

# Welkom

## 40/100G Migratie en kansen in uw connectiviteit

**25-03-2015**

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## Over Intronic

- Onderdeel van de beursgenoteerde TKH groep
- Gespecialiseerd in klantgerichte, projectmatige oplossingen
- Stabiele en flexibele organisatie
- Technische expertise in huis
- Breed productgamma
- Uitgebreid en modern logistiek systeem
- Vooraanstaand in B2B e-commerce
- Financieel gezonde organisatie

# Developments

## Tenfold growth in Data Centre Interconnect Market

16/12/2014

0 Comments

The growth of cloud-based services in computing is spectacular. Projections are that this traffic is forecasted to increase tenfold. It will be in social networking applications. At least a 40 percent average annual rate.

By 2019 there will be 60 percent more data centre interconnect volumes will increase. Research "Rise of High-Capacity Data Centres"  
**Bron: [www.opticalconnectionsnews.com](http://www.opticalconnectionsnews.com)**

## 255 Terabits/s over fibre link

16/12/2014

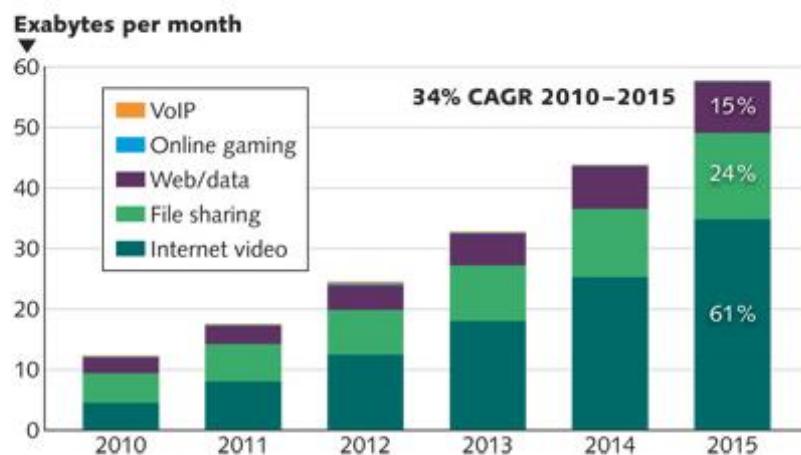
0 Comments

Researchers at Eindhoven University of Technology (TU/e) in the Netherlands and the University of Central Florida (CREOL) in the USA, report in the journal Nature Photonics the successful transmission of a record high 255 Terabits/s over a new type of fibre allowing 21 times more bandwidth than currently available in communication networks. This new type of fibre could be an answer to mitigating the impending optical transmission capacity crunch caused by the increasing bandwidth demand.

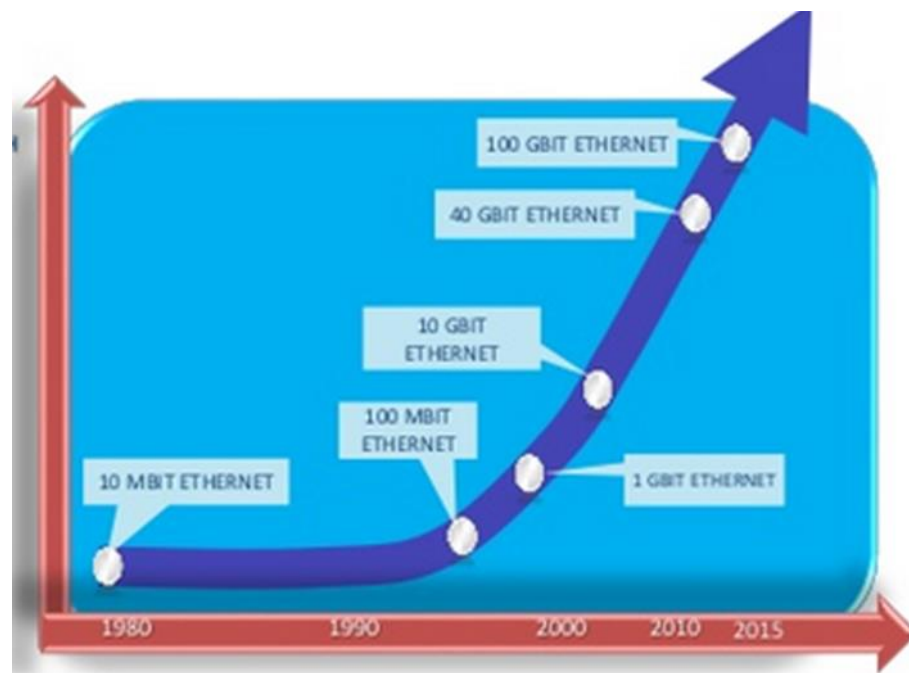
The team at TU/e and CREOL, led by dr. Chigo Okonkwo, an assistant professor in the Electro-Optical Communications (ECO) research group at TU/e and dr. Rodrigo Amezcua Correa, a research assistant professor in Micro-structured fibres at CREOL, demonstrate the potential of a new class of fibre to increase transmission capacity and mitigate the impending 'capacity crunch' in their article.

