PARAFIL® ROPE

End terminations and fitting instructions

Technical note TN3, Issue 2

1. Background

PARAFIL® ropes derive their unique properties from their essentially parallel fibre structure (see Technical Notes 1 and 2). To utilise these properties to maximum advantage terminations based on a conical wedge principle have been developed.

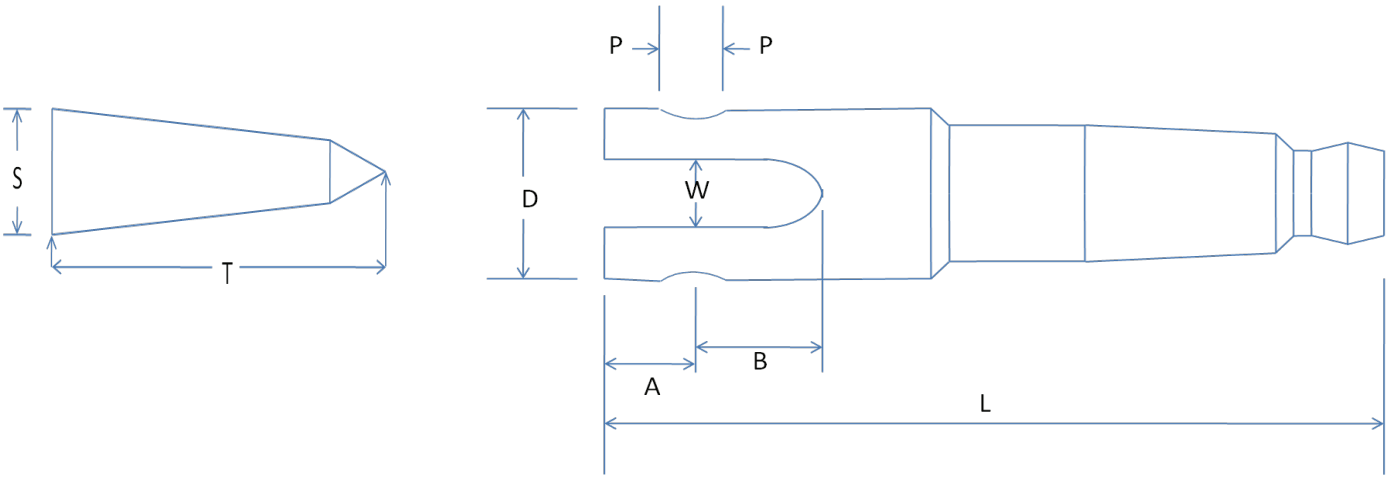
2. Materials

The standard design terminations are made from anodised aluminium alloy (BS 1474/6082T6, anodised to BS1615, AA25) or mild steel (BS970/230M07 or 220M07 spun galvanised to BS729). Terminations are also made from other materials on request, eg stainless steel (BS970/316S11), to suit particular requirements. The selection of the Termination material will depend on the environment in which it is to be used.

3. Typical Dimensions

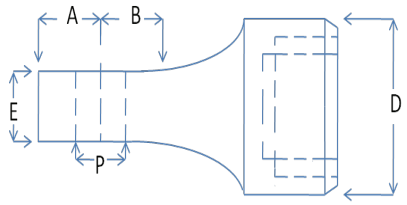
The dimensions of standard design aluminium alloy and steel Terminations are given in the following tables. Values quoted are approximate.

(i) Type A Ropes (polyester fibre core) are a 1-piece design up to 30 tonne Nominal Breaking Load (NBL)

