

Supplier of choice for Harness Components



Aerospace | Defence | Energy | Commercial | Marine | Motorsport

## Braided Sleeving

Powerful Solutions for Protection



Mechanical Protection  
Electrical Insulation  
Thermal and Fire Insulation  
Electromagnetic Shielding



# Introduction



## Protective Expanding Sleeve, Wraparound and Push-Fit

Range of protective sleeving, providing protection for electrical harnesses, hoses and pipes against heat, abrasion, chemicals fluids and electrical noise.

Protective sleeving comes in a wide variety of constructions, sizes and colours including wrap-around, push-on, heat-shrinkable.

Mechanical protection

Chemical resistance

Electrical insulation

Fluid and solvent resistance

Moisture protection

Strain relief, flexibility

Aesthetic enhancement

Fast and efficient installation

## Abrasion

- Superior abrasion protection in easy-to-apply, flexible designs including expandable and self-wrapping.
- Ideal for instrument panel and engine harnesses; tubing, hose and cable assemblies.

## Thermal Management

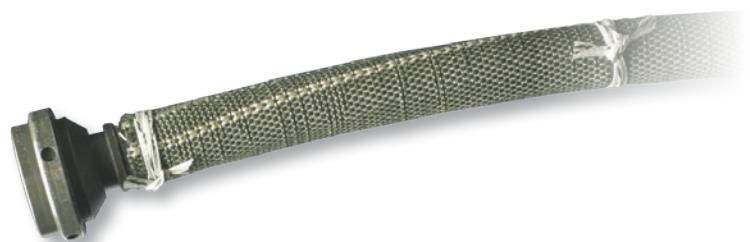
- Excellent thermal insulation and radiant heat protection.
- Innovative designs expand for flanges and bends with unique material combinations and self-sealing features.
- Convective and radiant heat solutions for EGR tubes and exhaust systems; fuel and hydraulic lines; battery and control cables; wire harnesses; hoses and tubing.

## Electromagnetic Shielding

- Lightweight, durable and easy to install products.
- Specially-designed yarn and wire technology combine for exceptional performance.
- Addresses growing concerns for engine and instrument panel harnesses; power and battery cables; and starter assemblies.

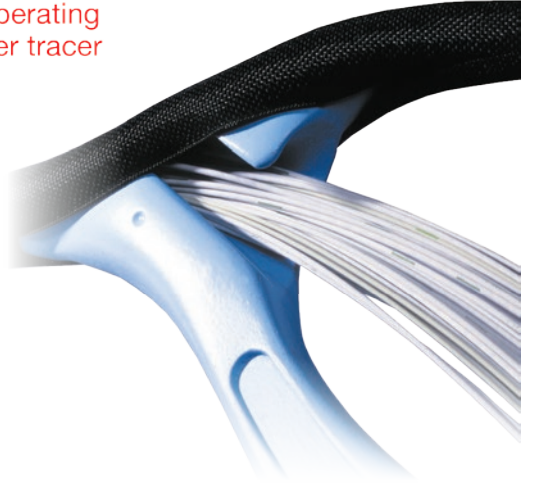
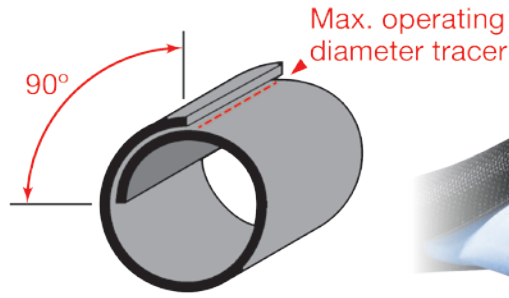
## Safety

- Durable textile sleeving offers cut-through protection for fuel lines, electrical harnesses and other critical components during crash situations or harsh environments.
- Innovative designs such as CrushShield® help vehicle designers meet current and emerging industry standards for high voltage electric vehicle systems and for mission critical communications and safety systems.



## ROUNDIT®

Self-wrapping braided sleeve...



Maximum application size is determined by wrapping product to obtain a minimum of 90° of overlap. For further information, please contact us.

Professional aluminium assembly tools are available to suit application size. Please note that a basic plastic tool is also available FOC on request.

## EXPANDO®

Expandable braided sleeving...



Expansion ratios vary from 1:2 up to 1:3 subject to the particular sleeving.



