# CORNING

Romeo Lazar - Sales Manager
Eastern Europe, EN EMEA
April 2013 Ukraine

CORNING
LANscape®
Solutions

# Agenda

- Introduction
- Project Documentation, project registration
- Shielded copper solutions, FutureCom™
- Standards (copper) focus on Cat. 6A
- Exercises, Hands-On and Measurements, troubleshooting
- Break
- Fiber Optic cables
- new Hardware LNAS+C and CCH
- Lunch
- Clear Curve™
- Hands-On
- Fiber Standards & Polarity
- Data Center solutions, EDGE™
- Exercises, Hands-On
- Field Installable Connector, UniCam™
- Exercises, Hands-On and Measurements

# Corning Incorporated

CORNING
LANscape® Solutions

**Founded:**
1851

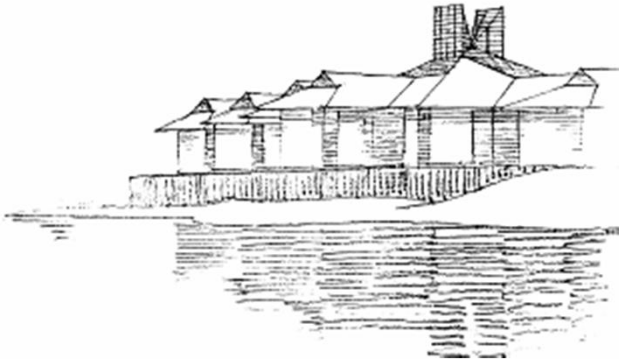
**Headquarters:**
Corning, New York

**Employees:**
Approximately 28,000 worldwide

**2012 Revenues**:
$8,01 Billion

**Fortune 500 Rank:**
350

- **Corning is the world leader in specialty glass and ceramics.**
- We create and make **keystone components** that enable **high-technology systems** for consumer electronics, mobile emissions control, telecommunications and life sciences.
- We succeed through **sustained investment in R&D, over 150 years** of materials science and process engineering knowledge, and a distinctive collaborative culture.



# An Embedded Culture of Innovation

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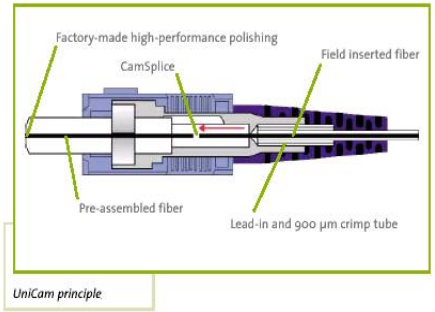
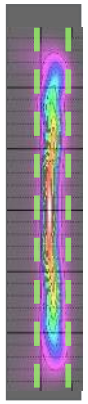
Glass envelope for Thomas Edison's light bulb

First low-loss optical fibre




UniCam® field-installable Connector without epoxy and polish

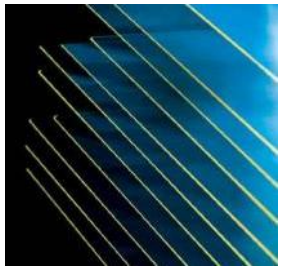


Minimum EMBc Test method for Corning OM3 fibre introduced as standard

**1879** **1915** **1947** **1970** **1984** **1990** **2000** **2002**

Heat-resistant Pyrex® glass

Processes for mass producing the television bulb



AMLCD glass for computers and large-screen TVs

EAGLE2000™, a special glass substrate for bigger, thinner and brighter displays (TV too)

# Corning's Major Market Segments

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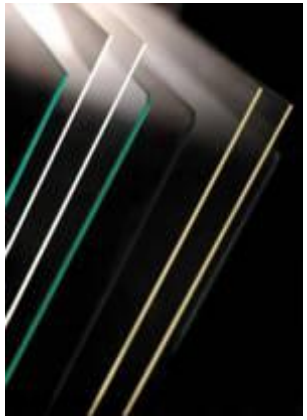
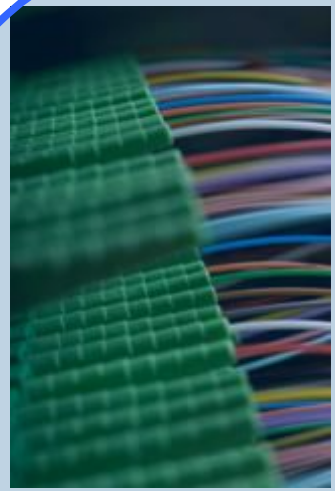


## Display Technologies

- LCD Glass Substrates
- Samsung Corning Precision Glass Company, LTD (SCP)

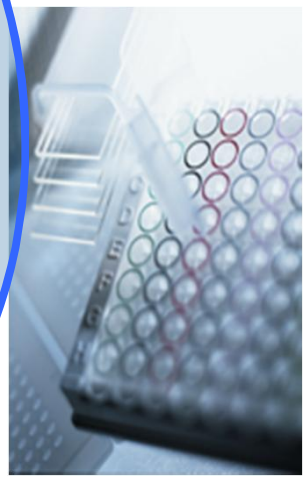
## Environmental Technologies

- Automotive Emissions Control
- Diesel Emission Control
- Molten Metal Filters
- Stationary Emissions Control



## Telecommunications

- Optical Fiber and Cable
- Hardware and Equipment
  - Coaxial Connectivity Products



## Life Sciences

- Microarray Products
- Drug Discovery and Genomics
- Cell and Molecular Biology
- General Laboratory Products

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# Corning Cable Systems

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# Corning Cable Systems (CCS)

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- **Corning Cable Systems** is wholly owned by Corning Incorporated
- **Corning Cable Systems** offers the most comprehensive Fibre Optic and Copper Solutions for Telecommunication and Data networks
- Headquarter Europe: Berlin
- Employees: ca. 10.000 world wide
- **World wide** partnerships with **local** service and support
- Global **references** within the finance, industrial and insurance market

# References

citibank

BMW

AMD

infineon

HUK-COBURG
Da bin ich mir sicher

DAIMLERCHRYSLER

BOSCH

ERNST & YOUNG
Quality In Everything We Do

e·on Energie

rbb

Deutsche Bank

SIEMENS

mdr MDR.DE

Dresdner Bank
Die Beraterbank

BAYER Bayer

DEPARTMENT OF THE ARMY · UNITED STATES OF AMERICA · 1775

NORD/LB
Finanzgruppe

RWE

# CCS – EN EMEA

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LANscape® Solutions

- D-A-CH
- UK- Nordics
- RoE
- Middle East, Turkey
- France

**Headquarter:**
**Berlin, Germany**

**Cable-Plant:**
**Neustadt, Germany**



**FO and Hardware-Plant:**
**Strykow, Polen**

CORNING

# Corning Cable Systems, Enterprise Networks

Our Offer

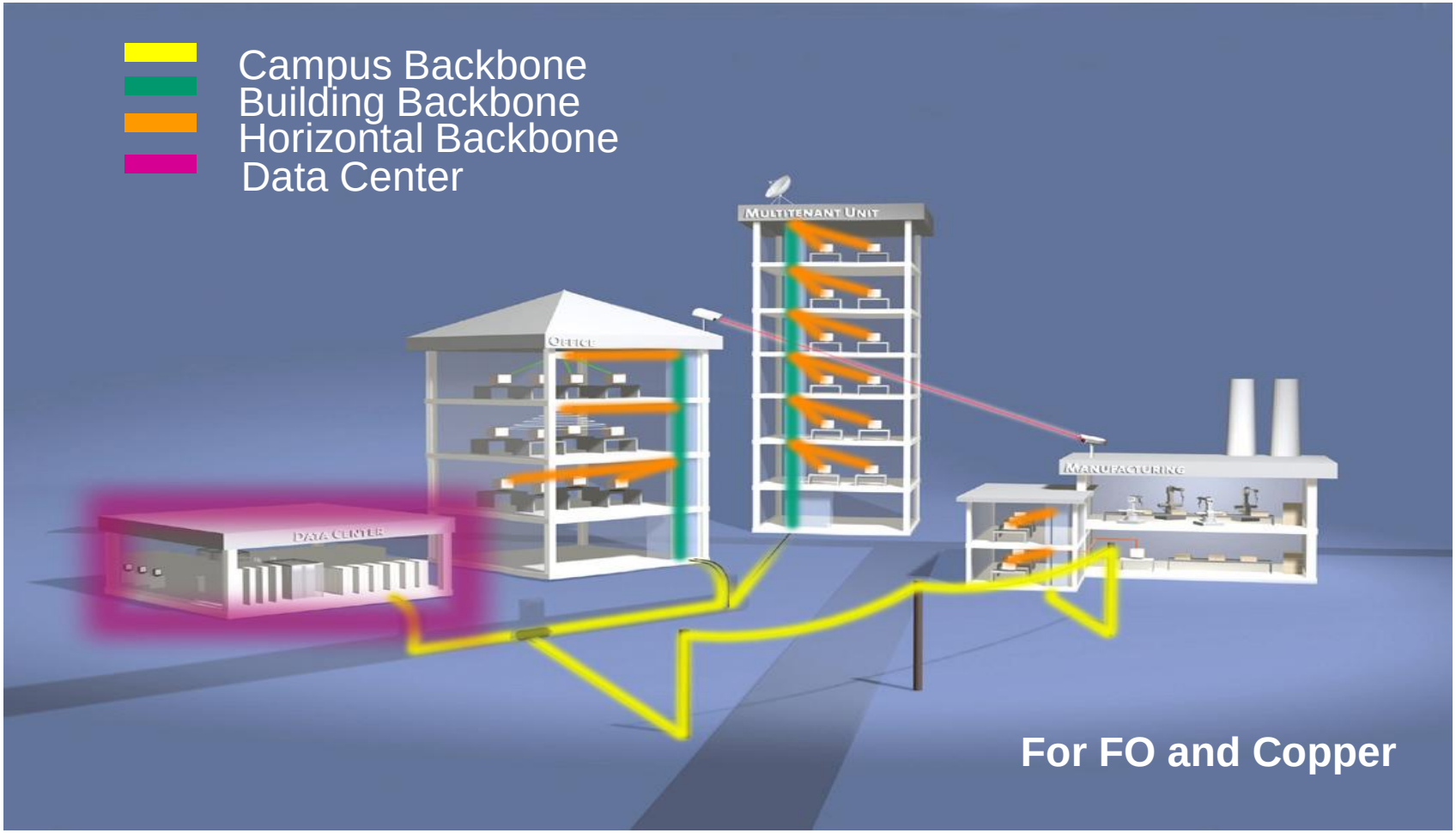
CORNING

LANscape®
Solutions

# Corning Cable Systems EN – Complete Solutions

CORNING
LANscape® Solutions

CORNING Green Solutions



# Corning Benefits

- Comprehensive solutions for structured Cabling
- Standardised FO and Copper Solutions for all specifications (cable, patch panel, outlets)
- Excellent  Technology for Datacentre Cabling –“Plug & Play™“
- Customer specific applications
- High-performance facilities in Germany, Poland, etc.
- High-qualified Inside- and Outside-Sales
- World wide Service, Support for global customers with local service
- System Warranty Program