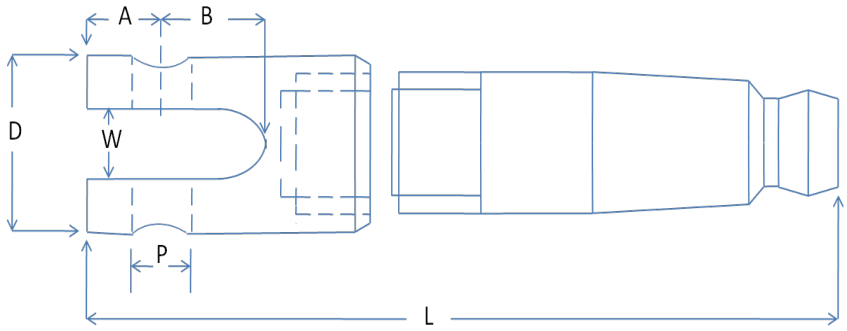


Rope Size	Termination Dimensions						Approximate Assembly weight including seals etc	
NBL Tonnes	L mm	D (Dia) mm	P (Dia) mm	W mm	A mm	B mm	Aluminium Alloy Kg	Steel Kg
0.5	79	19	6.4	7	8	13	0.04	0.11
1	98	22	8	8	10	16	0.1	0.17
2	123	30	9.6	10	12	19	0.15	0.34
3.5	156	38	12.7	17	16	25	0.33	0.63
5	188	44	16	20	20	32	0.48	1.13
7.5	224	54	19.1	23	24	38	0.79	1.45
10	254	60	22.3	26	29	44	1.16	1.87
15	305	76	25.4	33	32	51	2.1	2.75
20	340	86	28.6	36	36	56	2.95	5.22
30	416	102	38.1	42	48	76	5.4	12.8

3. Typical Dimensions (continued)
(ii) Type F & G Ropes (aramid fibre cores) are a 2-piece design except sizes marked *.



Dimensions of eye/spade connector on request



(when joined together)

Rope Size	Termination Dimensions						Approximate Assembly weight including seals etc	
NBL Tonnes	L mm	D (Dia) mm	P (Dia) mm	W mm	A mm	B mm	Aluminium Alloy Kg	Steel Kg
0.75	74	14.2	5	4.5	6.5	13	0.03	N/A
1.5*	92	25	8	8.5	10	16	0.09	0.23
3*	132	38	12.8	17	16	25	0.25	0.57
4.5	151	41	15	18.5	18	29	0.33	N/A
6	168	44	16	20	20	32	0.45	1.1
10.5	225	60	22.4	26	29	44.5	1.0	2.4
15	257	76	25.5	33	32	51	1.6	4
22.5	305	83	28.7	36	36	56	2.4	6.1
30	371	102	38	42	48	76	4.9	12.25

* = 1 piece design only
N/A = not available

The dimensions of Terminations for PARAFIL® ropes of higher Nominal Breaking Loads will be supplied on request. The company reserves the right to amend the above specifications and dimensions as necessary.

4. Waterproofing Techniques
Although the presence of water inside PARAFIL® ropes has no effect on the strength characteristics, water will affect the electrical properties (see Technical Note 4); thus all industrial Terminations are fitted with nose and back seals.

Where PARAFIL® ropes are used in areas of high electrical stress, some end users have taken extra precautions, for example, by filling the space between the end of the rope and the back seal with a flexible silicone compound (eg Loctite Superflex, RIV Silicone Compound, or Wacker Elastosil E43), and also overwrapping the silicone nose seal with self amalgamating tape (eg Elkosil-Bank E12 or Rotunda PIF tape 2501).