# Mechanical and Abrasion Protection


Product		Type	Markets	Description	
	Expando® 686DM		Tubular	Aero, Def	Optimal solution for use where a combination of abrasion protection and lightweight are required.
	Expando® HR & HR Plus		Tubular	Aero, Def	Fray-resistant and flame retardant used for abrasion protection over a range of temperature environments. Low vacuum out-gassing.
	Expando® HTNS-L/HO		Tubular	Aero, Def	Low flammability, resists most chemicals. Highly flexible and resistant to trapping moisture. Non standard colours Ivory, Red, Black and Orange also available.
	Expando® HTNS-LA/HO		Tubular	Aero	Higher expansion ratio than HTNS L/HO (1:3)
	Expando® Peek		Tubular	Aero, Def	Designed for mechanical protection in temperature extremes and hostile conditions
	Expando® PFA		Tubular	Aero, Def	Self-extinguishing, used to encase typical non-flammable wires or cables, low flammability, resists damage from most chemicals.
	Expando® PPS		Tubular	Aero, Def	Offers mechanical protection in high temperature areas. Often used for its outstanding properties in extreme environments.
	Expando® PT Plus		Tubular	Elec	Highly expandable braid (1:3) with strong mechanical protection. Black is standard colour, also available in non standard Natural*, Orange*, Yellow*, Blue* and Grey*.
	Expando® TCP V0		Tubular	Rail, Elec	Expandable braid (1:2) with strong mechanical protection, with low toxicity and smoke-emission.
	Roundit® 2000		Wrap	Elec	Self-wrapping sleeve with strong mechanical protection; quick and easy installation and removal for assembly and maintenance
	Roundit® 2000 FR		Wrap	Rail	Rail approved self-wrapping sleeve with good mechanical protection; Excellent cut through and abrasion resistance.
	Roundit® 2000 V0		Wrap	Rail	Self-wrapping sleeve with high mechanical protection; Highly flame retardant (UL94 V0) with low toxicity and smoke emission.
	Roundit® 2000 NX		Wrap	Aero, Def, Oil/ Gas, Rail	Woven combination of Nomex® and PPS for a rugged and smooth texture. Green is standard colour, also available in non standard Red* and Orange*.
	Roundit® 2000 NX HT		Wrap	Aero, Def, Oil/ Gas, Rail	High temp. version of 'NX' differentiated by a wide ivory tracer on the outside. PEEK mono-filaments and Nomex® multi-filaments.
	Roundit® 2000 NX PTR/VTR		Wrap	Aero, Def	Designed with a pink tracer to identify fuel lines (PTR) or a violet tracer to identify fibre optics (VTR); Oil and water repellent.
	Roundit® 2000 NX Grip		Wrap	Aero, Def	Designed with a sewn loop textile attachment method in conjunction with adhesive hook, enables direct attachment.
	CrushShield®		Wrap	Elec, Def, Oil/ Gas	Provides superior cut-through protection for electrical cables. Tough multilayer construction absorbs and disperses energy. Available as cut pieces