# Projects & Benefits

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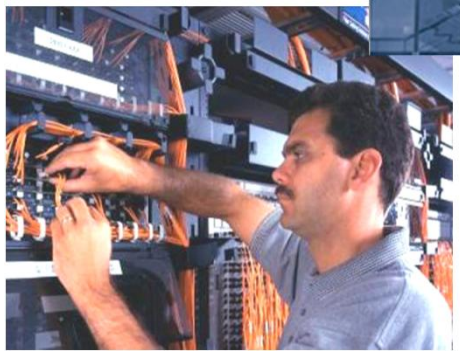
LANscape® Solutions

- Project registration
- Support with design and construction
- Technical Customer Service
- Trainings Centre and support through Consultants



# 25 Years - Extended Warranty Program (NPI)

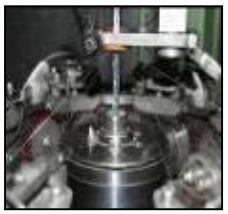
**Corning – Program with certified Installers:**

- Trained NPI-Installers assure the compliance for complete installed LANscape® Cabling Solution, listed in ISO/IEC 11801and EN 50173-1
- NPI-Installers can offer a 25 year Warranty on complete LANscape Cabling Solutions
- Repair or replacement in the case of failure of LANscape Cabling Solutions products to comply with specifications of ISO/IEC 11801
- Complete documentation and test report for the certification

CORNING
EWP Extended Warranty℠ Program

# Shielded copper solutions, FutureCom™

- Providing Enterprise copper solutions based on our Shielded Twisted Pair (STP) technology
- The Product line combines Copper Cable and H&E
- Serving the DC and LAN markets
- Manufacturing facility is in Neustadt near Coburg (Germany)
- Strategic roll for copper
    - Support of bundled projects



# Standards & Trends

## Classification according to ISO/IEC 11801

| Channel / PL | Component | Max Frequency | System Characteristics |
|---|---|---|---|
| Class $F_A$ | Cat $7_A$ | 1000 MHz | Shielded solutions only |
| Class F | Cat 7 | 600 MHz | Shielded solutions only |
| Class $E_A$ | Cat $6_A$ | 500MHz | Un-shielded / Shielded solutions (EMV problems with un-shielded solutions) |
| Class E | Cat 6 | 250 MHz | Un-shielded / Shielded solutions |
| Class D | Cat 5 | 100 MHz | Un-shielded / Shielded solutions |

# Standards & Trends

## Clarification of the Standards: 10G Copper Transmission

| | Active Devices | Structured Cabling (Passive Devices) | | |
|---|---|---|---|---|
| Standard Body | IEEE | ISO/IEC | CENELEC | TIA/EIA |
| Standard Name | IEEE 802.3an | ISO/IEC 11801 | EN 50173-1 | TIA/EIA-568-B.2-10 |
| Channel | 10G Base-T | Class $E_A$ | Class $E_A$ | Cat 6A |
| Permanent Link | Not defined | Class $E_A$ | Class $E_A$ | Cat 6A |
| Component | Not defined | Cat $6_A$ | Cat $6_A$ | Cat 6A |
| Max. Freq. (MHz) for Ch, PL, Comp. | 500 | 500 | 500 | 500 |
| Comments | Defines min. requirements for 2 devices to talk to each other in 2 conn. channel | ISO/IEC more stringent than EIA/TIA | ISO/IEC11801 & EN50173-1 basically identical | Looser requirements for channel, PL and component |

*Standards & Trends*

# Shielded Systems Are 10GBit Ready

DID YOU KNOW

- Cat 6A isn't equal Cat $6_A$
- ISO/IEC is more demanding than TIA/EIA for NEXT and RL Permanent Link and Channel
- Manufacturers of active 10GBit components recommend shielded systems
- Some well known UTP manufacturers have changed to shielded for 10GBit applications
- Shielded systems already fulfill the requirements of faster and faster networks

*Standards & Trends*

# 10,000,000,000 Bits Per Second Over Copper

100BASE-T is robust

1000BASE-T provides less safety margin

10GBASE-T requires high-performance active components and perfect link conditions to guarantee throughput

Now, what happens when noise interferes with your system …
This is what your electronics "see".

Only well-shielded systems can guarantee undiluted performance.

CORNING LANscape® Solutions

# Shielded copper solutions, FutureCom™

## We supply a full portfolio of shielded cable solutions

| Copper Data Cable | | Category |
|---|---|---|
| Full braid | Low braid | TIA/EIA |
| S/FTP 1500/22 | | Cat.8 |
| S/FTP 1200/22 | | |
| S/FTP 1000/22 | S/FTP 1000/22s | Cat.7$_A$ |
| S/FTP 1000/23 | | |
| S/FTP 800/23 | S/FTP 800/23s | Cat.7 |
| S/FTP 550/23 | S/FTP 550/23s | Cat.6$_A$ |
| F/FTP 450/23 | F/FTP 450/23s | Cat.6 |
| SF/UTP 300/24 | SF/UTP 300/24s | Cat.5 |
| F/UTP 300/24 | | |

# Copper Jack Overview

## … with supporting connectivity for each category

| Module Technology | | Category |
|---|---|---|
| not standardized | | Cat.8 |
| S1200 | | $Cat.7_A$ |
| | | Cat.7 |
| S500 | S10TEN | $Cat.6_A$ |
| S250 | | Cat.6 |
| S100e & S100eL | | Cat.5 |

S500 best of breed for 10GBase-T

# Copper Hardware Overview

## … next to LANscape also Keystone footprint

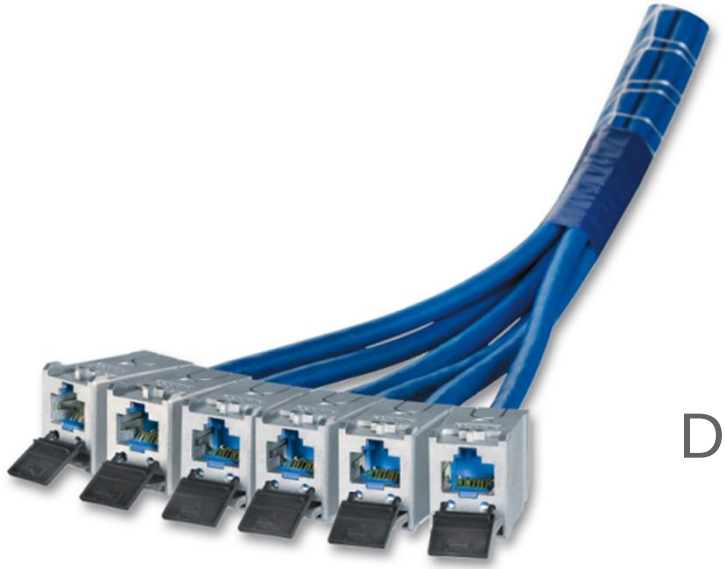
# Copper Hardware Overview

## Hardware for the structured cabling in LAN environment

LAN Hardware

# Copper Hardware Overview

## Specials for DC environments

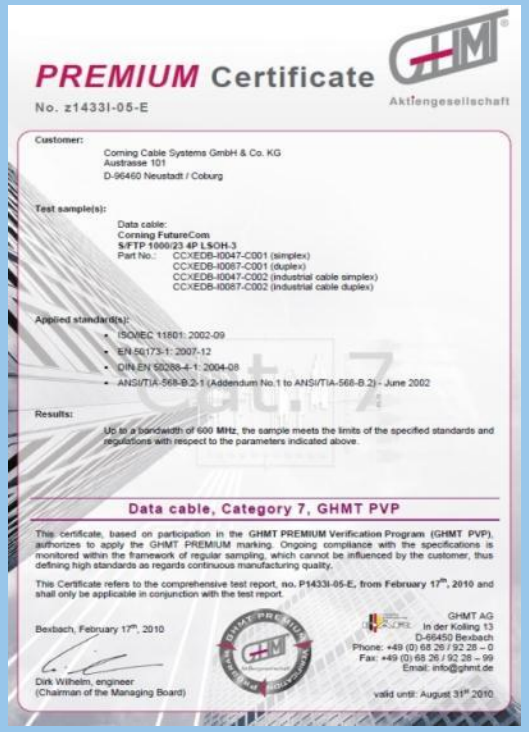


DC Hardware

# System Solution FutureCom™EA

## Component & Cable

| Data Cable (recommended) | | Module Technology | Category |
|---|---|---|---|
| S/FTP 550/23 | 550 MHz | S500 | Cat.6$_A$ |
| S/FTP 800/23 | 800 MHz | | |
| S/FTP 1000/22-23 | 1000 MHz | | |



**PREMIUM Certificate**

GHMT Aktiengesellschaft

No. z1433I-05-E

**Customer:**

Corning Cable Systems GmbH & Co. KG
Austrasse 101
D-96460 Neustadt / Coburg

**Test sample(s):**

Data cable:
**Corning FutureCom**
**S/FTP 1000/23 4P LSOH-3**
Part No.: CCXEDB-I0047-C001 (simplex)
CCXEDB-I0087-C001 (duplex)
CCXEDB-I0047-C002 (industrial cable simplex)
CCXEDB-I0087-C002 (industrial cable duplex)

**Applied standard(s):**

- ISO/IEC 11801: 2002-09
- EN 50173-1: 2007-12
- DIN EN 50288-4-1: 2004-08
- ANSI/TIA-568-B.2-1 (Addendum No.1 to ANSI/TIA-568-B.2) - June 2002

**Results:**

Up to a bandwidth of 600 MHz, the sample meets the limits of the specified standards and regulations with respect to the parameters indicated above.

