FURUKAWA ELECTRIC

FURUKAWA ELECTRIC GROUP

TDB-15K059

FTTH Tecnología en Japón

March 1st 2016

Optical fiber & cable products div.

Furukawa Electric Co., Ltd.

Furukawa Electric Perfil Corporativo

FURUKAWA ELECTRIC

Nombre: **Furukawa Electric Co., Ltd.**

Chairman: Masao Yoshida

Presidente: Mitsuyoshi Shibata

Fundada: **1884**

Establecida: **1896**

Capital: **¥69,395 million** (A marzo 31, 2015)

Ventas Netas: **¥867,817 million** (Consolidado) (Cierre de año: March 31, 2015)

Empleados: **46,134** (Consolidado)

Metales 14%

Tiras de cobre | Tubos de cobre | Laminas de cobre

Servicio y otros 6%

Telecomunicaciones 16%

Cables de fibra óptica | Dispositivos de fotónica

Energía / Productos Industriales 31%

Fios de Cobre y Cables de energía | Cintas de plástico para semiconductores

Electrónica / Sistemas Automotrizes 33%

Partes para control de airbags | Espacios en blanco de aluminio para discos duros

Unidad industrial Fibra óptica y cables

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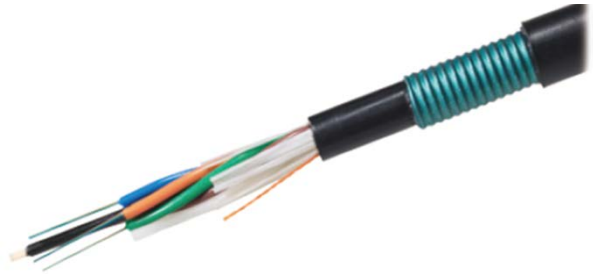


Europe

Brondby

Augsburg

Voronezh

Shianfu
Furukawa Xian

Americas

Carrollton

Sturbridge

Avon

Somerset

Norcross

FTOP

Chiba

Mie

SFPOC

Asia
/ Pacific

BFFO

BTC/TFOC

FFT

FOSI

FISA

FIA

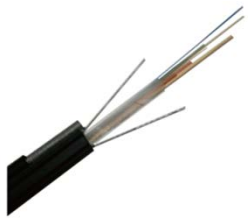
Mid-East

ofs
A Furukawa Company

Fiber Production
Cable Production

FURUKAWA

Fiber Production
Cable Production
Component Production



FURUKAWA en LATAM

FURUKAWA ELECTRIC

Empleados

TOTAL	1023

FIC 2014

Furukawa Industrial Colombia
Cables ópticos- (Palmira)

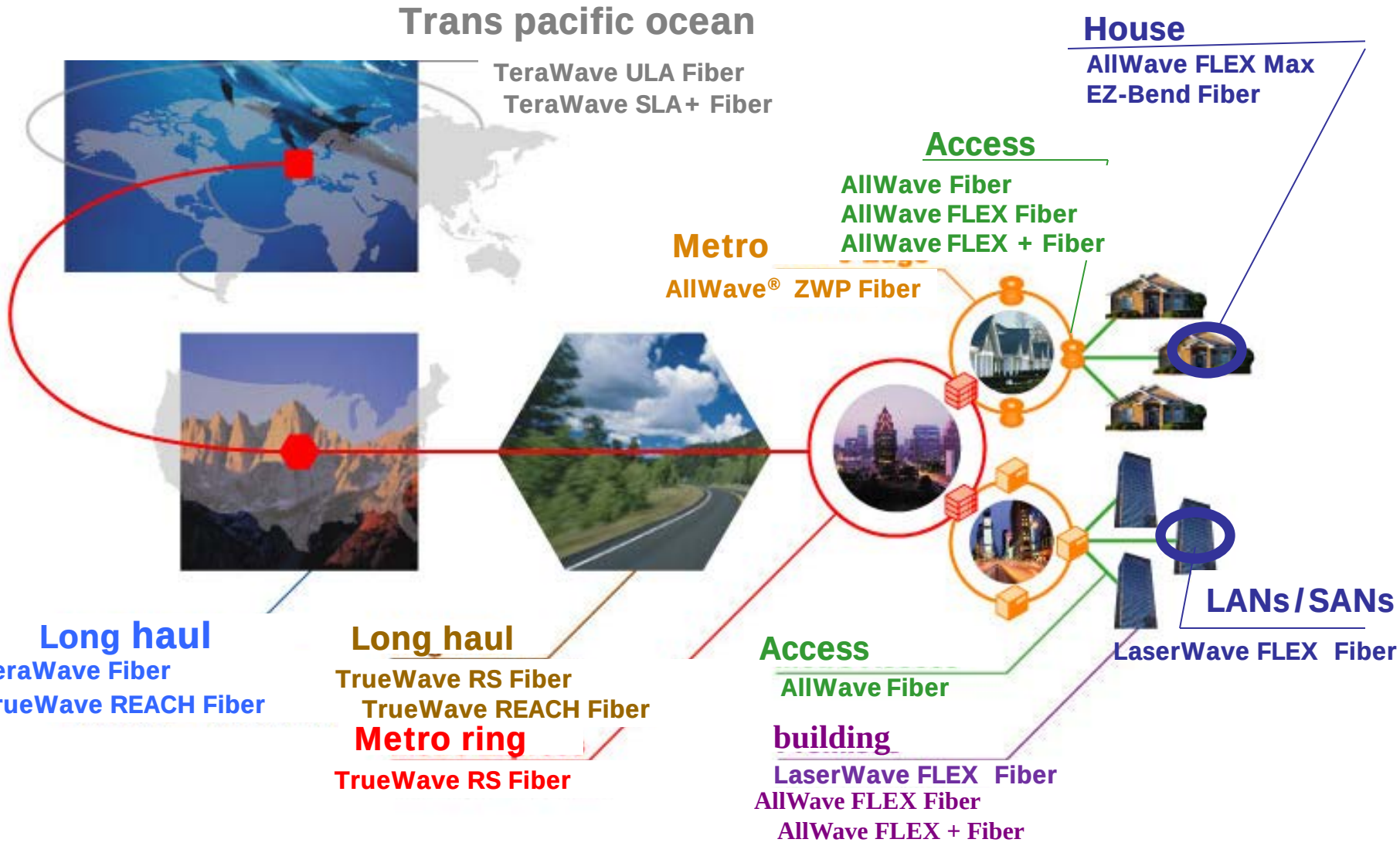
FISA 1974

Furukawa Industrial S/A
Cables y conectividad(Curitiba)

FIA 2008

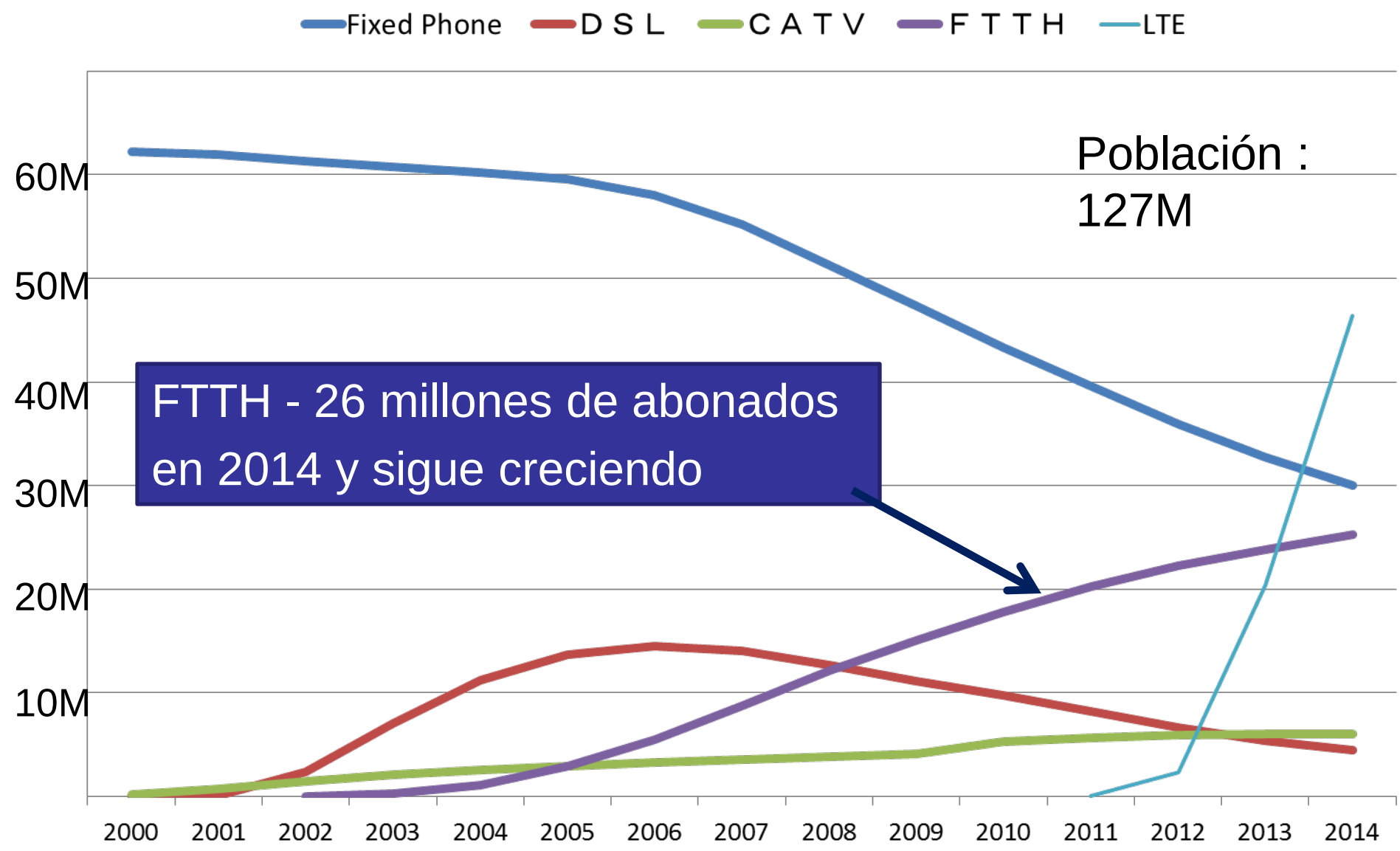
Furukawa Industrial Argentina
Cables ópticos- - (Berazategui)

Optical fiber products line



Tendencia de la red óptica de acceso en Japón.

