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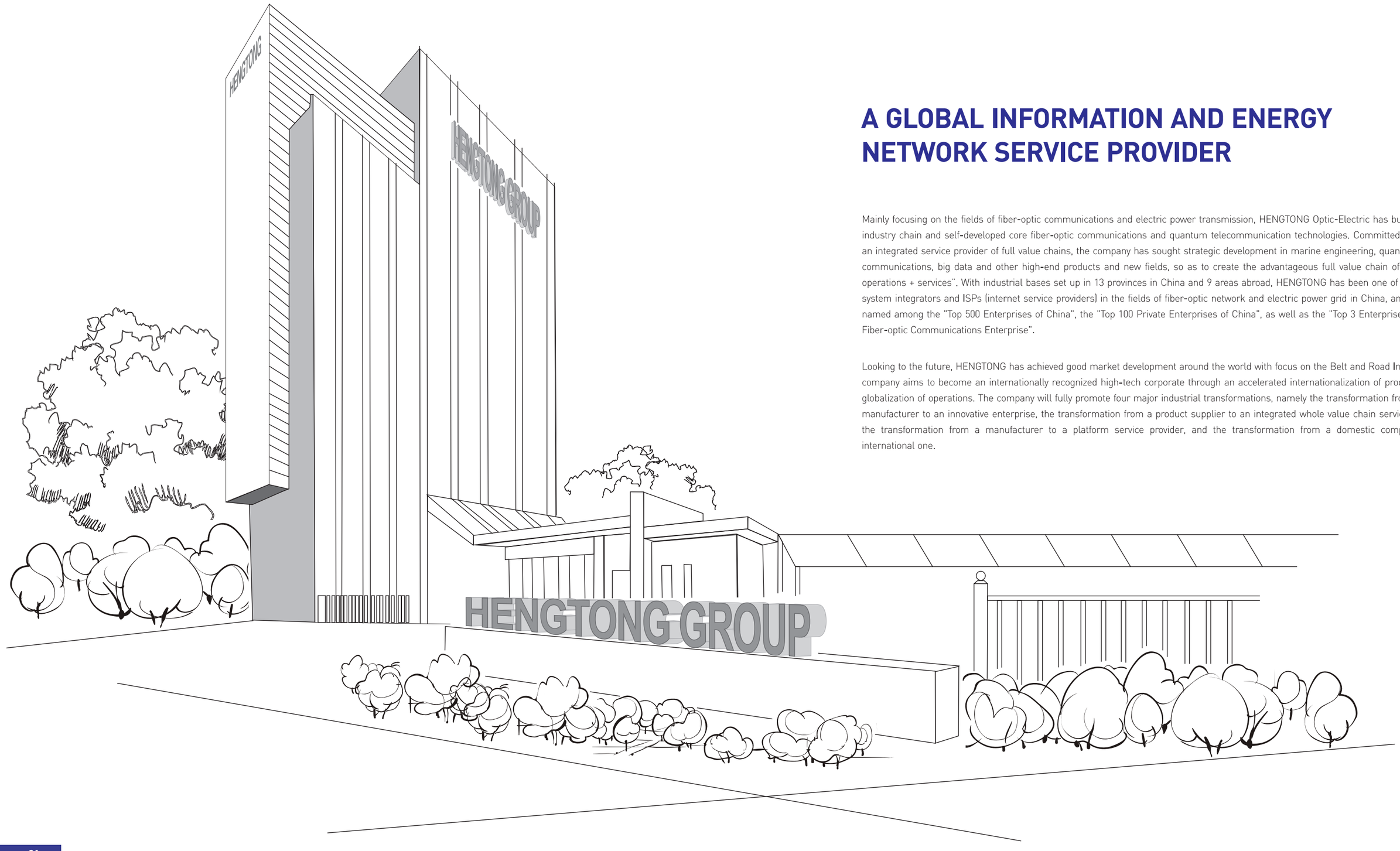
AIR-BLOWING MICRO CABLE

HENGTONG OPTIC-ELECTRIC
A Global Information and Energy Network Service Provider

Introduction



A GLOBAL INFORMATION AND ENERGY NETWORK SERVICE PROVIDER

Mainly focusing on the fields of fiber-optic communications and electric power transmission, HENGTONG Optic-Electric has built up a full industry chain and self-developed core fiber-optic communications and quantum telecommunication technologies. Committed to building an integrated service provider of full value chains, the company has sought strategic development in marine engineering, quantum secure communications, big data and other high-end products and new fields, so as to create the advantageous full value chain of "product + operations + services". With industrial bases set up in 13 provinces in China and 9 areas abroad, HENGTONG has been one of the leading system integrators and ISPs (internet service providers) in the fields of fiber-optic network and electric power grid in China, and has been named among the "Top 500 Enterprises of China", the "Top 100 Private Enterprises of China", as well as the "Top 3 Enterprises of Global Fiber-optic Communications Enterprise".