**Bron: [www.opticalconnectionsnews.com](http://www.opticalconnectionsnews.com)**

## Data needs



**FIGURE 1.** Global Internet traffic demand as projected by Cisco in 2011.



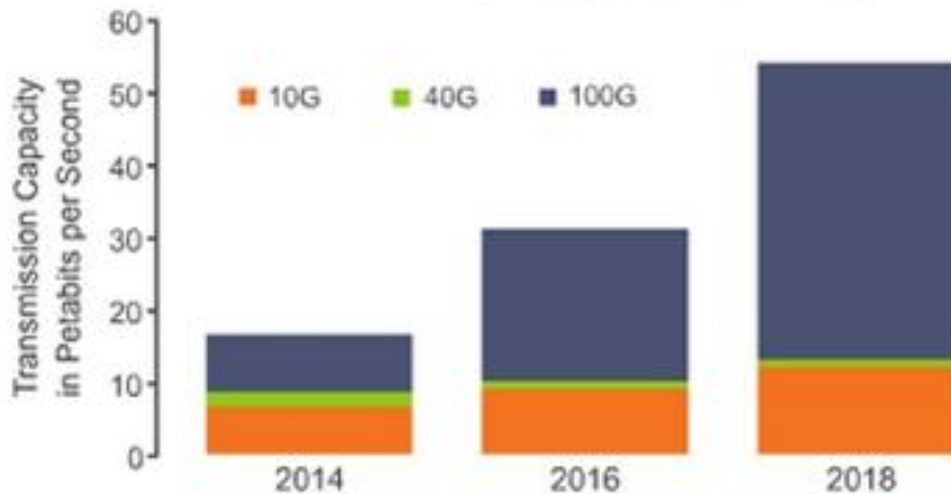
Increasing demand of video content is forcing the growth in data need and bandwidth.

# Network development

Focus shifts to (40G) and 100G networks.



**100G will account for over half of all bandwidth deployed in carrier networks in 2014, growing rapidly through 2018**



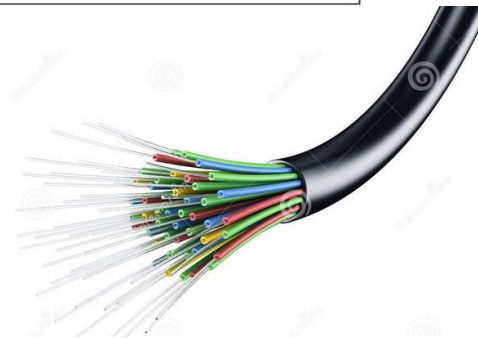
© Infonetics Research, 10G/40G/100G Optical Transceivers: Biannual Market Size, and Forecasts: November 2014

# Connectivity options

Clever use of the current cabling.

- Long(er) distances: Multi-tube fiber, Multiplexing
- Short distances: Multi-fiber, Parallel fiber connectivity (MPO/MTP)

Multi-tubes ducts indoor	Multi-tubes ducts outdoor	Multi-tubes ducts outdoor – direct burial
		

