

OPTOKON

Fusion splicing technology



OPTOKON, a.s.
Jihlava
Czech Republic

2021

Content

- Fusion splicing application
- Advantages of fusing splicing
- Principles of function
- Fiber preparation
- Commercial fiber splicers
- Optokon splicer – OSC-700

Fusion splicing application

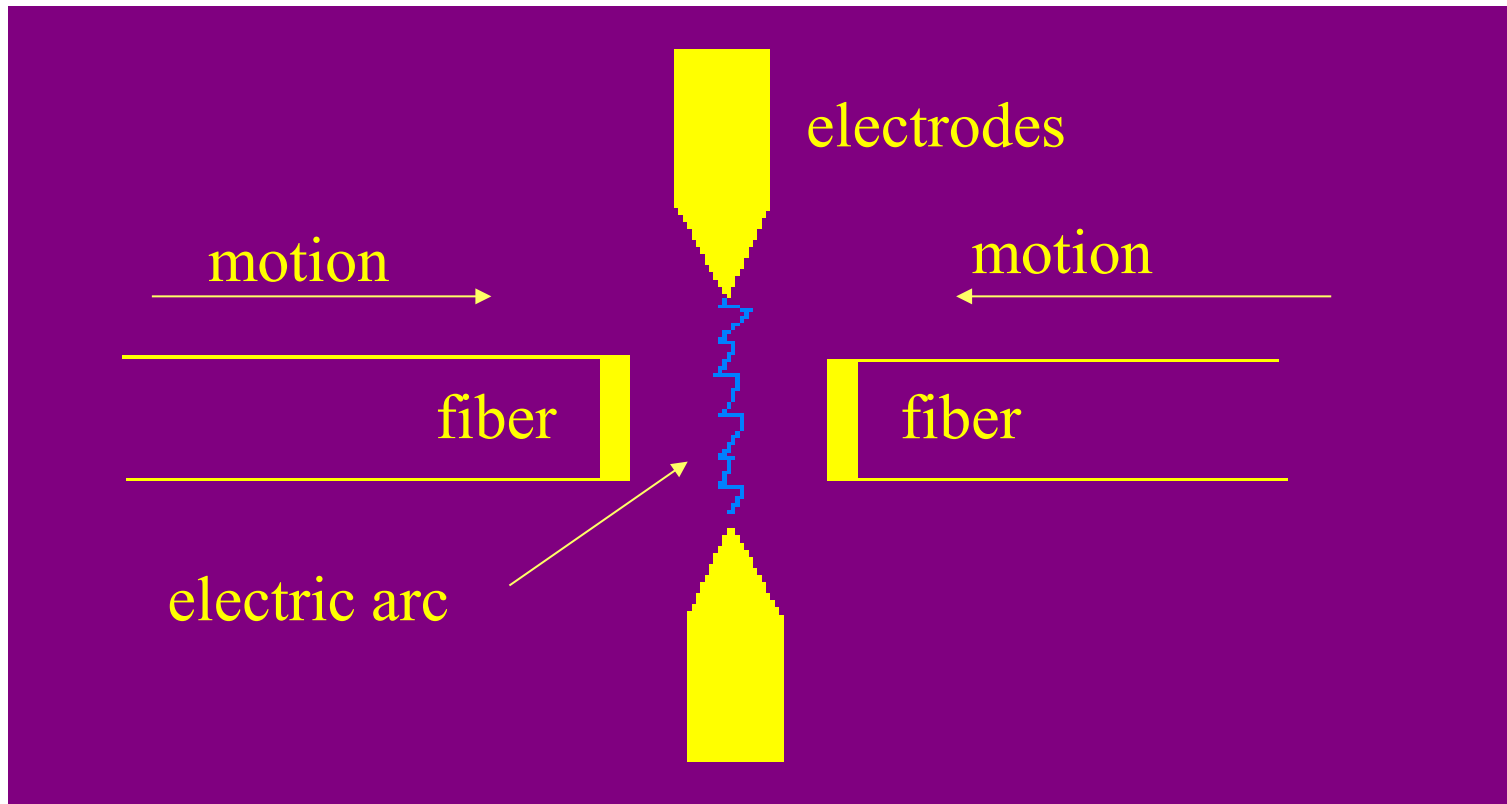
- Optical cable connection
(optical cable closures)
- Different cable types interconnection
(buried outdoor cable with indoor cabling)
- Optical cable termination
(utilizing pigtails)
- Installation and maintenance of optical networks
(fault clearing, repair works, network reconfiguration, ...)
- Manufacturing
(WDM filters & splitters cascading, special splicing, ...]