Looking to the future, HENGTONG has achieved good market development around the world with focus on the Belt and Road Initiative. The company aims to become an internationally recognized high-tech corporate through an accelerated internationalization of production and globalization of operations. The company will fully promote four major industrial transformations, namely the transformation from an R&D manufacturer to an innovative enterprise, the transformation from a product supplier to an integrated whole value chain service provider, the transformation from a manufacturer to a platform service provider, and the transformation from a domestic company to an international one.

Air-blowing Micro Cable
construction manual

Product overview

1. Introduction

GCYFY(non-metallic reinforcing member, jelly-filled loose tube and sheathed by the polyethylene air-blowing micro cable)
The structure of the optical cable is to put single or multi-mode fiber into a loose tube which made of high modulus of plastic filling with waterproof compound. The center of the cable core is a non-metallic reinforced core (FRP), and water blocking yams are placed around the FRP. The cables for a certain number of cores, non-metallic reinforced core may also squeeze a layer of polyethylene (PE), loose tube (and filling rope) wraps around the center reinforced core into a compact and rounded cable core. The interstice in the core is filled with water-blocking material, then squeezed with a layer of polyethylene outer sheath

GCYFXTY (jelly-filled central tube, non-metallic reinforcement and polyethylene sheathed air-blowing micro cable) The structure of the cable is to place the loose tube into the center of cable and put single-mode fiber into a loose tube which made of high modulus of plastic filling with waterproof compound, then extruded polyethylene sheath.Yarns are placed between the tube and outer sheath.

2. Typical cross section

Figure 1 GCYFY

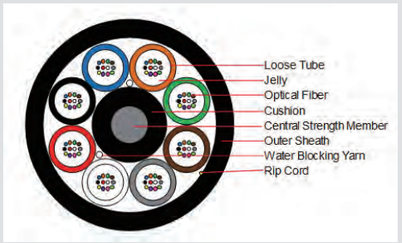
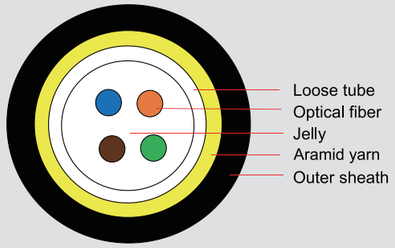


Figure 2 GCYFXTY



GCYFY technical parameters

No. of fibers	No. of fibers per tube(Max.)	No. of elements	Nom. cable diameter mm(approx.)	Nom. cable weight kg/km(approx.)	Min. short term tension N	Min. short term crush N/100mm
12~72	12	6	5.3	28	0.5G	500
72~96	12	8	6.3	37	0.5G	500
96~144	12	12	8.0	59	0.5G	500

NOTE: G is the weight of 1km cable.

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GCYFXTY technical parameters

No. of fibers	No. of fibers per tube(Max.)	No. of elements	Nom. cable diameter mm(approx.)	Nom. cable weight kg/km(approx.)	Min. short term tension N	Min. short term crush N/100mm
1~12	12	1	2.5	5.8	0.5G	50

NOTE: G is the weight of 1km cable.

3. Application overview

- According to the project and product characteristics, it can be used in the metropolitan area network and access network, the advantage of pipeline cost is obvious, and high contain fiber rate and high utilization rate of pipeline, which is suitable for the construction of a piece of elastic fiber optic communication network.
- Using the existing pipeline to expand the metropolitan area network, making full use of the existing pipeline to relieve the pipeline shortage.
- The joint construction and sharing of pipeline facilities can improve pipeline utilization, reduce construction cost, shorten construction period and save raw material consumption.
- The micro cable laying matches up road grooving technology can be used to reduce the cost of manual, minimize the damage to the road surface, with construction speed and efficiency significantly improved.
- The laying of access network greatly reduces the number of fiber connection points and the number of man hole.
- Lay cable with oil pipelines in the same ditch. According to overseas experience and continuous experimental demonstration, micro cable air blowing technology has become the preferred mode of oil pipeline communication construction.

