

Benefits of Connecting SWR&WTC in the Telecom and Data Centre markets

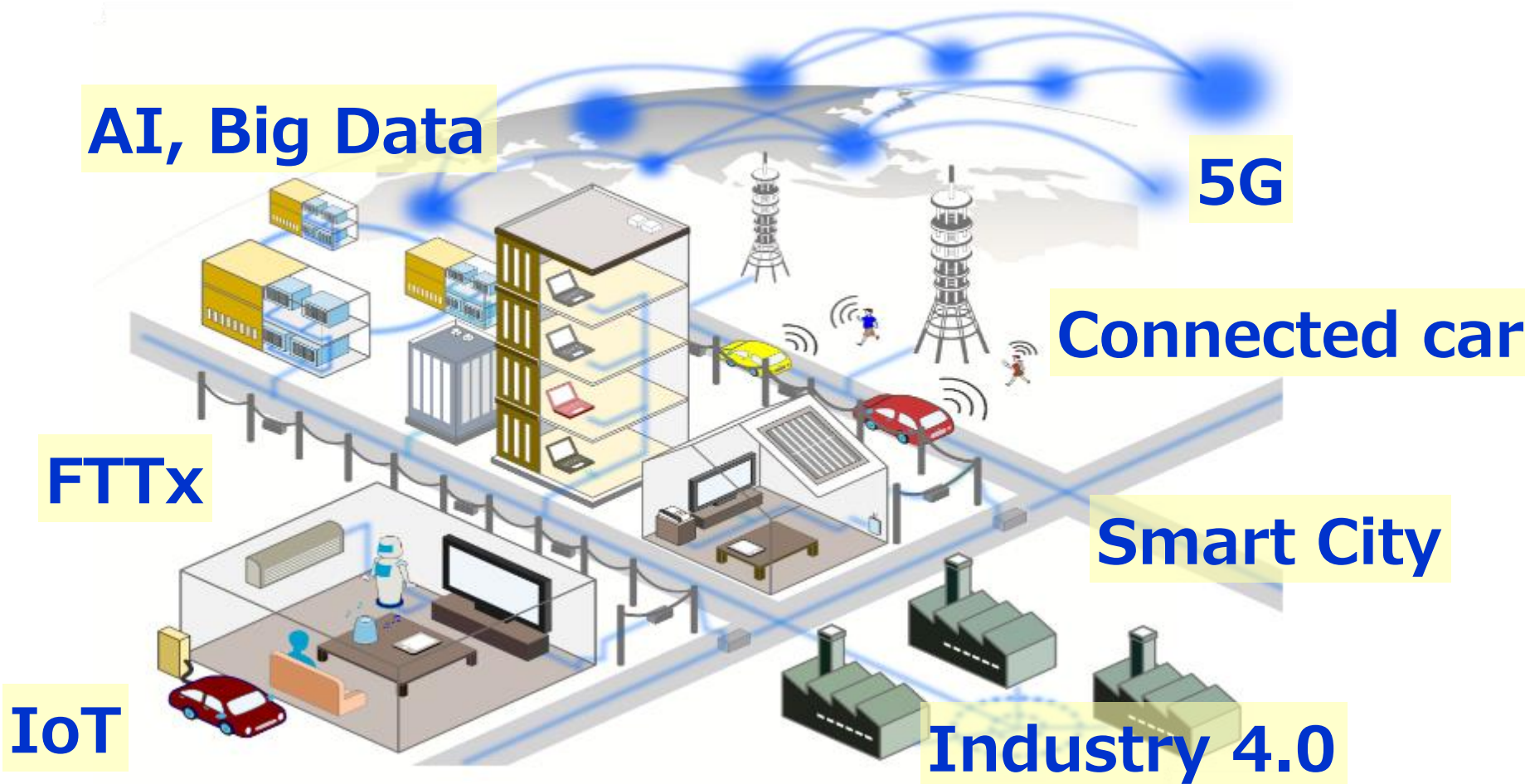
Stephen Rackstraw

UK Regional Sales Manager, Fujikura Europe Ltd.

14th/15th June 2023

Innovative IT based on optical fibre

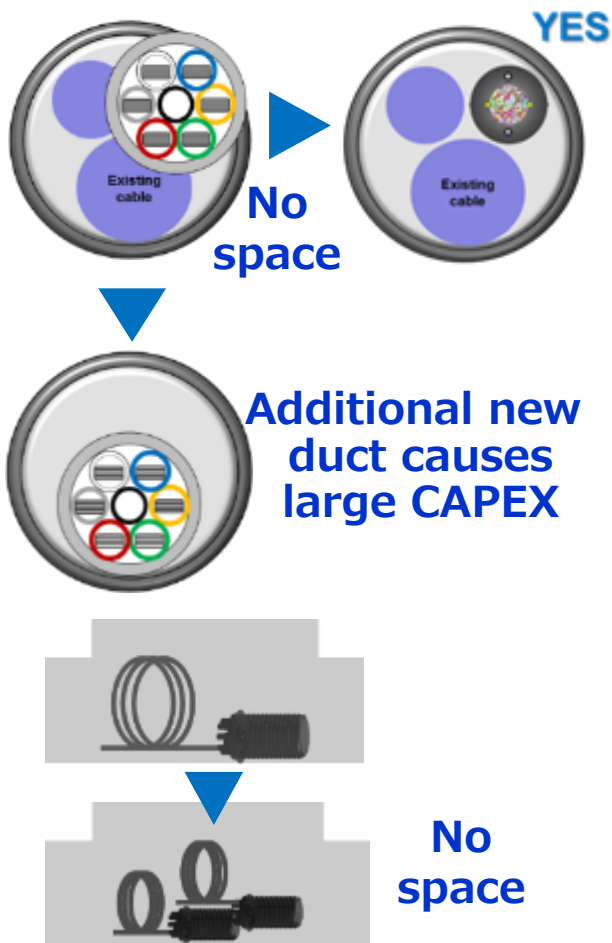
- Optical fibre supports improvements of the information technology.
 - Demands for large capacity networks are increasing, triggered by 5G, IoT, connected car, AI and big data.



Benefit of using high density cable

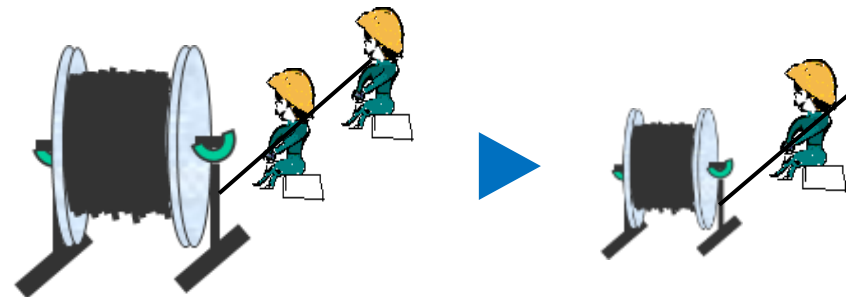
Duct and hand-hole utilization

- Adding the fibre cable into existing duct is getting tricky. There is a lot of cable already in it. Utilizing the existing duct avoids additional large CAPEX.



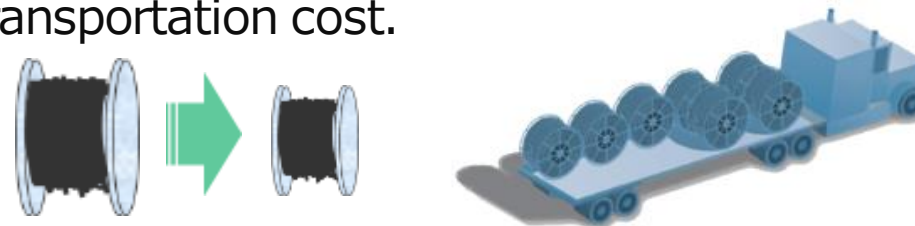
Easy cable installation

- Thin and lightweight cable offers easy and quick installation with less worker.



Easy transportation

- Small and lightweight reel enables a lower transportation cost.