Advantages of fiber splicing

- quickness
- reliability and sufficient splice tensile strength
- very low insertion loss
(SM - 0,02 dB , MM - 0,01 dB)
- low cost for consumables
(heat shrink protection sleeves)

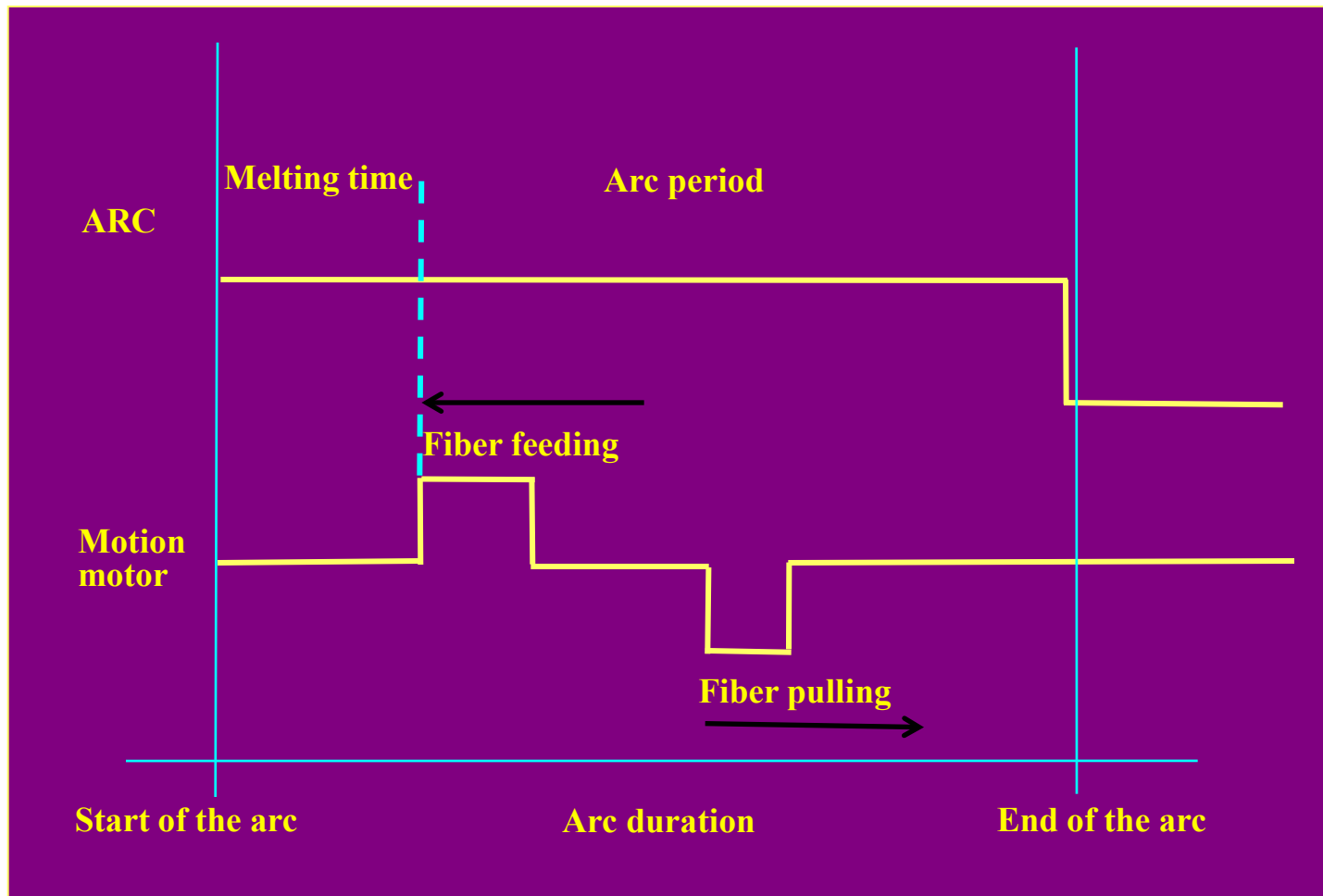
Splicing principles

Principle of Fiber melting