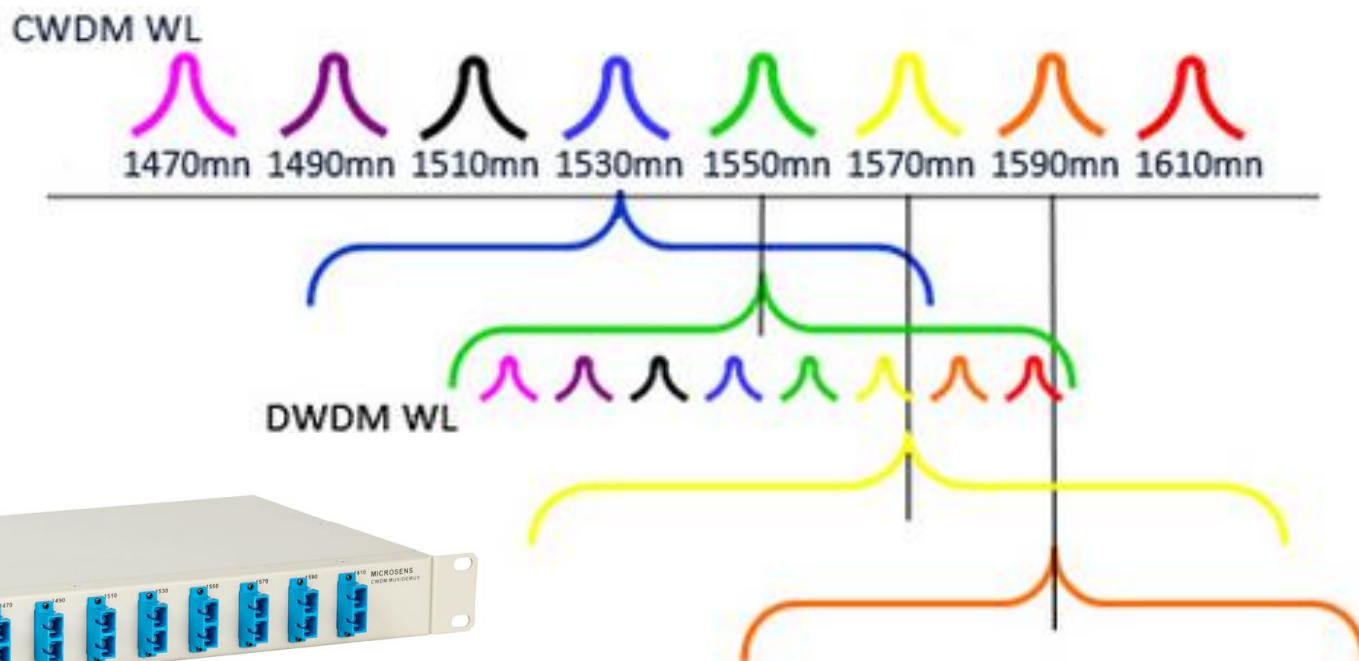


strong in connectivity

# Multiplexing

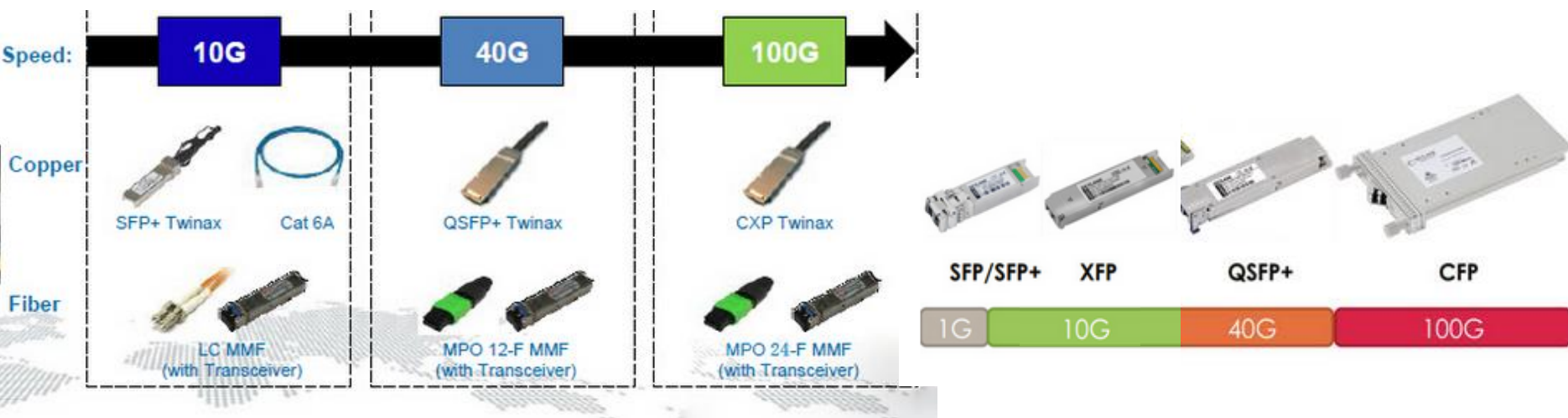
Using more wavelengths in a current cabling situation.

- (Bi-directional)
- CWDM
- DWDM



strong in connectivity

# The road to 40G and 100G Networks



## Physical layer

7m over twinax copper cable  
 30m over "Cat.8" twisted pair  
 100m over OM3 MMF  
 125m over OM4 MMF  
 2km over SMF, serial  
 10km over SMF  
 40km over SMF

## 40 Gigabit Ethernet

40GBASE-CR4 (QSFP+)  
 40GBASE-T (RJ45, GG45, Terra)  
 40GBASE-SR4 (MPO)  
 40GBASE-SR4 (MPO)  
 40GBASE-FR (CFP serial)  
 40GBASE-LR4 (CFP-WDM)  
 40GBASE-ER4 (CFP-WDM)

## 100 Gigabit Ethernet

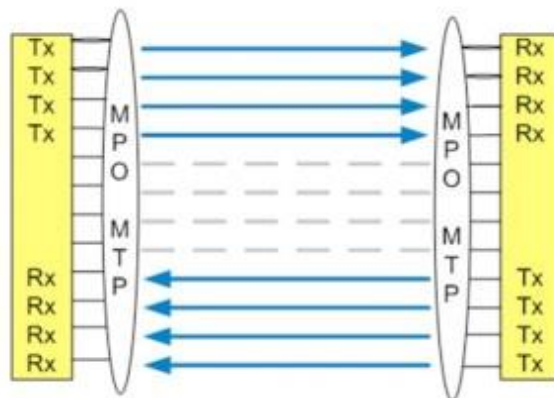
100GBASE-CR10 (CXP, infiniband)  
 100GBASE-SR10 (MPO-24)/  
 100GBASE-SR4 (MPO)  
 100BASE-LR4 (CFP-WDM)  
 100GBASE-ER4 (CFP-WDM)

strong in connectivity

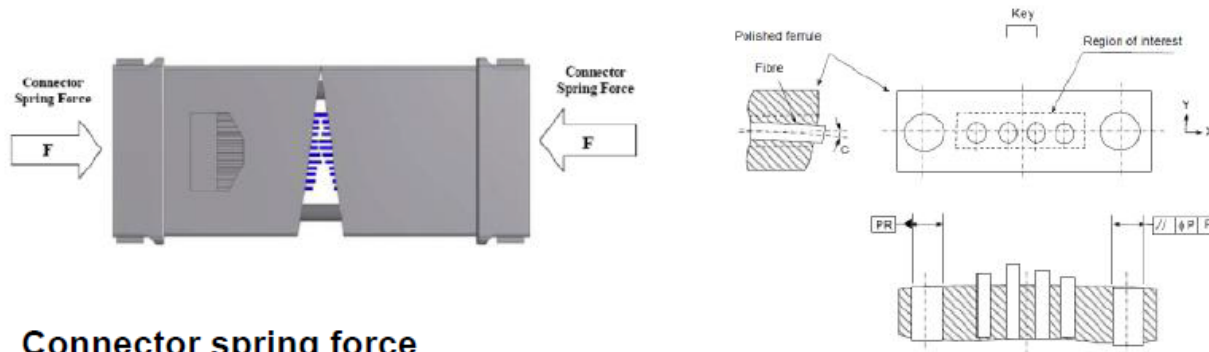


# Connectivity for 40 and 100G networks MPO

- Easy to install
- Space efficiency
- Modularity, scaling
- Structuration



# Connectivity for 40 en 100G networks MPO



**Connector spring force**

**Fiber tip shape**

**Fiber tip height variation**

**Ferrule surface shape and angular orientation relative to guide pin bores**

**Best fit fiber tip line angles relative to guide pin bores**

**Ferrule material properties**

**Guide pin material properties**

**Pin to hole friction**

## MPO versus MTP

The MPO connector family is defined by two existing standards. Internationally the MPO is defined by IEC-61754-7. In North America the MPO is defined by TIA-604-5 (also called FOCIS 5).