**Data cable, Category 7, GHMT PVP**

This certificate, based on participation in the GHMT PREMIUM Verification Program (GHMT PVP), authorizes to apply the GHMT PREMIUM marking. Ongoing compliance with the specifications is monitored within the framework of regular sampling, which cannot be influenced by the customer, thus defining high standards as regards continuous manufacturing quality.

This Certificate refers to the comprehensive test report, no. P1433I-05-E, from February 17th, 2010 and shall only be applicable in conjunction with the test report.

Bexbach, February 17th, 2010

Dirk Wilhelm, engineer
(Chairman of the Managing Board)

GHMT AG
In der Kolling 13
D-66450 Bexbach
Phone: +49 (0) 68 26 / 92 28 – 0
Fax: +49 (0) 68 26 / 92 28 – 99
Email: info@ghmt.de

valid until: August 31st 2010

# System Solution FutureCom™EA

## Jack/Module

| Data Cable (required) | | Module Technology | Category |
|---|---|---|---|
| S/FTP 550/23 | S/FTP 550/23 s | S500 | Cat.$6_A$ |

GHMT

**Certificate**

Customer: Corning Cable Systems GmbH & Co. KG
Austrasse 101
D-96460 Neustadt / Coburg

Description: **Corning FutureCom S500 Cat.6A module 1xRJ45 shielded Cat.6A**

Part-No.: **CAXASM-00104-C001 (S500)**
**CAXASM-00104-C002 (S500 flex)**
**CAXBSM-00104-C001 (Keystone S500)**
**CAXBSM-00104-C002 (Keystone S500 flex)**

Applied standards: 1st FPDAM 2 to ISO/IEC 11801 AMD 2 (2008/11)
Information technology – Generic cabling for customer premises

Result: Up to a bandwidth of 500 MHz, the sample meets the limits of the specified standards and regulations and complies with the requirements of the **Category $6_A$ connecting hardware** threshold values.

The test results, which were determined in the course of the measurement, refer to the submitted sample. Any future technical modifications of the component are subject to the responsibility of the manufacturer.

This Certificate refers to the comprehensive test report, **no. P2048a-09-E, from March 31st 2009**, and shall only be applicable in conjunction with the test report.

Bexbach, March 31st 2009

Dirk Wilhelm, engineer
(Chairman of the Managing Board)

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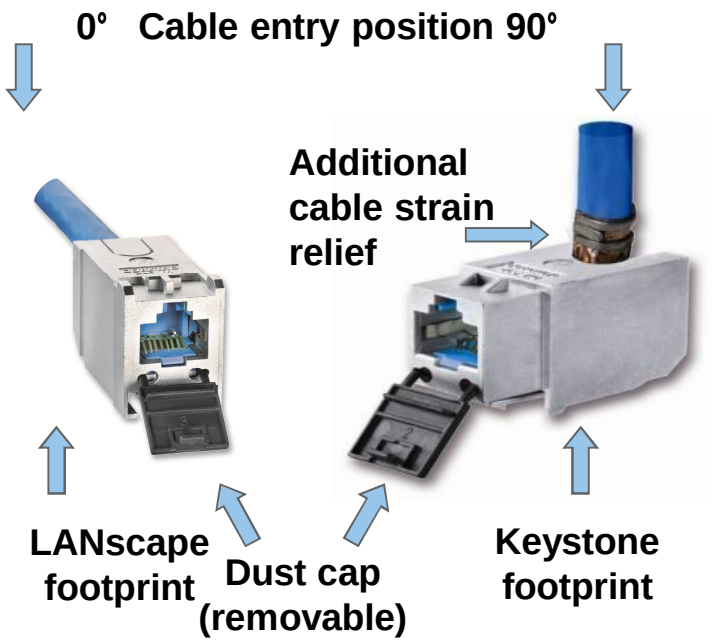
GHMT Aktiengesellschaft



# System Solution FutureCom™EA

## Class EA: Channel and Permanent Link

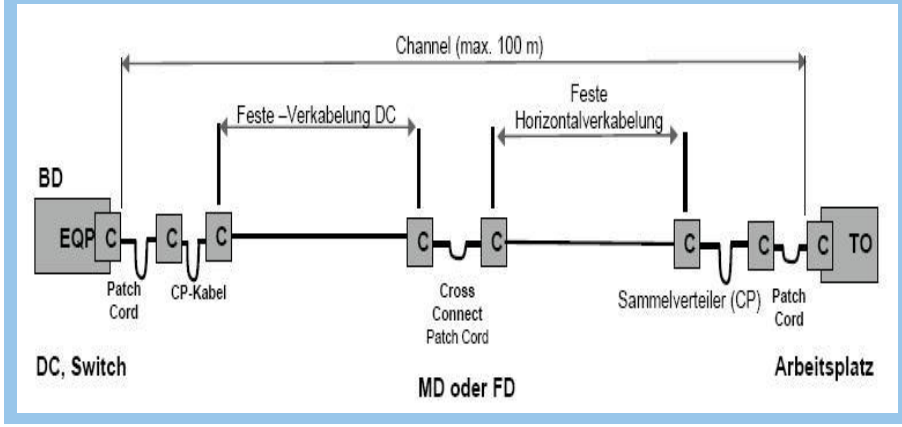
| Data Cable | | Module Technology | Class |
|---|---|---|---|
| S/FTP 550/23 | 550 MHz | S500 | Class $E_A$ |

**Surpasses system requirements for ISO/IEC 11801:2002 / Amd 1:2008 of Class $E_A$**

2 – Connector Link

**6 – Connector Link**

| Channel Link | Permanent Link |
|---|---|



GHMT

# Certificate

**Customer:** Corning Cable Systems GmbH & Co. KG
Austrasse 101

D-96460 Neustadt / Coburg

**Description:**

Module: **Corning S500 Module,Cat.6A,1xRJ45**
Part-no.: CAXASM-00104-C001, CAXBSM-00104-C001, CAXASM-00104-C002, CAXBSM-00104-C002

Data Cable: 2x40m **Corning FutureCom S/FTP550/23s,4P, 2x4P, 3x4P**
Part-no.: CCXEDR-D0047-C003, CCXEDR-D0087-C003, CCXEDR-D0127-C003

Patchcord: 3x2m **Corning FutureCom S/FTP flex/26,Cat.6A,2xRJ45,4P,xxxm** y = colour, xxx = length
Part-no.: CCAAGB-Gy002-Axxx-C0

CP-Cord: 2x3m **Corning FutureCom S500 CP S/FTP flex/26,RJ45-S500,4P,xxxm** xxx = length
Side A: RJ45-Plug; Side B: RJ45-module
Part-no.: CCAAGB-F1072-Axxx-C0

**Applied standards:**
ISO/IEC 11801 Amendment 1 (2008-04)
Information technology – Generic cabling for customer premises

ISO/IEC TR-24750 (2007-07) Assessment and mitigation of installed balanced cabling channels in order to support 10GBASE-T

ANSI/TIA-568-B.2-10 (2008-03)
Transmission performance specifications for 4-pair 100 Ω Augmented category 6 cabling

ANSI/TIA-TSB-155 (2007-03)
Additional guidelines for 4-pair 100 Ω category 6 cabling for 10GBase-T

IEEE 802.3an TM-2006
Local and Metropolitan Area Networks (10 GBASE-T)

**Results:** Up to a bandwidth of **500MHz** the sample, a 6-Connector-Channel, meet the Class $E_A$ limits of the specified standards and regulations.

**PS ANEXT and PS AACR-F met by design for Class $E_A$, because the result of the Coupling Attenuation is better than 50 dB at 30 MHz < f < 100 MHz and 90 -20*log(f) dB at 100 MHz < f < 1.000 MHz.** The test results which were determined in the course of the measurement refer to the submitted specimen. Any future technical modifications of the data cables or connectors are subject to the responsibility of the manufacturer.

This Certificate refers to the comprehensive test report, no. **P2040a-09-E, from March 30th 2009** and shall only be applicable in conjunction with the test report.