Approvals	Temp. Range	Flammability	Construction	Size	Colour
	-70°C to +200°C	FAR Part 25 § 853 and UL 1441 (VW-1)	PEEK and PPS	3 to 64	Black or Natural
	-70°C to +150°C	FAR Part 25 § 853 and UL 1441 (VW-1)	Halar® (E-CTFE) fluoropolymer	2 to 70mm	Black with White tracer or White with Black tracer
ASD EN6049-003	-60°C to +240°C	FAR Part 25 § 853 and UL 244 (VW-1)	Nomex®	1 to 40mm	Green or colours*
ASD EN6049-003	-60°C to +240°C	FAR Part 25 § 853	Nomex®	2 to 60mm	Green
	-70°C to +260°C	FAR Part 25 § 853	PEEK	2 to 76mm	Black or Natural*
BMS 13-52 Type IV	-70°C to +260°C	FAR Part 25 § 853	Perfluoroalkoxy (PFA)	1 to 76mm	Natural
BMS 13-52 Type III	-70°C to +200°C	FAR Part 25 § 853 and UL 1441 (VW-1)	Polyphenylene Sulfide (PPS)	2 to 64mm	Black or Natural*
	-70°C to +125°C	Flame retardant	Polyester	2 to 114mm	Black or colours*
EN 45545-2	-50°C to +150°C	NF16101 - 16102 DB DIN 5510 & 54837 ASTM E-662 & ASTM E-162	Polyester	4 to 75mm	Black with Grey tracer or Grey with Black tracer
	-70°C to +125°C	FMVSS-302 Method D45 1333	Polyester	5 to 62mm	Black
EN 45545-2	-50°C to +150°C	NF16101 - 16102 DB DIN 5510 & 54837 ASTM E-662 & ASTM E-162	Polyester	5 to 50mm	Black with White tracer
EN 45545-2	-50°C to +150°C	NF16101 - 16102 DB DIN 5510 & 54837 ASTM E-662 & ASTM E-162	Polyester	5 to 50mm	Black with broad white tracer
ASD EN6049-006 BMS 13-81 Type 1	-60°C to +200°C	FAR Part 25 § 853	Nomex® and PPS	5 to 40mm	Black, Red or Orange
ASD EN6049-007	-70°C to +260°C	FAR Part 25 § 853	Nomex® and PEEK	5 to 40mm	Green with Ivory tracer
ASD EN6049-006.	-60°C to +200°C	FAR Part 25 § 853	Nomex® and PPS	5 to 40mm	Green with Pink tracer or Green with Violet tracer
	-60°C to +200°C	FAR Part 25 § 853	Nomex® and PPS	5 to 40mm	Green with White grip
	+150°C	Supports compliance with FMVSS-305	Polyester (PET) mono-filament / multi-filament	5 to 25mm	Black or Orange

\*Please note that non-standard colours may have MOQs and extended lead times.

# Electrical Insulation

Product	Type	Markets	Description
 <b>GES 40 and GES 100</b> 	Tubular	Elec	Highly flexible with relative diametric expansion (1:3), with silicone coating. Offering dielectric strength from 4kV (GES 40) to 10kV (GES 100).
 <b>Roundit® 2000 NX HT</b> 	Wrap	Aero	High temperature version of Roundit 2000 NX. Oil and water repellent - Dielectric 1.5kV
 <b>Ben-Har® 1151 FRB A</b> 	Tubular	Aero	A rugged, flame-retardant sleeving that provides both electrical insulation and abrasion resistance. Difficult to ignite and self-extinguishes - Dielectric strength 7kV
 <b>Ben-Har® 1151 FRB B</b> 	Tubular	Aero, Def	A rugged, flame-retardant sleeving that provides both electrical insulation and abrasion resistance. Difficult to ignite and self-extinguishes - Dielectric strength 4kV

# Fire and Thermal Insulation

Thermal and Fire Insulation...	Type	Markets	Description
 <b>TST/TSX</b> 	Tubular	Aero, Def	High temperature resistant, multi-filament pure silica fibre (>99.8%). Heat treated to remove organic content.
 <b>Textalu® 1202</b> 	Tubular	Elec	Fibreglass sleeve with a heavy aluminium coating for protection in high temperature areas.
 <b>Thermotubix Aerospace</b> 	Tubular	Aero, Rail	Expands readily to go over fittings and couplings. Protects from molten splash and welding sparks.
 <b>Roundit® Therm-A</b> 	Wrap	Aero, Def	Two layer design provides thermal/fire protection and excellent cut-through and abrasion resistance; oils and water repellent.
 <b>Roundit® Therm-B</b> 	Wrap	Aero, Def	Three layer design provides increased protection and excellent cut-through and abrasion resistance; oil and water repellent
 <b>Therm-L-Wrap® 66</b> 	Wrap	Aero, Def, Oil/ Gas	Self-wrappable sleeve with an adhesive closure, offers excellent radiant heat protection and excellent EMI shielding performance.
 <b>ThermoJacket® S</b> 	Tubular	Elec, Rail	Braided fibreglass with a coating which adds rigidity and reduces the likelihood of end fray. Resists most acids and alkalis and is unaffected by most bleaches and solvents.