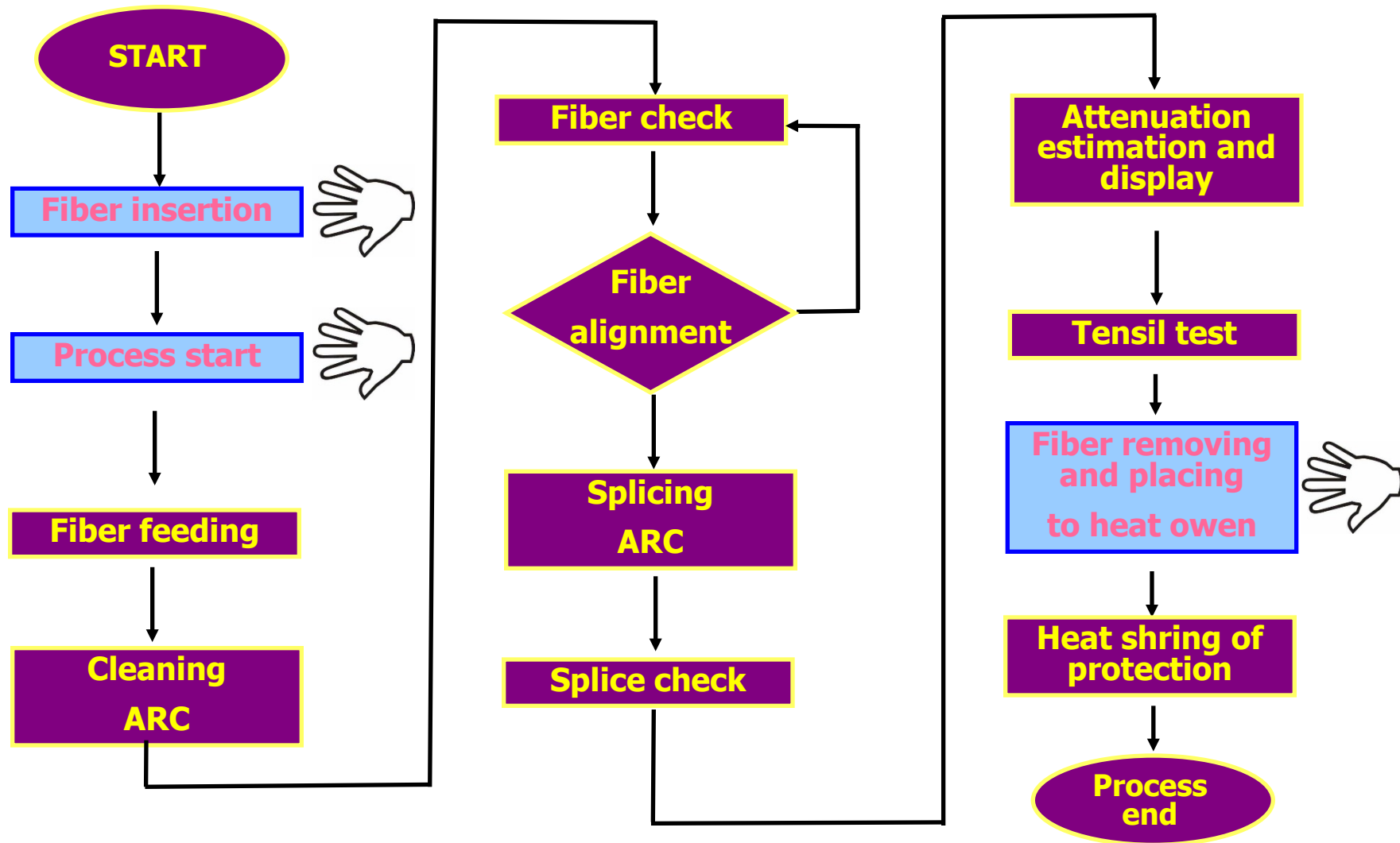


Fibers are melted by heat caused by electric arc between electrodes.

Timing diagram of splicing process



Splicer working diagram



Splice quality

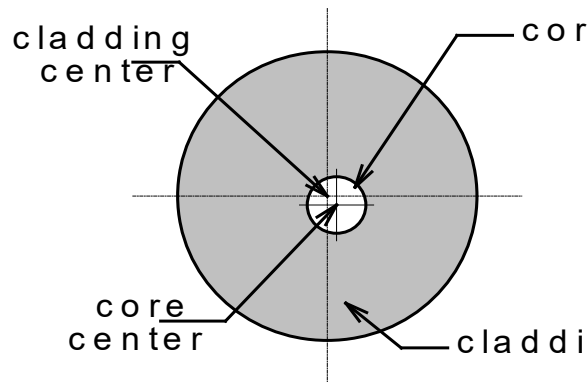
Factors affecting Insertion Loss of splice

- ARC intensity
- ARC timing
- Fiber characteristics
- Diameter of fiber core (MM 62.5/50, SM 9 μm)

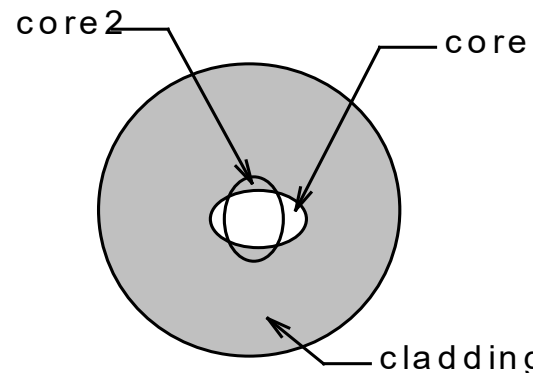
Splice quality

depends on physical quality of fibers:

- Core concentricity
- Core non-circularity
- Cleave quality
- Fiber core alignment (after splice)



