

PARAFIL[®] ROPE

Linear **COMPOSITES**



PARAFIL[®] ropes were the first products launched by Linear Composites Limited in 1969.

They consist of a core of closely packed high strength synthetic fibres, lying parallel to each other, encased in a tough and durable polymeric sheath. This parallel fibre structure and tough polymeric sheath ensures a combination of outstanding properties which have been utilised in an ever increasing scope of applications since its introduction. Some examples are highlighted in this brochure.

The technical properties and performance parameters are detailed in separate Technical Notes.

Linear Composites Limited
Vale Mills
Oakworth
Keighley
West Yorkshire
BD22 0EB

Phone: +44 (0)1535 643363

Fax: +44 (0)1535 643605

Email: sales@linearcomposites.com

Web: www.linearcomposites.com

High strength synthetic cable products



MACCAFERRI

Linear Composites are a member of the Maccaferri Group

PARAFIL® Types

There are three standard types of PARAFIL® based on the type of fibre used. Each has a choice of polymeric sheaths. A flame retardant variety is also available. The product range is shown in Table 1.

Table 1 PARAFIL® Types

Yarn Type	Sheath materials and Types			
	Polyethylene	Polyethylene	Polyester	Flame Retardant
	(LDPE)	Copolymer (EVA)	Elastomer (Hytrel)	Cross linked Polymer
High Tenacity polyester	Type A	Type A (C)	Type A (H)	Type A (X)
Standard Modulus Aramid	Type F	Type F (C)	Type F (H)	Type F (X)
High Modulus Aramid	Type G	Type G (C)	Type G (H)	Type G (X)

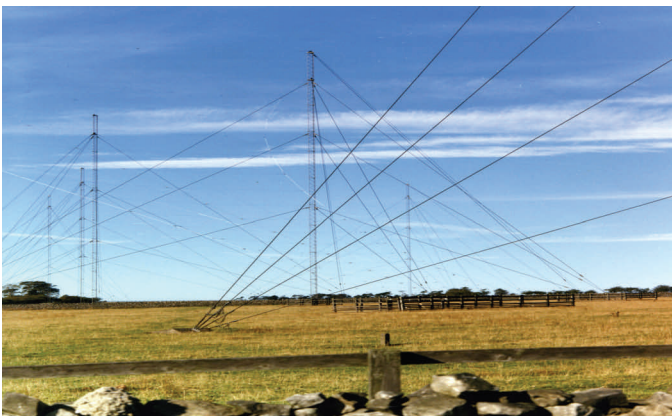
The specially formulated polyethylene sheath is most commonly used and is perfectly satisfactory for most purposes, but the EVA copolymer sheath is more flexible and stress-crack resistant. Higher resistance to heat and abrasion can be obtained from the polyester elastomer.

PARAFIL® Applications

Insulating guys, catenaries and support systems

The first applications for PARAFIL® were in the antennae and electrical industries, as insulating guys, catenaries and support systems, where tensile properties, excellent insulating properties and resistance to UV degradation ensure a long and essentially maintenance free life.

First PARAFIL® application in the UK in 1969, 5 tonne Type A



Periodically the PARAFIL® ropes from this earliest installation have been replaced so that ropes can be evaluated after extended service. To date no significant property changes have been detected.

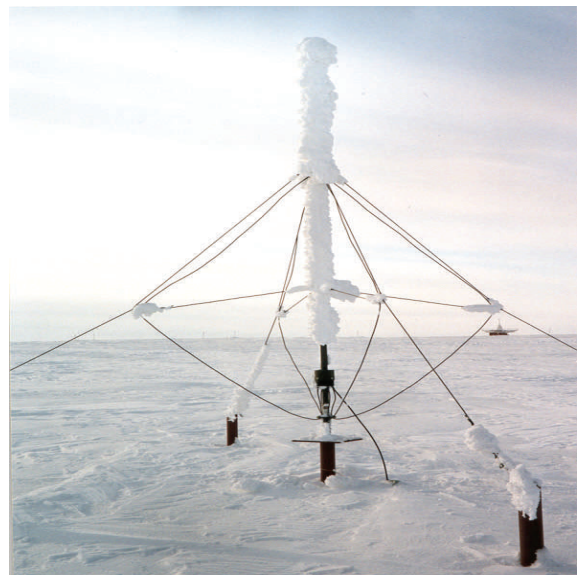
PARAFIL® application in Canada : 6 tonne Type F



The use of PARAFIL® in these applications has extended across the world. In each instance high quality tailor-made PARAFIL® products and specially designed terminations are manufactured to an individual customer's technical needs and specifications.