Abonados de banda ancha en Japón



FTTH share in JAPAN

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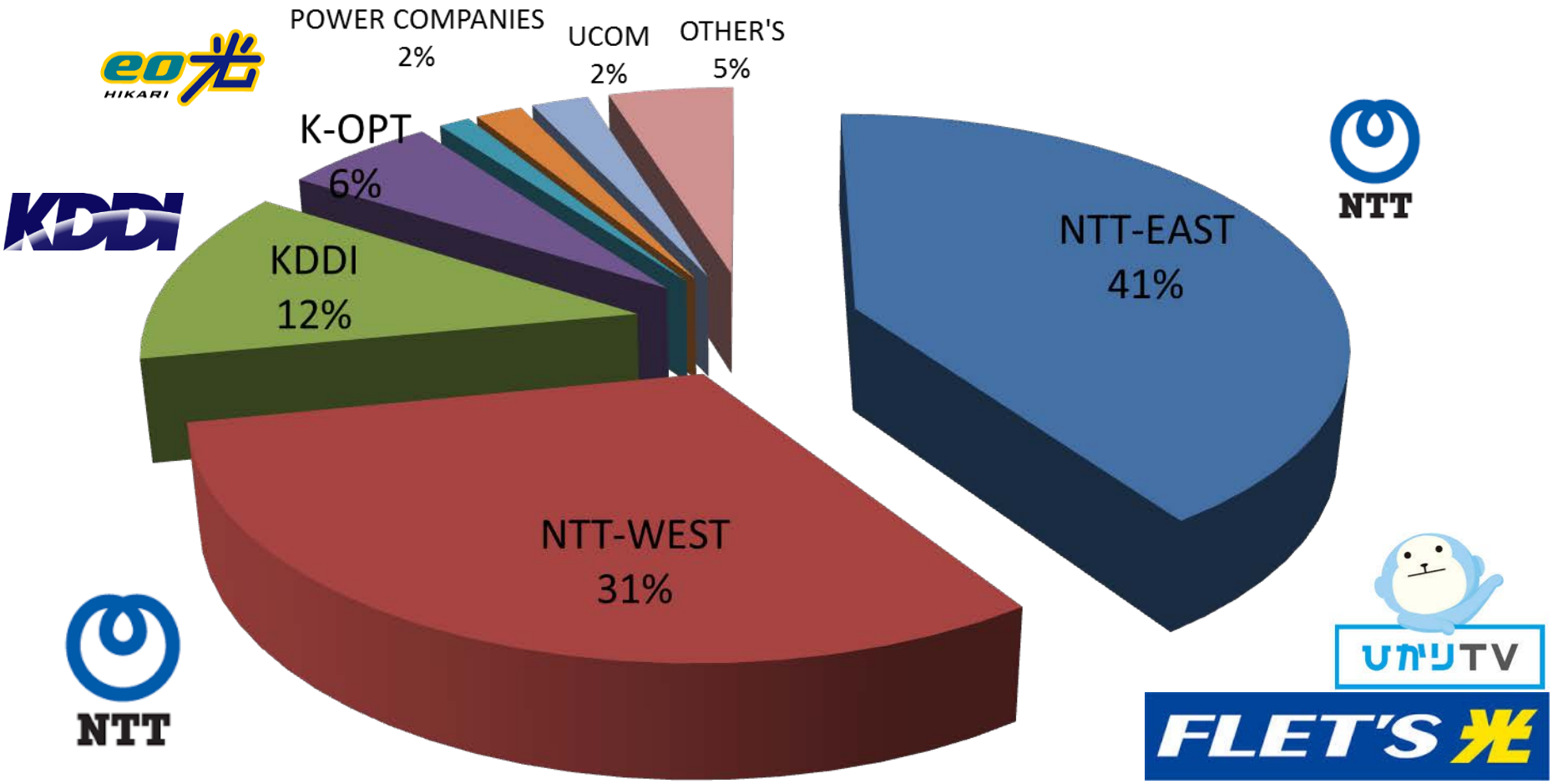
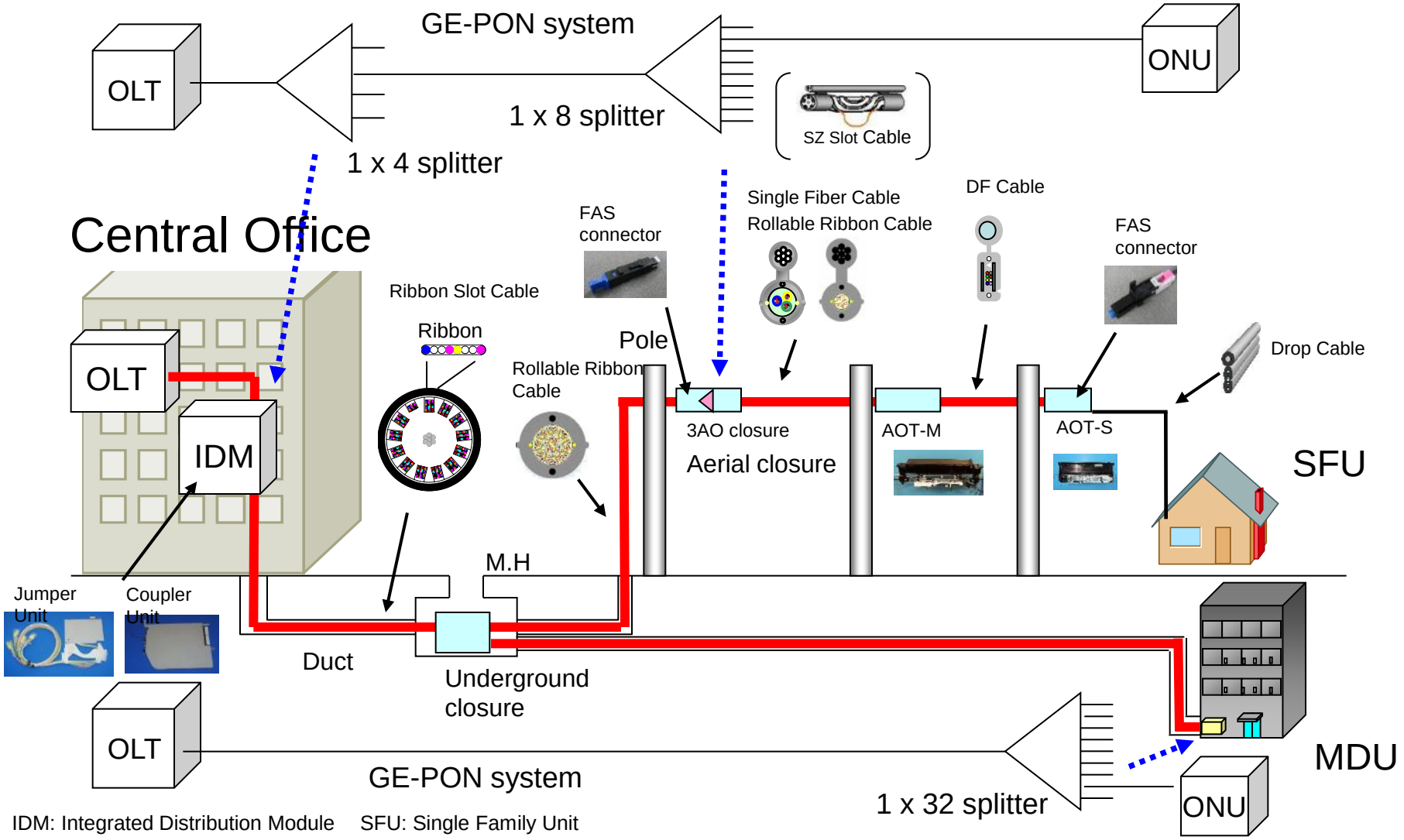


La NTT es la más grande con 70% MS en Japón.

Configuración tradicional red FTTH



IDM: Integrated Distribution Module
OLT: Optical Line Terminal
ONU: Optical Network Unit
SFU: Single Family Unit
MDU: Multi Dwelling Unit

Furukawa provee varios productos para NTT.