Less connection points

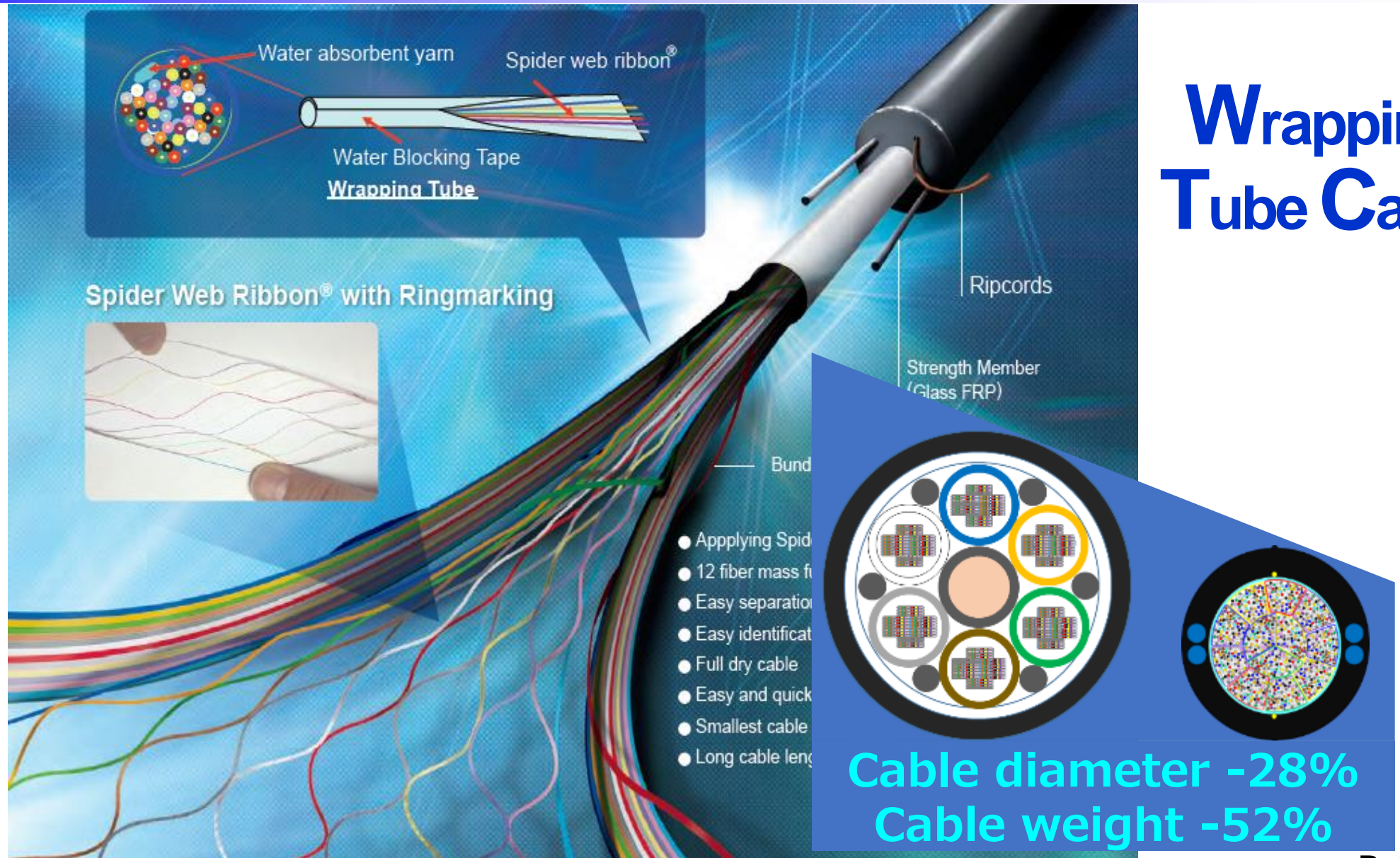
- Thin cables can be wound longer on one reel. The longer cable decreases the number of connection points.

▶ The longer cable reduces the cable connecting cost and optical power loss.

SWR&WTC

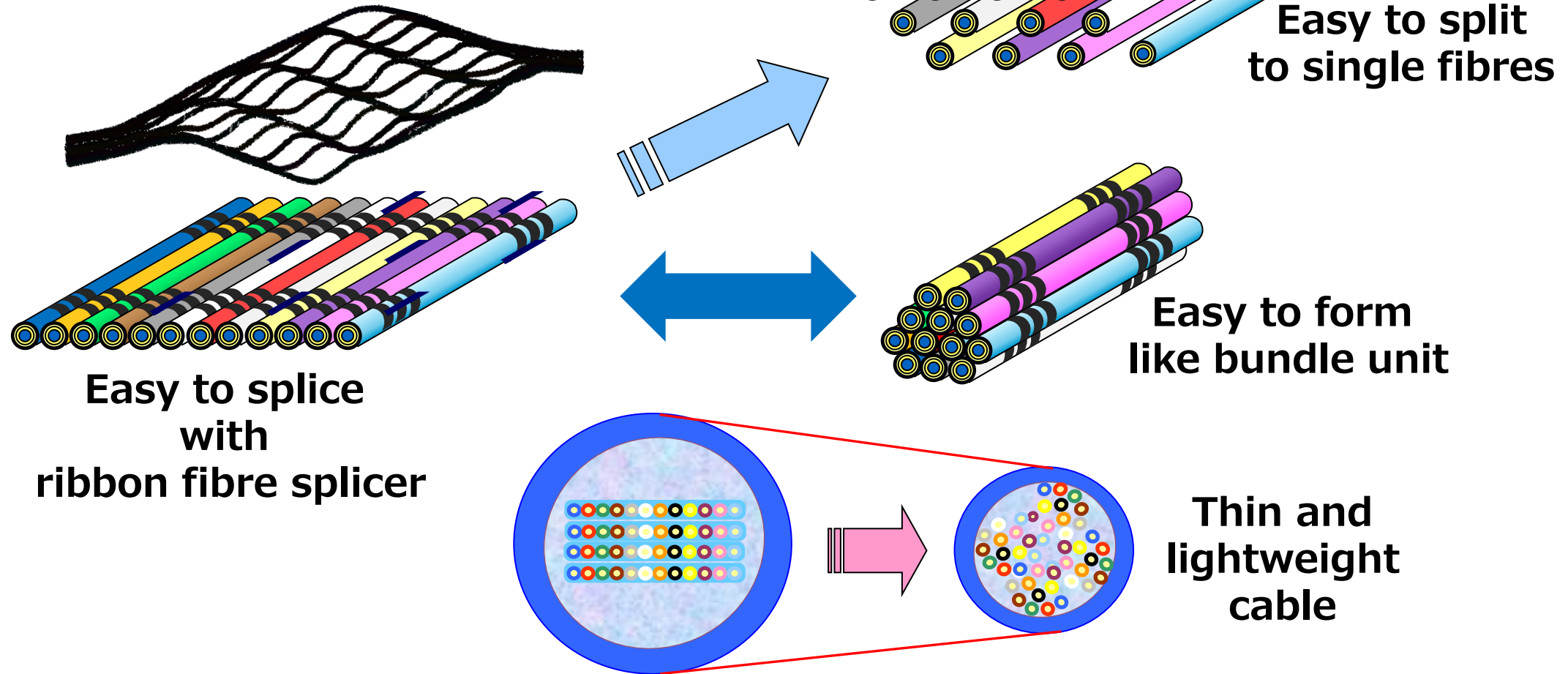
Wrapping Tube Cable

Spider Web Ribbon



SWR: Spider Web Ribbon, features

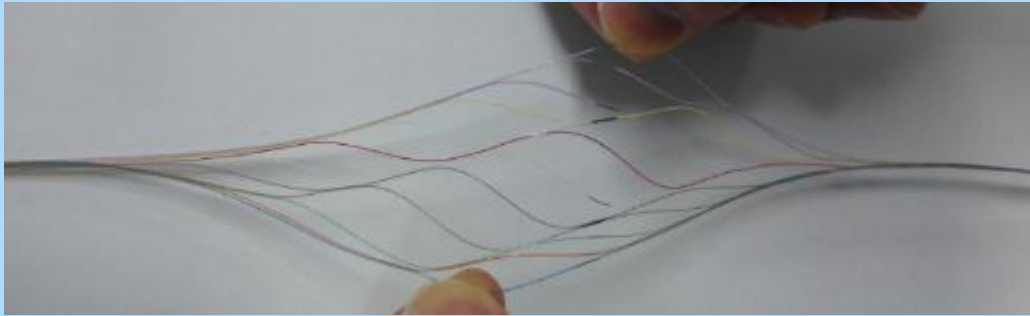
Spider Web Ribbon®



SWR: Spider Web Ribbon, features

■ Structure

- 1x12 structure based on ITU and IEC
- Short bonding part for flexibility
- Short bonding pitch to form like ribbon
- Optimized bonding strength for split

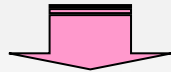


■ Easy identification by stripe ring marking

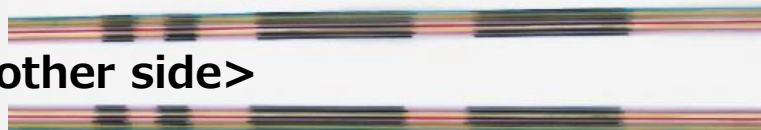


Previous method : Character by inkjet printer

<One side>



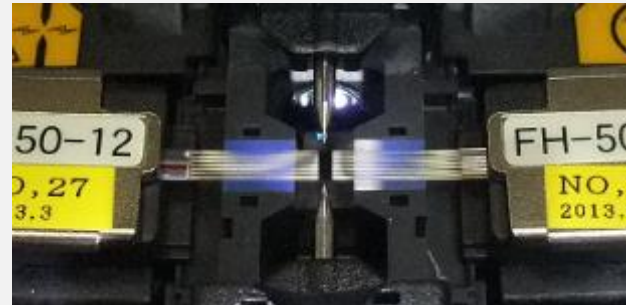
<Another side>



Stripe ring mark

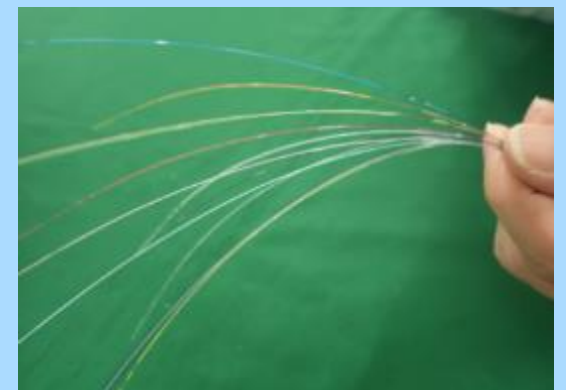
■ Fusion splice

- Using standard ribbon splicer
- Using core alignment splicer after split



■ Easy split to single fibres

- Easy split
- Easy removal of ribbonized resin
- Remain ring mark after resin removal