The MTP® brand multi-fiber connector is the trademarked name for US Conec's MPO connector. The MTP® connector is fully compliant with both FOCIS 5 and IEC-61754-7. The MTP® connector is fully intermateable with any FOCIS 5 or IEC-61754-7 compliant MPO connector



## MPO versus MTP / Removable housing

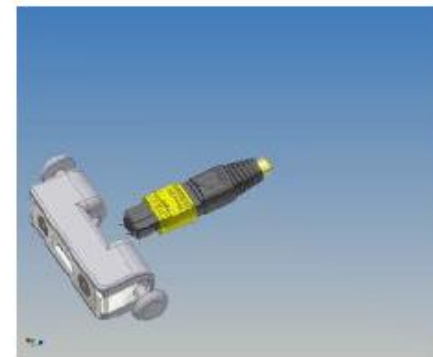
- Allows easy “gender changes” - from male to female and vice versa
- Allows re-polishing and re-measurements for end face visuals and geometry.



Ferrule guide  
PN: 14910

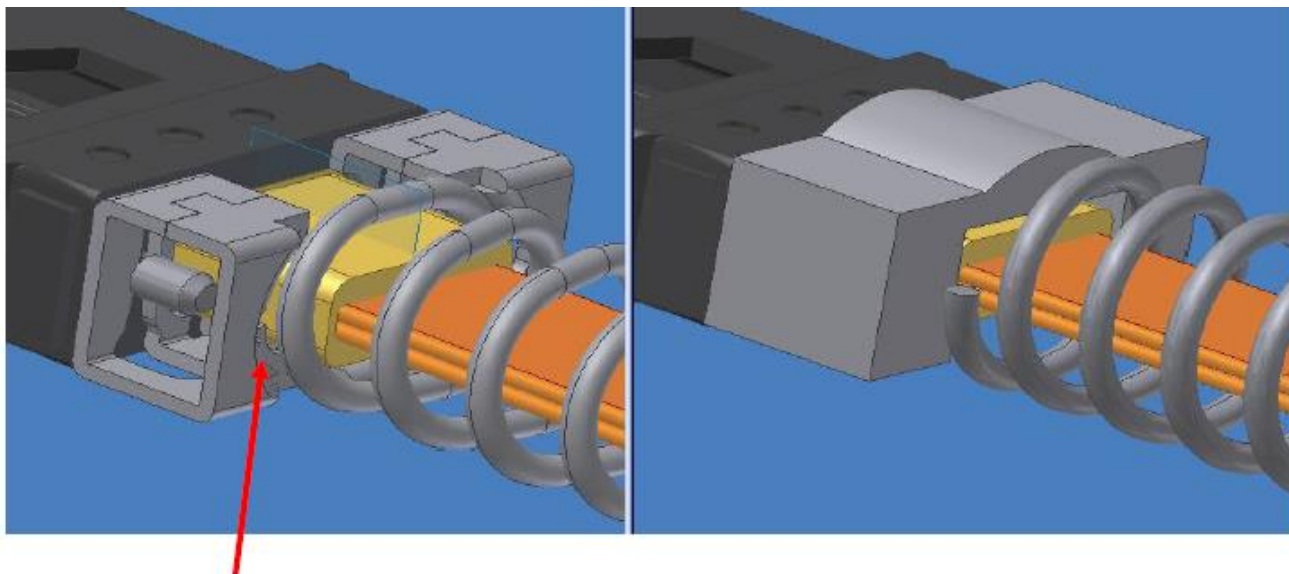


Spring compression tool  
PN: 12013



Housing Removal tool

## MPO versus MTP / Oval Spring

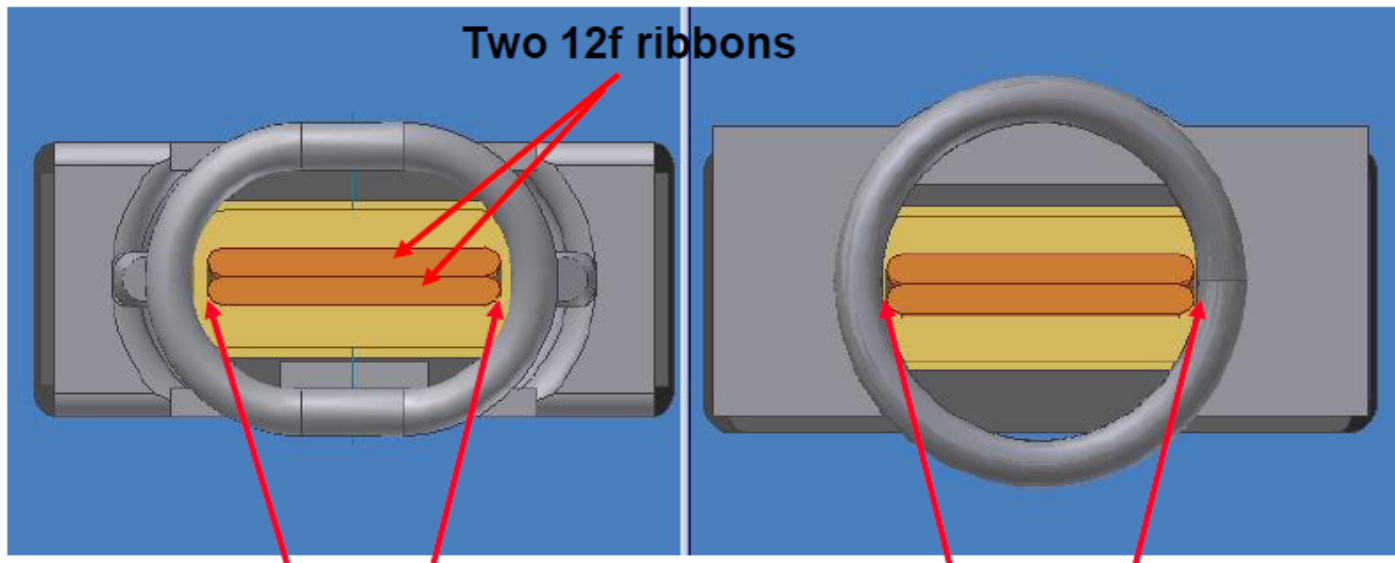


MTP<sup>®</sup> recessed metal pin clamp and oval spring – this ensures proper spring seating and force application to the ferrule. Ground spring for flat seating