Approvals	Temp.	Flammability	Construction	Size	Colour
	-60°C to +220°C	UL 1441 (VW-1)	Silicone rubber coated fibreglass sleeving	0.5 to 32mm	Red
ASD EN 6049-007	-70°C to +260°C	FAR Part 25 § 853	Nomex® and PEEK	1 to 40mm	Green with Ivory tracer
MIL-I-3190/6 and NEMA 5	-70°C to +200°C	UL 1441 (VW-1) and FAR Part 25 853	Silicone rubber coated fibreglass sleeving	1.6 to 25mm	Blue Grey
DMS 2109 and NEMA 5	-70°C to +200°C	UL 1441 (VW-1) and FAR Part 25 853	Silicone rubber coated fibreglass sleeving	2.3 to 78mm	Blue Grey

Approvals	Temp.	Flammability	Construction	Size	Colour
	-60°C to 950°C	FAR Part 25 § 853	Multi-filament pure silica fibre	0.5 to 36mm	Natural
ISO 6722 SAE AS1072 (2)	-40°C to +200°C	FMVSS 302, D45 1333	Fibreglass sleeve with aluminium coating	5 to 22mm	Grey
EN 45545-2	-54°C to 260°C	ASTM D-350 B and NF 16101-16102. Fire protection to +1100°C (15min)	Thick wall fibreglass sleeve coated with silicone rubber	8 to 100mm	Red
ASD EN6049-009	-60°C to +260°C	ISO 2685 - 5 min @ +1100°C	Roundit® 2000 NX HT, Silica and Panox®	5 to 32mm	Green with broad natural tracer and Red stitching
	-60°C to +260°C	ISO 2685 - 15 min @ +1100°C	Fibreglass sleeve coated with silicone rubber outer	5 to 32mm	Green & Red combination
	-60°C to 200°C	FAR Part 25 § 853	Aluminium outer layer and fibreglass inner layer	8 to 25mm	Silver
EN 45545-2	-55 to +540°C	DB DIN 5510 & 54837	Braided fibreglass with coating	6 to 102mm	Ivory

# Electromagnetic Shielding

Product	Type	Markets	Description
 <b>Roundit® 2000 NX EMI</b> 	Wrap	Aero, Def	Multi-layer solution providing mechanical protection and very high EMI shielding of $R_o = 3.45m\Omega$ . Also available with an inner layer of PTFE.
 <b>Roundit® 2000 VO EMI</b> 	Wrap	Rail	Self-wrapping metal solution; flexible and easy to install providing high performance EMI shielding of $R_o \text{ max} = 6m\Omega$ and $L_t = 1.2 \text{ nH}$ .
 <b>Roundit® 2000 EMI FMJ</b> 	Wrap	Aero, Rail	Self-wrapping metal solution, with 95% optical coverage; flexible and easy to install providing very high performance EMI shielding of $R_o \text{ max} = 5.5m\Omega$ and $L_t = 0.6nH$ .
 <b>Roundit® 2000 EMI C4 XWS</b> 	Wrap	Aero, Def	Self-wrapping metal solution to optimise weight with EMI shielding performance of $R_o \text{ max} = 5m\Omega$ and $L_t = 2 \text{ nH}$ . C4 (Blue tracer).
 <b>Roundit® 2000 EMI C27 XWS</b> 	Wrap	Aero, Def	Self-wrapping metal solution to optimise weight with EMI shielding performance of $R_o \text{ max} = 5m\Omega$ and $L_t = 2 \text{ nH}$ . C27 (Pink tracer).

## EMI Highlights

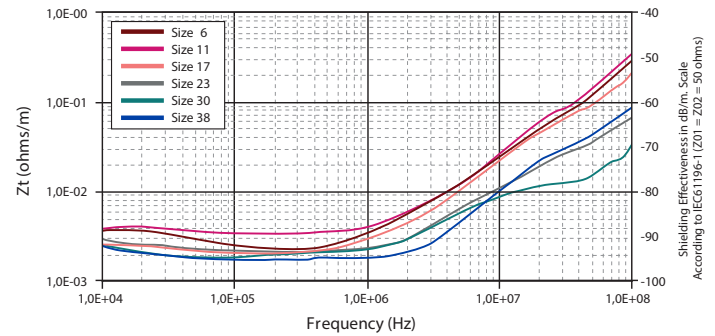
Electromagnetic interference (EMI) can cause adverse effects on electronic components and equipment leading to operational malfunctions. Proper shielding and grounding of electromagnetic sensitive components can effectively eliminate this occurrence.

Our EMI shielding products, constructed from materials including nickel-plated copper, tin-plated copper and stainless steel, Nomex®, PPS and Polyester, provide excellent shielding properties with the added benefit of abrasion or thermal protection.

All EMI protective sleeves offered on these page are RoHS compliant and Halogen Free...