WTC: Wrapping Tube Cable, features

■ Material

- No plastic tube and no slotted core
- Specification based on IEC and Telcordia



■ Easy opening

- Special rip-cords for easy opening
- No stranding tape and thread
- Easy mid span access



■ Dry structure



■ Bunching unit

Easy identification and easy removal



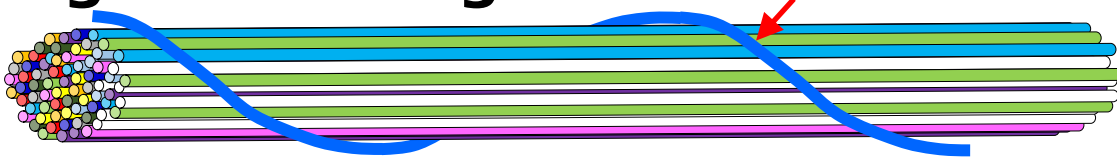


WTC: Wrapping Tube Cable, features

【Conventional bunching method】

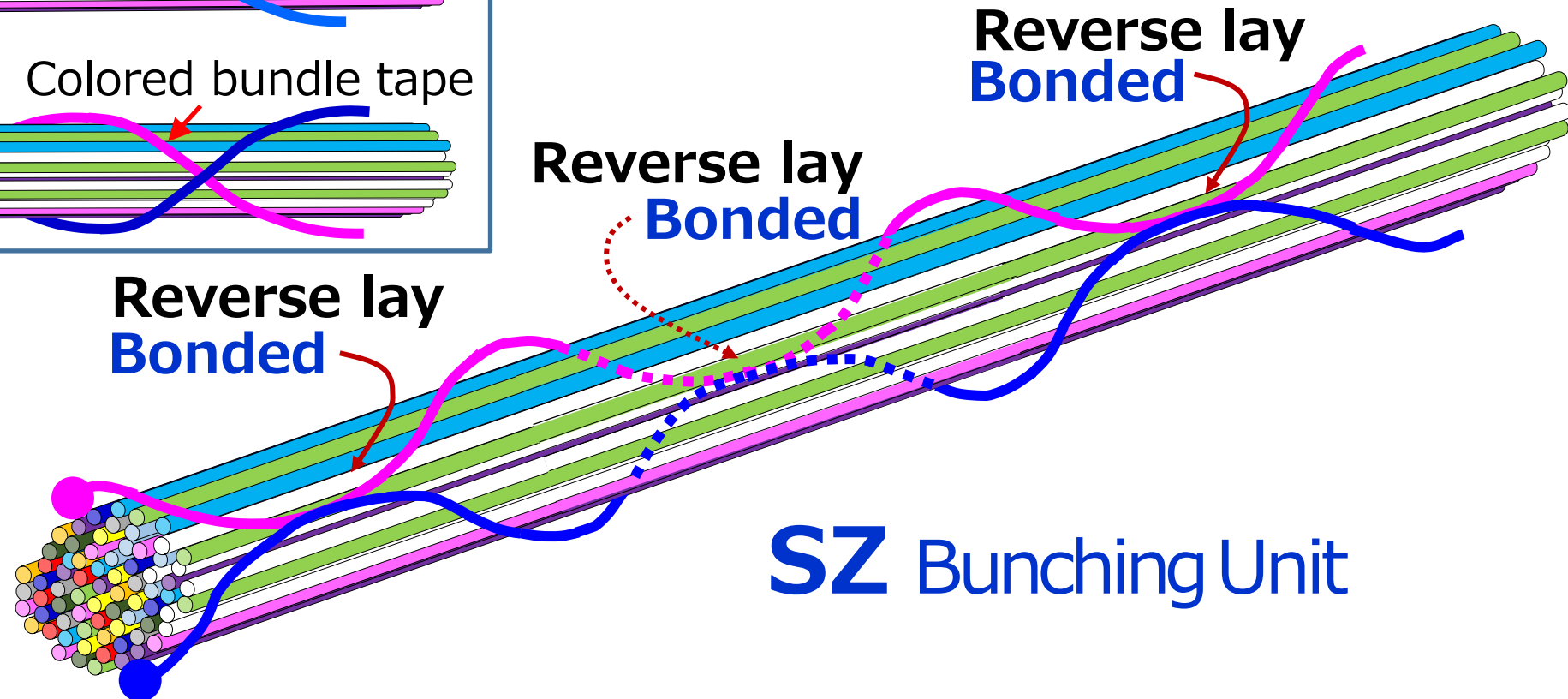
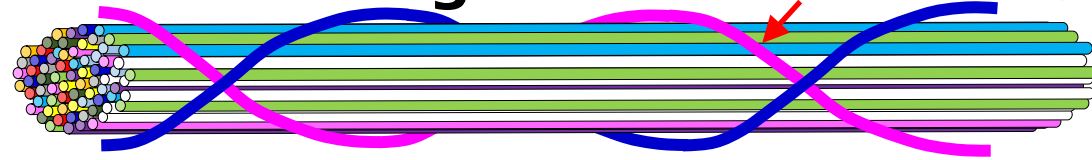
• Single bunching