Bexbach, March 30th 2009

Dirk Wilhelm, engineer
(Chairman of the Managing Board)

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GHMT Aktiengesellschaft

# Summary

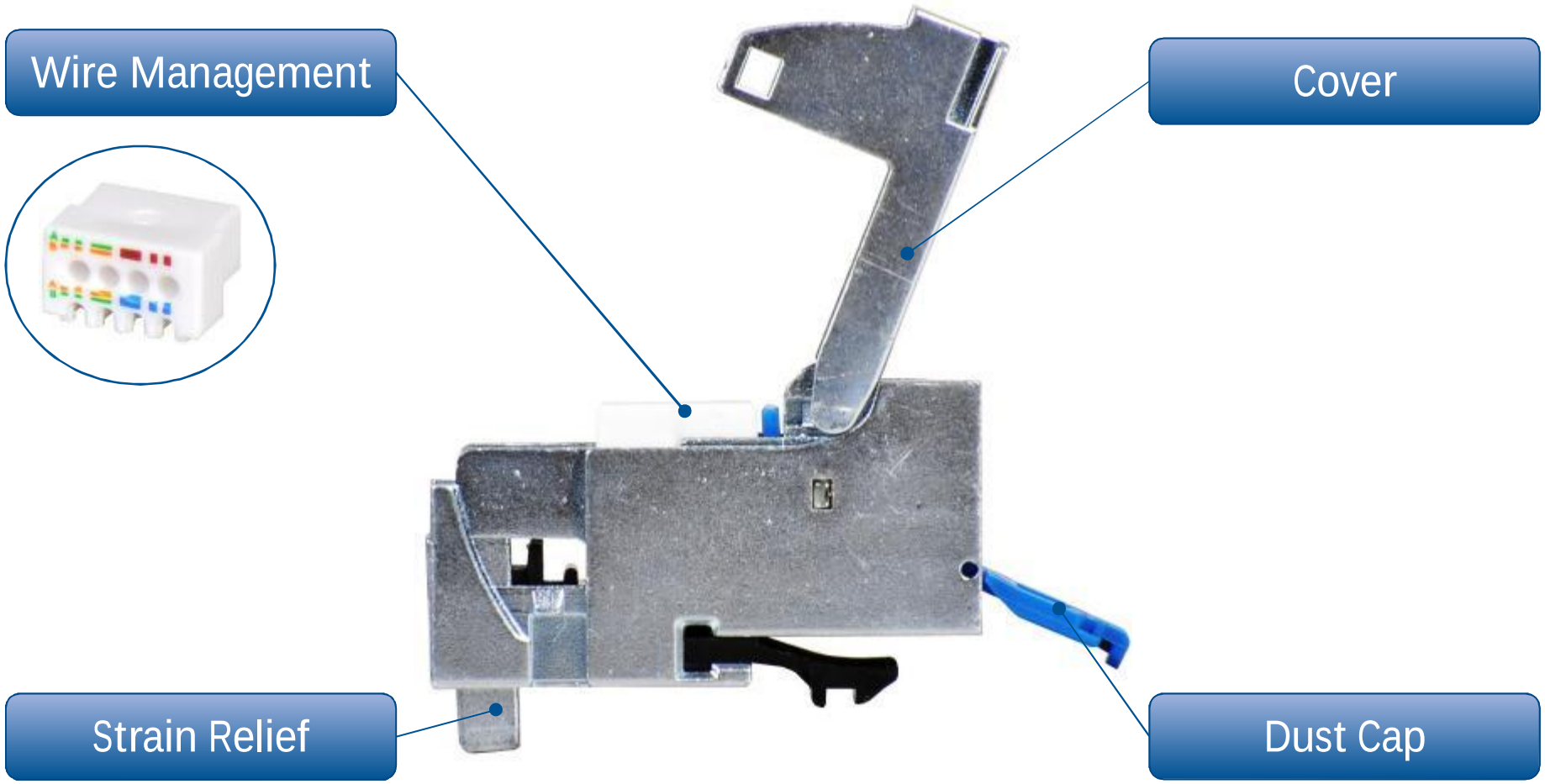
**FutureCom™EA** system solution offers **highest, certified performance** for new technologies and enables application within **diverse environments.**

# FutureCom™ xs500

## xtra performance - xtra affordability - xtra flexibility

- Enhanced performance Cat. $6_A$
  - 3rd Party Certified (PvP GHMT)
- Flexibility with a wide range of frame sets and panels
  - Keystone footprint
  - H x B 19,4 +0,1mm x 14,7 -0,1mm
  - (19,3 - 19,7mm)
- Faster and simpler installation
  - Only 2 pieces + Copper tape

# FutureCom™ xs500
## Mechanical Details



# FutureCom™ xs500

## S/FTP Cable Preparation

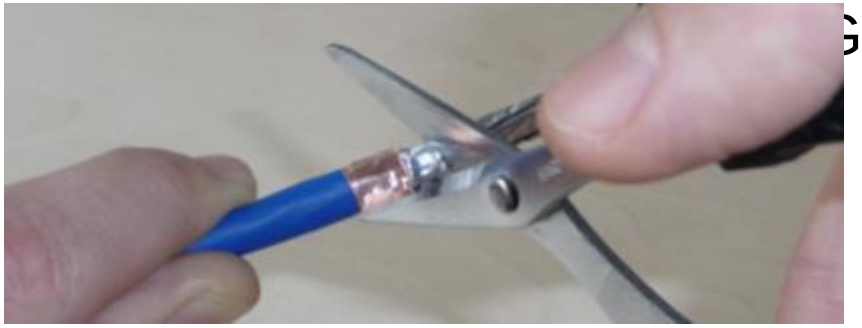
- Remove cable sheath following manufacturers recommended procedures. Use the FutureCom F tool
- Bend braided shield over the jacket and trim it shorter than copper tape width

- Fix conductive tape over the braided shield

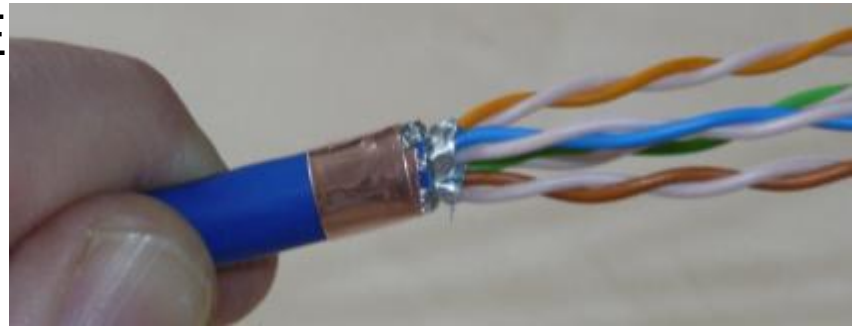
## FutureCom™ xs500

## S/FTP Cable Preparation

- Shorten the pair metal foil at 3/4 mm.



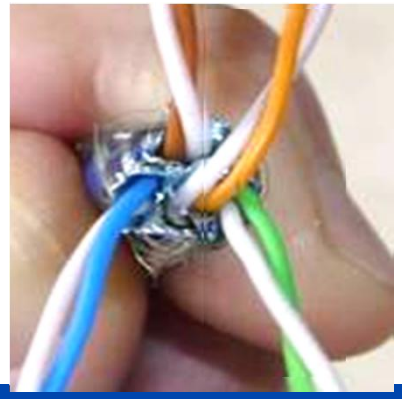
GE



- Order the 4 pairs (TIA/EIA 568 B):
  - 1st brown/blue to the left, green/orange to the right
  - 2nd blue/green to the bottom, brown/orange to the top

ATTENTION TO CROSS OVER THE FOILS NOT OVER BARE PAIRS

GOOD

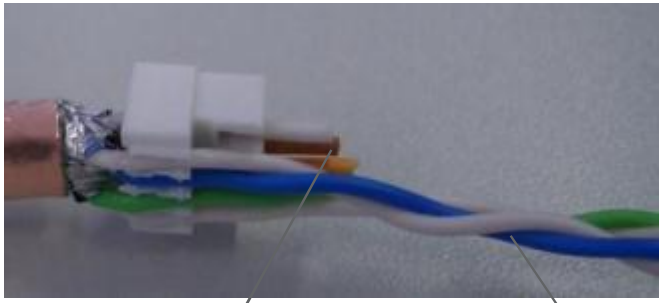


BAD

# FutureCom™ xs500

## Wire Manager Installation (straight cable)

Insert pairs in the wire management

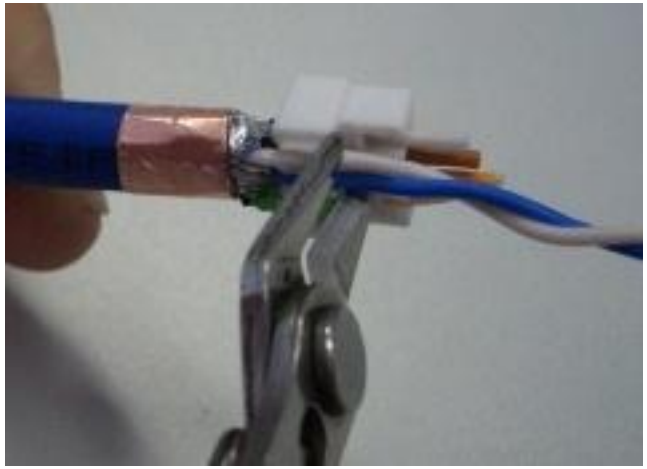


cut pairs put in holes before

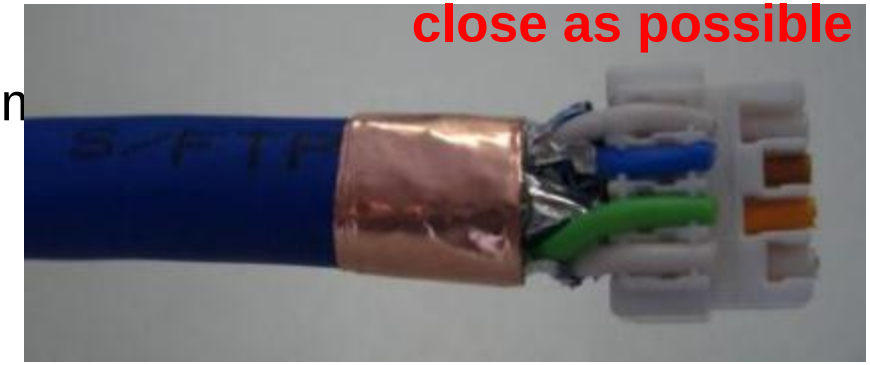
Don´t untwist pairs on the top

Foils should extend 3 / 4 mm from sheath

**Gap between jacket and wire management as close as possible**



Trim the wires flush to the wire managen

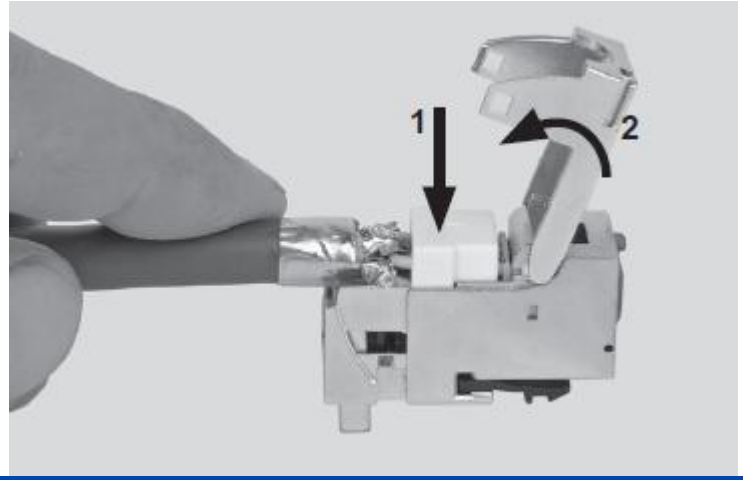


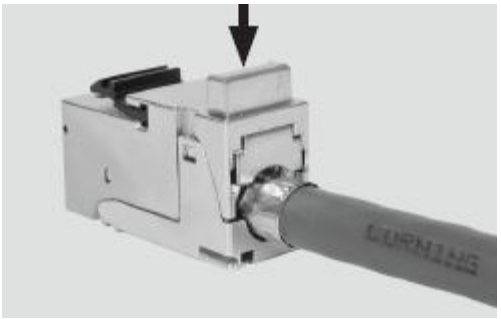
# FutureCom™ xs500

## Jack Installation (straight cable)

Press wire management!