## Roundit 2000 NX EMI

### Transfer Impedance Measurement

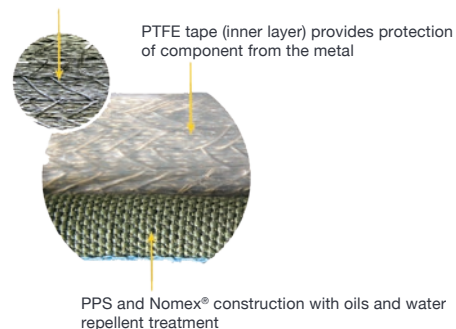


Roundit® 2000 NX EMI is a self-wrapping sleeve designed for mechanical protection and EMI shielding of wire and cable bundles. The outer layer, supplies the abrasion resistance, is manufactured from PPS mono-filaments and Nomex® with an oil and water repellent treatment. The inner layer is composed of nickel-plated copper (Cu/Ni), which provides EMI insulation. The outer layer construction with a 100% covering ratio provides excellent cut-through and abrasion resistance.

Also available with an internal layer of PTFE tape, allowing wire harnesses to be protected from the inner metal layer.

*Nomex is a registered trademark of E.I. DuPont de Nemours.*

Braided nickel-plated copper wire provides EMI insulation

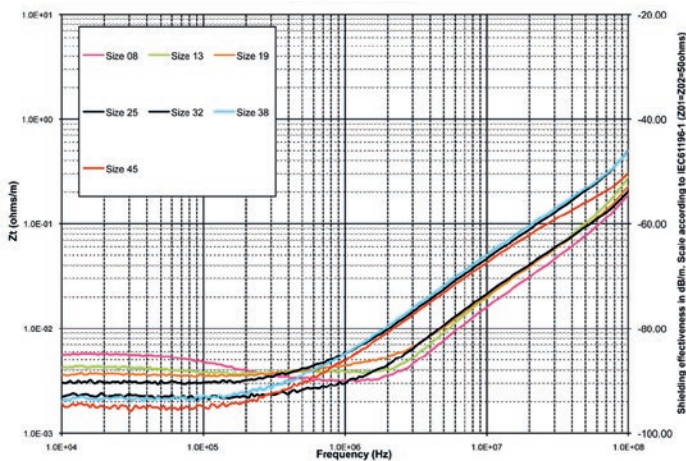




Approvals	Temp.	Flammability	Construction	Size	Colour
ASD EN6049-008	-60°C to 200°C	FAR Part 25 § 853	Ni plated Cu combined with PPS mono-filaments	5 to 38mm	Green
EN 45545-2	-50°C to 200°C	NF 16101-16102	Ni plated Cu combined with PPS mono-filaments	8 to 45mm	Light Grey
EN 45545-2	-65°C to 200°C	FAR Part 25 § 853 NF 16101-16102	Ni plated Cu combined with PPS mono-filaments	5 to 38mm	Light Grey
C4: EN4674-003	-65°C to 200°C	FAR Part 25 § 853	Ni plated Cu is at least 4% total weight of wire. Combined with PPS mono-filaments	5 to 165mm	Light Grey with Blue tracer
C27: EN4674-004	-65°C to 200°C	FAR Part 25 § 853	Ni plated Cu is at least 27% total weight of wire. Combined with PPS mono-filaments	5 to 165mm	Light Grey with Pink tracer

## Roundit 2000 V0 EMI

Transfer Impedance Measurement



Roundit® 2000 V0 EMI is a wrap-around sleeving designed for high performance EMI shielding of wire and cable bundles.

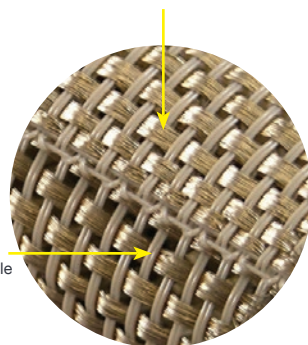
Manufactured from UL 94 V0 rated PPS mono-filaments and nickel plated copper wires class 4 according to ASTM B-355.

The stable construction guarantees the same level of EMI shielding regardless of the diameter on which it is installed within the recommended application range.

Roundit V0 EMI has many applications in the railway, marine and electronics industries.

