



## **measurement & training services**

optical, protocol, video, power, power quality & energy

## **power quality & EMC & Instrumentation**

fixed and portable PQ & energy monitoring, EMC immunity

## **telecommunication & networks**

wireless & wireline testing, optical transport testing

## **fiber**

physical layer testing, protocol testing, fiber splicers & cleaning, tools

## **Synchronisation**

Time and Frequency Synchronization Solutions, NTP Servers

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HET KENNISEVENT OVER COMPUTERRUIMTES, DATACENTERS EN CLOUD COMPUTING



2021

16 NOVEMBER

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# MPO multi-fiber connectoren: inspectie, meten en reinigen



# Why inspection is important?

Not only because it's nice to have clean connectors!

- Direct impact on BER
- System performance
- Network reliability
- Impact is even greater with multi-fiber connectors where a single bad connector impacts multiple links

Why are connector dirty or damaged ?

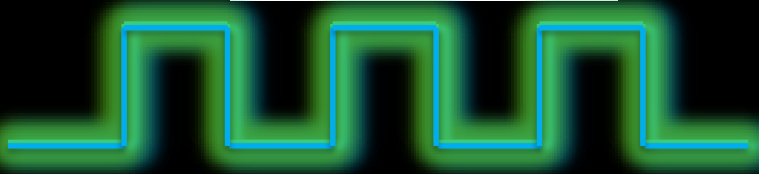


# Is your fiber foundation ready?

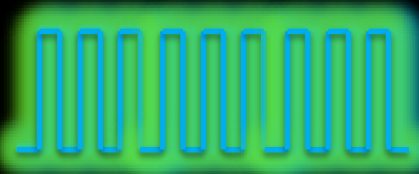
## Why does it matter more than ever now?

- Increased data rates make networks ultra sensitive.
- Excessive light returned to transmitter disturbs the laser and causes noise.
- It only takes  $1/1000^{\text{th}}$  of the signal to be reflected back to cause errors at 10 GigE!


Physical impairments



Physical impairments




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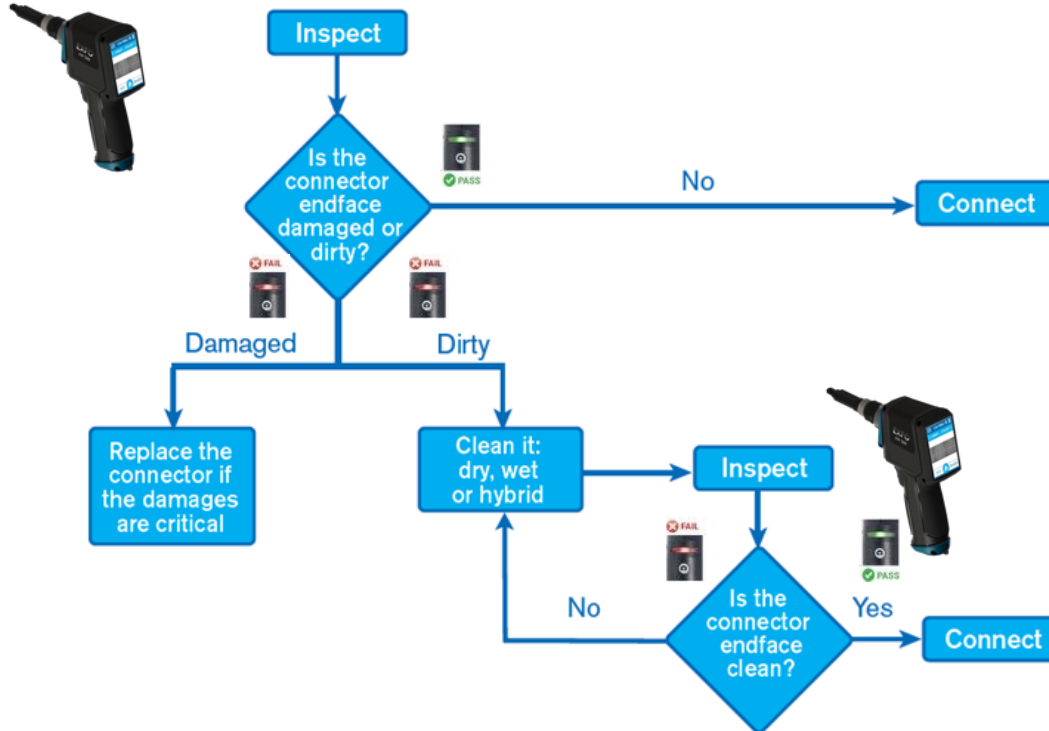
**No. 1** cause of network failures is contaminated connectors  
- NTT-Advanced Technology Research,