No system is too complex for PARAFIL®. Working with customers and designers ensures that technical requirements are met.

PARAFIL® application in Canada : 1.5 tonne Type F



The 2 pictures above and on the front cover are provided by courtesy of ASCS Canadian Signal Corp & Thales Canada, Systems Division.

Urban Transport Systems

It was a natural evolution from the antennae and electrical industries to the use of PARAFIL® in urban transport systems where the same attributes are put to good use in supporting tram and trolley bus overhead conductors.

There is a rapidly growing demand for efficient pollution free urban transport systems all over the world.

PARAFIL® is playing an ever increasing role in this market where Type A and Type F versions are utilised.

PARAFIL® application in Prague, Czech Republic: support for urban transport systems



In terms of linear metres used, urban transport systems represent one of the largest and fastest growing markets for Type A PARAFIL® and terminations.

PARAFIL® application South Yorkshire Super Tram, England



Marine Applications

PARAFIL® ropes have also been used in marine applications for over 20 years for buoy moorings, ship and yacht rigging, guard rails and tow ropes etc. The specially engineered tensile properties, together with the inherent low weight, freedom from corrosion and excellent tension-tension fatigue resistance ensure long life and ease of handling.

50 tonne Type A PARAFIL® for North Sea buoy mooring application



The photograph above shows a particularly interesting example. The size of the project is put into context when considered along side the car in the photograph.

The polyethylene sheath of PARAFIL® is not affected by sea water and is unlikely to attract marine debris.

PARAFIL® mooring ropes have been recovered after extensive service and the ropes were clean and showed no loss of tensile properties.

When used in ship's rigging, PARAFIL® is unaffected by sunlight and sea water, and the smooth polyethylene surface ensures the minimum build up, and easy release of ice, no matter how severe the conditions.

Structural Applications

Cable Stay bridge across the River Tay in Aberfeldy, Scotland



The high strength-to-weight ratio, together with its high modulus, low extension and good tension-tension fatigue life make PARAFIL® an attractive material for many structural applications. The first 'all plastic' bridge was built in Scotland in 1992, with PARAFIL® playing a major part.

Built on the cable-stay principle, this revolutionary bridge spans the River Tay at Aberfeldy in Scotland, and is some 60 metres in length between the towers. Both 15 tonne and 22.5 tonne Type G PARAFIL® were used.

Cable Stay bridge across the River Tay in Aberfeldy, Scotland



This bridge facilitated the expansion of the Aberfeldy golf course from 9 to 18 holes, and provided an opportunity for the design concepts of MAUNSELL Ltd to be evaluated. PARAFIL® and its special termination have long been thought of as ideal materials for such applications.

Pre-stressing tendons

Long before the cable stay bridge opportunity came along, to demonstrate the versatility of PARAFIL®, it had already been used to repair concrete structures.

Cooling Tower Repair



The photograph above shows how a large concrete cooling tower in the UK was repaired using 30 circumferential tendons of 10.5 tonne Type G

PARAFIL®. The extreme atmospheric conditions called for enhanced durability.

Based on high strength, high modulus aramid fibres PARAFIL® has many attributes for use as external, unbounded pre-stressing tendons in concrete beams. Many of its properties are clearly attractive: high strength-to-weight ratio, excellent chemical resistance, high U.V. resistance, excellent fatigue characteristics and safety over a wide temperature range.

Roof Support Systems

The same physical and chemical attributes also make Type G PARAFIL® an ideal contender for roof support systems.

Drummer Street Bus Station, Cambridge, England



The future for PARAFIL®

Two technologies have been blended together to bring about the success of the PARAFIL® system: the compact core of parallel fibres encased in a tough and durable polymeric sheath and the specially designed termination technique.

When PARAFIL® ropes are correctly terminated and subjected to test they invariably break in the body of the rope and not at the terminations. This guarantees that the fibre properties are used as efficiently and effectively as possible. No other system matches this performance.

PARAFIL® has a unique blend of physical and chemical behaviour characteristics. Linear Composites Limited has unparalleled experience in developing and refining applications for PARAFIL® systems in conjunction with customers. With new opportunities emerging continuously the future for PARAFIL® looks assured. Its success to date has come from ensuring that customers' specific technical and performance needs have been satisfied, and that policy will continue.

More case studies are available upon request.