Tecnologías para las redes ópticas de acceso

(1) Fibra óptica ribbon

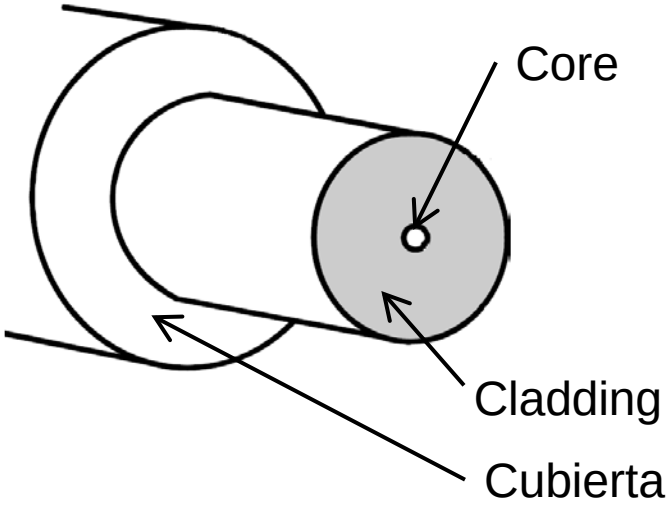
(2) Mid-span para derivaciones

(3) Cable Low friction/ uso interior y conector de campo

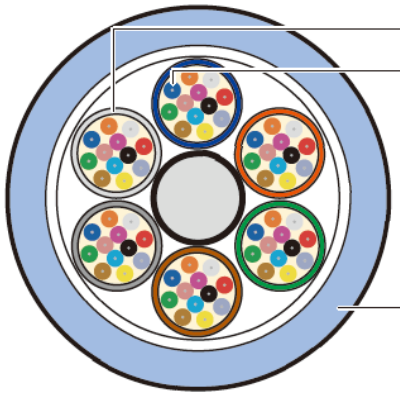
¿Qué es una fibra óptica?

Fibra óptica

	Diámetro estándar	Material
Core	0.01 [mm]	Silica (Vidrio)
Cladding	0.125 [mm]	Silica (Vidrio)
Cubierta	0.250 [mm]	Resistente UV



Cable fibra óptica



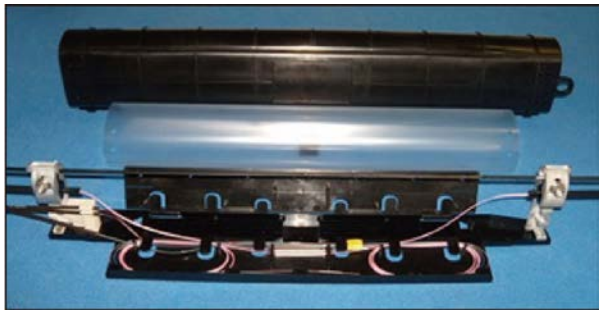
¿Cómo fusionar la fibra?

1. Remover las fibras ópticas del cable.

2. Remover la cubierta de la fibra y cortar la fibra desnuda

3. Fusionar la fibra y proteger el punto de fusión

4. Colocar la fibra en la base de enfriamiento



Requiere habilidad y lleva tiempo.

Tecnologías para las redes ópticas de acceso

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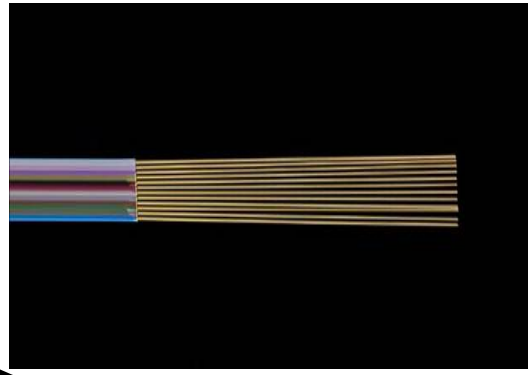
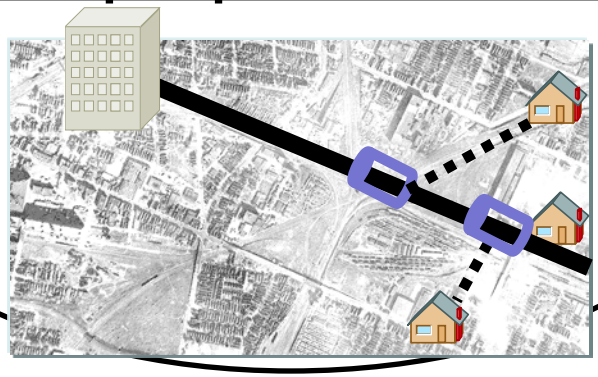
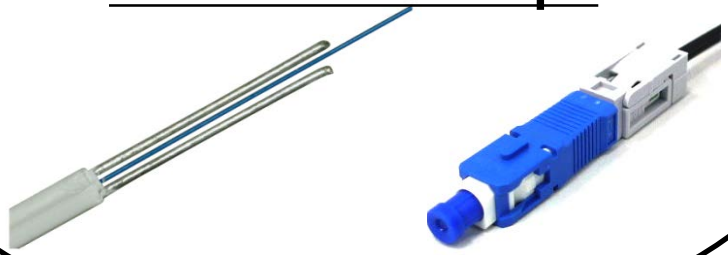
(1) Fibra óptica - ribbon



(2) Mid-span para derivaciones



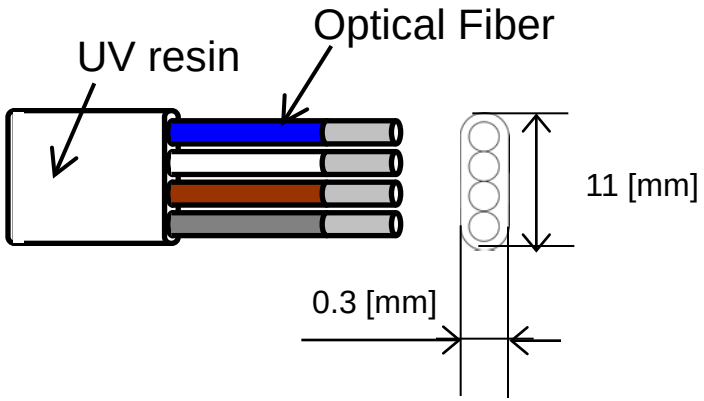
(3) Cable Low friction/ Indoor conector de campo



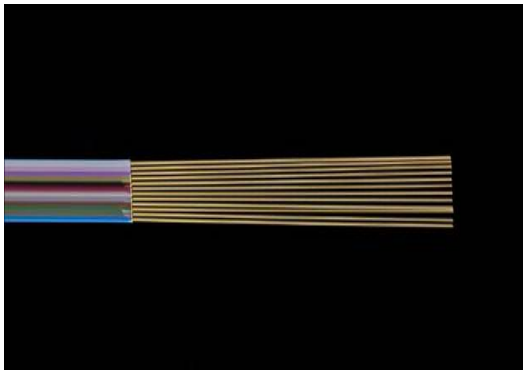
(1) ¿Qué es una fibra óptica ribbon ?

Estructura

Las fibras ópticas están alineadas a lado y lado. Protección UV



Ribbon Type (4-Fiber Ribbon)

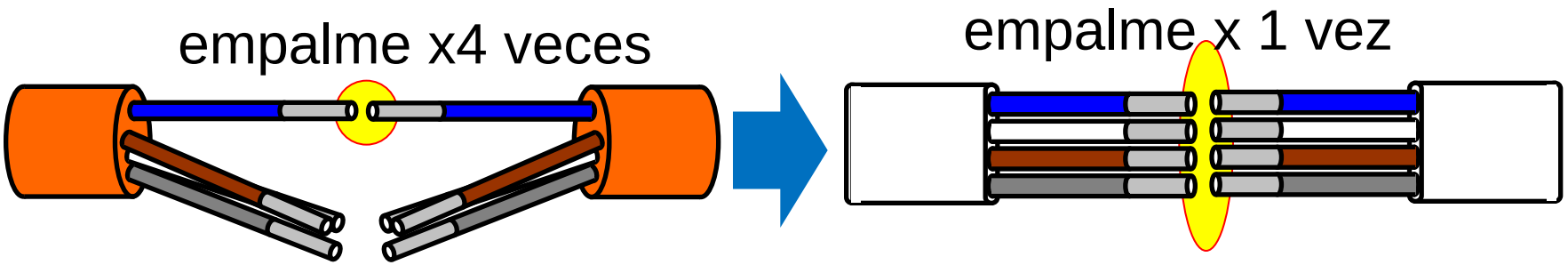


(12-Fiber Ribbon)

Características

*Pequeñas y livianas
*Mass-Fusion (empalme 4 fibras a la vez)

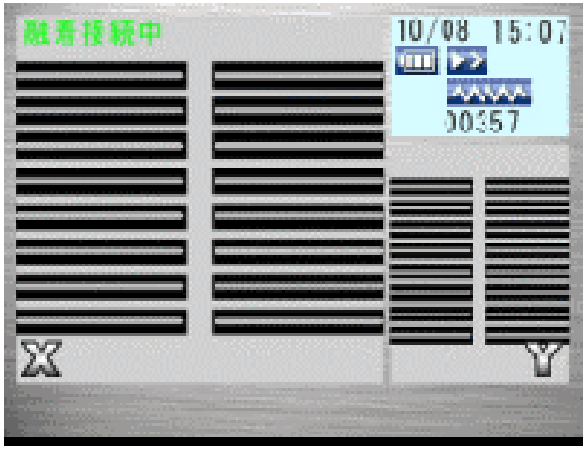
(1) Mass-Fusion Empalme



Cable convencional

Cable Ribbon

Mass Fusion Splicer S123 series

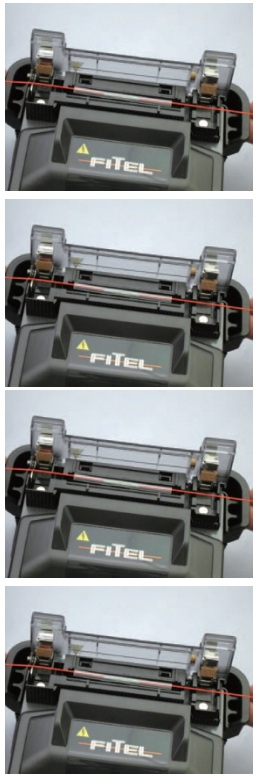


(1) Conjunto de fibras individuales

Fiber Pick Up

Preparación fibra x 4

Fusion Empalme x4



Protección fibra x4

Instalación de cierre x4

(1) Fibras tipo ribbon

Fiber Pick Up

Preparar la fibra x1

Fusion Empalme x1

Protección de la fibra x1

Instalación de cierre x1

Con las fibras Ribbon :