MPO plastic pin clamp and round spring - the spring is not constrained and can easily move damage the ribbon and fibers. Spring is not ground “flat”



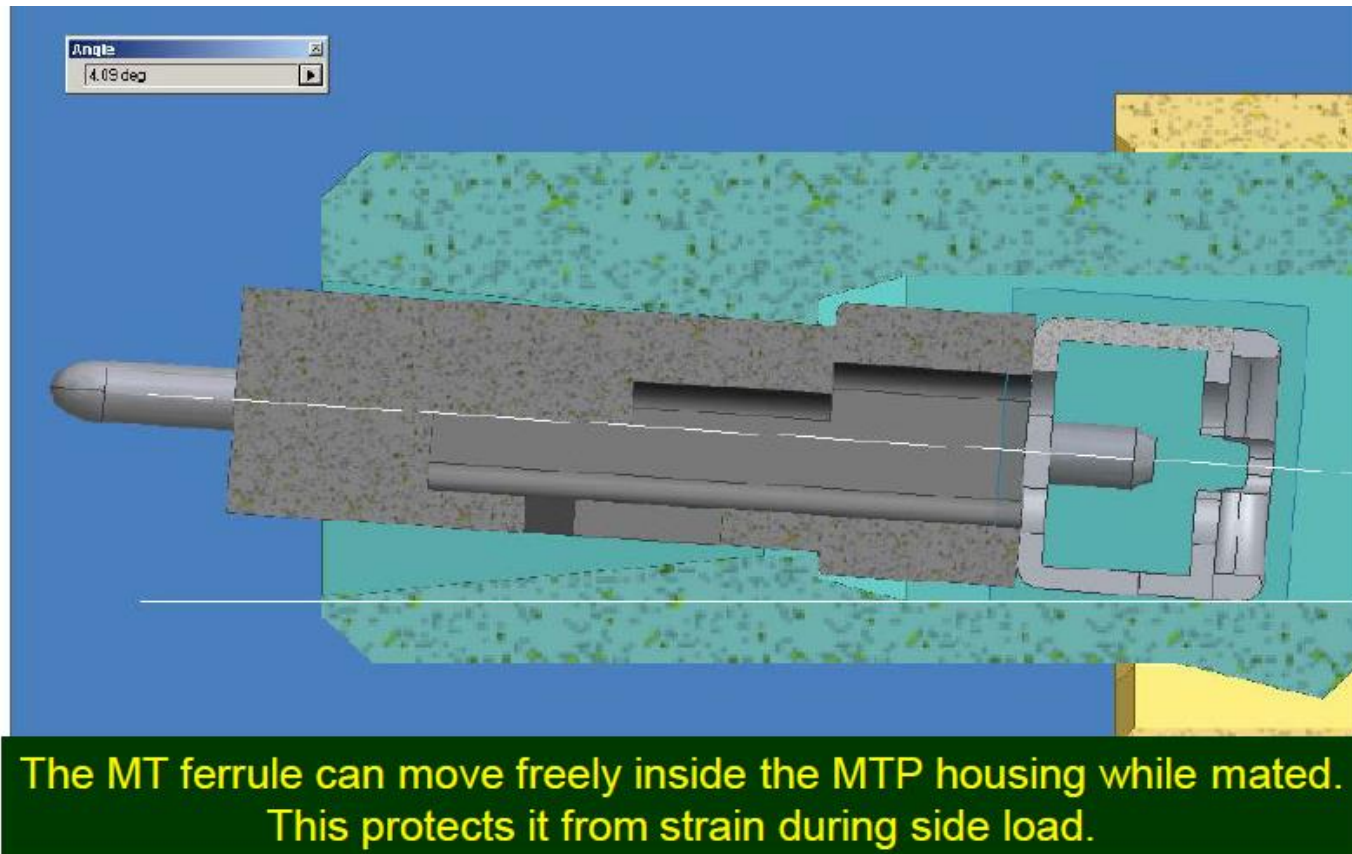
## MPO versus MTP / Oval Spring



MTP® oval spring provides more ribbon clearance; enhances mechanical performance especially during cable side load testing.

MPO round spring provides inadequate ribbon clearance; reduces mechanical performance and decreases reliability.