Colored bundle tape

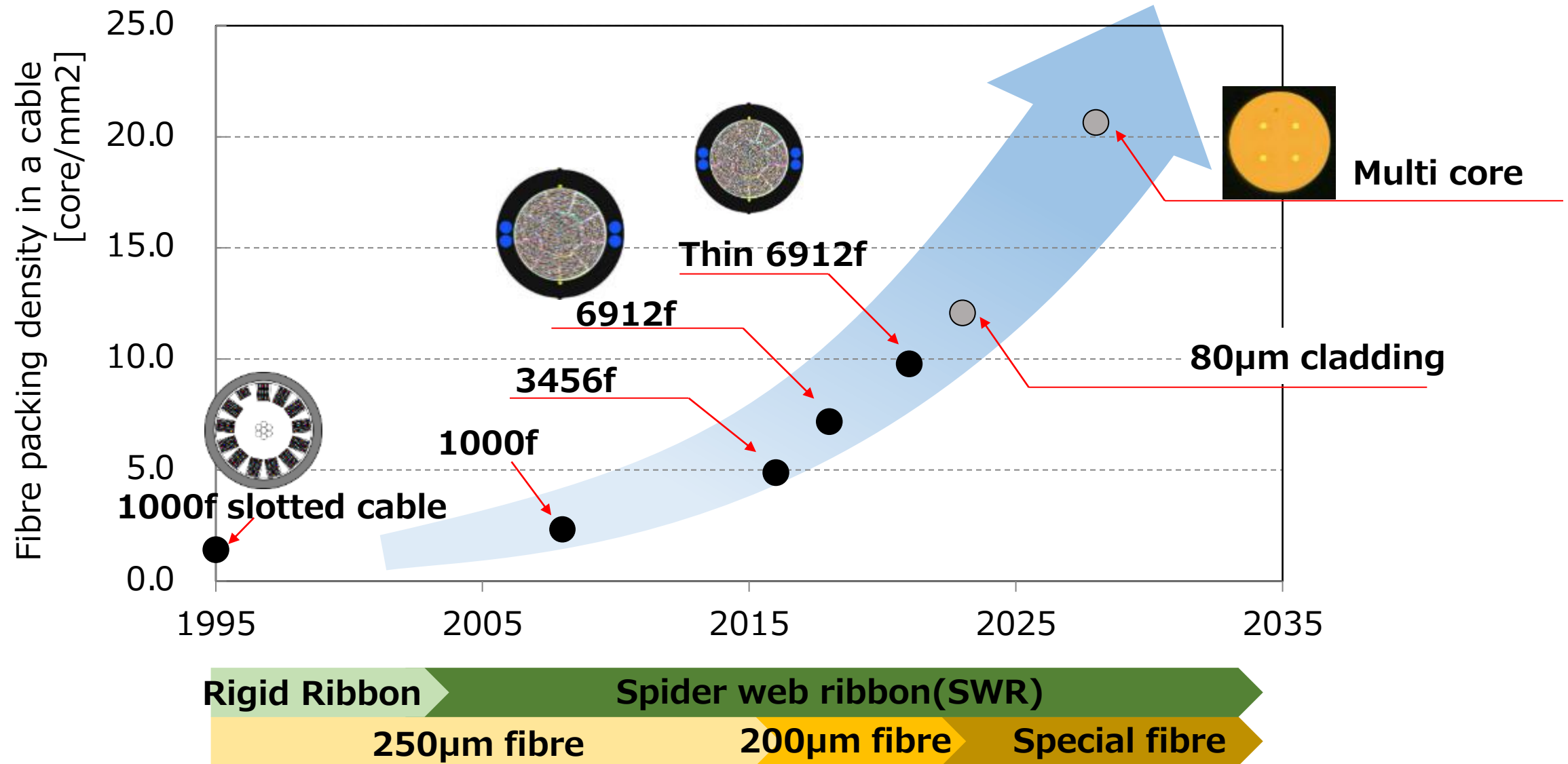


• Cross bunching

Colored bundle tape



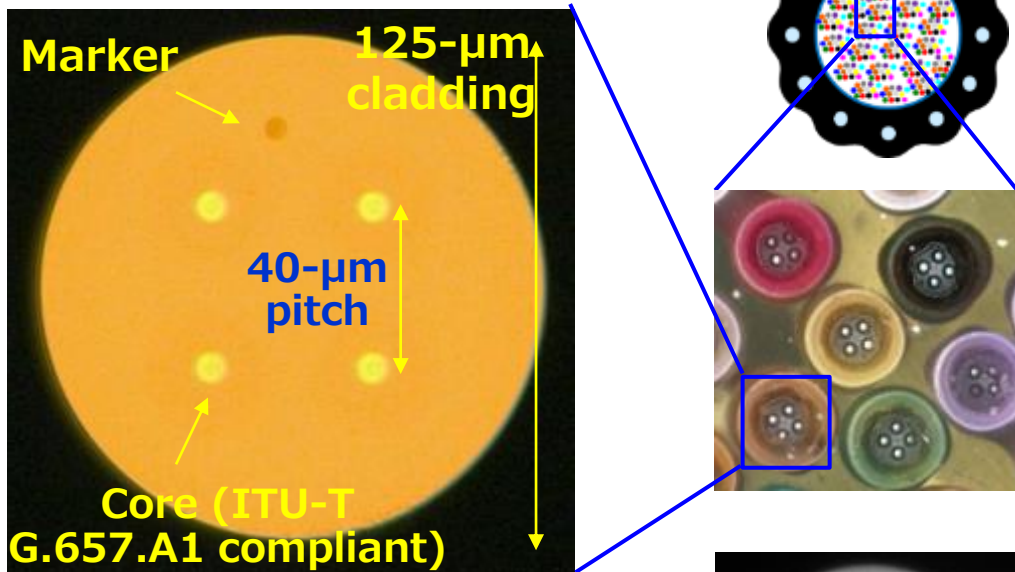
Technology trend of high density cable



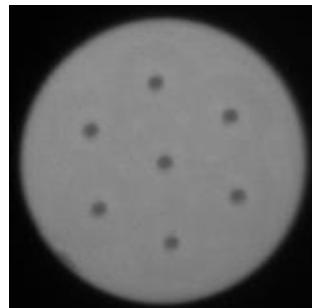
Technology trend of high density cable

Multi Core Fibre

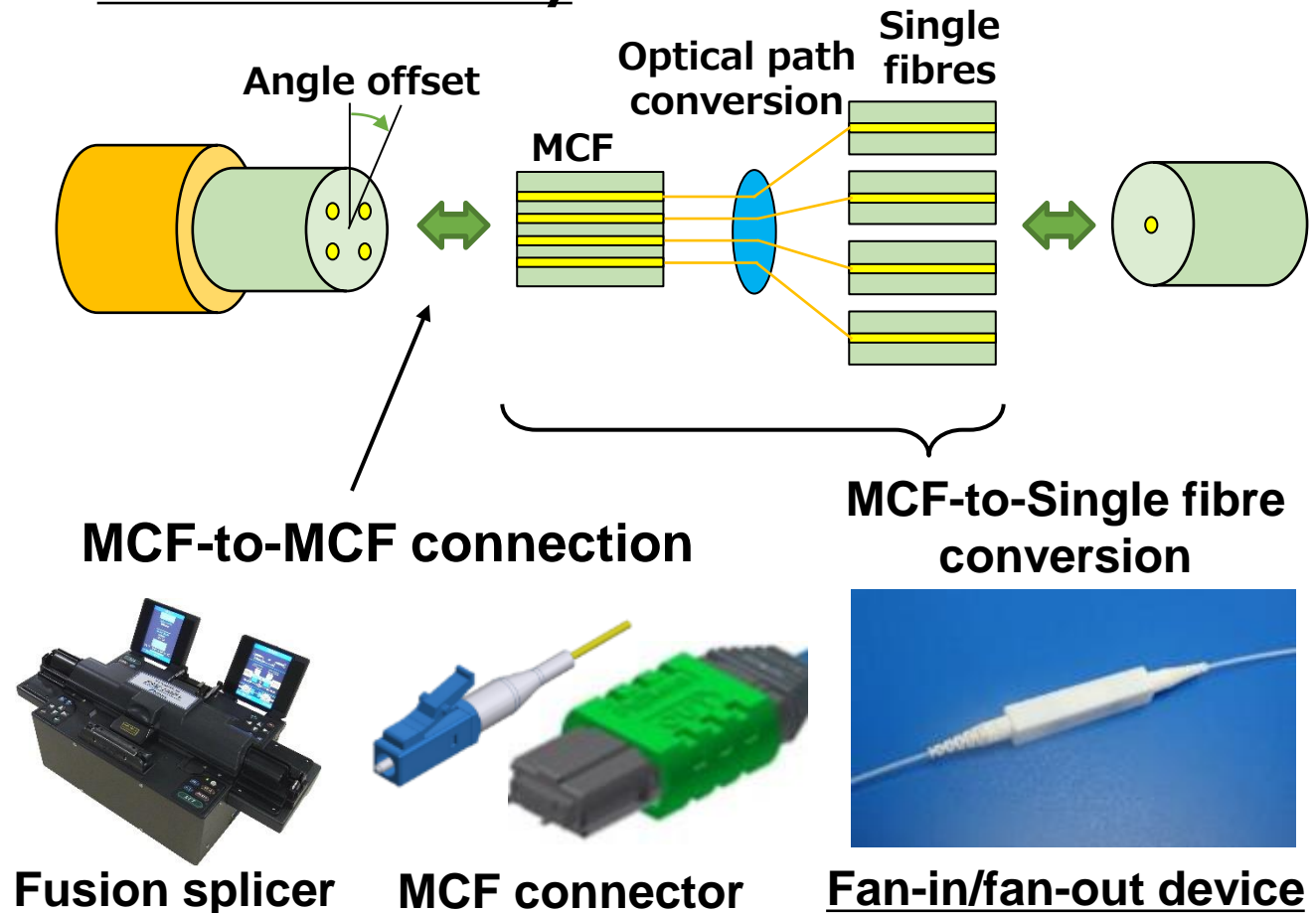
■ 4-core MCF



7-core MCF

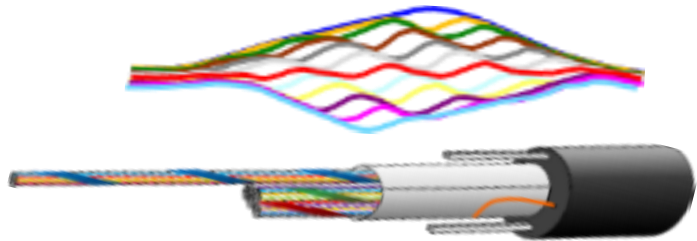


■ MCF connectivity



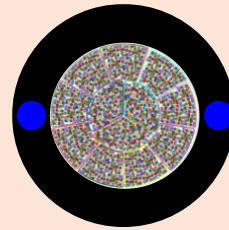
SWR&WTC for two markets

Telecom
market

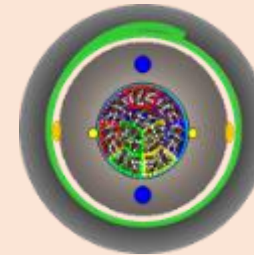


Data centre
market

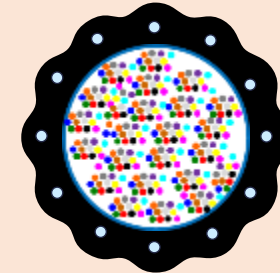
- ✓ **Compatibility** with existing cable
- ✓ Long time **reliability**
- ✓ Thin, lightweight and long length
- ✓ 250µm coating diameter



Standard OSP



Armored

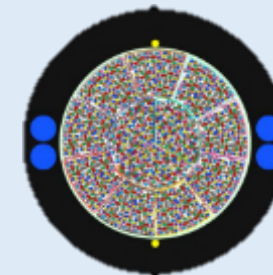


Air blown

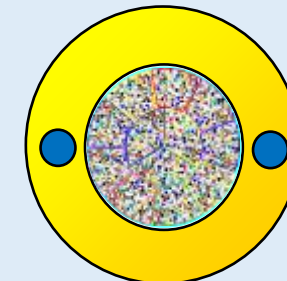


Aerial

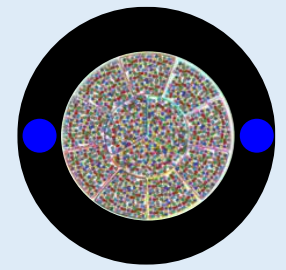
- ✓ High density
- ✓ **High fibre count**
- ✓ Small diameter
- ✓ **High flame retardant**
- ✓ 200µm coating dia.
- ✓ Max. 6912 fibre cable