5. Assembly Instructions
Fitting the Terminations to PARAFIL® ropes is a relatively quick and easy operation. The notes on the following 2 pages explain the basic steps to successful termination practice.
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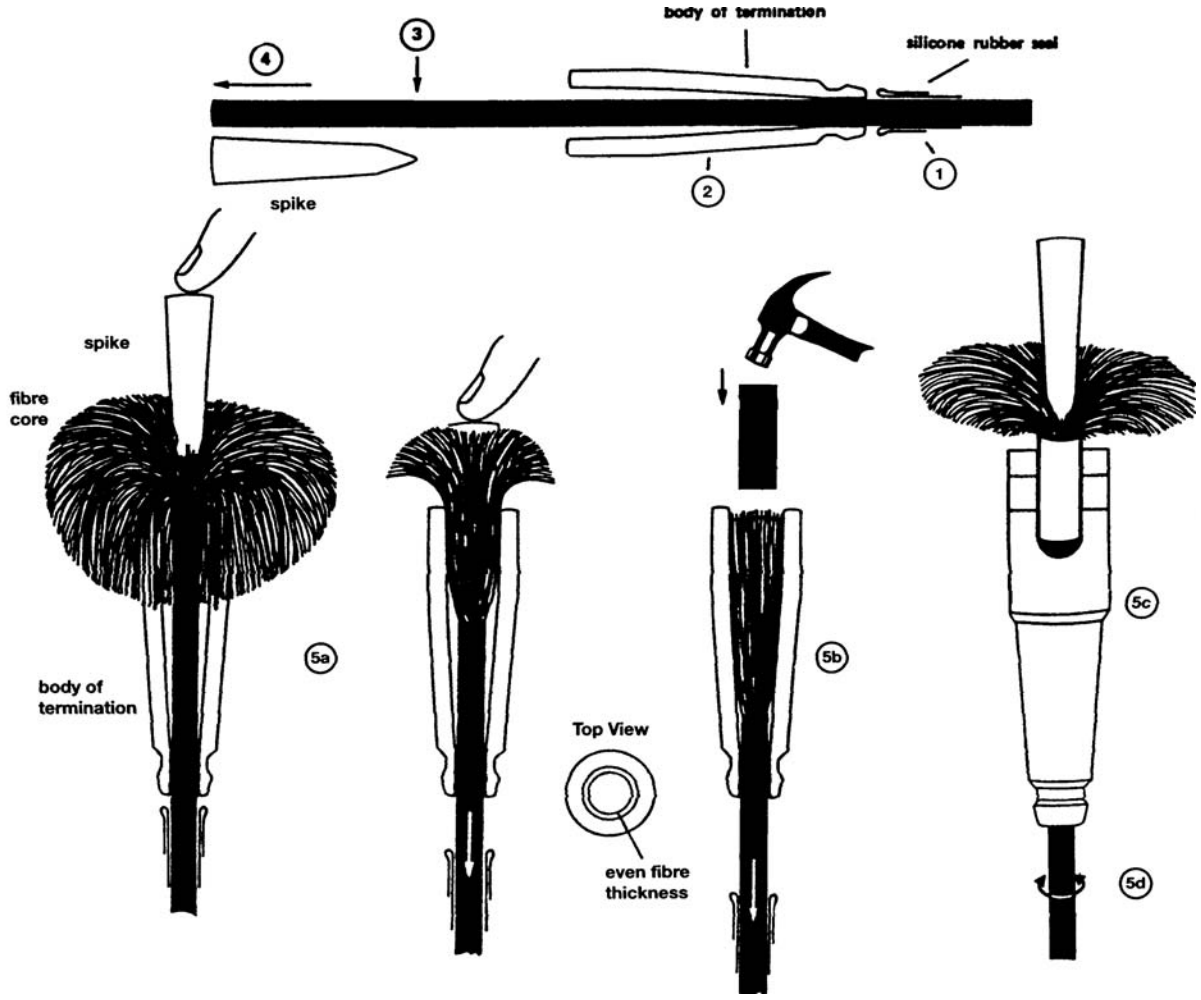
ASSEMBLY INSTRUCTIONS
TERMINATIONS TO PARAFIL® ROPE



1. Slide the silicone rubber front seal a sufficient distance along the PARAFIL® rope to avoid interference with the terminating of the rope. French chalk or talc on the rope will aid this operation. Any surplus chalk or talc MUST be removed from the rope before proceeding further. OILS OR GREASES SHOULD NOT BE USED. Fold back the seal one third of its length as shown.

2. The terminations must be clean, dry and oil free. Remove any residual oil, grease etc from metal surfaces using a suitable solvent. When dry, slide the body of the termination over the rope.

3. Make a single circumferential cut around the rope sheath at a point 1 to 2mm longer than the spike from the end of the rope, so that after termination the fibres protrude slightly above the back of the spike (1-2 mm). Care must be taken to avoid cutting through to the core fibres. This is best achieved by cutting nearly through the sheath and bending the rope at the cut to sever the remaining part of the sheath.

4. Pull off the cut portion of sheath.

5. a) Hold the termination vertically (e.g. in a vice) and allow the fibres to fall back over the end of the rope and termination. Pull the rope down until the cut end of the sheath is level with the back end of the termination and arrange the fibres so that they are straight (i.e. not crossed over each other) and evenly distributed radially around the termination.

