation benefit (<b>ReflexWrap™ 1463C</b>)</li> </ul>	200°C (392°F)	Wrappable	Aluminum, fiberglass multifilaments and PET (polyester) monofilaments	<ul style="list-style-type: none"> <li>Brake Lines</li> <li>Fuel Lines</li> <li>Cable Assemblies</li> <li>Engine Harnesses</li> </ul>
	 <b>ReflexWrap™ 1463UF</b> <b>ReflexWrap™ 1463LF</b> <b>ReflexWrap™ 1436LF-E</b>	Radiant protection	<ul style="list-style-type: none"> <li>Delivering optimized fray resistance for critical applications</li> <li>Product selection will be based on application and regional availability</li> </ul>	200°C (392°F)	Wrappable	Aluminum, fiberglass multifilaments and PET (polyester) monofilaments	<ul style="list-style-type: none"> <li>Quick Connects</li> <li>Brake Lines</li> <li>Fuel Lines</li> <li>Cable Assemblies</li> <li>Engine Harnesses</li> </ul>
	 <b>ReflexWrap™ 1466</b>	Radiant protection	Primarily for European OEMs	225°C (437°F)	Wrappable	Aluminum, fiberglass multifilaments and PPS (polyphenylene sulfide) monofilaments	<ul style="list-style-type: none"> <li>Engine Harnesses</li> <li>Tubing and Cables</li> </ul>

\* Temperature ratings may vary due to alternate OEM test requirements

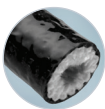
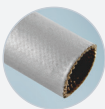
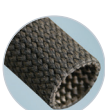
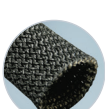

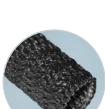
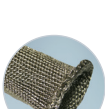