1. Tiempo de instalación más rápido
2. Bajos costos de operación

Tecnologías para las redes ópticas de acceso

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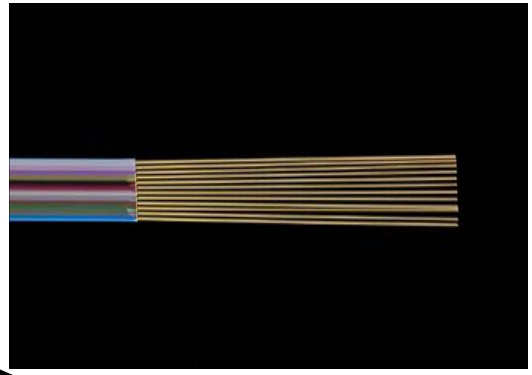
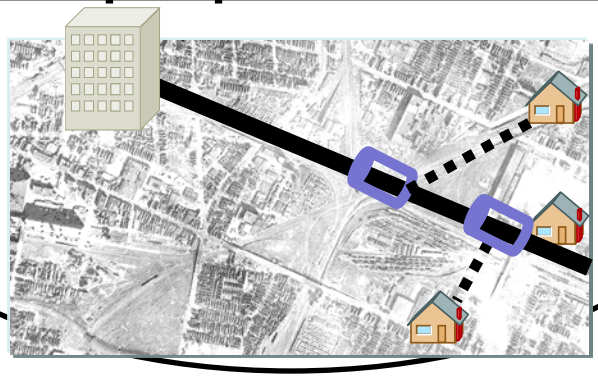
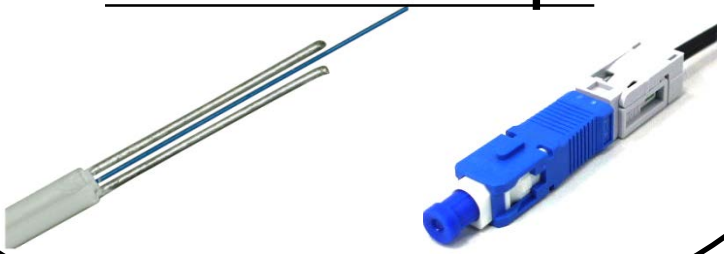
(1) Fibra óptica - ribbon



(2) Mid-span para derivaciones

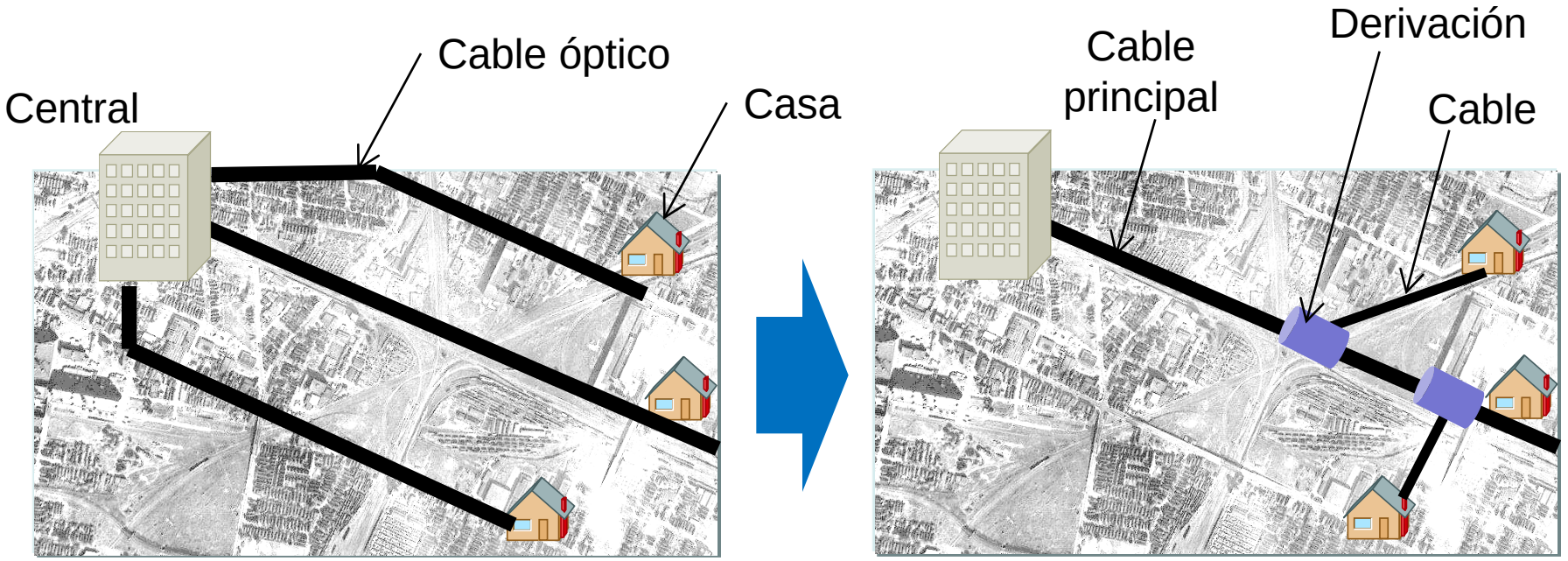


(3) Cable Low friction/ Indoor conector de campo



(2) Mid-span para derivaciones

Dificultades desarrollo Fttx



Linea directa

Derivaciones

(2) Mid-span Derivaciones

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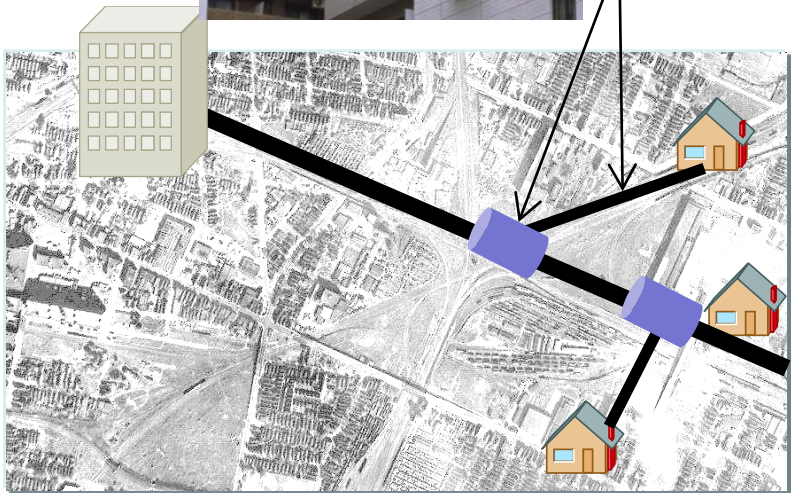
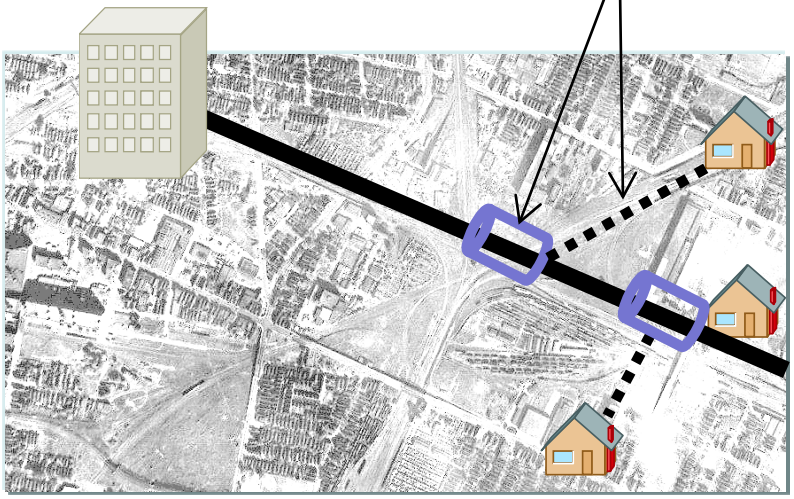
Central

Derivación

Soluciones Mid-span

Derivación por demanda





Cable-derivaciones

Mid-span Derivaciones

Derivaciones
Mid-span Reduce los costos iniciales para el desarrollo de FTTX

(2) Tecnología para Mid-span/derivaciones

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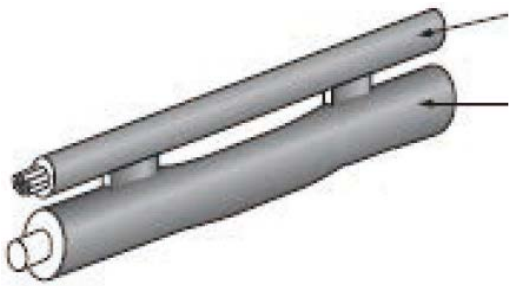
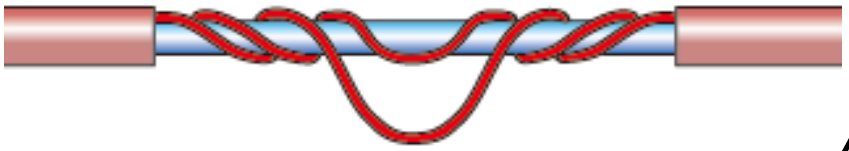
SSW