4. Product features and advantages

- Make full use of limited pipeline resources, which has greatly improved pipeline utilization and shortened construction cycle.
- Reduce the initial investment. Operators can blow the micro cable batches and invest in batches based on market demand.
- It is flexible distribution, flexible to modify and repair the routing, only need to change the direction and connection of the micro tuct, which can be used to change the fiber network structure easily.
- It is convenient to upgrade the line in the future, increase the number of fiber core or replace the new variety of optical fiber, and adapt to the market demand continuously.

Micro Optical Fiber Cable Construction Equipment List

1. Air blowing equipment

Micro cable air blowing machine

Air compressor

2. Air blowing accessories

Micro duct or bundle duct

Silicon core silicon duct or Horizontal micro duct Opening Knife

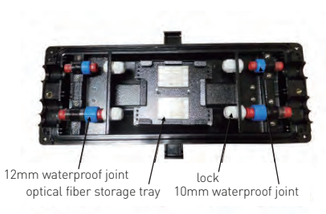
Y Joints

T Joints

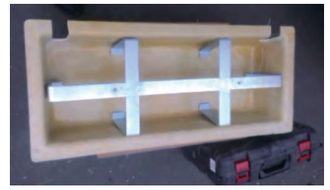
Pipe plug

Straight Joints | Waterproof Joints | Adjustable joints | Waterproof Plug | Cable pipe plug

3. Silicon core duct or micro tube Joints



Special splice enclosure for micro cable



Micro cable protection box

a.Micro cable air blowing machine:
Micro cable air blowing machine is one of the main equipments for air blowing. It is connected to micro duct and air compressor at the same time, and its continuous driving force drives the micro duct to advance at high speed in micro duct.

b. Air compressor:
The air compressor generates high-speed and high-pressure airflow, which is injected into the micro duct through the air blowing machine, so that the micro-cable is suspended in the micro duct, reducing friction between the micro-cable and the inner wall of the micro duct, thereby prolonging the blowing distance of the micro cable.

c. Micro duct or bundle duct:
The micro duct is a carrier for micro cable gas blowing, generally made of HDPE, which can be put into the silicon duct by means of air blowing or pulling; the bundle duct is bundled by a certain number of micro duct. The bundle of micro duct formed together, similar to a honeycomb tube, has a high density of micro duct, which are normally integrated at the factory.

d. Silicon duct or Horizontal micro duct Opening Knife:
Special tool for silicon duct or micro duct cutting.

e. Silicon duct or micro duct joints:
Used for connection and divergence of silicon duct and micro duct at the joint, wherein the silicon duct joint has Y type joint, T type joint and duct plug; micro duct joint There are direct heads, waterproof joints, adjustable joints, waterproof plugs and cable pipe plugs.

f. Special splice enclosure for micro cable:
It is used for fiber splicing and waterproof protection at the joint of the micro cable. Its air-tightness is more strict than that of the traditional cable connector box.

g. Micro cable protection box:
For the reserved protection of the micro cable and the joint box protection, can be buried underground or installed in the pipeline.

Overview of Cable Construction Technology and Precautions

1. Preparation before construction

Detection of each drum of fiber 1 → Route retest 2 → Cable allocation 3 → Route preparation 4

8 Completion acceptance ← 7 Attenuation detection ← 6 Connection installation ← 5 Laying wiring

1).Single cable drum testing: appearance of cable, index of fiber and so on.

2).Route retest: according to the construction design, review the specific direction of routing, laying conditions, environmental conditions and the specific location of the joints, the ground distance, distribution drum, sub-Tuen and so on.

3).Cable distribute drums: The total length of the cable and the number of fittings are calculated according to the retest routing calculation.

4).Route preparation:before laying duct cable laying need pipeline cleaning, pre-release wire or pre-filled silicon core tube, etc., before laying non-self-supporting overhead need pre-stranded strand, hook, etc., also need to inventory the amount of fittings, it will provide convenient conditions for the smooth progress of the project and the safe laying of fiber optic cable.

5).Cable laying: According to the way of laying, the single drum cable is put into the communication tower.

6).The splice of cable install: Include optical fiber splice, strengthen core connection, and contact loss measurement. Package of joint casing and support for joint protection.