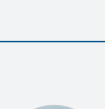




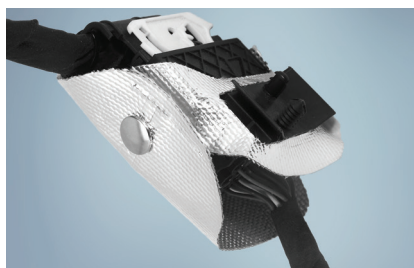
Product Description	Product	Purpose	Unique Features	Temp. Rating*	Design	Construction	Typical Applications
<p><b>Clevaflex®</b> is a flexible, convoluted, multi-ply sleeve designed to provide an excellent level of thermal protection. Various unique constructions deliver a range of performance solutions designed to balance flexibility and durability.</p> <p>The products are available in slit or unslit versions aiding in installation.</p> <p>Customizable (Notches, holes, end caps, etc.)</p>	 <b>Clevaflex® A-A</b>	Radiant protection and thermal containment/insulation	<ul style="list-style-type: none"> <li>• High temperature</li> <li>• High durability</li> <li>• Flexibility</li> <li>• Primarily for North American OEMs</li> </ul>	400°C (752°F)	Tubular or slit (wrappable)	Aluminum	<ul style="list-style-type: none"> <li>• Exhaust Pipes</li> <li>• EGR Systems</li> <li>• Downpipes</li> <li>• Turbo Systems</li> </ul>
	 <b>Clevaflex® AFS-F-AFS</b>	Radiant protection and thermal containment / insulation	<ul style="list-style-type: none"> <li>• High temperature</li> <li>• High flexibility</li> <li>• Durability</li> <li>• Primarily for North American OEMs</li> </ul>	400°C (752°F)	Tubular or slit (wrappable)	Aluminum fiberglass scrim layers and fiberglass multifilaments	<ul style="list-style-type: none"> <li>• Fuel and Hydraulic Lines</li> <li>• Power Steering Hoses</li> <li>• Heater/Radiator Hoses</li> <li>• Control Cables</li> <li>• TOC Lines</li> </ul>
	 <b>Clevaflex® F-A</b>	Radiant protection and thermal containment / insulation	<ul style="list-style-type: none"> <li>• High temperature</li> <li>• High flexibility</li> <li>• Durability</li> <li>• Primarily for North American OEMs</li> </ul>	400°C (752°F)	Tubular or slit (wrappable)	Aluminum and fiberglass multifilaments	<ul style="list-style-type: none"> <li>• Fuel and Hydraulic Lines</li> <li>• Power Steering Hoses</li> <li>• Heater/Radiator Hoses</li> <li>• Control Cables</li> <li>• TOC Lines</li> </ul>
	 <b>Clevaflex® F-A2</b>	Radiant protection and thermal containment / insulation	<ul style="list-style-type: none"> <li>• High temperature</li> <li>• High flexibility</li> <li>• Durability</li> <li>• Primarily for North American OEMs</li> </ul>	400°C (752°F)	Tubular or slit (wrappable)	Aluminum and fiberglass multifilaments	<ul style="list-style-type: none"> <li>• Fuel and Hydraulic Lines</li> <li>• Power Steering Hoses</li> <li>• Heater/Radiator Hoses</li> <li>• Control Cables</li> <li>• TOC Lines</li> </ul>
<p><b>ReflectShield®</b> and <b>ReflectSnap®</b> are customizable products that offer unique flexible solutions for protecting systems and components from thermal damage.</p> <p>Customizable 2D or 3D designs with unique features (Snaps, notches, holes, adhesives, hinges, rolled edges, customized connectors, etc.)</p>	<i>This is not an exhaustive list of all available heat shield products and materials. Please contact your local sales representative to discuss your unique custom application needs.</i>						
	 <b>ReflectShield® 1435</b>	Radiant protection	<ul style="list-style-type: none"> <li>• Self-locating peel and stick 2D design using a pressure sensitive adhesive to adhere to flat or contoured surfaces</li> <li>• Available with multiple adhesives for different substrates. (<b>ReflectShield® 1435SA2</b> for low surface energy plastics)</li> </ul>	200°C (392°F)	2-D Die-cut part (application specific)	Aluminum and fiberglass multifilaments with adhesive backing	<ul style="list-style-type: none"> <li>• Plastic Fuel Tanks</li> <li>• Engine Components</li> <li>• Wire Harnesses</li> </ul>
	 <b>ReflectShield® 1440</b> <b>ReflectShield® 1485</b>	Radiant protection and thermal containment / insulation	<ul style="list-style-type: none"> <li>• Fully Customizable</li> <li>• 3D formable</li> </ul>	175°C (347°F)	Application specific	Aluminum, PET (polyester) non-woven and a 3rd layer of either aluminum or an adhesive backing	<ul style="list-style-type: none"> <li>• Engine Components</li> <li>• Plastic Components</li> <li>• Underbody</li> </ul>
	 <b>ReflectShield® 1486</b>	Radiant protection and thermal containment / insulation	Customizable sensor / connector shield with plastic mounting cap designed for easy install. Metalized cap ( <b>ReflectShield®1486M</b> ) available for increased thermal protection.	175°C (347°F)	Tubular	Aluminum, fiberglass multifilaments and PET (polyester) non-woven	<ul style="list-style-type: none"> <li>• Sensors</li> <li>• Connectors</li> </ul>
	 <b>ReflectSnap® 1420HD</b>	Radiant protection	Customizable heat shield that incorporates a snap closure for easy installation after component assembly	200°C (392°F)	Application specific	Aluminum and fiberglass multifilaments	<ul style="list-style-type: none"> <li>• Hoses</li> <li>• Fuel Lines</li> <li>• Brake Lines</li> <li>• Control Cables</li> <li>• Wire Harnesses</li> </ul>
<p><b>ReflecTube®</b> is a flexible, corrugated sleeve designed to provide thermal protection.</p> <p>The products are available in slit or unslit versions aiding in installation.</p>	 <b>ReflecTube® 1592</b>	Radiant protection	<ul style="list-style-type: none"> <li>• Abrasion</li> <li>• Aesthetics</li> <li>• Durability</li> </ul>	150°C (302°F)	Tubular or slit (wrap-pable)	PA46 (nylon 46)	<ul style="list-style-type: none"> <li>• Battery Cables</li> <li>• Alternator Wiring Systems</li> <li>• Electronic Sensor Control Wiring</li> <li>• Metal Tubing</li> </ul>
	 <b>ReflecTube® 1597J</b>	Radiant protection	<ul style="list-style-type: none"> <li>• Abrasion</li> <li>• Aesthetics</li> <li>• Durability</li> </ul>	150°C (302°F)	Tubular or slit (wrap-pable)	PA9T (nylon 9T)	<ul style="list-style-type: none"> <li>• Battery Cables</li> <li>• Wiring Systems</li> <li>• Electronic Sensor Control Wiring</li> </ul>

