Fujikura

Nationwide to worldwide: Fujikura continued to grow and launched sales outlets throughout the country to explore private demand. The company opened Fukuoka office in 1913 and Osaka office the next year in 1914. The company also concluded a contract with Mitsui & Co., Ltd. and expanded the sales network all over the world. With the completion of the manufacturing system, the number of employees exceeded 450.

Shaping the future with "Tsunagu" Technology.

FUJIKURA NEWS 2017 No.436 11

R&D

Development of Multicore Fiber Extending Technology

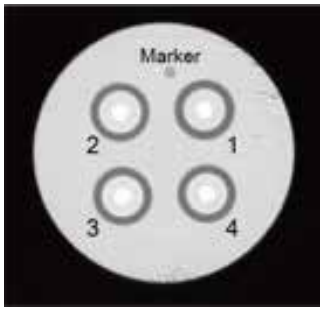
Fujikura has succeeded in producing a multicore fiber (MCF) longer than 100 km from a single preform. This four core fiber was used in a high-capacity transmission experiment conducted by Nippon Telegraph and Telephone Corporation (NTT). The experimental results were described in a post-deadline paper published by NTT at an international conference regarding information and telecommunications, Opto-Electronics and Communications Conference (OECC), held in July in Singapore.

Now, data transmission volume has been steadily growing worldwide, and in the future the limitations of transmission capacity of existing optical fiber will become apparent. To resolve this limitation issue, MCFs, each of which have multiple cores, are now actively being researched and developed. Against this background, we have researched and developed MCFs and finally succeeded in producing a more than 100 km-long four-core MCF with an outer diameter of 125 μm from a single preform as one of the fruits towards practical use.

This MCF features an outer diameter size and optical characteristics similar to those of existing single-mode optical fibers. To satisfy desired optical characteristics stably over the whole length, the MCF requires meticulous care in terms of characteristic variations of the core material, outer diameter of the preform in which core is formed, and hole diameter. By simulating optical characteristics of the core material and gaining feedback, stable optical characteristics of the MCF have been exhibited over the entire length.

We will continue research and development with practical application in mind to build future high-capacity optical networks, which will support the development of broadband services from now on. In addition, this study is partly supported by the National Institute of Information and Communications Technology (NICT) under "R&D of Advanced Communication and Broadcasting towards the Realization of Innovative Optical Fiber and Communication Technology."

● Cross-sectional view of new four-core fiber



[1] T. Matsui et al., OECC 2017, PDP2 (2017)

*1 a paper accepted after submission deadline. Only highly-regarded studies are allowed to report on the results.

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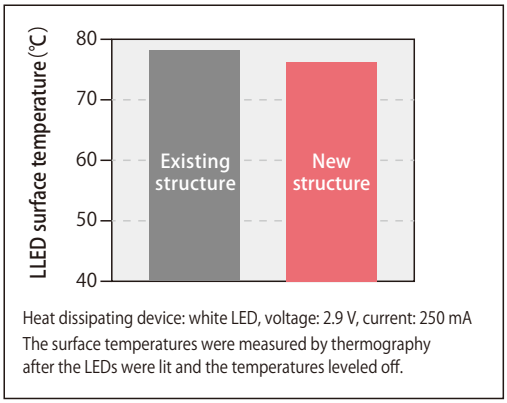
Electronics

Highly Heat-dissipative FPC

An FPC (flexible printed circuit board) that accommodates a heat-generating component needs a heat-dissipating structure to remove heat from the component. Generally, a heat dissipating structure includes a metal reinforcement board attached to the backside of the mounting area with adhesive. Fujikura's newly-developed structure enables a component to dissipate heat using a double-sided CCL (copper coverlay) that has a circuit layer on one side and a heat dissipating layer of a thick conductor on the other side using no metal reinforcing board.

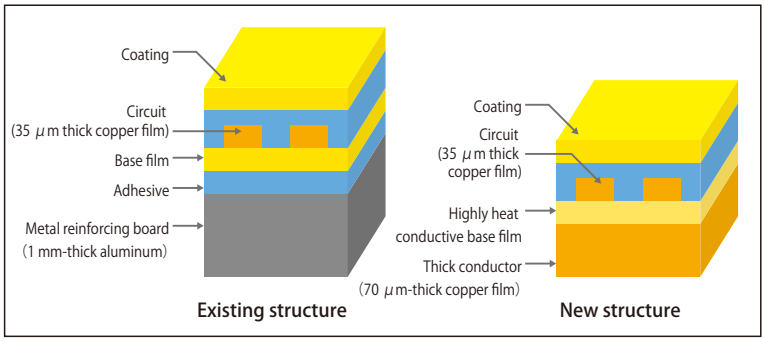
In addition, by the use of a highly heat conductive material as the base film, the 70 μm- thick CCL achieved an equivalent to or higher heat dissipation compared to a structure with 1 mm-thick metal reinforcing board. This new structure is capable of releasing about the same amount of heat compared to the existing structure while possessing various advantages in reducing thickness, weight and costs and being bendable. This structure is expected to find a variety of applications in FPCs that needs to dissipate heat.

● LED surface temperature of existing structure and new structure



Heat dissipating device: white LED, voltage: 2.9 V, current: 250 mA
The surface temperatures were measured by thermography after the LEDs were lit and the temperatures leveled off.