OSP



ISP

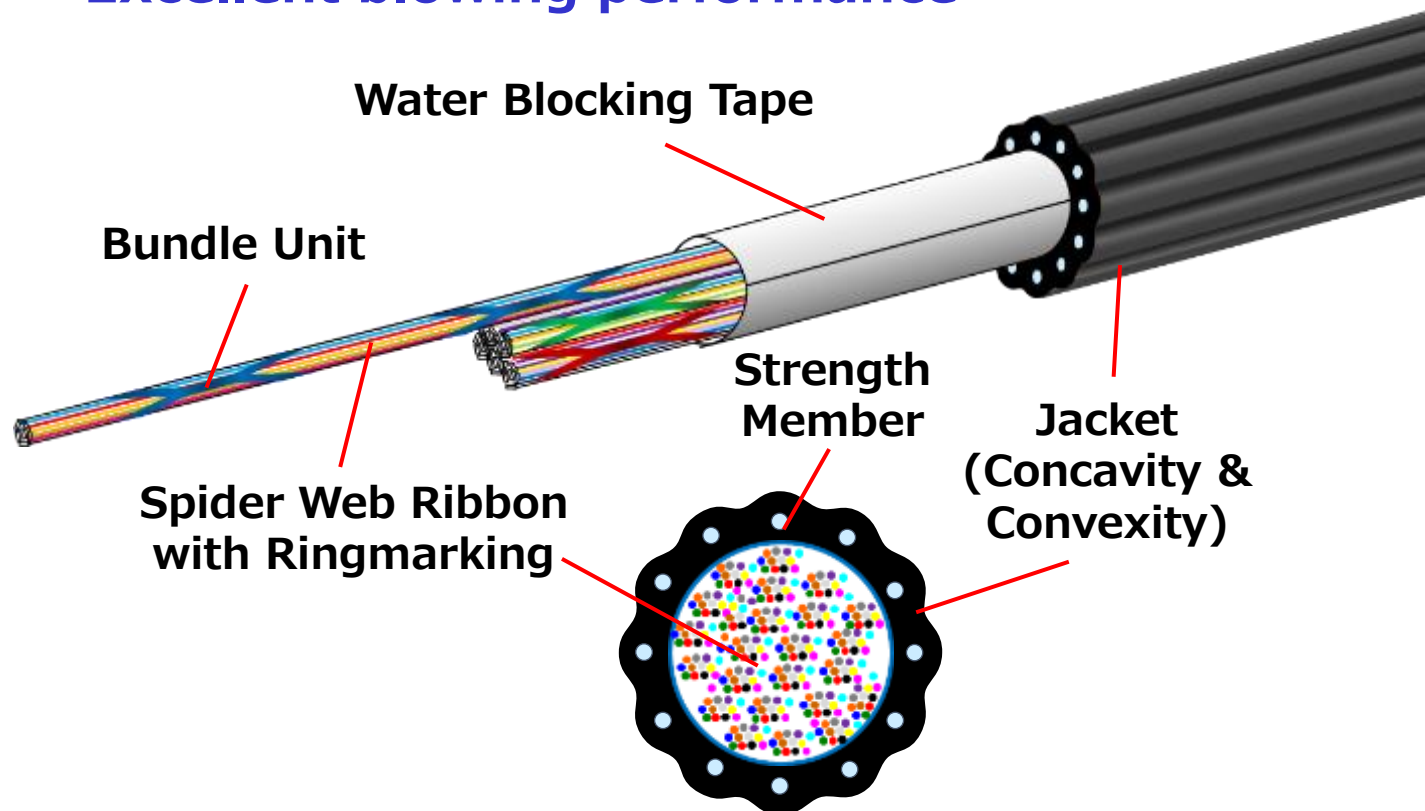


I/O

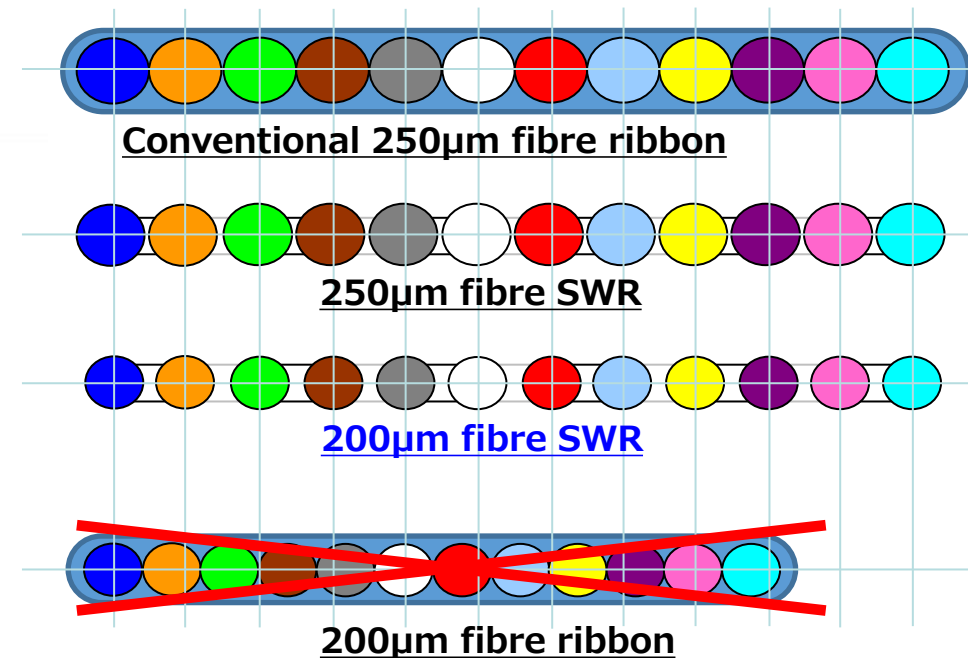
Air blown cable for telecom

■ SWR&WTC optimized for air blowing performance


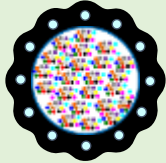
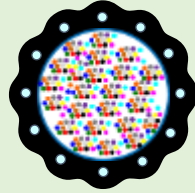
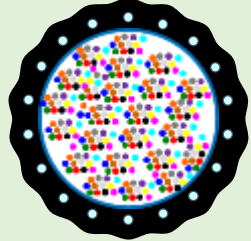
- Thin and lightweight with full dry structure
- Mass fusion splice
- Easy to handling e.g. bunching unit
- Excellent blowing performance



200μm coating SWR
with 250μm fibre pitch
contributes excellent
compatibility



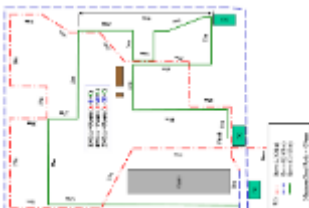
Air blown cable for telecom

Fibre Count	144F	288F	432F	864F
Cross Section				
Cable O/D of 200µm fibre SWR (Duct size)	6.6 mm (12/8 mm)	8.1mm (14/10 mm)	9.7 mm (16/12 mm)	12.4 mm (20/16 mm)
Cable O/D of 250µm fibre SWR (Duct size)	8.2 mm (14/10 mm)	10.2 mm (16/12 mm)	11.7 mm (18/14 mm)	15.5 mm (25/20 mm)