\* Temperature ratings may vary due to alternate OEM test requirements



Product Description	Product	Purpose	Unique Features	Temp. Rating*	Design	Construction	Typical Applications
<b>FyreJacket®</b> is a flexible tubular sleeve designed to provide thermal protection. The materials and constructions are specifically designed to impede flame penetration allowing critical components to continue to function for a short amount of time.	 <b>FyreJacket® 1610</b>	<ul style="list-style-type: none"> <li>Thermal containment/insulation</li> <li>Reduces thermal radiation</li> </ul>	<ul style="list-style-type: none"> <li>Retards flame penetration</li> <li>Dielectric</li> <li>Durability</li> </ul>	260°C (500°F)	Tubular	Silicone coating and fiberglass multifilaments	<ul style="list-style-type: none"> <li>Fuel Lines</li> <li>Brake Lines</li> <li>Power Steering Hose</li> <li>Heater Hose</li> </ul>
	 <b>Textalu® 1202</b>	<ul style="list-style-type: none"> <li>Thermal containment/insulation</li> <li>Reduces thermal radiation</li> </ul>	<ul style="list-style-type: none"> <li>Reflective coating</li> <li>Durability</li> </ul>	225°C (437°F)	Tubular	Aluminized silicone coating and fiberglass multifilaments	<ul style="list-style-type: none"> <li>Wire Harnesses</li> <li>Electrical Cables</li> <li>Sensor Wirings</li> <li>Cable Controls</li> </ul>
	 <b>ThermFlex® 1212</b> <b>ThermFlex® 1210</b>	<ul style="list-style-type: none"> <li>Thermal containment/insulation</li> <li>Reduces thermal radiation</li> </ul>	<ul style="list-style-type: none"> <li>Custom coating for improved installation and handling</li> <li>Product selection will be based on application and regional availability</li> </ul>	Up to 540°C (1004°F)	Tubular or slit (wrappable)	Fiberglass multifilaments	<ul style="list-style-type: none"> <li>Exhaust Gas Recirculation (EGR) Tubes</li> <li>Exhaust System Components</li> <li>Wire Harnesses</li> <li>Hoses and Tubes</li> </ul>
	 <b>ThermFlex® 1220</b>	<ul style="list-style-type: none"> <li>Thermal containment/insulation</li> <li>Reduces thermal radiation</li> </ul>	Custom coating for improved installation and handling	Up to 540°C (1004°F)	Tubular or slit (wrappable)	Fiberglass multifilaments	<ul style="list-style-type: none"> <li>Exhaust Gas Recirculation (EGR) Tubes</li> <li>Exhaust System Components</li> <li>Wire Harnesses</li> <li>Hoses and Tubes</li> </ul>
	 <b>ThermFlex® 1224</b>	<ul style="list-style-type: none"> <li>Thermal containment/insulation</li> <li>Reduces thermal radiation</li> </ul>	<ul style="list-style-type: none"> <li>High expandability</li> <li>Customizable design for fit and installation</li> </ul>	Up to 750°C (1382°F)	Application specific	Basalt multifilaments	<ul style="list-style-type: none"> <li>Exhaust Gas Recirculation (EGR) Tubes</li> <li>Exhaust System Components</li> </ul>
<b>ThermFlex®</b> is a flexible and expandable sleeve that offers various unique installation solutions for specialized applications while continuing to deliver excellent thermal protection.	 <b>ThermFlex® 1226</b>	<ul style="list-style-type: none"> <li>Thermal containment/insulation</li> <li>Reduces thermal radiation</li> </ul>	<ul style="list-style-type: none"> <li>Easy installation</li> <li>Custom coating on sleeve ends to prevent fraying</li> <li>Primarily for European OEMs</li> </ul>	Up to 550°C (1022°F)	Tubular	Fiberglass multifilaments	<ul style="list-style-type: none"> <li>Exhaust Gas Recirculation (EGR) Tubes</li> <li>Exhaust System Components</li> <li>Hoses and Tubes</li> </ul>
	 <b>ThermFlex® 1229</b>	<ul style="list-style-type: none"> <li>Thermal containment/insulation</li> <li>Reduces thermal radiation</li> </ul>	<ul style="list-style-type: none"> <li>High expandability</li> <li>Customizable design for fit and installation</li> <li>Customized pattern control for variable performance</li> </ul>	Up to 750°C (1382°F)	Application specific	Basalt multifilaments	<ul style="list-style-type: none"> <li>Exhaust Gas Recirculation (EGR) Tubes</li> <li>Exhaust System Components</li> </ul>
	 <b>ThermShield™ 1229</b>	<ul style="list-style-type: none"> <li>Thermal containment/insulation</li> <li>Reduces thermal radiation</li> </ul>	<ul style="list-style-type: none"> <li>Flat designs for increased installation benefit</li> <li>Customizable design for fit and installation</li> <li>Customized pattern control for variable performance</li> </ul>	Up to 750°C (1382°F)	Application specific	Basalt multifilaments	<ul style="list-style-type: none"> <li>Exhaust Gas Recirculation (EGR) Tubes</li> <li>Exhaust System Components</li> </ul>
	 <b>ThermShield™ 1231</b>	<ul style="list-style-type: none"> <li>Thermal containment/insulation</li> <li>Reduces thermal radiation</li> </ul>	<ul style="list-style-type: none"> <li>Customizable geometry and features for optimized fit and installation</li> <li>Variable textile construction for tailored performance</li> <li>Silicone coated outer layer for added durability</li> </ul>	Up to 750°C (1382°F)	Application specific	Silica and fiberglass based woven and non-woven constructions with silicone coated outer layer	<ul style="list-style-type: none"> <li>Exhaust Pipe/EGR</li> <li>Truck SCR/EGP/DPF</li> <li>Engine Manifold</li> <li>Other Exhaust Applications</li> </ul>