● Schematic diagram of heat dissipating FPC structure



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Information

Fujikura's Study Selected as IEICE Milestone

The Institute of Electronics, Information and Communication Engineers (IEICE) has marked the centennial of its foundation. In commemoration of this, IEICE selected studies that greatly influenced the development of our society, life, industry, and science and technology as milestones from among the studies discussed at IEICE conferences held in the last 100 years. These studies were recognized at the commemorative ceremony on September 15.

The study on "Low-loss Low-OH GeO_2 Doped Quartz Optical Fiber in the Long Wavelength Band" conducted by Fujikura's former employee, Hiroshi Osanai, was selected as the milestone of basic fiber optics in the fiber optics section. Mr. Osanai along with Masaharu Horiguchi from then Nippon Telegraph and Telephone Public Corporation (currently NTT) received the Achievement Award from the institute in 1976. Mr. Osanai proved the usefulness of the currently-used wavelengths through the production of ultra-low-loss optical fibers. In addition, a study on the method of S-Z twisting of communication cable conducted by Masamichi Yoshimura, Toshihisa Takada, and Shigenobu Tanaka was also selected as a milestone in fiber optic cable technology. The SZ twisting method, a remarkable way of producing metal cables, was invented by these three Fujikura employees. This technology was awarded Okochi Memorial Technological Prize in 1968 and has been applied in manufacturing current optical cables.

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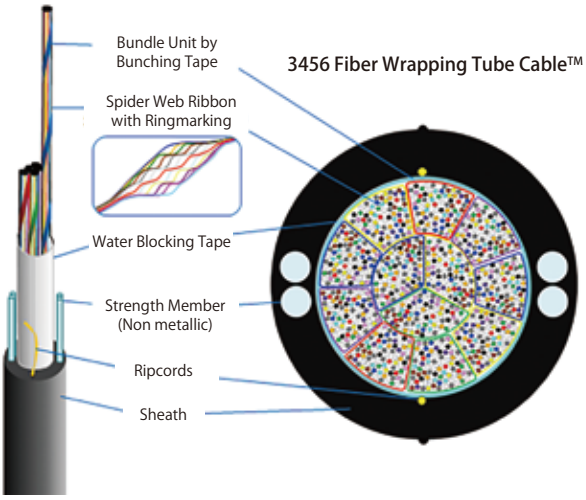
Power and Telecommu-nication

Released High Fiber Count Optical Fiber Cable 3456 Fiber Wrapping Tube Cable™

Fujikura has released 3456 fiber Wrapping Tube Cable™ (WTC™) consisting of 12 fiber Spider Web Ribbon™ (SWR™) produced by our proprietary technology. The use of SWR of excellent flexibility enabled unprecedentedly fine, lightweight, high-density optical cable with extremely many fibers to be produced. This WTC has a gel-free full-dry structure and is readily identifiable by the ring marking on SWR and also easily demountable because they are bunched up in each unit by the use of heat-fusion bunching. In addition, this product allows short processing time compared to conventional cables by the use of a method in which 12 fibers are spliced at once.

As video distribution and cloud services have recently become widespread, further increase of capacity is required of optical fiber networks for 5G and IoT use. In large cities worldwide, particularly, the shortage of underground duct lines has come to light and there is increasing demand for the installation of super-multi fiber optic cables in the limited space. The cable with significantly many fibers and ultra-small diameter, 3456 fiber WTC, is expected to meet such customer demands.



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Information

Bio Garden "Fujikura-Kiba Millennium Woods" Registered on Edo Greenery List for First Time

EDO-MIDORI

Fujikura built a bio garden named the Fujikura Kiba Millennium Woods within the headquarters premises in November 2011 and has been engaged in ensuring bio diversity. Since our efforts in conserving the environment have been highly regarded by the Tokyo Metropolitan Government (TMG), this bio garden has been registered as an excellent greenery area for the first time under TMG's new project called Edo Greenery Regeneration Project.

This project has been initiated to regenerate the environment that is suitable for creatures including insects, birds and other animals, living in Tokyo by planting native plants within premises of buildings.

We will continue to cooperate with the efforts being made by TMG while communicating with the local community through the Millennium Woods.

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Electronics

Small Lightweight Waterproof Round Connector CM09Y Series

The CM09Y is a smaller and lighter version of a present connector, the CM09. This new product has achieved weight reductions by about 20% for plug connector alone and 40% for the whole connector portion through the replacement of metal parts by resin parts and a reduction in the number of parts. The reduction in components number results in reducing assembly steps by about 20% (compared to the CM09). In the replacement of metal by resin, the metal sleeve has been molded integrally with the resin part. The product provides noise resistance equal to or higher than that of the CM09. The CM09Y connector is also available with a small-diameter harness.

● Picture：External view (from left, cable receptacle harness, plug harness, receptacle)

Specifications

Item	CM09Y	CM09
Weight of connector	28g	36g
Outer diameter of connector	φ23mm	φ28.5mm
Rated current	1A/contact	
Rated voltage	DC30V	DC24V
Withstanding voltage	AC500V(r.m.s.) /min	AC1500V(r.m.s.) /min
Operating temperature	−25℃～+70℃	
Compatible cable	AWG24～28（crimped）	№1、2：AWG20～22（crimped） Other cables：AWG24～28（crimped）
Number of conductor	25	25、32
Connecting system	Push on/Turn off（one-touch lock）	
Waterproofness	IP67（connected）	

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