Technical Specification of Fabric Inner Duct for Communication Pipeline

Installation and Maintenance Manual

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Changzhou Nanbo Composite Material Co., Ltd. develops the fabric inner duct for communication pipeline, a kind of soft pipe-in-pipe manufactured from chemical fiber, which can be used for deploying various communication cables and used as the upgraded alternative product of traditional hard plastic inner duct, greatly reducing the cost of re-excavation for deploying new pipelines and bringing the users significant convenience for construction and substantial economic benefits.

Fabric Inner Duct for Communication Pipeline consists of the following parts:

1. Inner duct
2. Pull tape

I. Design indexes for fabric inner duct for communication pipeline

1. Design indexes

Material requirement

Product	Material	Specification requirement	Breaking strength (kg/m)	Percentage elongation （50KG）
Inner duct	PET reinforced polyester monofilament	Diameter 0.23±0.02mm; denier＝520±75g	＞450	<0.9％
	Reinforced nylon 6 monofilament	Diameter 0.19±0.02mm; denier＝300±50g		
Pull tape	Reinforced high-tenacity polyester multifilament	Tenacity ＝7.9±0.2mg/ denier, 1000D	＞500	

Specification of inner duct

Diameter of inner duct	TX-50 type (width)
	TX-40 type (width)
	TX-30 type (width)
Specification of length	1,000m or 5,000m

II. Construction specifications

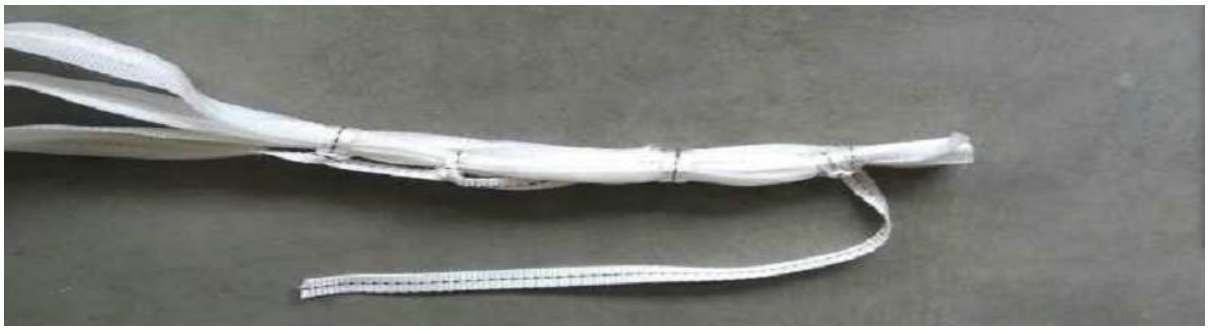
1. Procedures for deploying the fabric inner duct

a) Cut a 3cm long opening horizontally at 30-40cm from the end and at 2cm from the edge of inner duct.

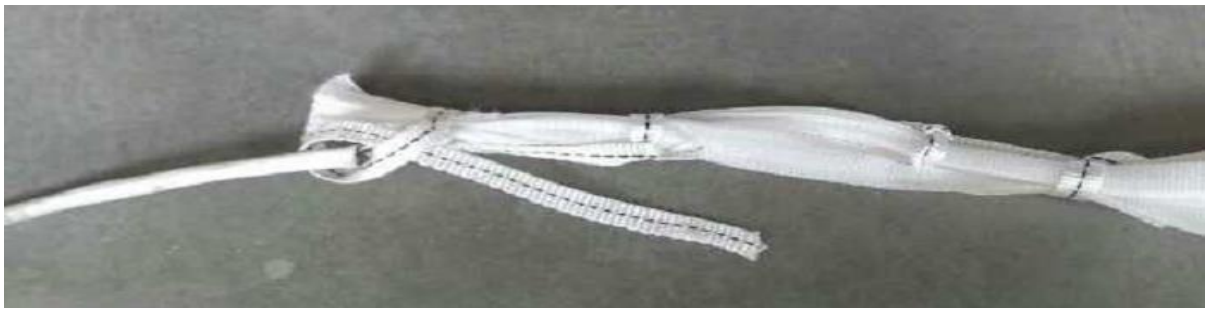
b) Use a pull tape of about 1m long to make a fast knot on the 3cm opening. Then make 2-4 half knots

to about 2cm from the end of inner duct. Use PE electrical adhesive tape to wrap the inner duct from the opening knot to the end of inner duct. The knots and the end of inner duct shall be wrapped fully by the tape.