\* Temperature ratings may vary due to alternate OEM test requirements



## About Systems Protection

Systems Protection (SP) is the world's foremost supplier of protective sleeving and shielding solutions for wires, hoses, and mechanical assemblies. Founded in 1924 as Bentley-Harris, acquired by Federal-Mogul in 1998 and most recently acquired by Tenneco in 2018, SP built its foundation as a North American manufacturer of insulation sleeving for electronics and then expanded into the aerospace market in the 1960's and the automotive market in the 1980's.

Today, Systems Protection continues to grow into new markets and geographic regions in order to meet our customers' ever-changing needs. With sales offices, technical centers, and manufacturing facilities located throughout the Americas, Europe, Africa and Asia, SP continues to deliver innovative products for the automotive, heavy truck, aerospace and railway markets, as well as a host of other transportation and industrial segments.

As the market leader of protective sleeving and shielding solutions, our goal is to deliver value through continual improvement in our products and processes by focusing on innovative product solutions, superior engineering and technical support, outstanding customer service, manufacturing excellence, and global presence.

## About Tenneco

Tenneco is one of the world's leading designers and manufacturers of innovative products for original equipment and aftermarket customers. Through our four business groups, Motorparts, Performance Solutions, Clean Air and Powertrain, Tenneco is driving advancements in global mobility by delivering technology solutions for diversified global markets including light vehicle, commercial truck, off-highway, industrial, motorsport, aerospace and their aftermarket segments.



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**BentleyHarris®**  
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# Global Presence



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\* EIT markets include Aerospace, Railway, Industrial, Off-Road and other Electronics markets

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### MANUFACTURING LOCATIONS:

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ISO14001: Environmental Management Systems  
 ISO 45001: Occupational Health and Safety Management Systems  
 ISO 9001, IATF 16949, AS/EN 9100: Quality Management Systems

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