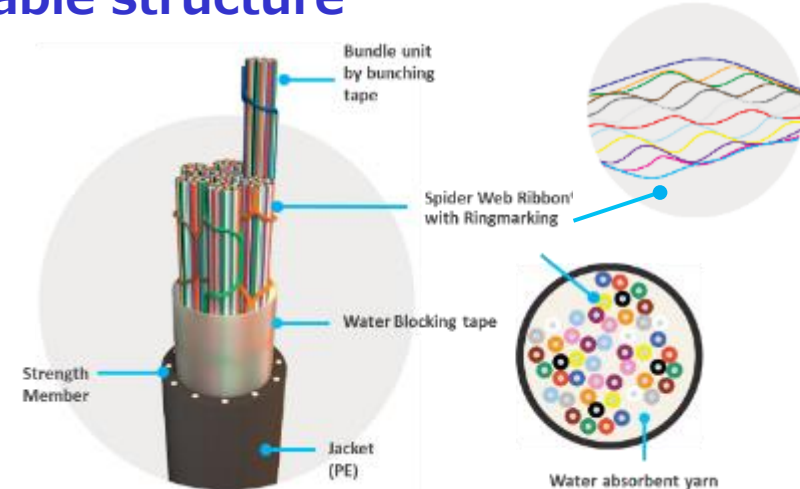
Jetting experiences



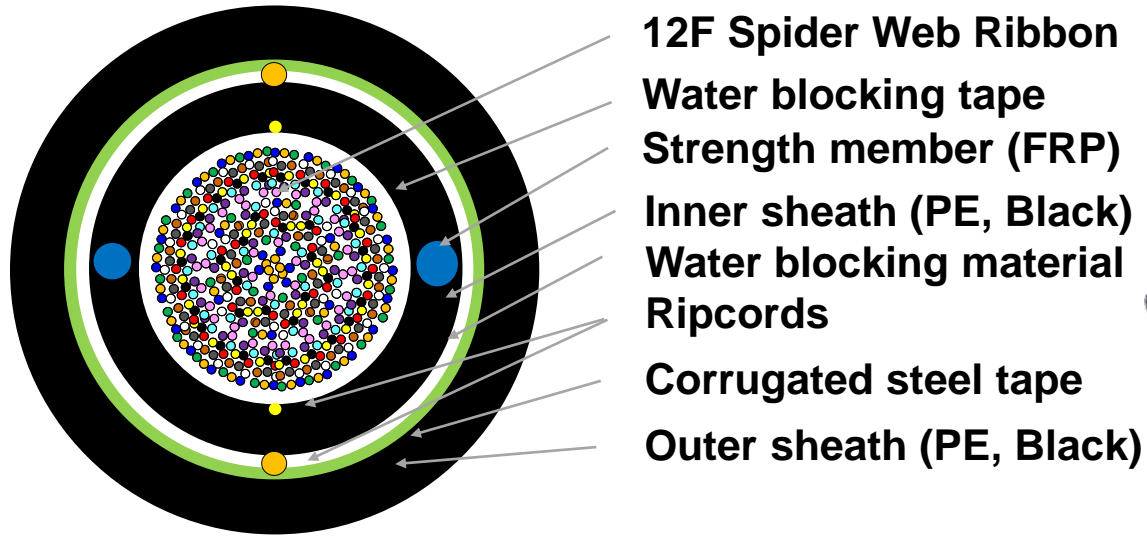
Customer tracks



Cable structure



Armored cable for telecom

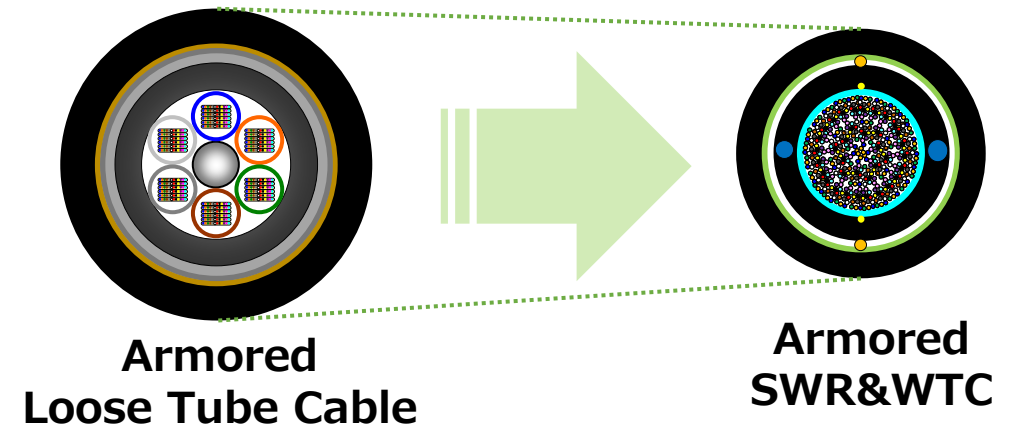
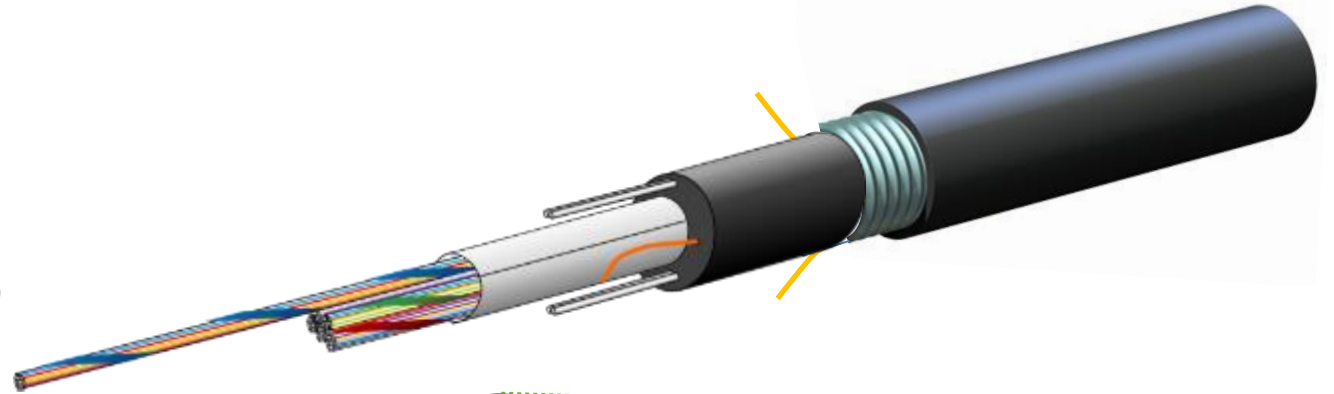


Features

- Full dry structure
- Thin and lightweight

Application

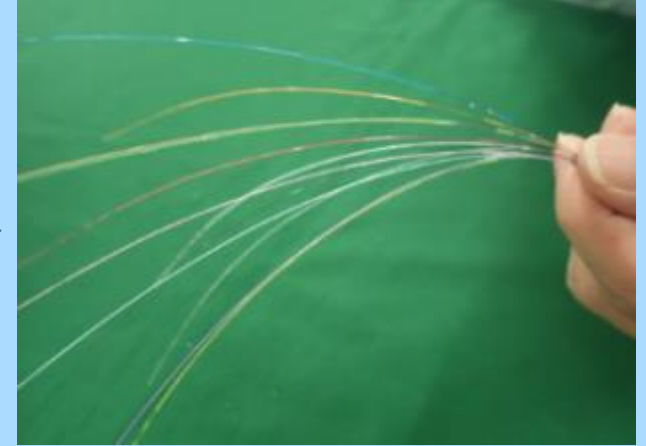
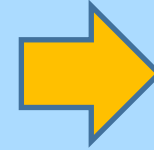
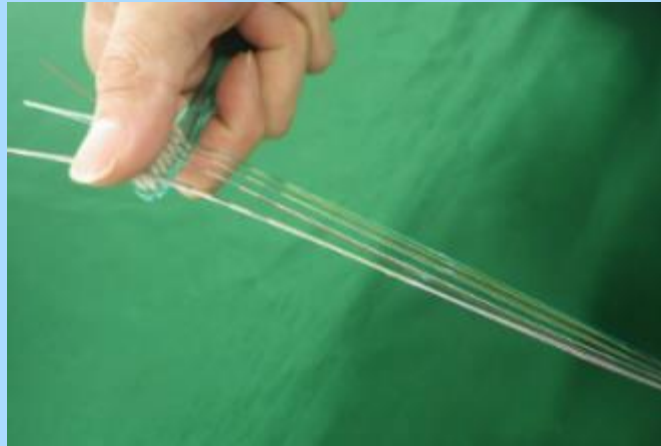
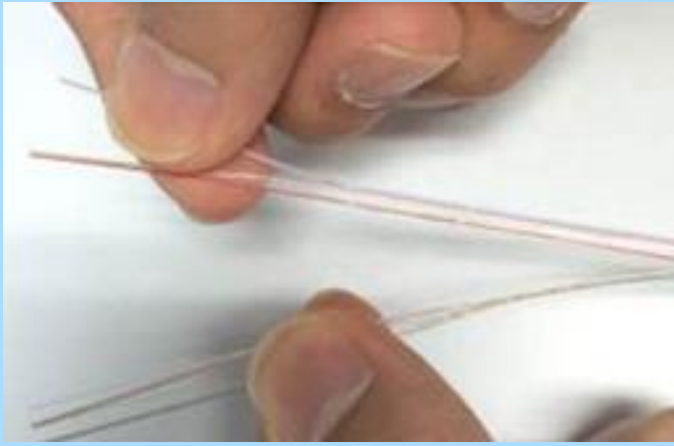
- Outdoor installation, direct buried, etc.