c) Overlap three inner ducts for 80cm and cut an opening, and pull out the pull tape of one of inner ducts to make a fast knot and then make 2-3 half-knots for tensioning.



d) Thread the pull tape into one end of threading apparatus and make a fast knot.



e) Then wrap the inner duct and one end of threading apparatus closely with adhesive tape.

f) Reserve additional 2-3m fabric inner duct in each cable manhole. Cut a 3cm long opening horizontally at 1m from the orifice of PE pipe and at 2cm from the edge of inner duct, then tie a binding band at this opening to fix the fabric inner duct on the cable holder of manhole (hand hole).

g) Cut out the extra inner duct at 10cm from the cutting opening, and do not cut out the pull tape inside with 2-3m pull tape reserved, which shall be tied on the cable holder for cable pulling in the future.

h) Slightly strain the inner duct from the other end of cable manhole to tension the inner duct in the manhole, and fix the pull tape and inner duct on the cable holder according to the procedures.

i) Before threading and laying the cables and after fixing the empty fabric inner duct in the manhole (hand hole), the binding tape must be fixed on the cable holder in the manhole (hand hole) and shall not be slack; avoid the layup of pull tape in manhole (hand hole).

2. Handling procedures during threading and playing of cables

a) When pulling the cables, take down the pull tape of inner duct reserved on the holder at the opening. Bend the metallic strength member in cable into hook shape, and connect the pull tape and the metallic strength member. Wrap the knots and cable head with electrical adhesive tape after making knots, and wrap the bent metallic strength member to prevent scratching the inner duct.

b) Pull the pull tape at the other end of manhole to lead the cables into the embedded inner duct.

IV. Later maintenance of inner ducts after laying the cables

1. Orifice sealing treatment

a) In principle, the existing pipe sealing technology remains unchanged when carrying out sealing treatment for fabric inner duct, and the pipe orifice will still be sealed with the original method, such as foaming agent, oakum, cement, air bag, etc. When using foaming agent, the following methods are usually used for sealing:

b) Before use, reversely roll the fabric inner duct and put in the pipe orifice for about 20cm, padded with plastic thin film or scrap of paper to prevent the fabric inner duct directly contacting with the resin foaming agent, and then apply the resin foaming agent to seal the orifice. However, the sealing shall be cleaned up when laying new cables, and the orifice shall be resealed after laying.

c) For the orifice with low requirement of sealing, apply the thin film on the fabric inner duct, then apply the foaming agent between the fabric inner duct and the orifice.

2. Attentions for laying fabric inner duct

a) In order to prevent wear of fabric inner duct, the fabric inner duct shall not be pulled for more than 600m in empty plastic duct, more than 300m in empty cement duct and more than 150m in empty steel duct each time. If there is small space in the orifice of pipe with cables, the duct shall be pulled in sections during construction according to the section length.

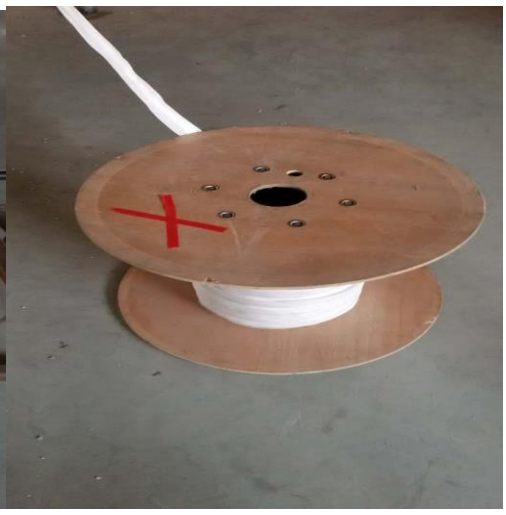
b) Before laying, the fabric inner duct to be laid shall be stored on the cable tray, which is close to the manhole (hand hole) for use, requiring flexible rotation.

c) The fabric inner duct can be bound on the threading rod to be directly pull into the pipe; if the pull tape or steel wire is used to pull the fabric inner duct, the pulling rotor shall be adopted between the fabric inner duct and the pull tape.

d) When threading and laying the fabric inner duct, protection treatment can be provided at the edges and corners to prevent longitudinal wear at the edges and corners of manhole (hand hole) and the pipe orifice, and manually comb the inner ducts at the orifice into the orifice, however, the pulley shall be adopted for guiding if the cervical part of manhole (hand hole) is deep; the same surface of fabric inner ducts shall be upward when being put into the orifice, and **overturn is not allowed**.