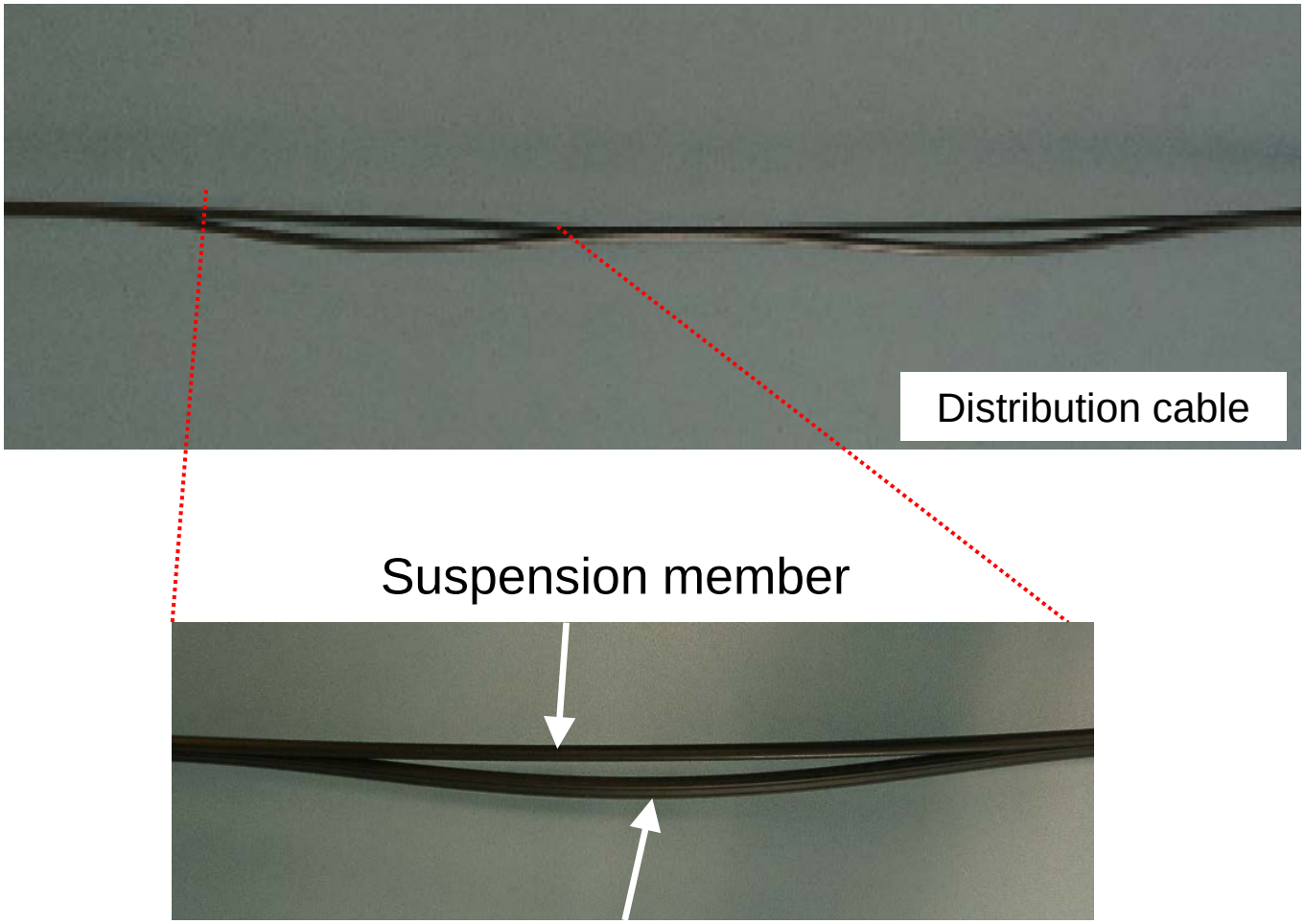
(Autosoportado on mensajero)



SZ-Slotted Cable



SSW (Self Support with Window)



Window Structure of Distribution Cable

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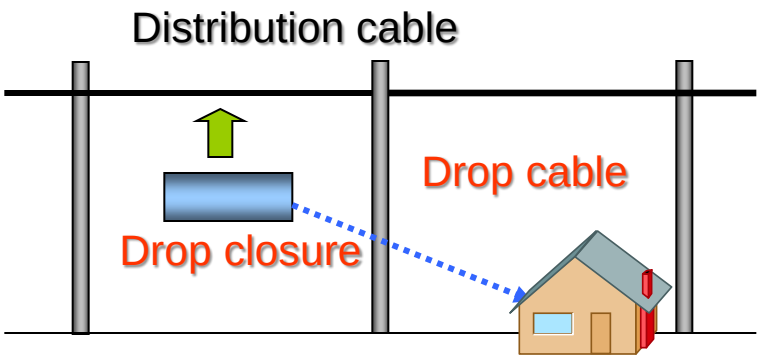
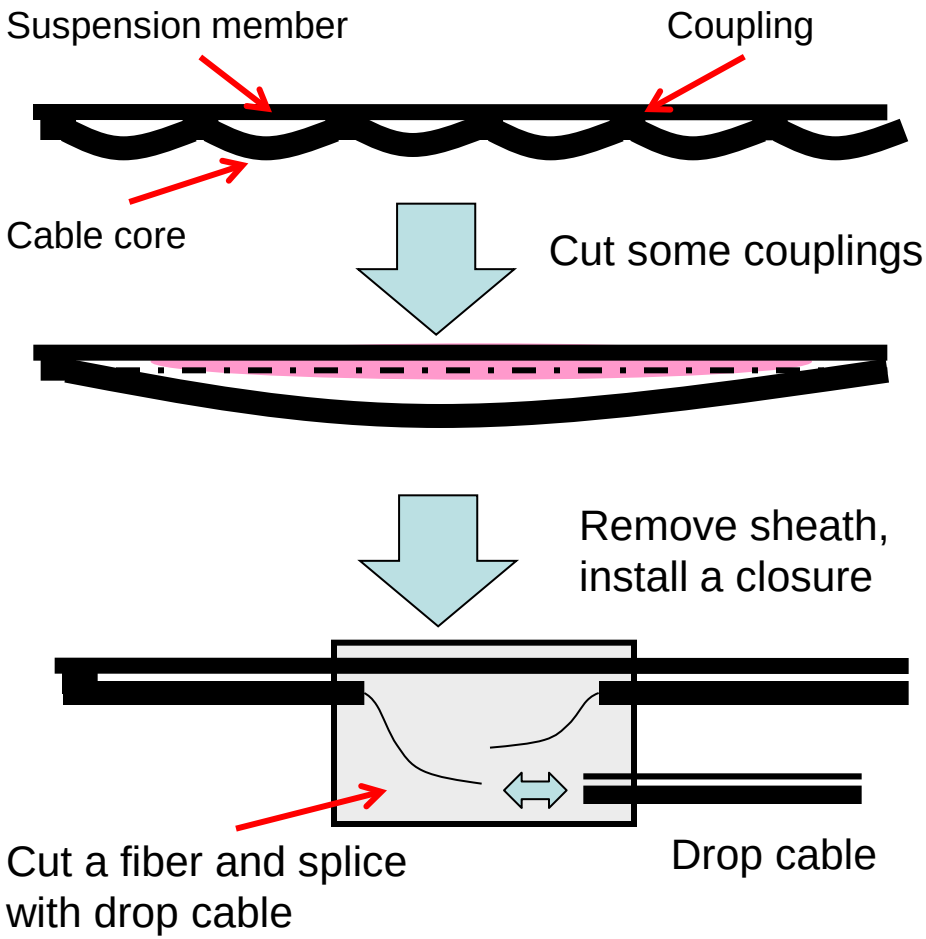
Why “Window Structure”?

You can install drop cable by Mid-Span-Access to distribution cable



Even if there is no closure near a customer, you can install a drop closure and drop cable on demand. (Closure pre-installation for future demand is not necessary).

Mid-span-access procedure



SZ-Slotted Cable (Aerial distribution cable)

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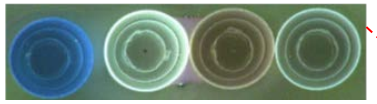
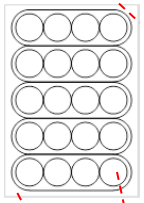
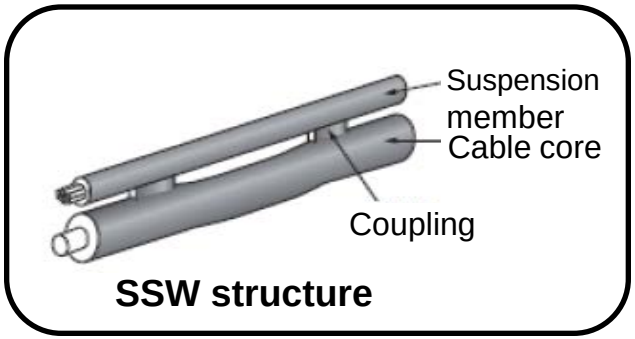
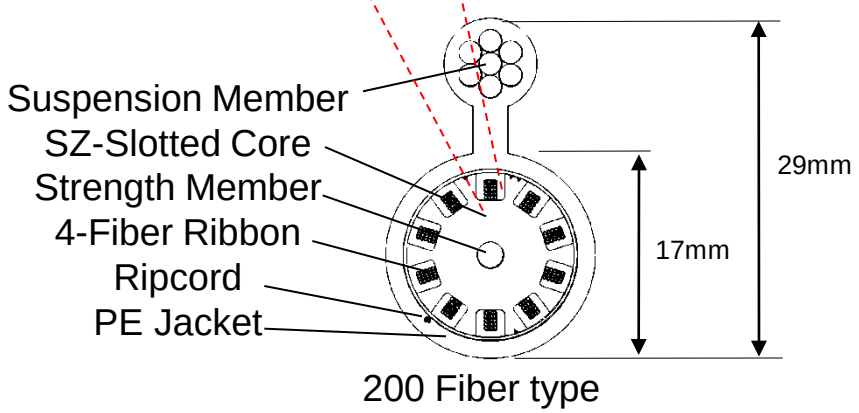