Diameter : 25% down
Weight : 43% Down

Single fibre splicing SWR for telecom

- Easy split to single fibres by hand or toothbrush

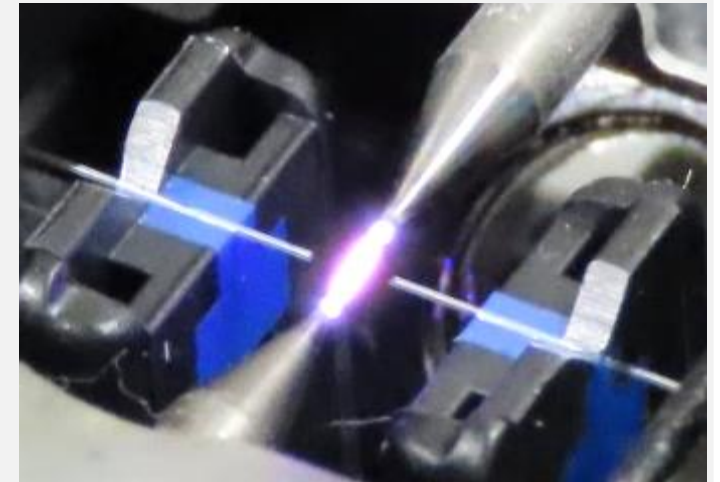


- Fusion splice with core to core alignment

90S+

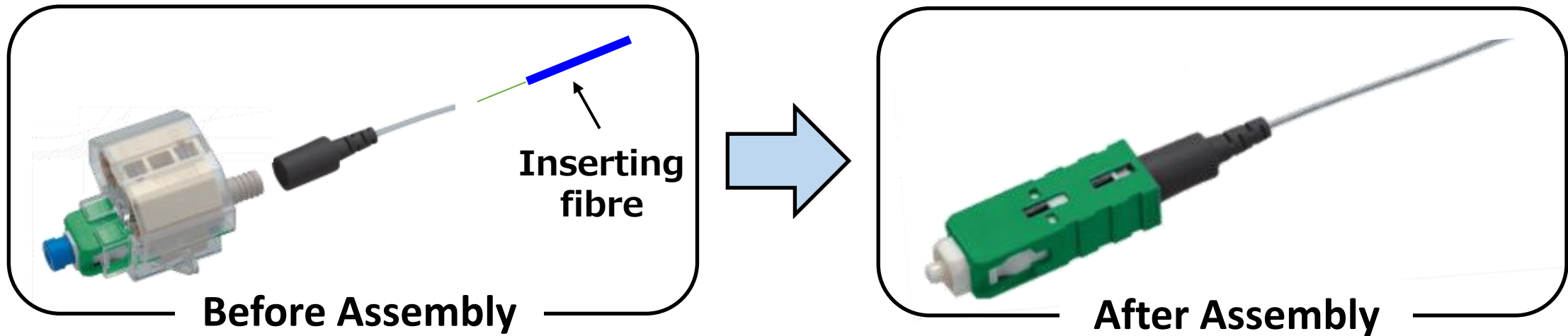


Type 72C+

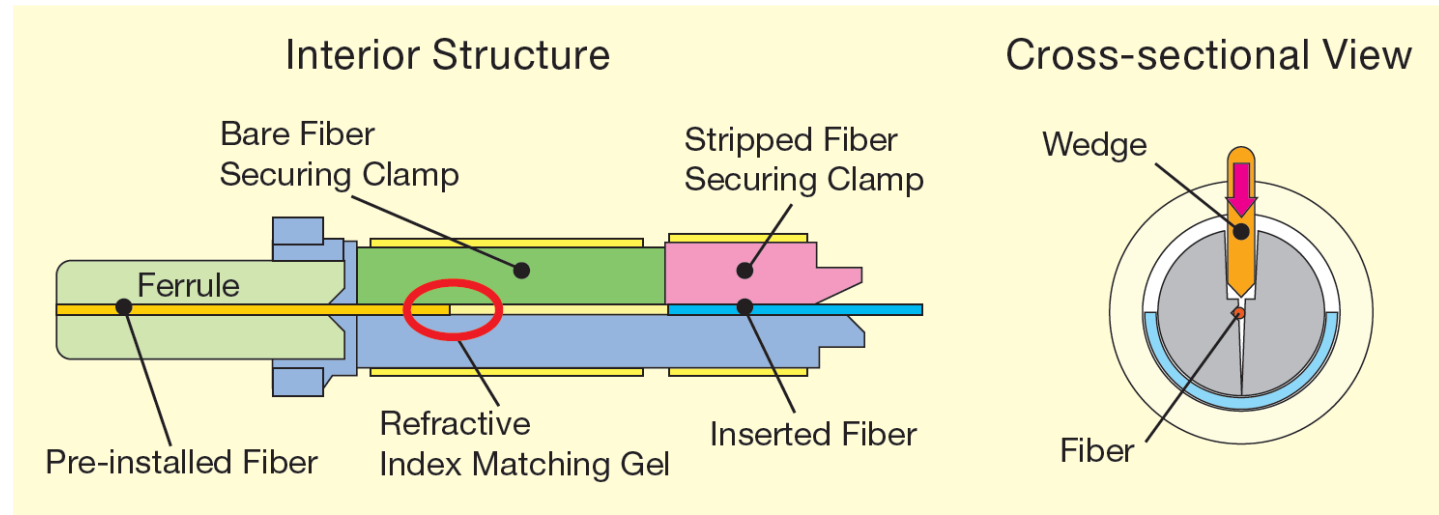


Field installable connector for SWR

➤ Mechanical splice: **No fusion splicer required**



- No epoxy and no polishing
- Low insertion loss
- Basic tooling required



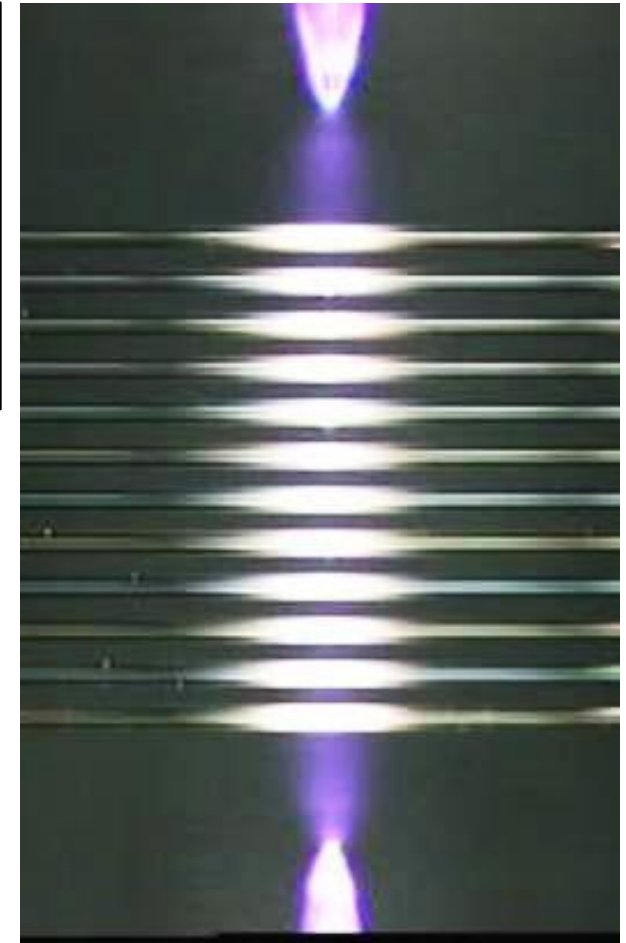
Field installable connector for SWR

➤ MPO connector with splice



- No epoxy and no polishing

➤ Ribbon to ribbon splice



Field installable connector in data centre

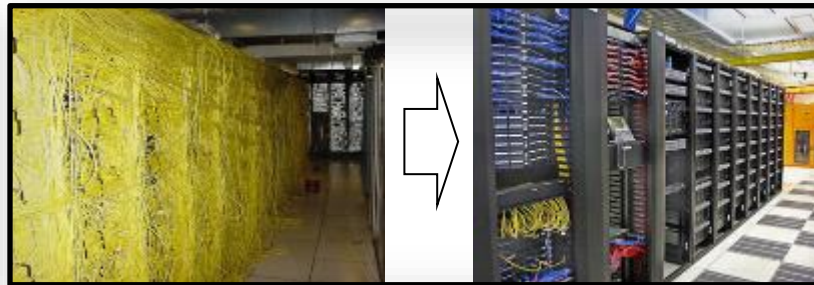
Data
centre



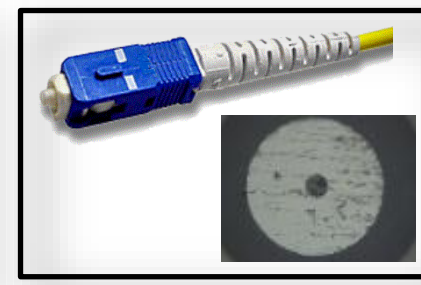
- ✓ Cable/cord convergence improvement
- ✓ Easy assembly and quick installation
- ✓ Cable/cord slack reduction
- ✓ Cable/cord cost down
- ✓ More than 20-years of field life span



Cable testing



Cable/cord slack reduction

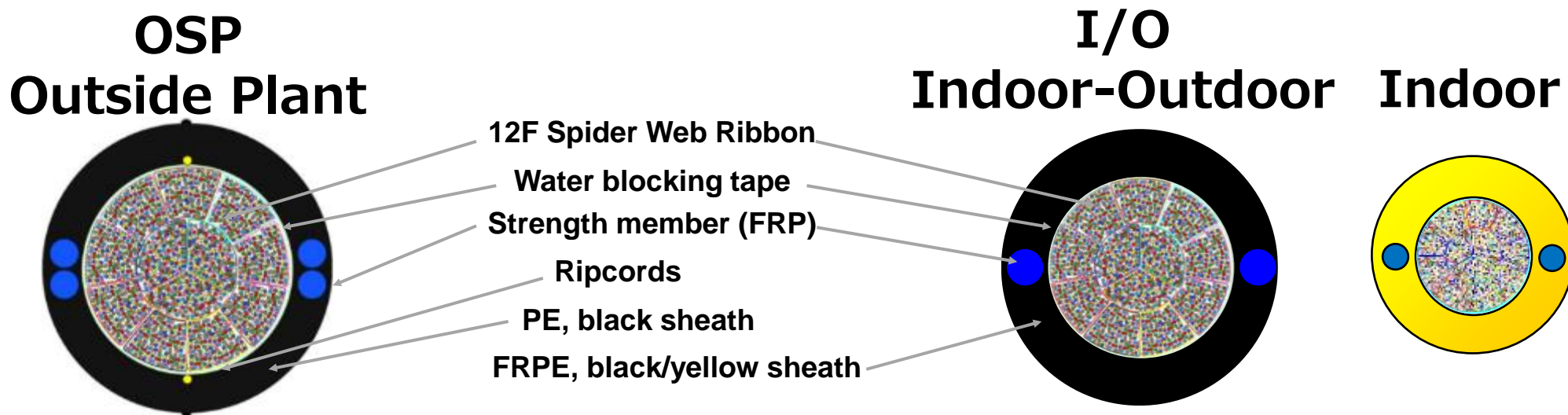


Emergency
field repairs



Connector
replacement

High fibre count cable for data centre



Features

- Thin and lightweight with full dry structure (3456f @ 25mm, 6912f @ 33mm)
- Up to 6912 fibres
- Specification based on Telcordia GR-20, ICEA S-104-696, ICEA S-83-596, etc.
- Low combustible material structure allows I/O and Indoor cables to have high flame retardance and low smoke emission.