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**80%** of network owners report having connector issues

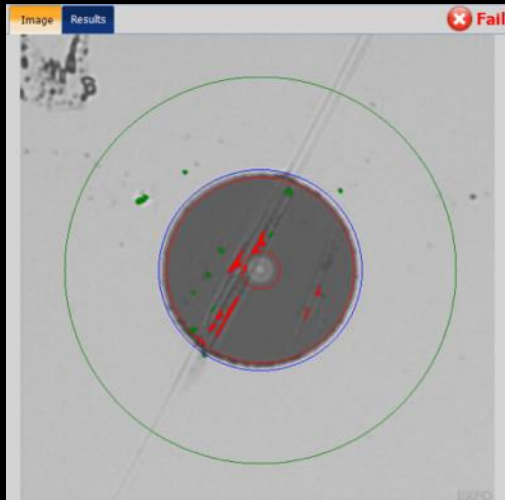
# Inspection / Cleaning flow



# When to clean?

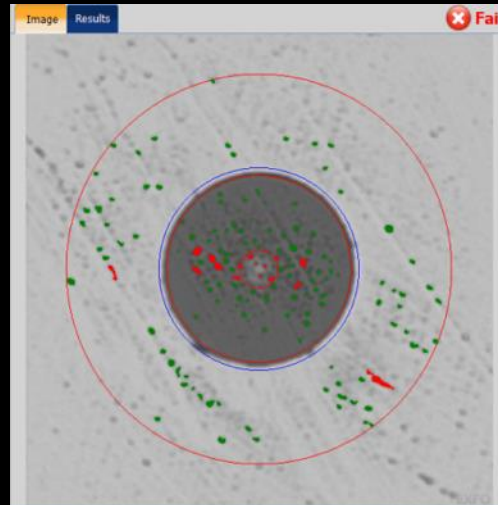
**DAMAGED = REPLACE**

Cleaning is worthless



**DIRTY = CLEAN**

Clean ONLY if needed



**CLEAN = CONNECT**

NO cleaning required

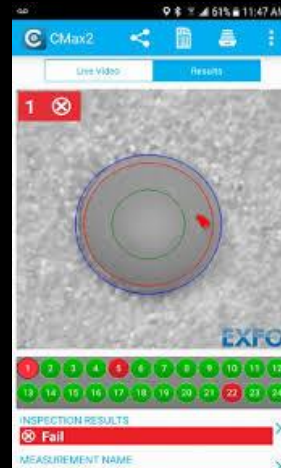


# Evaluation MPO Inspection tools

2008



2017



2021









Inspection

1 2 3 4 5 6 7 8 9 10 11 12

1x12

MM

# MPO connector cleaning

- Attempting to clean a MPO connector can make it worse
- Inspect before you connect to avoid cleaning when not necessary
- MPO connectors are hard to clean and multiple inspections may be required