4-Fiber Ribbon

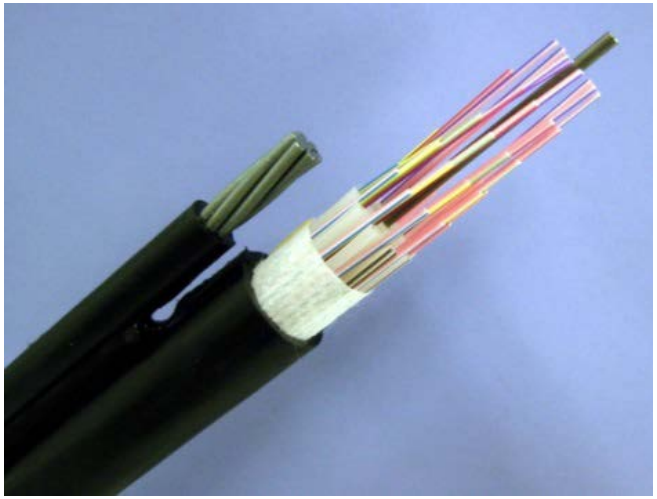




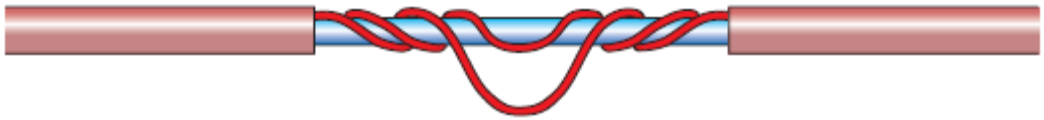
SSW structure



200 Fiber type



SZ Slot



200 fiber cable
Size: 17mm x 29mm
Weight: 400kg/km

24F Aerial Distribution cable transition

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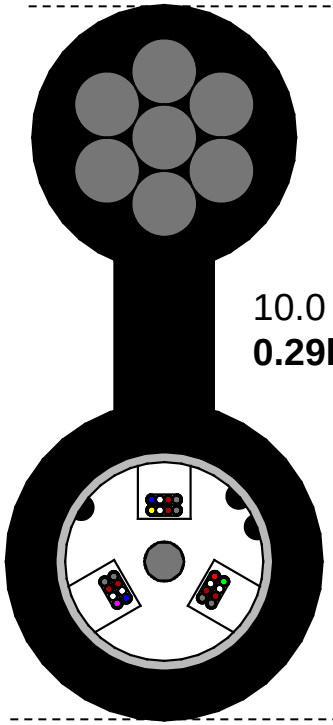
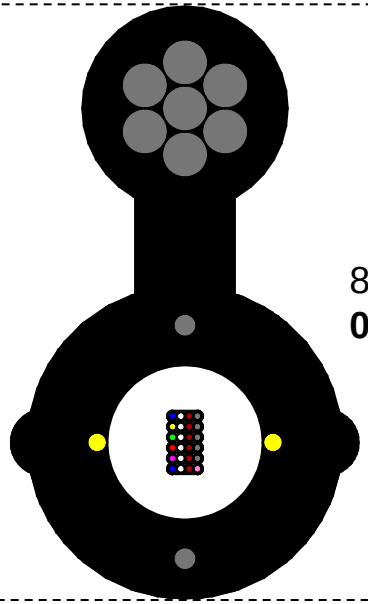
SZ Slotted core type → Central core type → Direct sheath type

2009

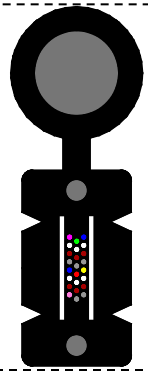


10.0 x 22.0mm
0.29kg/m

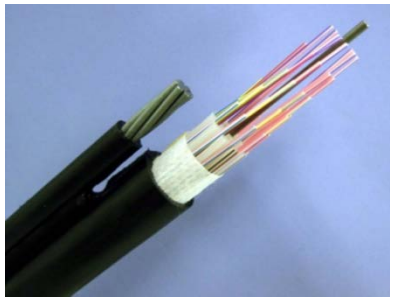
2013

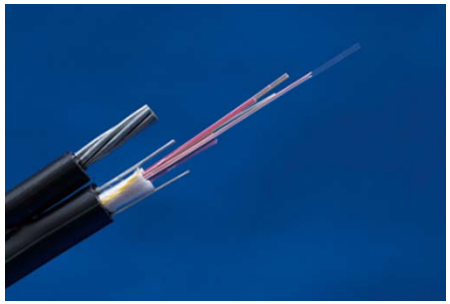


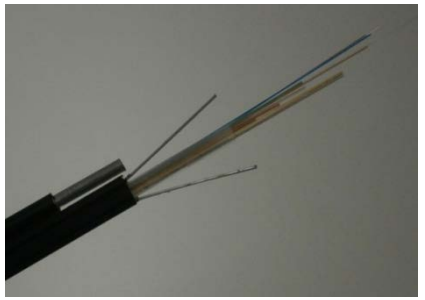
8.5x 17.0mm
0.15kg/m



4.0x 10.5mm
0.07kg/m







Technologies for Mid-span branching

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- Excess cable length

  → **SSW** : self supporting structure with excess cable length

- Excess fiber length

  → **SZ slotted** structure

- Excess cable size

  → **Rollable Ribbon Cable**

Mid-span branching solution

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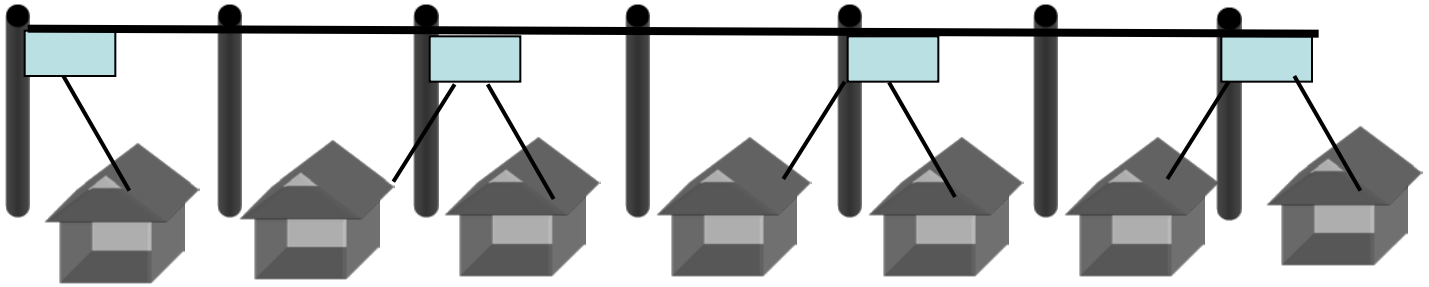
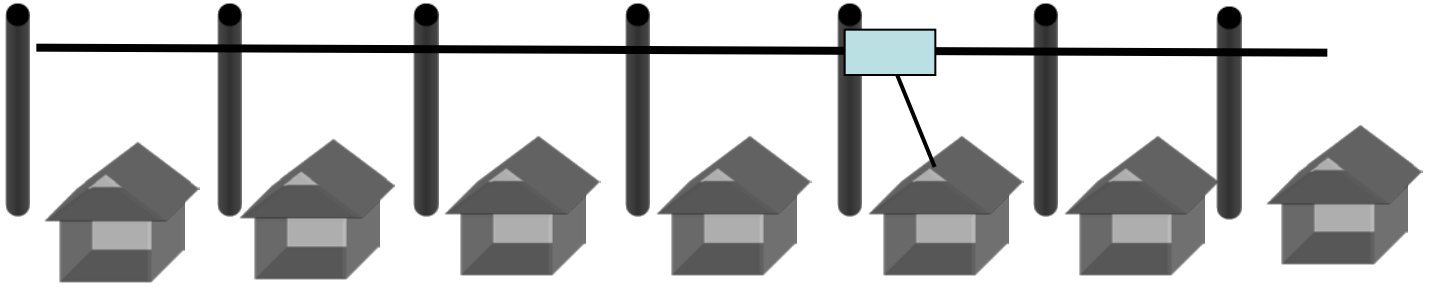
All closure must be set in the beginning of FTTH



each closure can be set when a subscriber demand occur.



Reduce the initial cost!