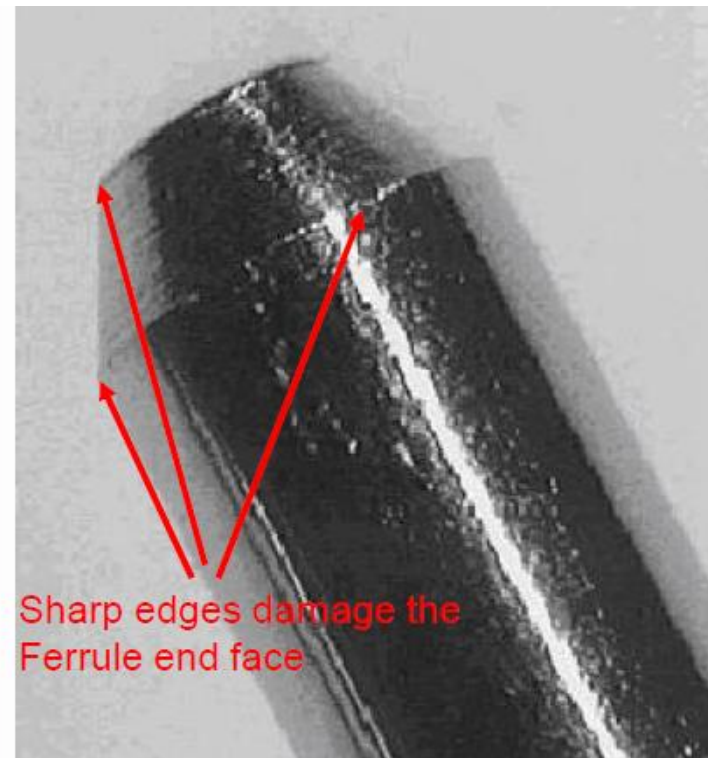
## MPO versus MTP Floating ferrule



## MPO versus MTP / Guide Pin



MTP® Guide Pin

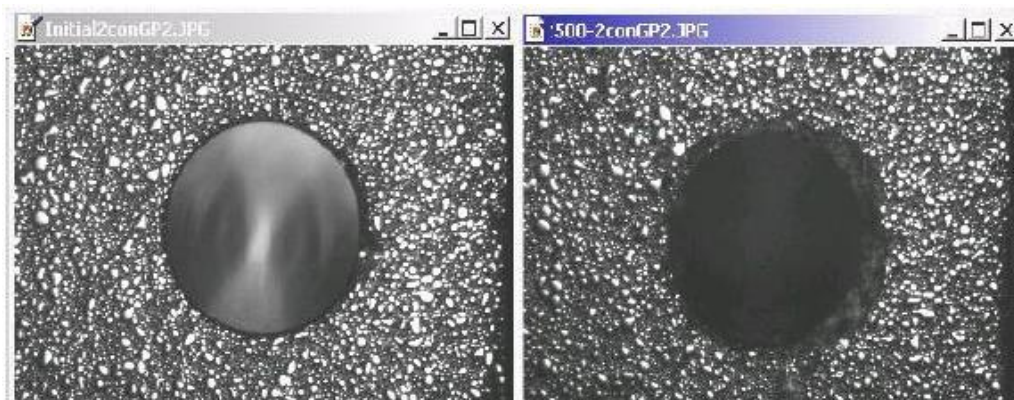


Sharp edges damage the  
Ferrule end face

MPO Guide Pin



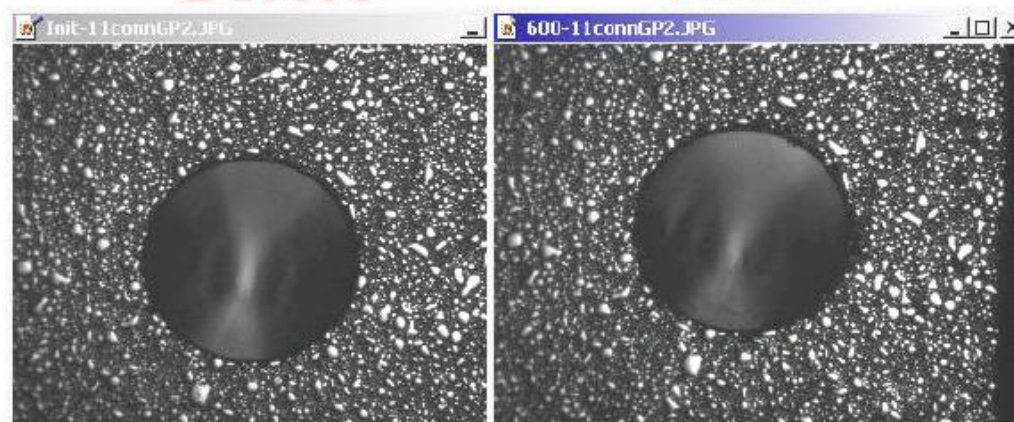