7).Attenuation monitoring: Fiber properties（Such as the total attenuation of optical fiber） test.

8).Completion acceptance of optical cable: Provide the technical data of construction drawing, modify routing diagram and measurement data, and do with the inspection and completion acceptance work, providing qualified optical fiber lines to ensure system tuning.

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2. Overview of construction process

01. Draw the silicon tube out of the well

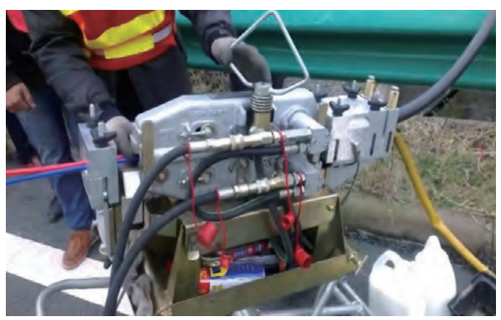
02.Inspection of silicon tube air tightness and handling cut-though

Note: Draw the silicon tube out of the well, which need Inspection of silicon tube air tightness and handling cut-though

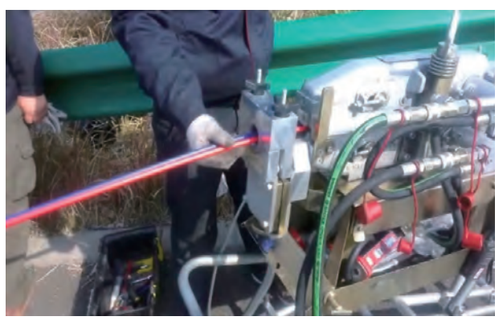
03. The front of the microtubule as the tractor

04. Check the air tightness of the microtubule

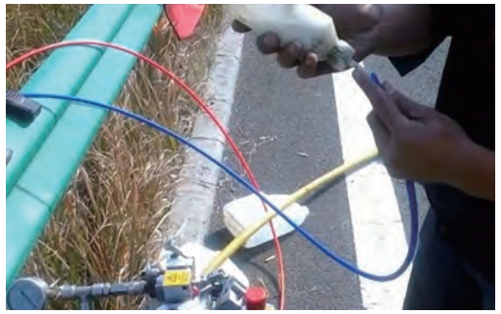
Note: The front of the microtubule as the tractor, for sealing and traction, seal at the end of the microtubule, and fill in a number of air pressure for air tightness inspection.



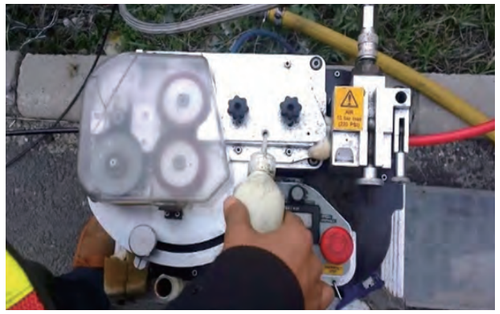
05. The micro tube is inserted into the silicon tube by the air blower



06. Blowing microtubules



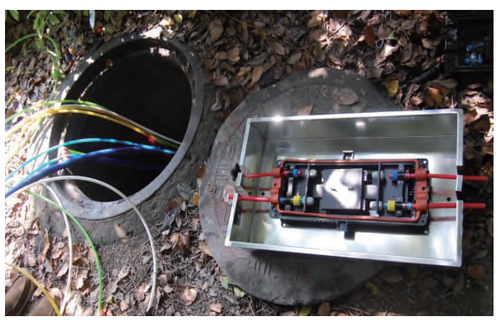
07. Micro tube lubrication



08. Micro cables blow into microtubules and add lubricant

Note: add sponge ball and lubricant into the micro tube cleaning to clean and lubricate the tube, install the right end face sealing ring and handle and micro cables, blowing tiny cable, start blowing process to add lubricant, which can effectively increase the air blowing distance;

09. The microtubes are fixed to the splice box by means of an airtight joint



10. Secure the connector box in the protection box

Note: Inspect the air tigtness of the silicon tube, then draw the silicon tube out of the well.

Summarize

In the network construction, with the shortage of pipeline resources, users of the pipeline space utilization, construction efficiency and convenient of maintenance put forward higher requirement of, air blowing technology will be a good choice because of the high construction efficiency, low comprehensive construction costs , Maintenance and other advantages to be a good choice.

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