Correct use:

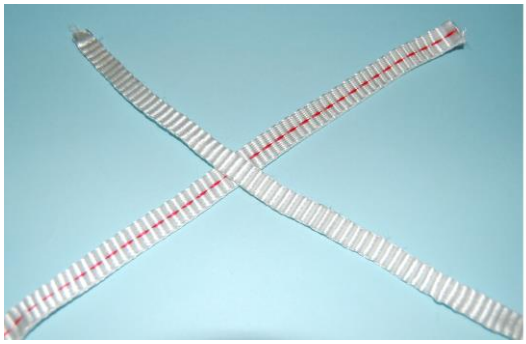
Incorrect use:



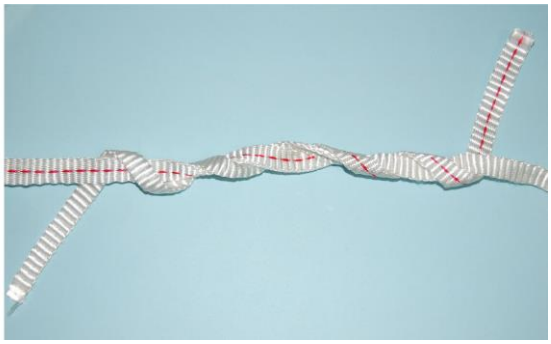
V. Tying methods of various connecting knots of pull tape

1. Tying method for blood knot

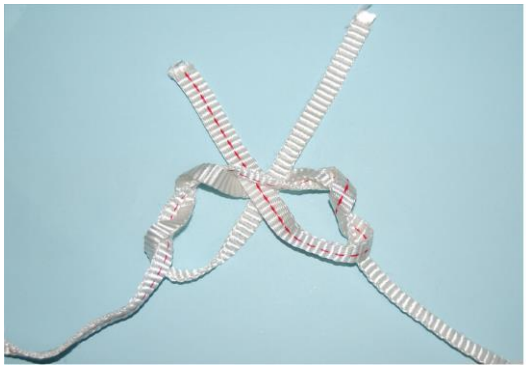
1. Cross the ends of two pull tapes



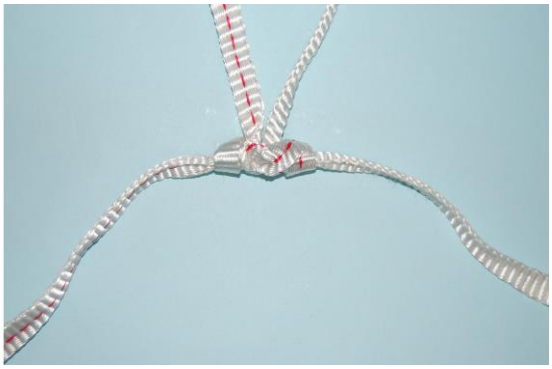
2. Wrap the tape for 6-8 rounds and separate the middle part



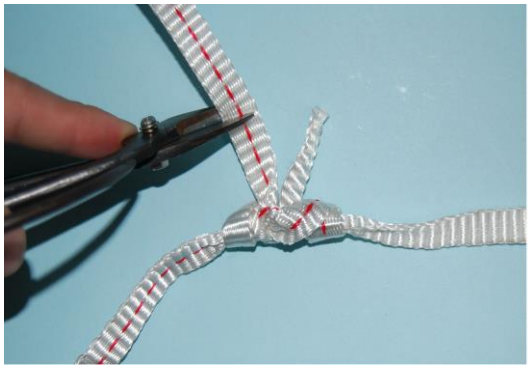
3. Pass the ends through the part separated



4. then tension the two ends of pull tape to make a knot



5. Cut out the extra part with 3cm reserved



6. Wrap the knot with electrical adhesive tape