Core concentricity



Core non-circularity

Fiber Splicers systems

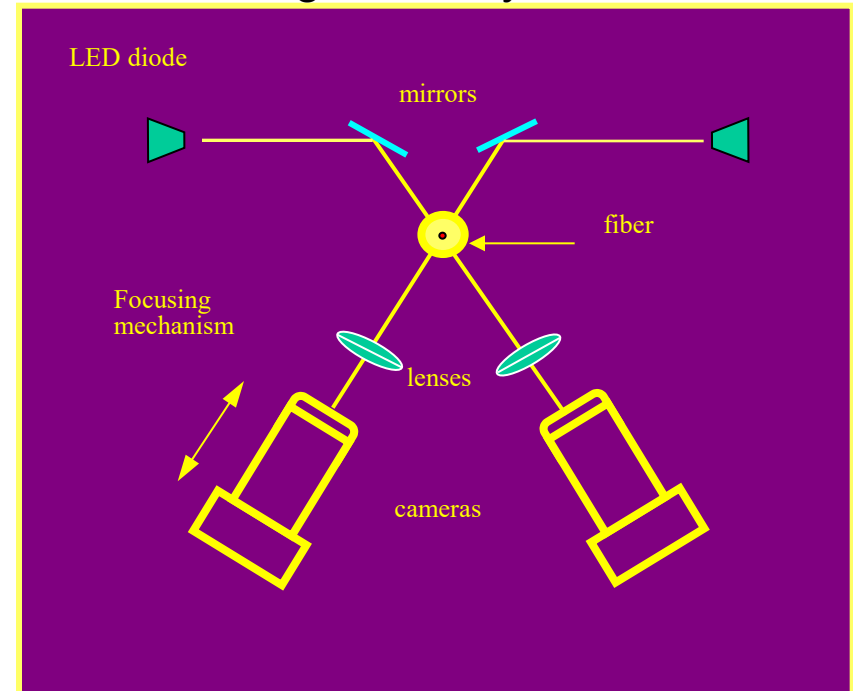
History:

- RTC (real time control)
- LID (local injection and detection)

Current:

- Fixed V-groove
- Active V-groove
- **PAS (profile alignment system)**

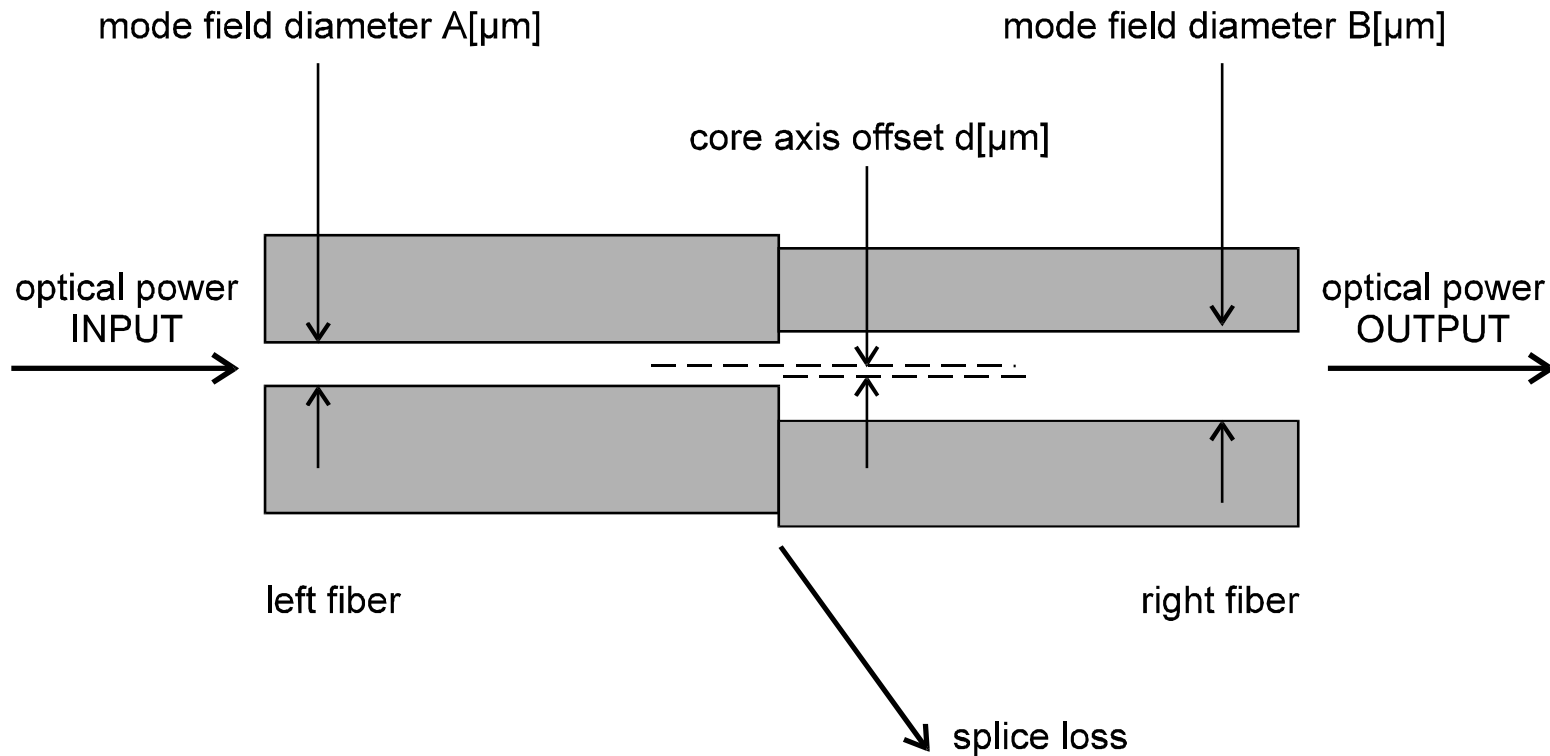
Profile Alignment System - PAS



Principle of fiber core alignment

According different refractive index profile on interface of core and cladding

Calculation of Splice attenuation



$$\text{splice loss} = 10 \times \log_{10} \frac{\text{OUTPUT}}{\text{INPUT}} = 10 \times \log_{10} \left[\left(\frac{2AB}{A^2 + B^2} \right)^2 \text{EXP} \left(- \frac{2d^2}{A^2 + B^2} \right) \right]$$

Fiber preparation

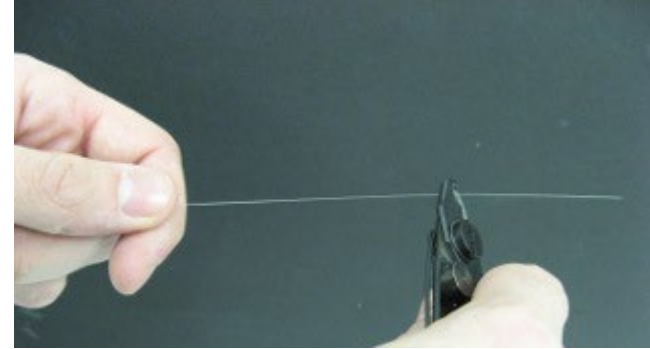
- Buffer removing - pliers

cable jacket, secondary protection 900 μm , primary 250 μm

- Fiber clean – remove residue

IPA / acetone + wipes

- Fiber Cleaver



Splice Tool kit



Fiber splicing machines

General requirements

- Allow splicing common telecommunication fibers –
SMF – 28 (9/125 μm), MM(50; 62.5/125),
buffer the same 250 μm
- Mobile, easy to move, portable
- Great amount of splices
- User friendly GUI and easy to operate (minimal knowledge)
- Battery powered for work also outdoor at field conditions –
windproof, dust proof, waterproof, anti-shock