## MPO versus MTP / Guide Pin



**Before**

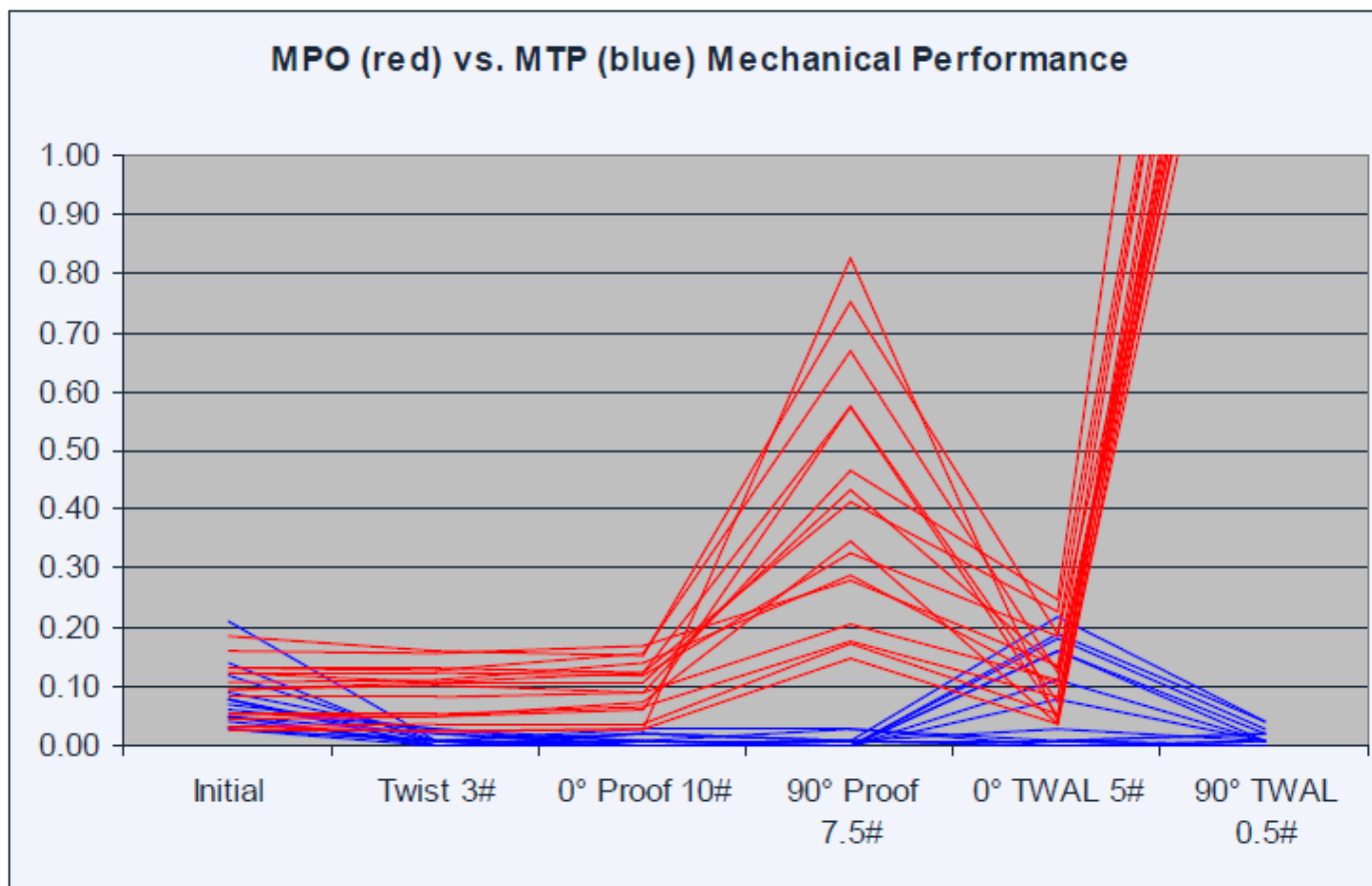
**After**

Typical MPO  
guide pin hole  
damage after  
only 50 matings



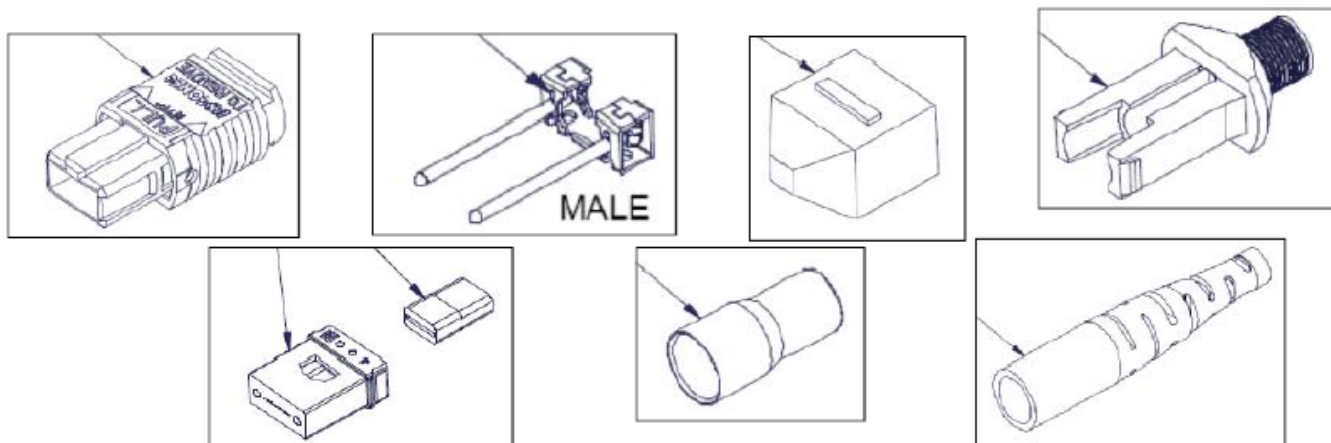
Typical MTP®  
guide pin hole  
damage after  
500 matings