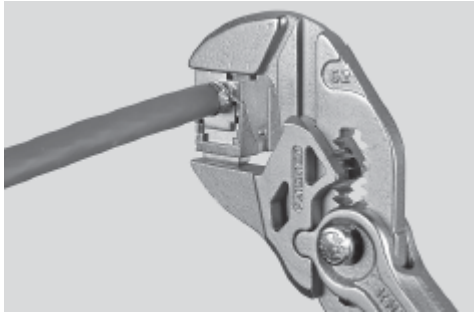
Close cover and press until it locks!



**Reset latch (if necessary)**

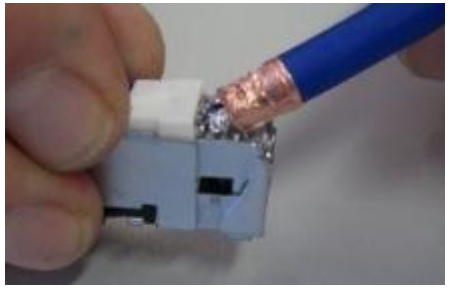
Using a parallel crimp tool press the metal latch to lock and strain relief the cable in the jack.



# FutureCom™ xs500
## Jack Disassembly

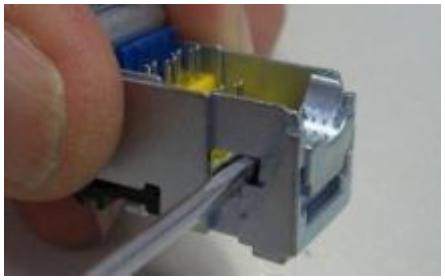
Open cover by open lashes on both sides with screw driver!

Cover jumps up



Bend and pull cable to the Top

Corrrect wire managament



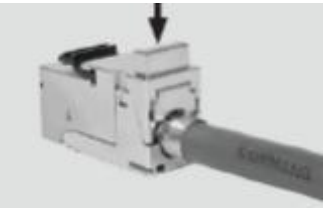
Reset strain relief

# FutureCom™ Solutions

## Installation – Bonding and Grounding

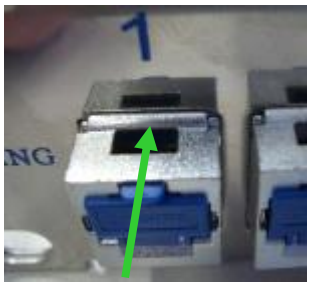
- Earthing and Bonding are part of safety regulations (EN 50174-2) and are required
  for every installation, regardless of the use of shielded or unshielded cabling.

- Bonding is made easy with Corning's copper solution

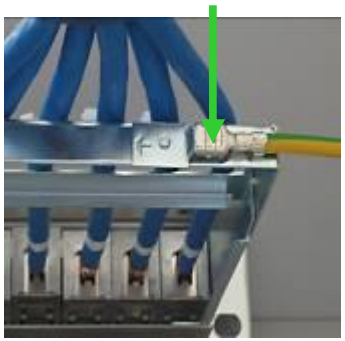


Cable shield bonds to module housing

Panels are bonded to conductive racks or grounded individually via ground latch




Housing bonds to panel



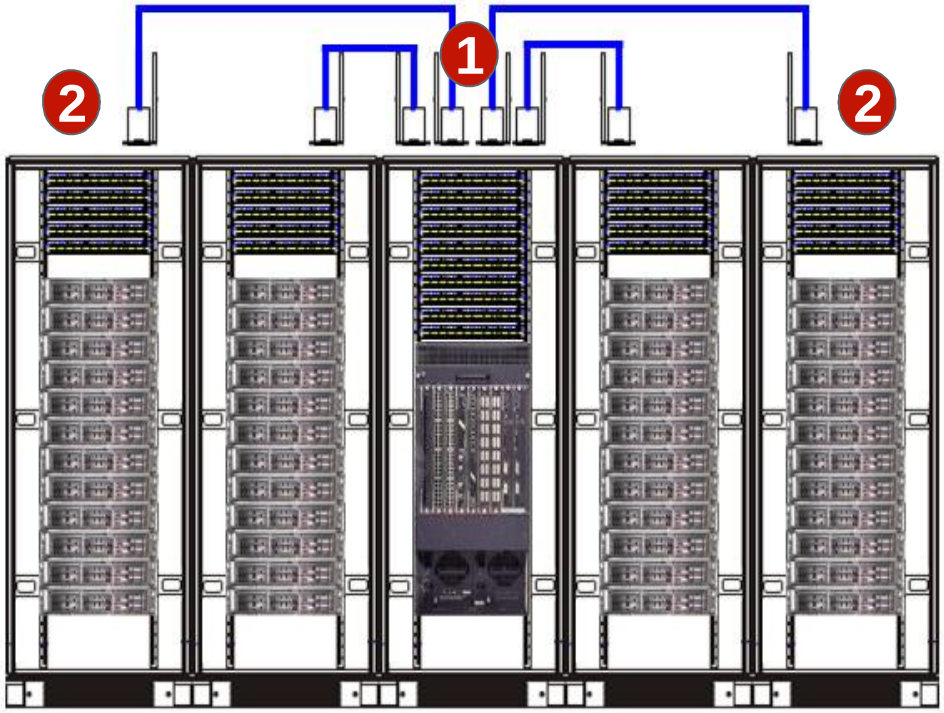
Add. ground lash on module housing

Racks must be grounded according to safety regulations

# Copper in the Data Centre

## Flexible during planning and construction

### 2 - Connector Link in the DC




Row concept with integrated Patch Location

### Realize with

S500 patch panel

FutureCom EA sextuple solution package

FutureCom EA patch cord

# Copper in the Data Centre

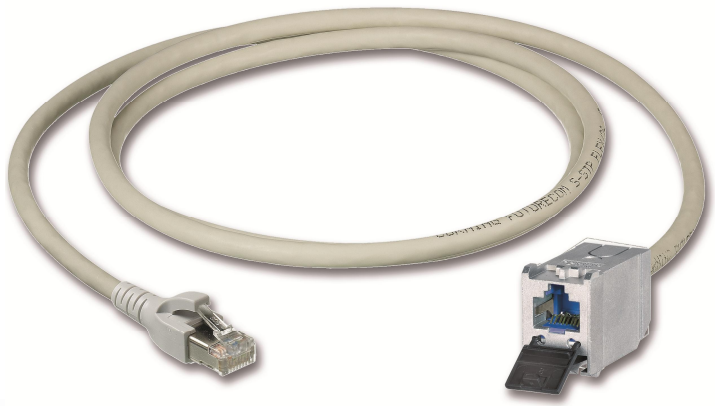
## Pre-terminated Patch Cables

Consolidation Point Patch Cords

Zone Cabling

Port Representation

Flex - Cable



# Copper in the Data Centre

## Multi – Patch Cable Clamp

Enables Connectivity of 12x or 16x RJ45 Connectors Simultaneously

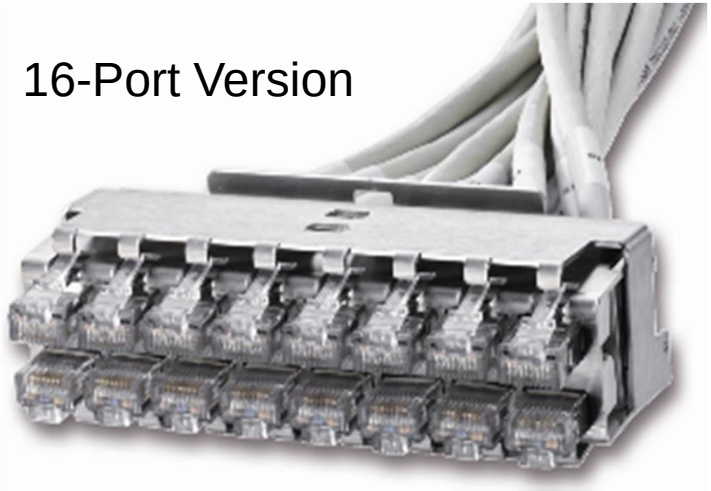
Optimized Positioning of all Patch Cords to the Switch-Ports

Speed-Up & Simplified Maintenance & Blade-Change in Data Centers and Consolidation Points