High fibre count cable for data centre

Pre-terminated SWR&WTC

- Flexible pulling tube enables to **install the pre-terminated SWR&WTC into existing ducts.**

Pulling tube diameter: less than 50 mm in case of 3456f cable



Pre-terminated
SWR&WTC



MPO connector



Pre-terminated end



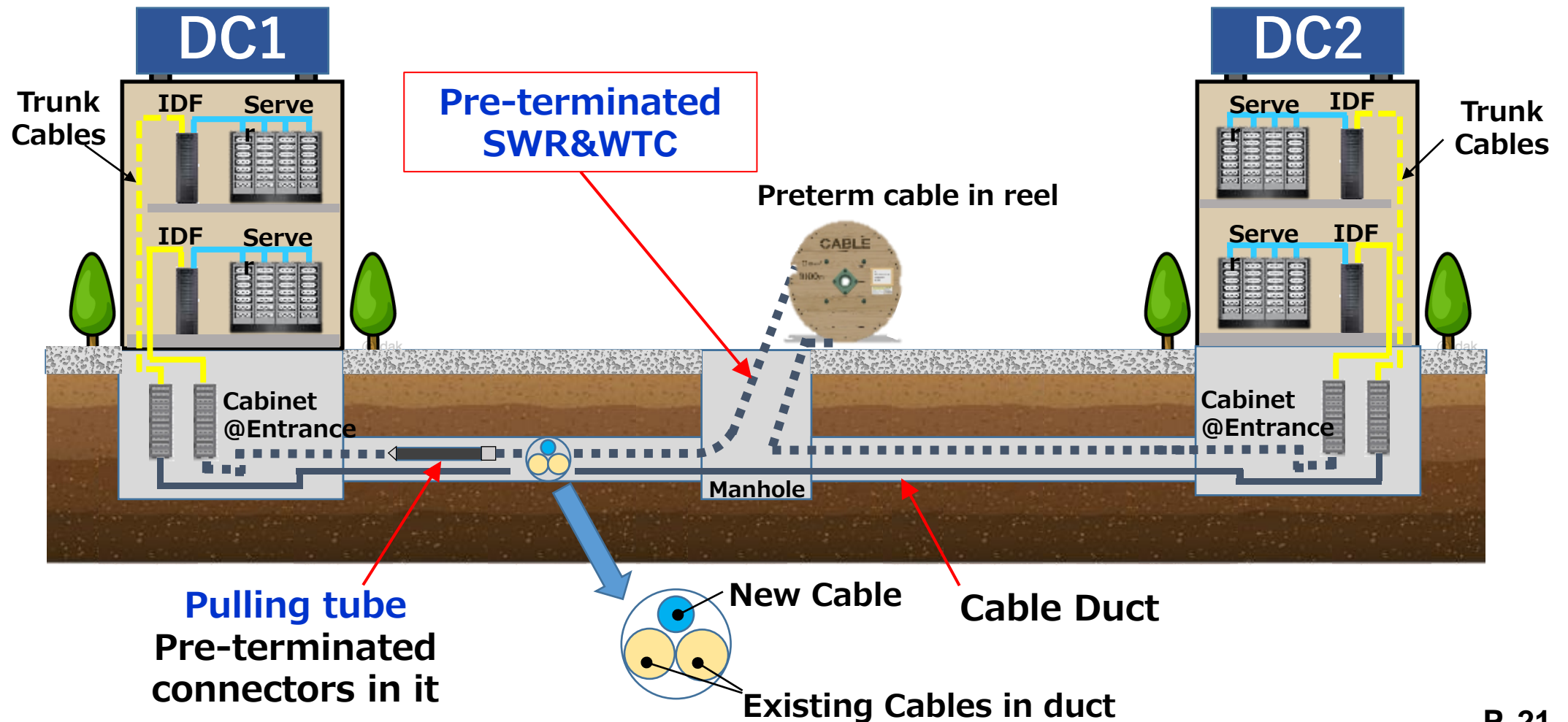
Pulling Tube



Cabinet

High fibre count cable for data centre

- Pre-terminated SWR&WTC with MPO connector **reduces an installation time significantly.**



Ribbon Splicing SWR for telecom/DC

The **90R** mass fusion splicer includes a spare set of 12 fibre V-grooves with electrodes installed and ready to splice as part of the standard package.

A screenshot of the splicing machine's control interface. It shows a table of 12 fiber positions with parameters like Gap, Offset, and Cleave angles. The interface is in English and includes a 'Large Fiber Offset' warning. The table data is as follows:

No.	Gap [μm]	Offset [μm]	Cleave L	Cleave R
1	68	0.9	1.4°	1.9°
2	63	0.3	0.5°	1.1°
3	55	1.3	0.7°	0.9°
4	54	5.2	1.7°	1.2°
5	54	0.4	1.3°	0.4°
6	62	1.1	0.4°	0.7°
7	48	1.2	1.9°	0.3°
8	48	2.7	1.0°	1.5°
9	48	0.8	1.9°	0.1°
10	43	6.7	0.9°	0.3°
11	42	0.7	0.4°	1.8°
12	40	2.8	2.0°	0.5°

This is primarily designed for resolving poor cleanliness of the V-grooves and reducing maintenance downtime...

...but can also give **increased versatility**...



Ribbon Splicing SWR for telecom/DC

Replaceable V-groove



90R can splice many types of ribbon fibre by changing the V-groove



16 fibre

8 fibre

4 fibre

250µm fibre pitch:

Fibre count: 16/12/8/4 fibre



200µm fibre pitch
Fibre count: 12 fibre

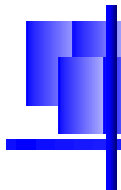


**80µm
fibre
ribbon**



**Hybrid 125-
80µm fibre
ribbon**

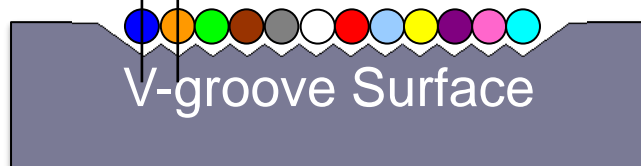
Under development



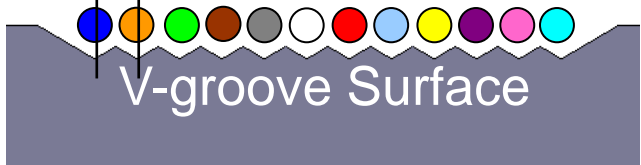
Ribbon Splicing SWR for telecom/DC

Fibre Pitching – 200 or 250µm

200µm



250µm



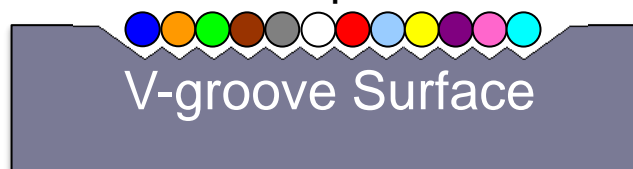
V-Groove kits adapt to different ribbon types
8f, 12f, 16f, 200µm

Same main splicer body!!

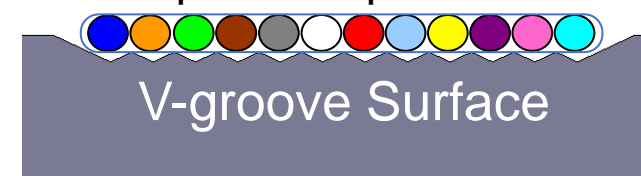
Highly versatile 90R has multiple ribbon splicing options



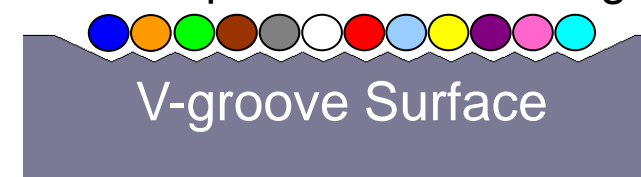
200/200µm SWR



250/250µm Encapsulated ribbon



250/250µm Ribbonised single



250/250µm SWR



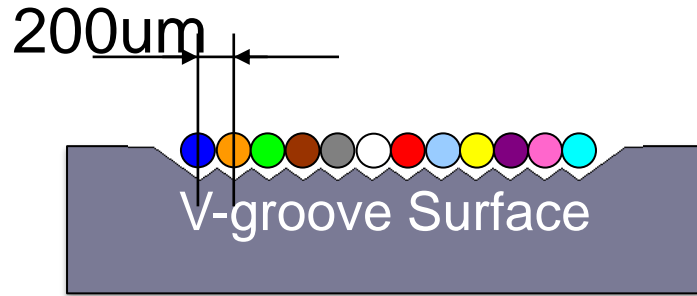
200/250µm SWR



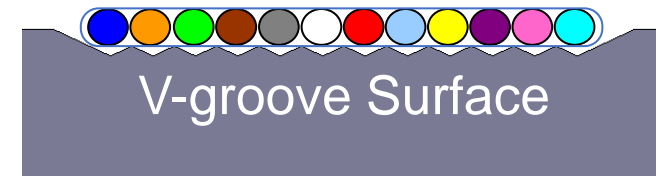
Ribbon Splicing SWR for telecom/DC

Fibre Pitching – 250 or 250µm

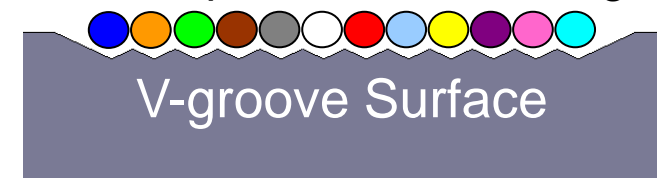
**Highly versatile 90R
multiple ribbon
splicing options**



250/250µm Encapsulated ribbon



250/250µm Ribbonised single



Not necessary to purchase both 250 and 200µm pitch or 16fibre V-groove splicers

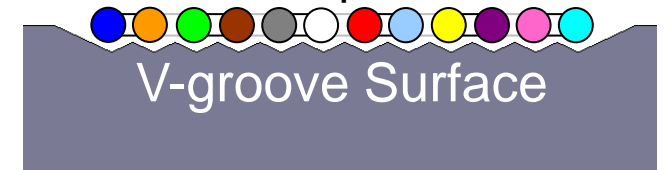
**V-Groove Kits adapt to
different ribbon types
8f, 12f, 16f**

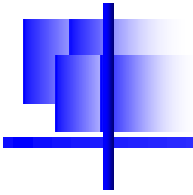
Same main splicer body!!

200/200µm SWR



200/250µm SWR





In Summary

What are the Benefits of Connecting SWR&WTC in the Telecom and Data Centre markets?

- *Smaller cables* ✓
- *Less weight* ✓
- *Increased capacity* ✓
- *Quicker installations* ✓
- *Less equipment costs* ✓
- *Multiple connectivity options* ✓