Tecnologías para las redes ópticas de acceso

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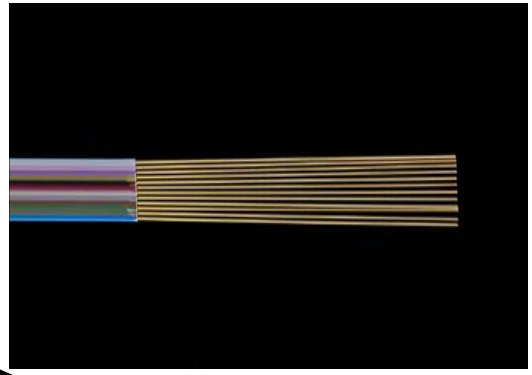
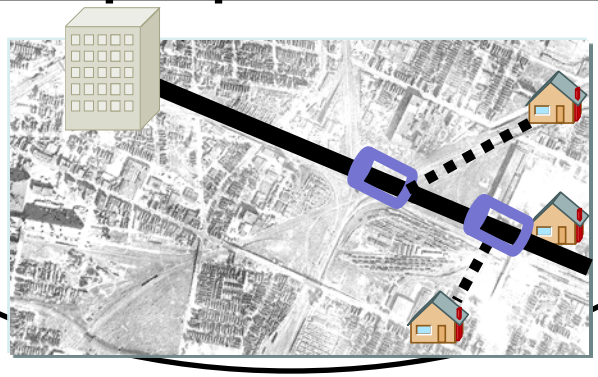
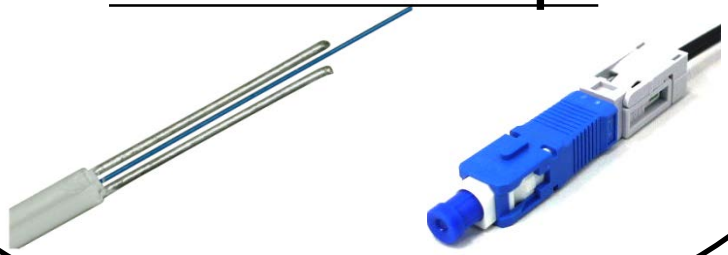
(1) Fibra óptica - ribbon



(2) Mid-span para derivaciones



(3) Cable Low friction/ Indoor conector de campo



(3) Low friction/ indoor y conector de campo

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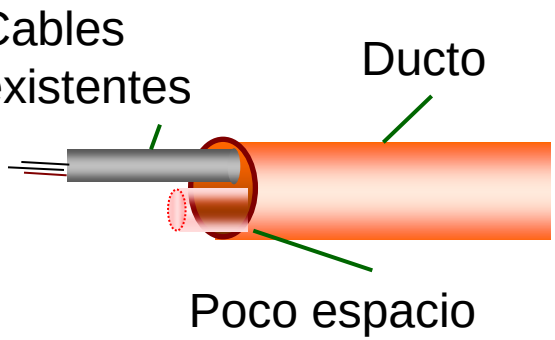
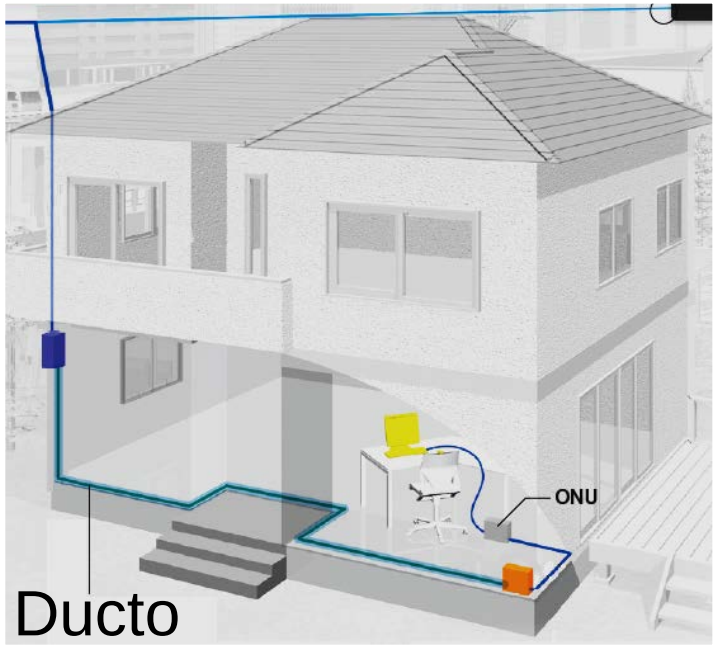
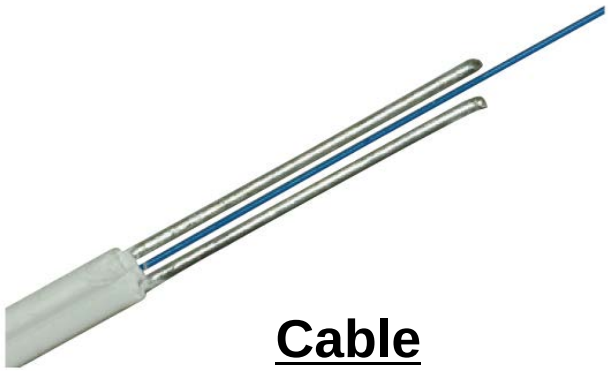
Problemas cableado estructurado







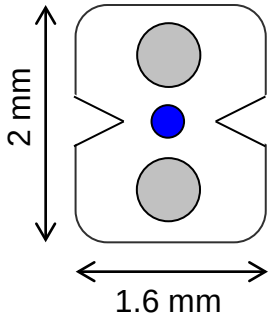
Cable

Low Friction Indoor

Conector de campo

(3) Cable Low friction indoor

Estructura



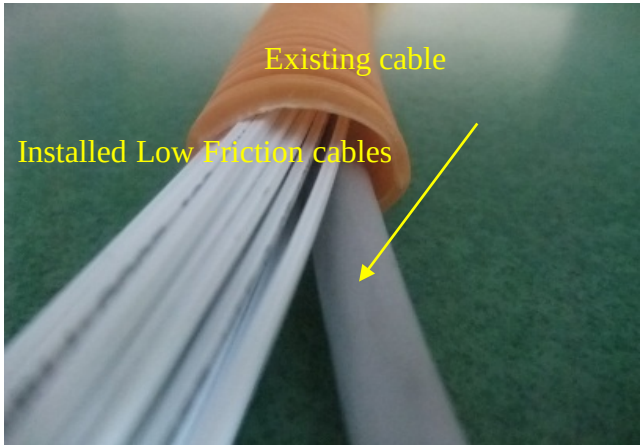
Low Friction indoor cable

Características

Compacto

&

Baja fricción



Multiples cables por ductos

Installation Methods and Results

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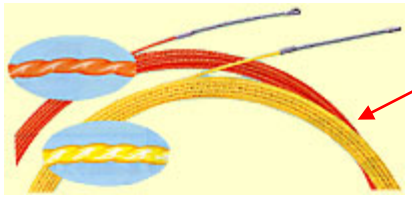
Pulling Method

Install existing cable in advance → Insert installation wire from exit side → Connect installation wire with LF Indoor at entry side → Pull out Installation wire from exit side → Complete



Installation wire

LF Indoor

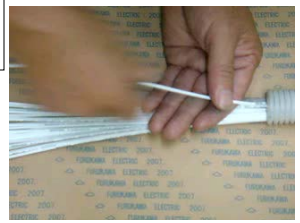
PVC tape

Numbers of installed cable: **30 - 35**

Pushing Method

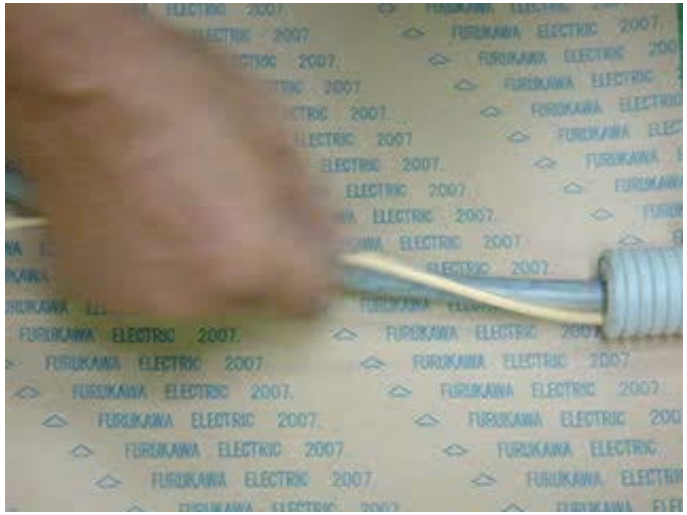
Install existing cable in advance → Bend 15mm tip of LF indoor → Insert LF Indoor by pushing from entry side → Complete

15mm



Numbers of installed cable: **30 - 31**

(3) Fácil instalación



Posible instalación enpujada

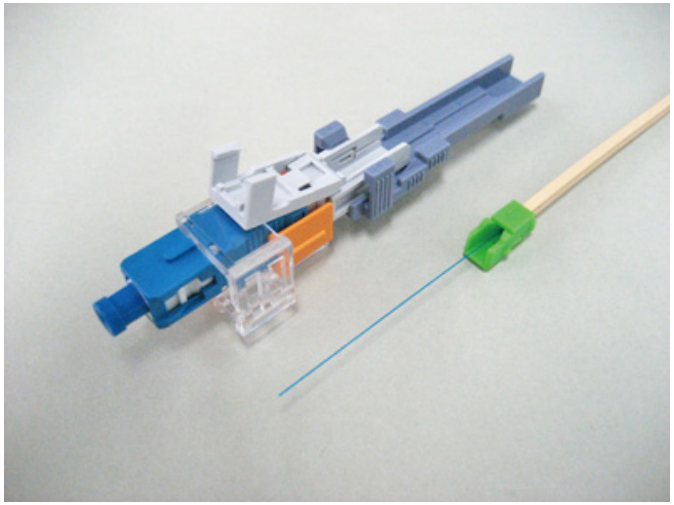
Sin necesitad de guía/sonda

Ventajas Cable Low Friction Indoor

1. No necesita sonda para instalación
2. Reduce tiempo y costos

Conector de campo

EZ! Connector

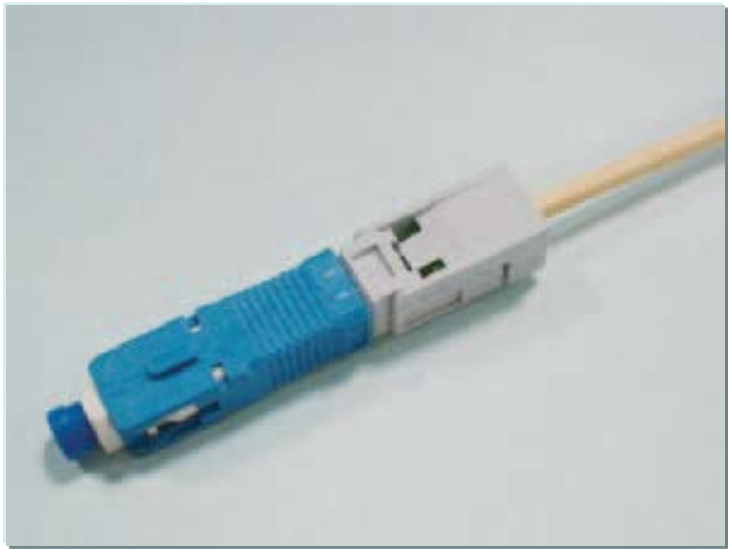


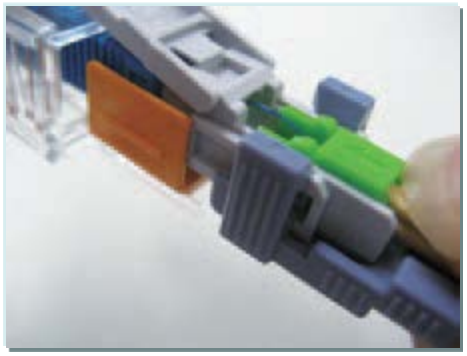
Features:

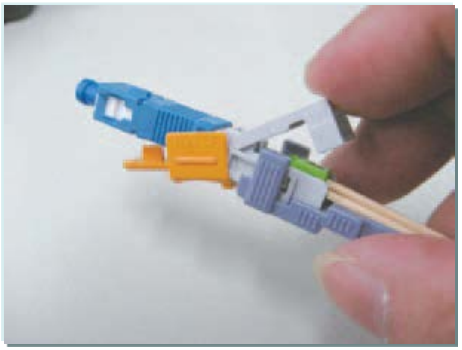
- Quick and Easy assembly
- No polishing or No epoxy required
- Fully compatible with standard SC connector
- Low insertion loss

Item	Specification
Applicable cable	Low friction drop cable (size : 2 x 3.1 mm) Low friction indoor cable (size : 1.6 x 2 mm)
Polishing type	SPC polish, APC polish
Insertion loss	Max. 0.5 dB (SPC), Max. 0.6 dB (APC)
Reflection	Max. -40 dB (SPC), Max. 50 dB (APC)
Operating temperature	-40 to +75 degree C

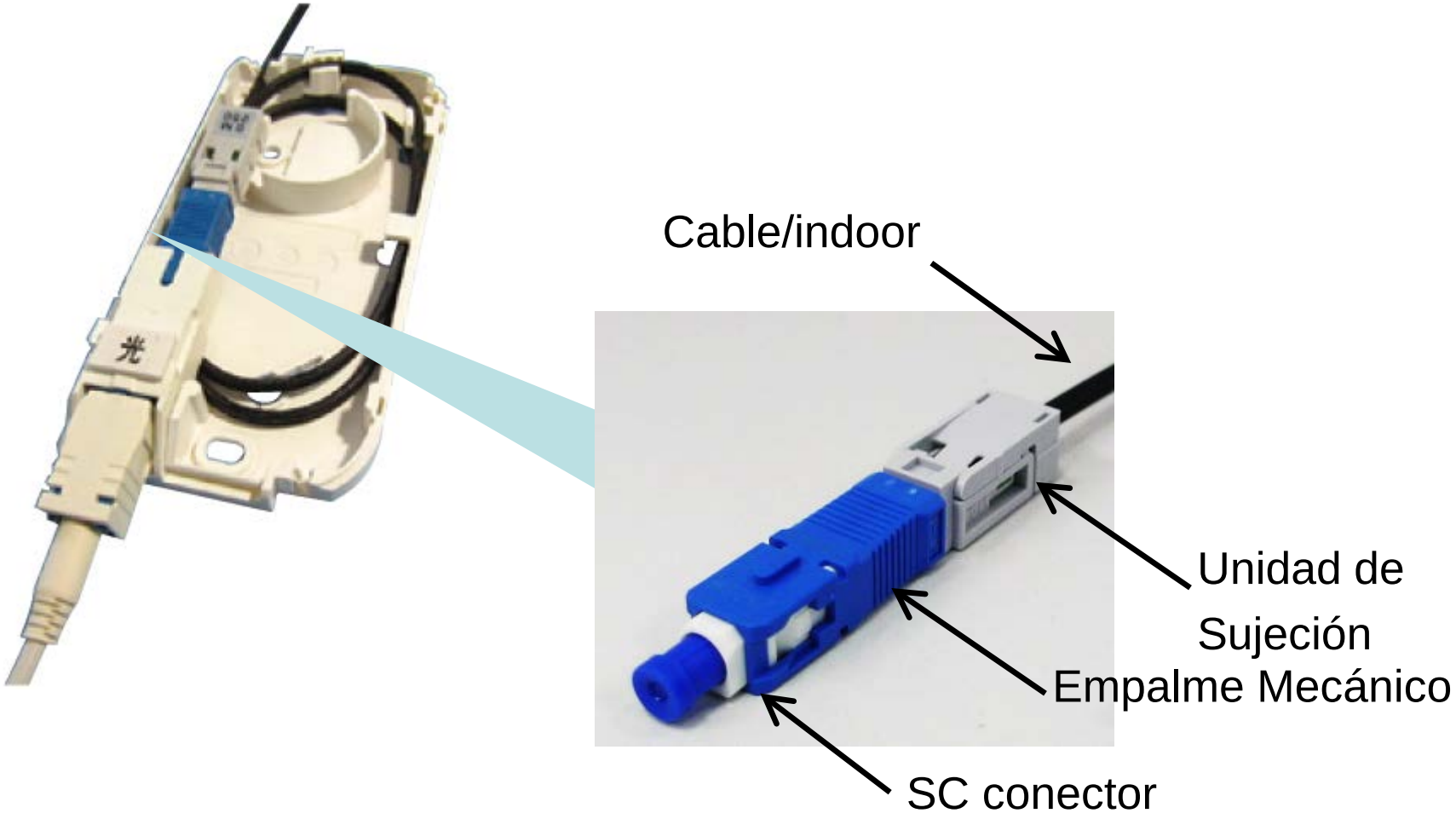
Joint operation of Field installable connector





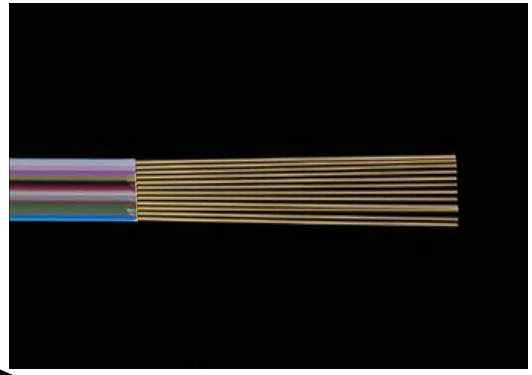


(3) Conector de campo

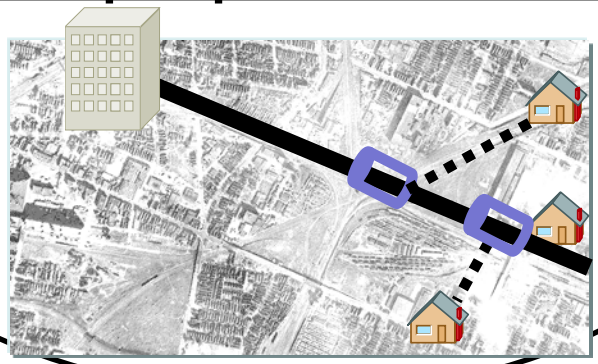


Las tecnologías clave para Optical Red de Acceso

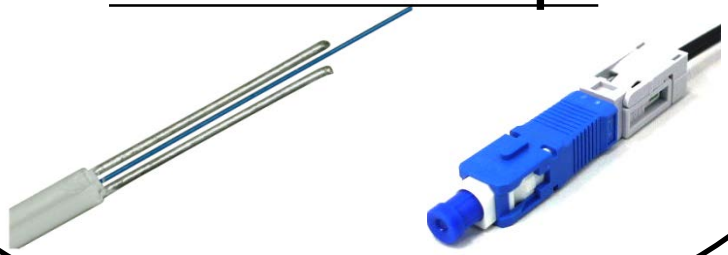
(1) Fibra óptica - ribbon



(2) Mid-span para derivaciones



(3) Cable Low friction/ Indoor conector de campo



- SSW,
- SZ-slotted rod,
- Rollable Ribbon

Standardization activity

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- **Rollable ribbon**
  - ITU-T: Structure is newly specified in four cable recommendations L.10, L.26, L.43, L.59).
    L.10, 26, 43 were published in August 2015.
    L.59 will be published in March 2016.
  - IEC: Structure will be specified in new standard document of fiber ribbon.
    (Document number TBD, most likely IEC 60794-1-31 Ed.1)
    Will be issued in the second half of 2016 (at the earliest).

- **Low friction indoor cable**
  - ITU-T: Structure, features and guidance for selection is newly specified in indoor cable recommendation (L.59)
    Will be issued in March 2016.
  - IEC: Test method of friction coefficient will be added in standard of test method (IEC 60794-1-21 Ed.1 Am.1).
    Will be issued in the first half of 2016 (at the earliest).

- **SSW cable**
  - IEC: Figure of structure will be specified in standard of the aerial cable (IEC 60794-3-20 Ed.3).
    Will be issued in the second half of 2016 (at the earliest).

Furukawa contribuye con las redes ópticas de acceso en Perú

Muchas Gracias !

Muito Obrigado!

ご清聴ありがとうございました。

Thank you!