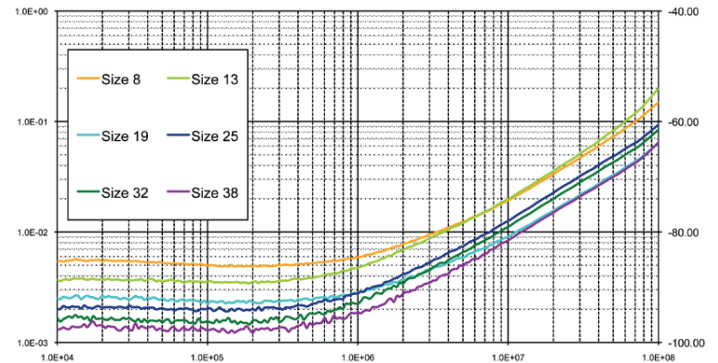
Nickel-plated copper strands are woven to provide high conductivity and ensure EMI shielding.

PPS mono-filaments ensure a highly flexible assembly



## Roundit EMI FMJ

Transfer Impedance Measurement



Roundit® EMI FMJ (Full Metal Jacket) is a wrap-around sleeving designed for high performance EMI shielding of wire and cable bundles. Manufactured from PPS mono-filaments and nickel plated copper.

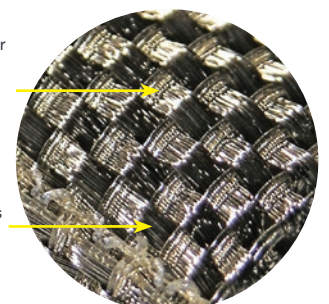
The stable construction guarantees the same level of EMI shielding regardless of the diameter on which it is installed within the recommended application range.

Thanks to its unique geometry and metal insertion, ROUNDIT EMI FMJ is easy to clamp with existing solutions.

Roundit® EMI FMJ has many applications in the aeronautical, space and military industries.

Nickel-plated copper strands are woven to provide high conductivity and insure EMI shielding with a 95% optical coverage

PPS mono-filaments ensure aerospace grade temperature and a highly flexible assembly



# Product Linecard

Added value....

24hr Delivery

Split Packs

Low MOQ's

Cut to Length

Pre-Print

Wire and Cable



Multicore Cable



Data Cable



Heat Shrink



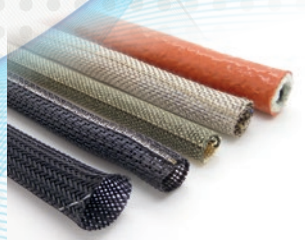
Moulded Parts



Commitment to customer service and quality, providing innovation, technical support and cost effective solutions...



Sleeving



Backshells



Devices



Identification



Adhesives





Supporting customers needs and wants for a complete solution.

Switches



Grips



Relays



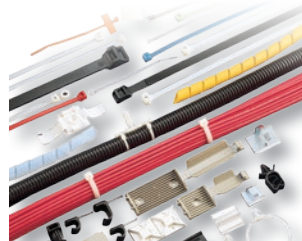
Tough Panels



Contactors



Accessories



Aero Switches



Application Tools





Working closely with suppliers and manufacturers worldwide we offer a comprehensive range of high performance components and associated products for the Aerospace, Defence, Energy, Industrial, Marine and Motorsport markets. Our experienced internal and external sales teams offers leading customer service and support.

With immediate access to in excess of 8000 product lines from an extensive 'off the shelf' stock profile for next day delivery as standard, along with flexible MOQ's and pack sizes.

We are fully committed to complying with the latest quality approvals for the customers and markets we serve, including ISO9001:2008 and AS9120:2010.



+44(0)1793 616700  
sales@is-rayfast.com  
www.is-rayfast.com

2 Lydiard Fields, Swindon, Wiltshire, SN5 8UB, UK.

All the information contained in this publication is believed to be reliable. However, we advise that customers should separately evaluate the suitability of our products for their particular application. The IS-Group give no guarantee in respect of the accuracy or sufficiency of the information presented and disclaim any liability regarding its use. Our responsibilities are only those listed in our standard terms and conditions of sale for these products. In no instance will we be liable for any eventual, indirect, or consequential damage or damages from the sale, resale, transfer, use or misuse of the product.

Images and illustrations used in this publication are used with the permission and/or under open licence agreement, attributed to various sources including our supplier partners, Crown Copyright (courtesy of Defence Imagery), iStock and Dreamstime.