OSC-700 Single Fiber Fusion Splicer

OPTOKON splicing machine

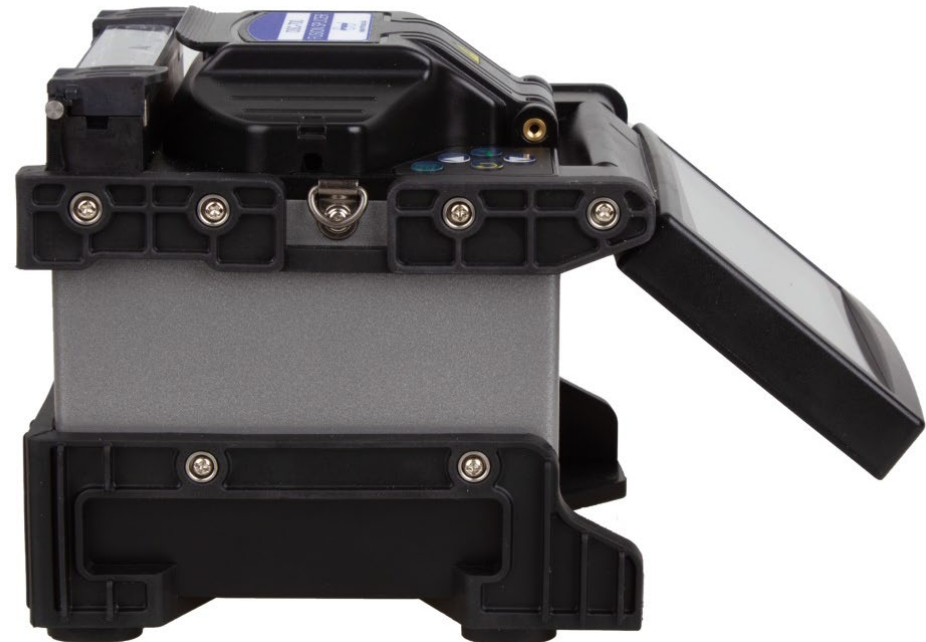


OSC-700 Single Fiber Fusion Splicer

- **Core Alignment PAS Technology with fixed focus**
- Fast splicing and heating time
- Newly-designed carry case: easy carry and can be as work plate
- Powerful battery and Top Quality electrode: up to 250 times of continuous splice and heat and 5000 times life span electrode
- Fully Automatic Operation
- Store 8000 groups of splice results
- USB & DC interface
- Color LCD monitor
- 350 Magnifications of X and Y

Application:

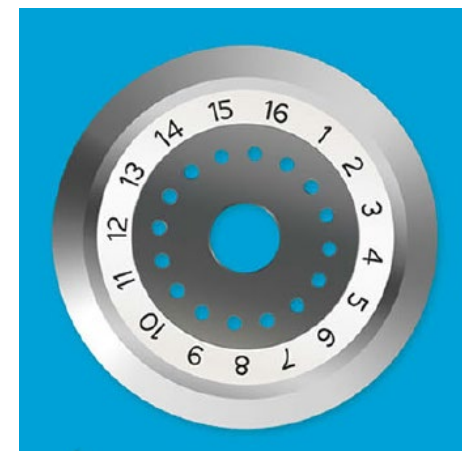
- FTTX application
- Long hauls
- Backbones



OSC-100 Cleaver

Specifications

- Applicable fiber:
250 μm , 900 μm , \varnothing 2 mm, \varnothing 3 mm, drop cable
- Dimensions:
60 x 55 x 45 mm
- Cleave length:
10 – 20 mm
- Cleaving angle:
 $\leq 0.5^\circ$
- Blade lifespan:
50.000 times
- Weight:
275 g



Cleaving blade

Fusion splicer kit



Fusion splicer kit

			
Fusion splicer	Fiber cleaver	Charger adapter	Carry box
			
Spare electrodes	Cooling tray	Drop cable stripper	Stripper
			
	Manual	Carry belt	

OPTOKON Service Center

OPTOKON Service Center provides:

- Repairs and maintenance of various fusion splicers (Fitel, Sumitomo, ...) ensured by staff with more than 10 years experiences
- Training for operators of fusion splicers
- Technical support (s/w updates, troubleshooting)
- Spare parts delivery (electrodes, blades, holders)
- Consumables and accessories (splice protection sleeves, tools, ...)

Thank you for your attention

OPTOKON, a.s.

Červený Kříž 250

586 01 Jihlava, Czech Republic

tel. +420 564 040 111

fax +420 564 040 134

OPTOKON@OPTOKON.COM

WWW.OPTOKON.COM