For Cisco 12- & 16-Port Groups, Alter path 16-Port & Others

12-Port Version

16-Port Version



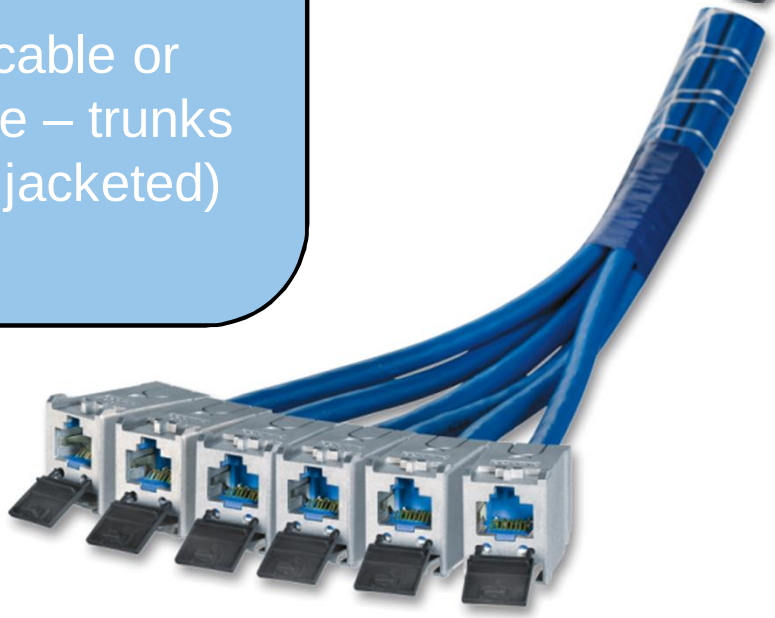
# Copper in the Data Centre

## Pre-terminated Trunks

One - or both ends terminated

Tested & ready for installation

Single cable or Multi cable – trunks (sewn or jacketed)



# Products release

## FutureCom EA, 6x4P, Plug & Play solution

**FutureCom™ EA, 6x4P, Plug & Play solution,**
**2-ends terminated each with S500 modules, over-jacketed**

**30% less fire load**

**14% less Bend radius**

**36% less weight**

# Copper in the Data Centre

## Value Props for P&P solutions

**100% factory-made pre-terminated and tested**

**Less material – and packaging waste on-site**

**Installation time reduced because of bundled solution**

**Installation without any special tools**

**80% faster installation compared to traditional cabling**

**Costs reduction for any project**

# Copper in the Data Centre

## Market view: Bundled copper / fibre projects

CORNING

Cable
Systems

# FO Hardware, LANC/LANS

*LAN Panel Overview*

# Two footprints offering endless options

**Value**

## LANscape footprint

- Modular
- Splicing
- UniCam

- Modular
- Splicing
- UniCam
- fibre & copper*
- pre-terminated PnP*

**LANC**
Up to 48 fibres

**LANS**
Up to 48 fibres

## CCHE footprint

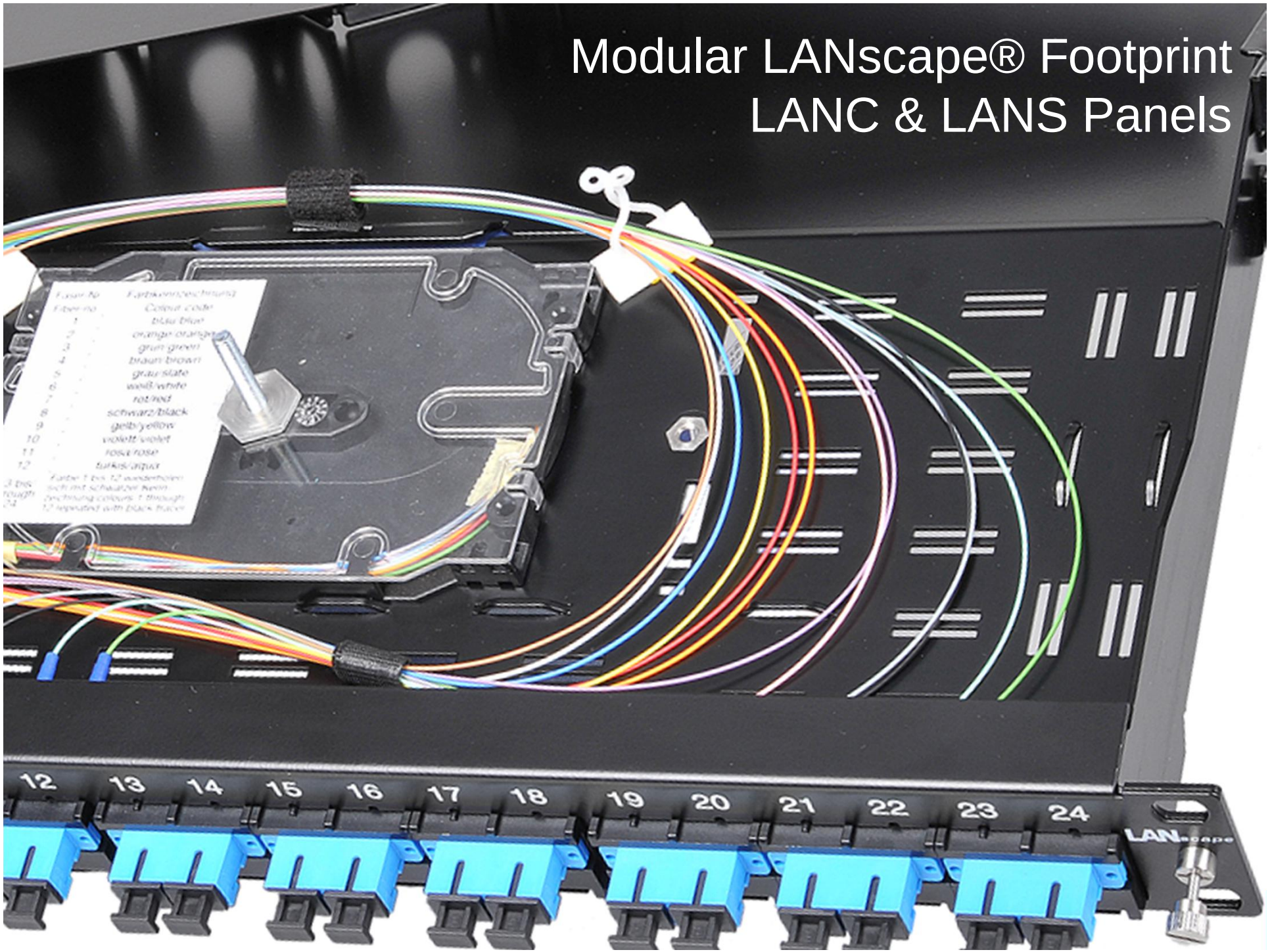
- Modular
- Splicing
- UniCam
- fibre & copper*
- pre-terminated PnP*

**CCH**
Up to 288 fibres

**Features**

*accessories needed

# Modular LANscape® Footprint
# LANC & LANS Panels



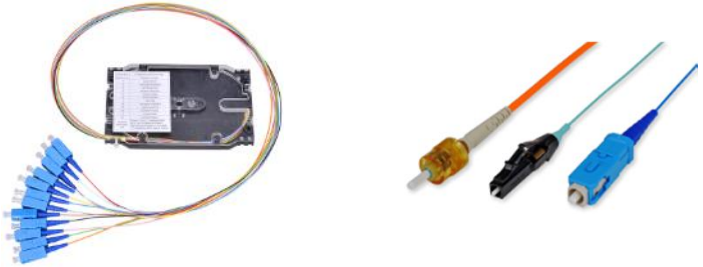
*Modular LANscape Footprint*

# Three Steps To Your Individual Panel Solution

1.

2.

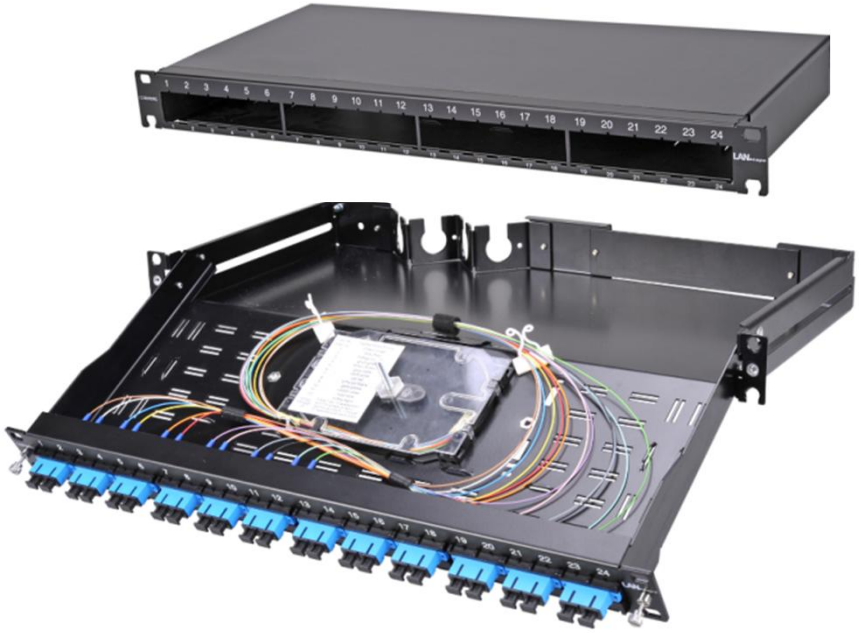
3.