# MPO versus MTP / Mechanical Performance

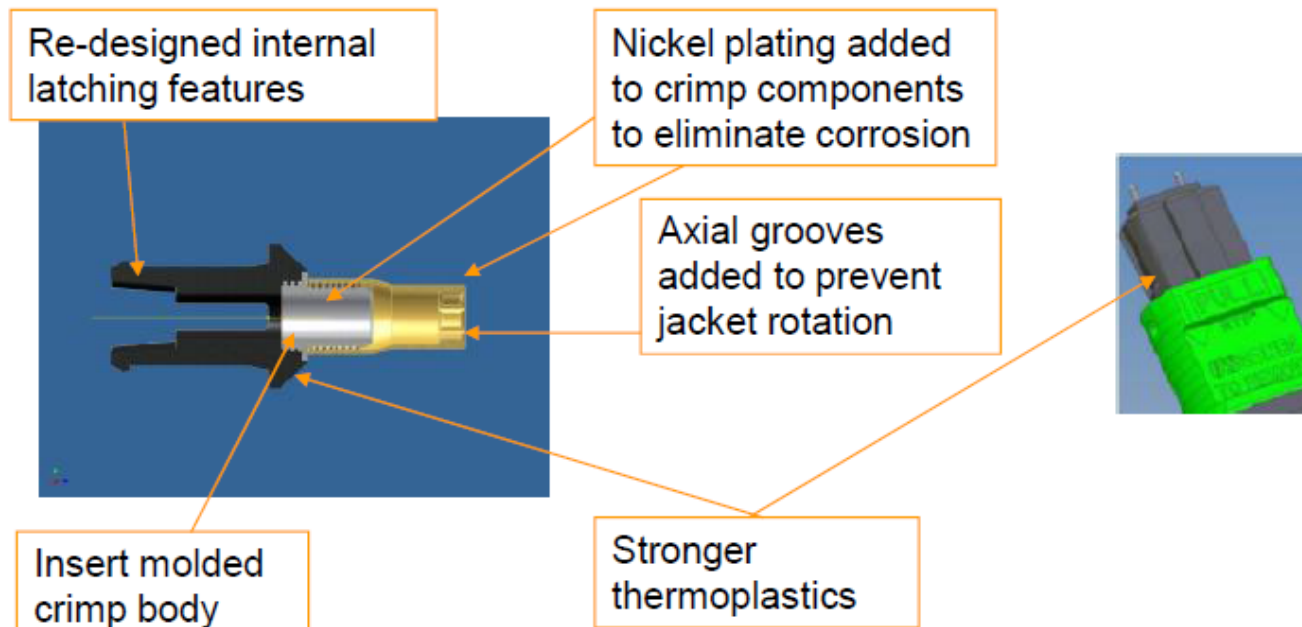


## MTP for Telecom use (FTTA)

- Networks requiring multifiber connectivity in uncontrolled operating conditions. Telcordia 1435 Uncontrolled & VZ.TPR.9431 (O)bjectives
- Outside Plant environment inside enclosure, cabinet or building entrance terminal
- Corrosion resistant pins, metallic components
- Fungus resistant elastomeric components
- Increased housing strength for higher mechanical cable loads
- Enhanced adapter and plug to adapter interaction
- IEC grade B compliant SM MT Elite® Ferrules

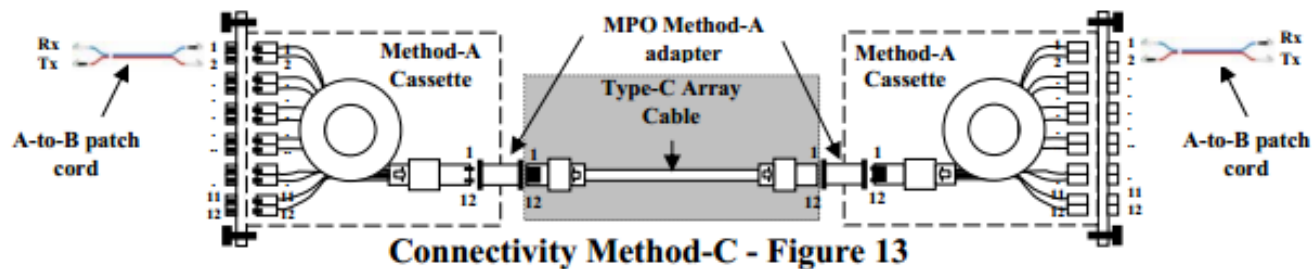
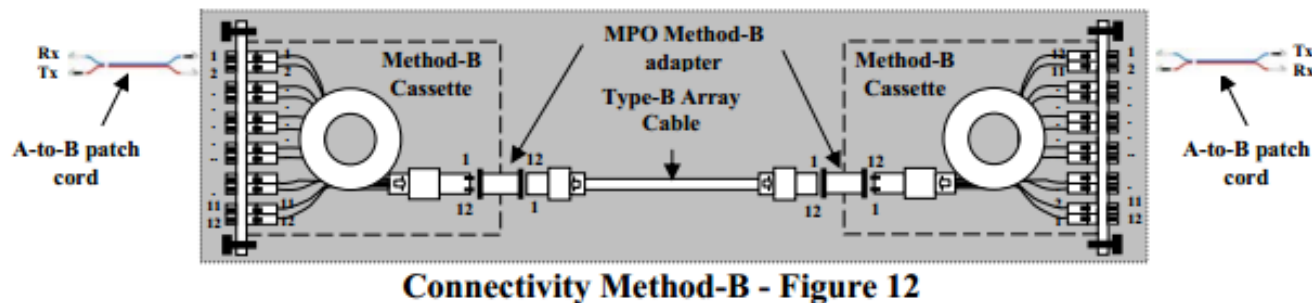
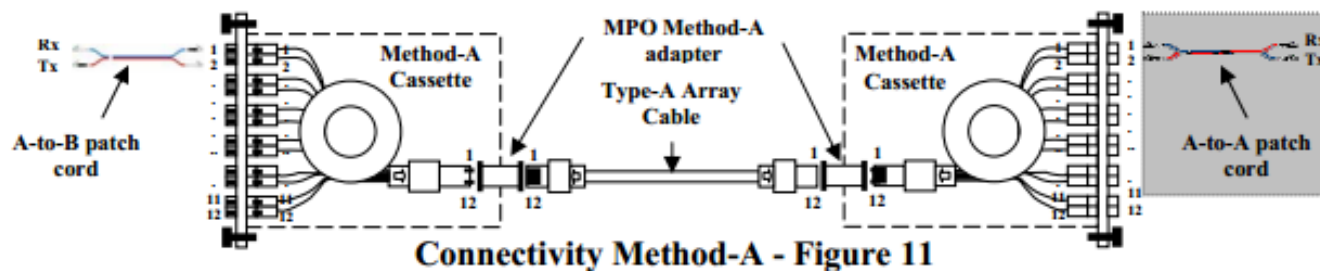


## MTP for Telecom use (FTTA)



- Increases pulling installation strength to >75 pounds
  - Increases 0 deg proof to >15lbf
  - Increases 90 deg proof to >10lbf

# MPO polarity





## Summary

- Bandwidth will grow extremely mainly because of video content
  - 100G will account for 75% of all bandwidth in carrier networks in 2018
- Parallel fiber connectivity is used because of easy installation, structuration, space efficiency, scaling and costreduction
- MPO/MTP is the ideal connectivity for migration to 40G/100G networks
- MTP is a better solution for MPO connectivity
- Take polarity in consideration