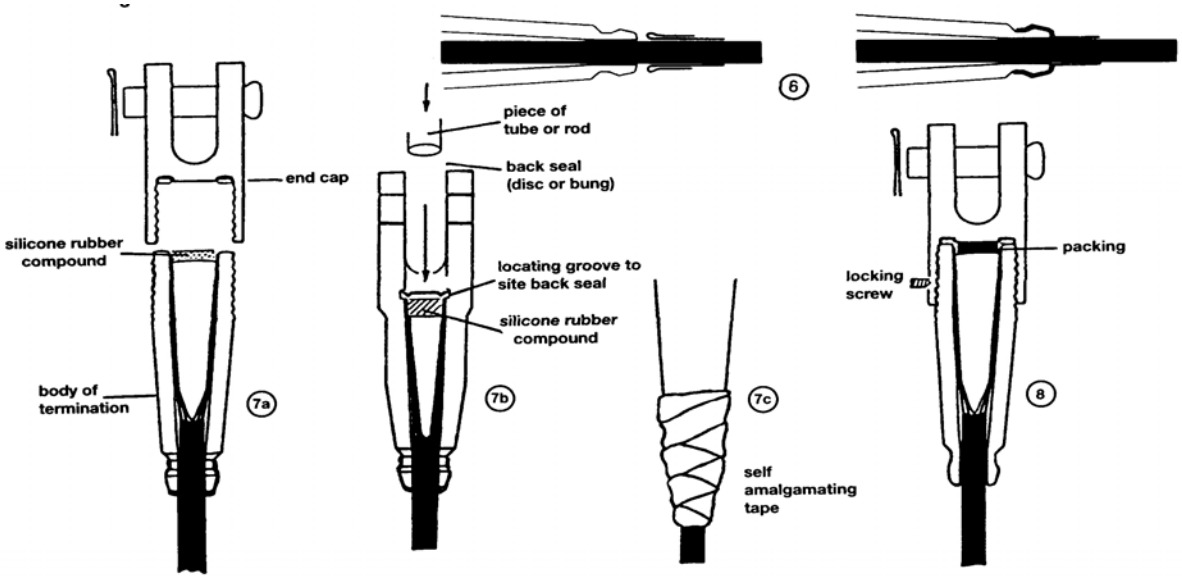
   Rest the tip of the spike in the centre of the rope end. Keeping a light finger pressure on the spike, slowly pull down on the rope drawing both the spike and fibres into the body of the termination. This should result in an even annulus of fibre trapped between the body of the termination and the spike. Adjust if necessary.

   b) It is important that the fibre bundle and spike are now drawn further into the body of the termination together. To achieve this PULL down HARD on the rope. Follow this by tapping GENTLY on the back end of the spike with a suitably sized punch, whilst MAINTAINING the PULL on the rope. DO NOT vigorously hammer the spike into the fibre bundle or sheath. Generally a change in the sound of the hammer tapping the punch is apparent when the spike is firmly home.

   c) For one piece terminations it may be found beneficial to insert a stiff paper cylinder between the lugs of the termination to assist the assembly. Remove the paper cylinder after completion of process.

d) Check that the outer sheath is not trapped between the spike and inner wall of the termination by ensuring that the rope can be rotated through ± 30°.

6. Slide the silicone rubber seal back down the rope to the nose of the termination using French chalk or talc again if necessary, and over the nipple end on the terminal body.



7. Complete the assembly by fitting back seals.

a) For two-piece terminations simply screw the two parts together and tighten the locking screw. If further waterproofing is required fill the gap between the end of the spike and the back end of the body of the termination with a silicone rubber compound. It is important that the waterproof compound used is not so fluid that it can flow and penetrate into the fibres.

b) For one-piece terminations, push in the back seal squarely using a piece of tube or rod, until it is captured into the radial locating groove. Waterproof with silicone rubber compound if required.

c) Further waterproofing can be achieved at the nose of the terminations by over-wrapping with a suitable amalgamating tape, ensuring that this extends beyond the end of the silicon tube.

8. Packing can be incorporated between the spike and end cap if required (see additional guidance notes below).

Additional Guidance Notes

Following the instructions above should secure the spike for transportation.

For Parafil® ropes that are always in tension the assembly procedure described above has proved to be successful.

However, where Parafil® ropes are used in situations where the rope is installed without tension and which may then be subject to vibration or very low oscillating loads before high tensions are applied (e.g. as could happen in certain types of moorings) then it is recommended that the ropes be pre-tensioned to 10 or 20% of the breaking load before use, or, if practically possible, preferably to about 60% Nominal Breaking Load.

When tension is applied to a terminated Parafil® rope the spike will be drawn further into the termination so that it cannot be removed without considerable force.

If under certain circumstances tensioning is not possible, then some end users have successfully incorporated packing between the back of the spike and the end cap (two-piece terminations only) to ensure no spike movement. (see diagram 8).

LINEAR COMPOSITES LTD
VALE MILLS
OAKWORTH
KEIGHLEY
WEST YORKSHIRE
BD22 0EB, UK
Tel: +44 (0)1535 643363
Fax: +44 (0)1535 643605
Email: sales@linearcomposites.com