*Modular LANscape Footprint*

# LANC & LANS Panels

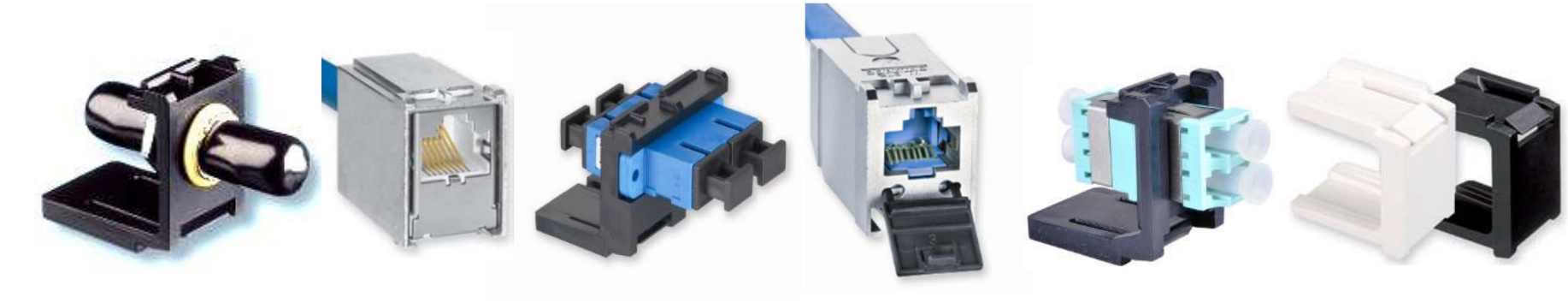
- Developed for 19-inch rack applications in local networks
- Ideal for splicing & field connectorization
- Suitable for loose tube & tight-buffer cables
- Flexible configurations
  - combining Singlemode & Multimode as well as different adapter types on 1U



*LANscape Modular Footprint*

# One Universal Concept

- Easy, fast, flexible and universal
  - Usable in modular LANscape outlets, floor boxes and patch panels
  - Copper and fibre connector types available
- Two grades of adapter modules
  - LANS modules with ceramic insert, offering higher performance
  - LANC modules with metal insert, less expensive
- Both are interchangeable and compatible with both LANC and LANS housings

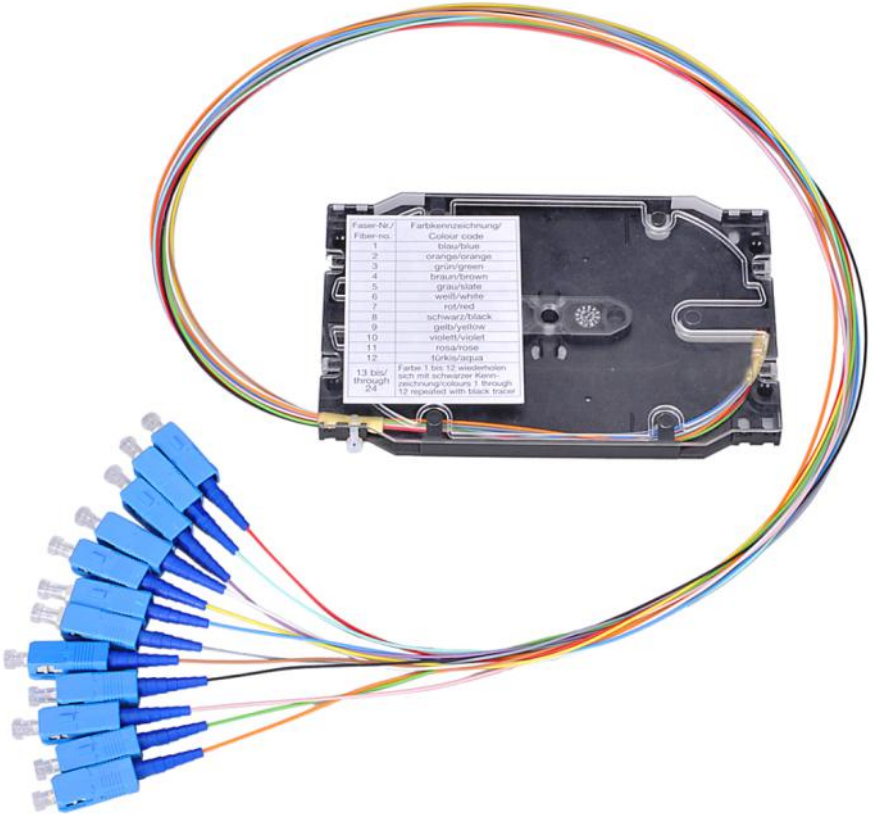


*LANscape Splice Packs*

# Splicing made easy

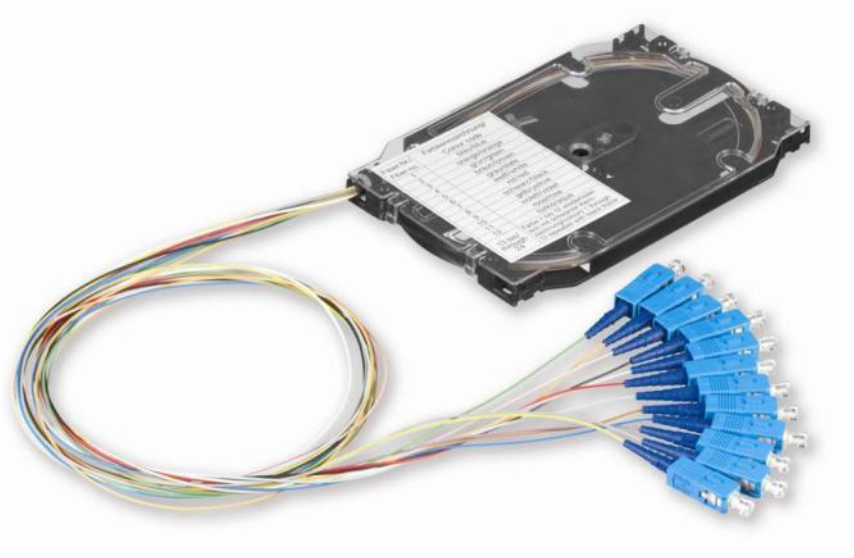
- LANscape Splice Packs are optimized for the use in LANC and LANS panels
- Kit consists of one Standard Splice Tray including splice holder and 12 coloured pigtails
- Easy ordering, short lead times and reduced preparation time onsite

- Cassette holds 12 splices
  - Crimp or heat-shrink splice organizers
- Available with LC, SC and ST connectors
  - Telcordia colouring scheme
  - OS2 Singlemode
  - OM4, OM3, OM2 & OM1 Multimode



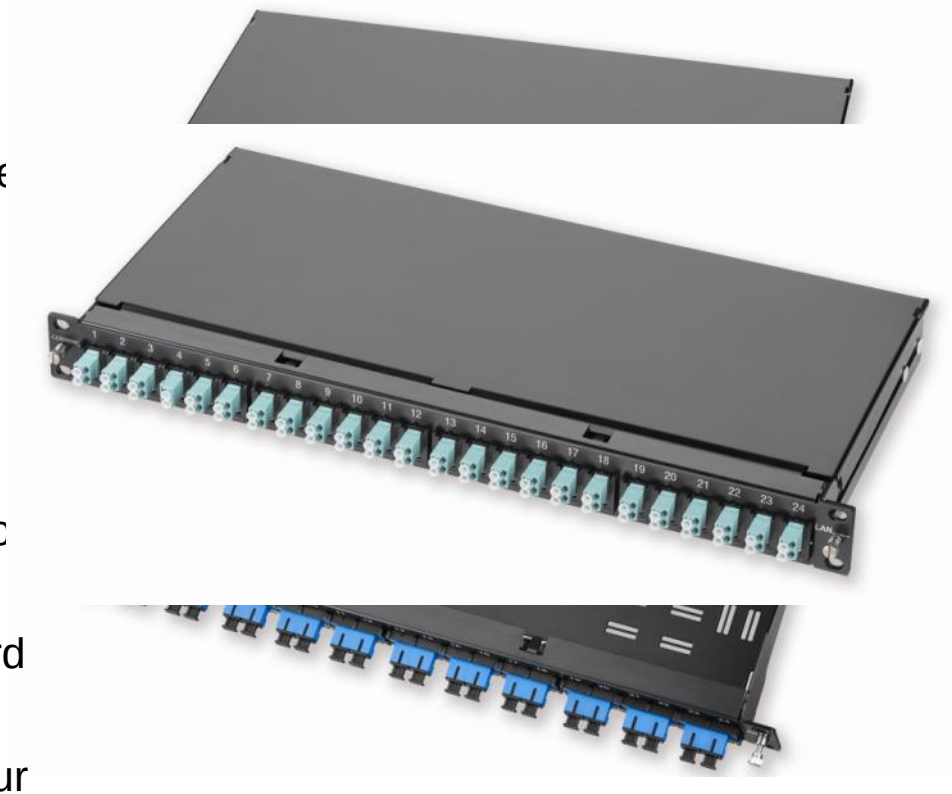
# LANscape Modular fibre optic patchpanels: Bulk pack version – LANC

- Available only in 1U version fixed.
- Can be used only for field termination (pigtail spliceing or UniCam installation)
- 2 cable entries for M20 glands (6-13mm cable diameter) 2 cable entries for M25 glands (9-17mm cable diameter).
- Empty panels available only in  bulk packs of 10 pcs.
- Adapter modules available only in bulk packs of 100 pcs.
- Bulk pack adapter modules available only with LC-Duplex, SC-Duplex and ST adapters
- Splice tray kits available only in bulk pack of 4 pcs.
- Splice tray kit including:
  - Standard splice tray with cover
  - 12 colour coded pigtails stripped and laid in the tray



# LANscape Modular fibre optic patchpanels: Changes

- Available in 1U and 2U
- Only „splice box“ version available
- Break-out cable entry or trunk heads holder available as accessories
- Can accept standard and MFT splice trays.
- Splice tray holder and front panel in one piece
- More robust housing
- Improved sliding and 30° slide out position
- Improved closing pins
- 2 angled cable entries (1U panel)
  4 angled cable entries (2U panel)
- Cable entries fit M20 glands (6-12mm cable c diameter
- Loaded panels available with MFT or standard splice trays
- Loaded panels available with preloaded colour coded pigtails



*LAN Panel Overview*

# Two footprints offering endless options

**Value**

## LANscape footprint

- Modular
- Splicing
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- Modular
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- fibre & copper*
- pre-terminated PnP*