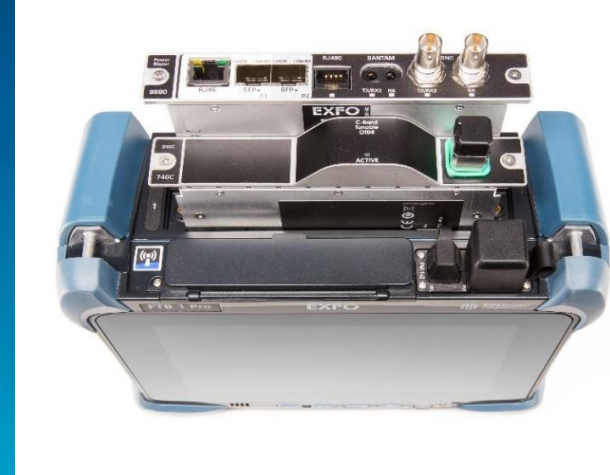
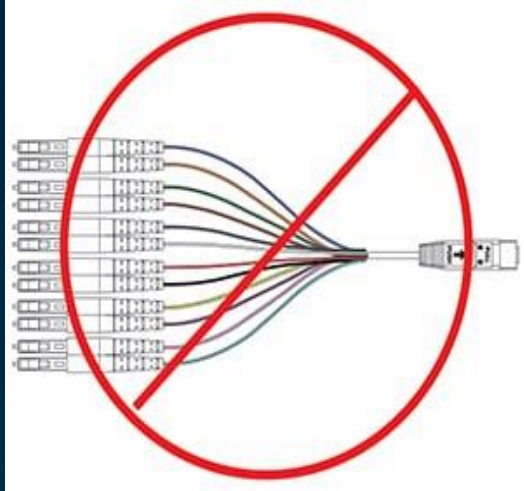




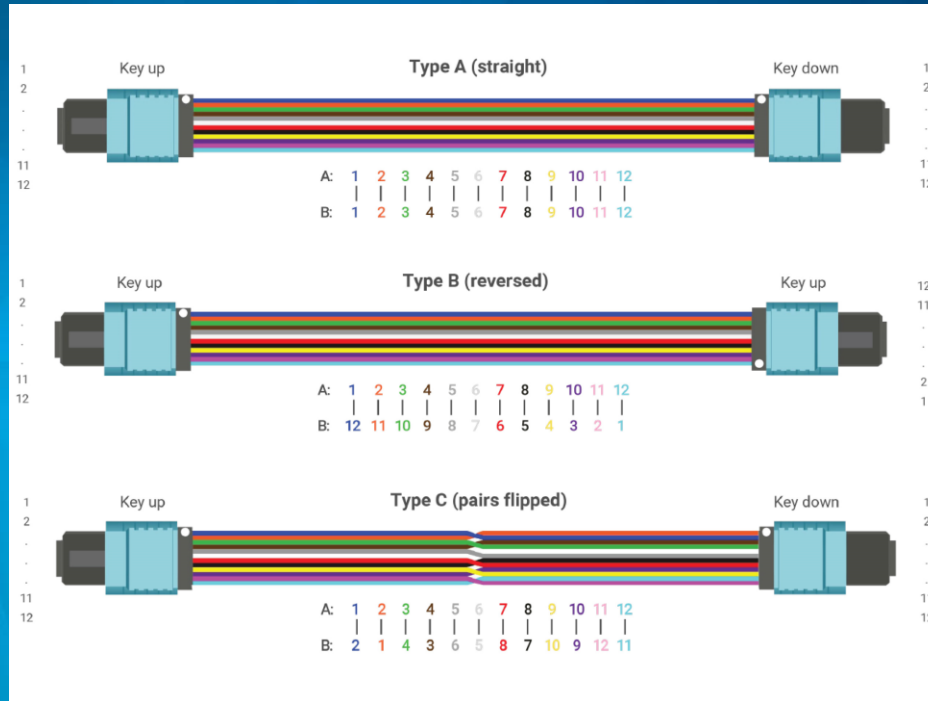
# MPO Cleaning



# MPO Automated OTDR Testing



# MPO OLTS & Polarity check





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**Standnummer: 1**

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