## CCHE footprint

- Modular
- Splicing
- UniCam
- fibre & copper*
- pre-terminated PnP*

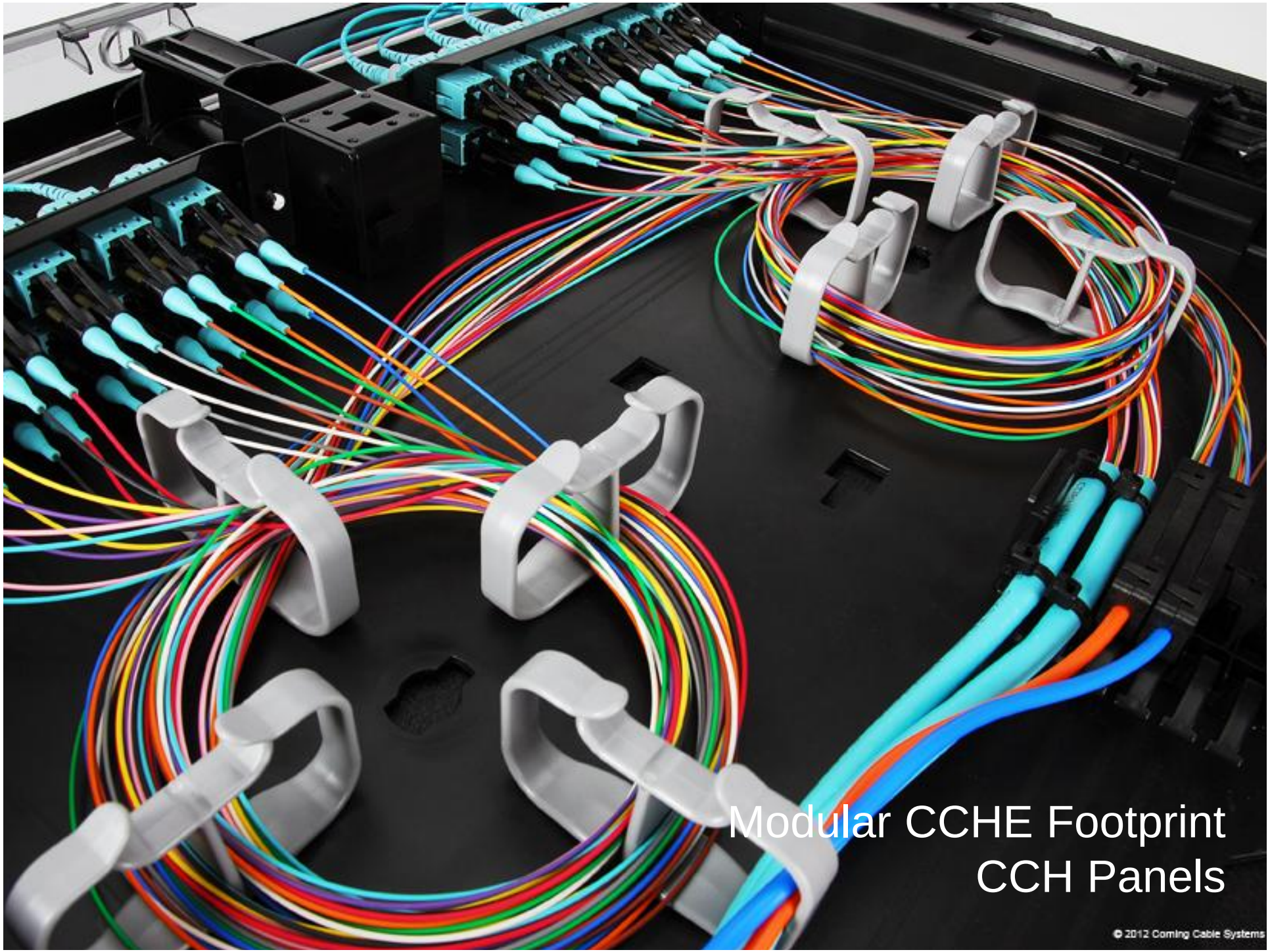
**LANC**
Up to 48 fibres

**LANS**
Up to 48 fibres

**CCH**
Up to 288 fibres

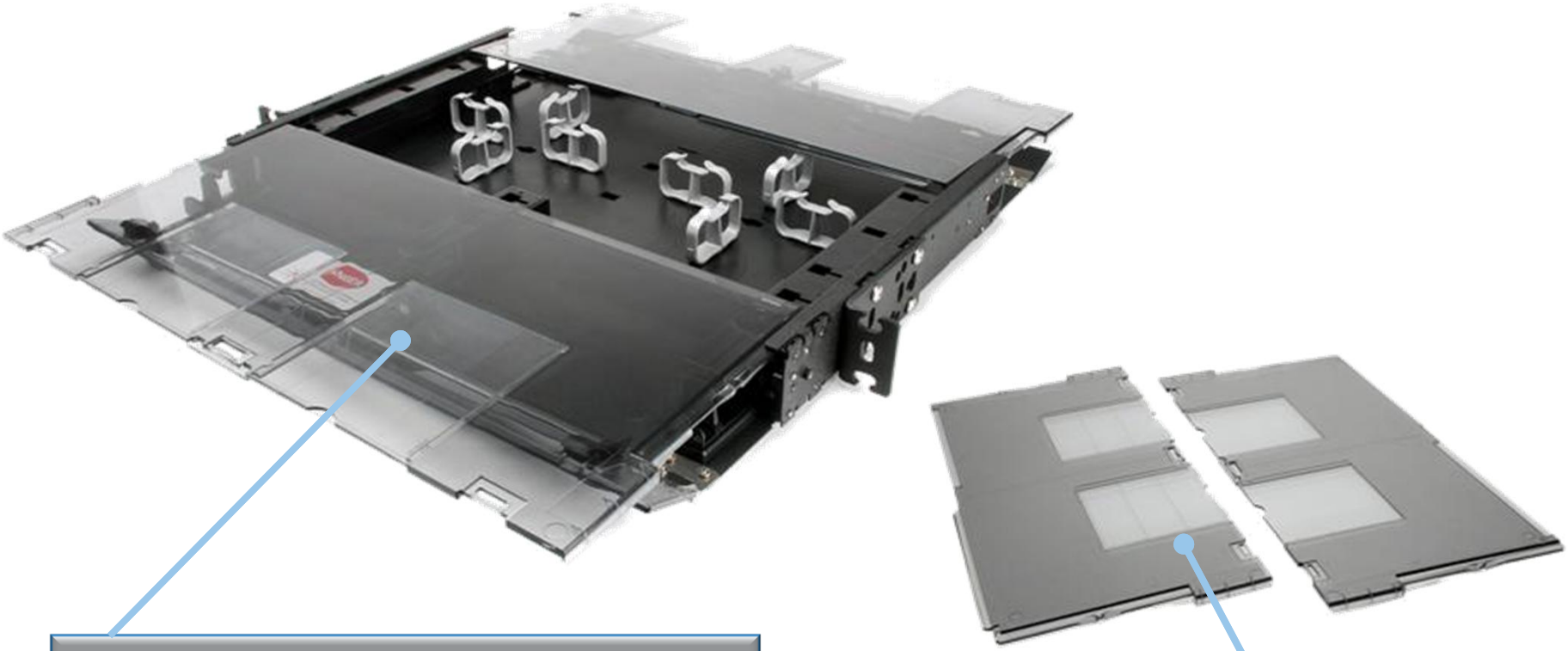
**Features**

*accessories needed


Modular CCHE Footprint
CCH Panels
© 2012 Corning Cable Systems

*CCH Panels*

# Transparency all over….

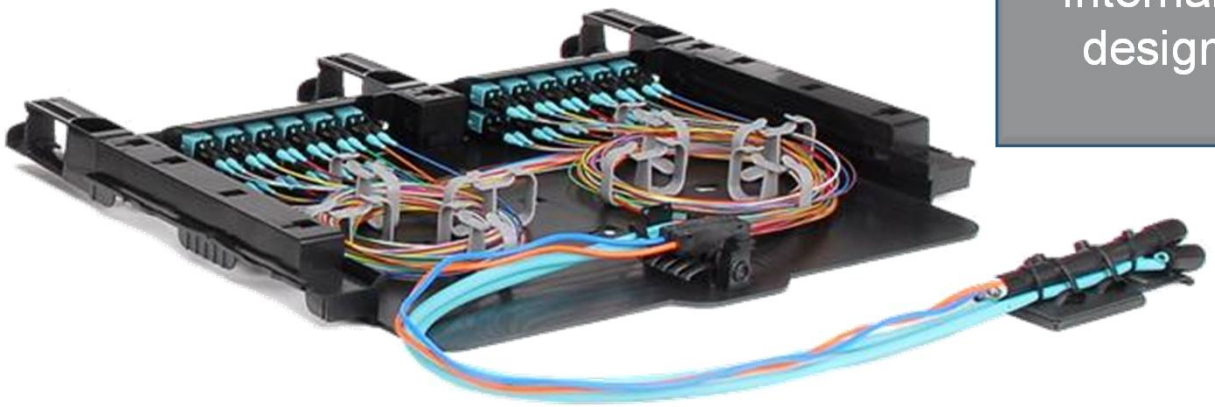


Cover is a two-piece removable design accessible from the front and rear of the hardware

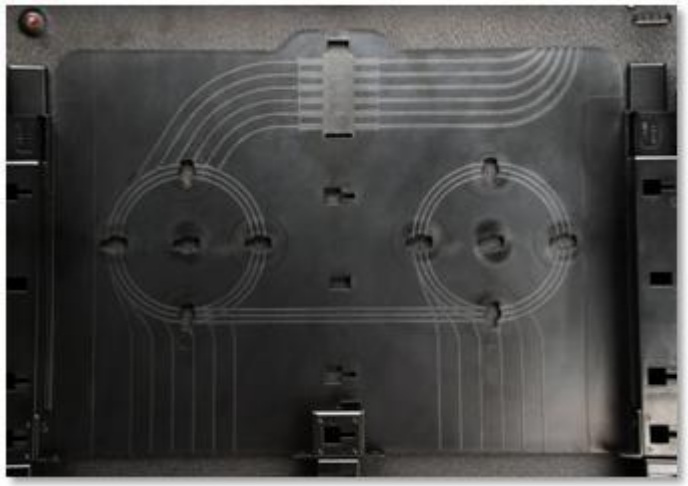
Cover halves are identical

*CCH Panels*

# Sliding Tray Reduces Risk and Is Filled with Features



Internal sliding tray is a “bath tub” design that eliminates the fiber-guillotine effect



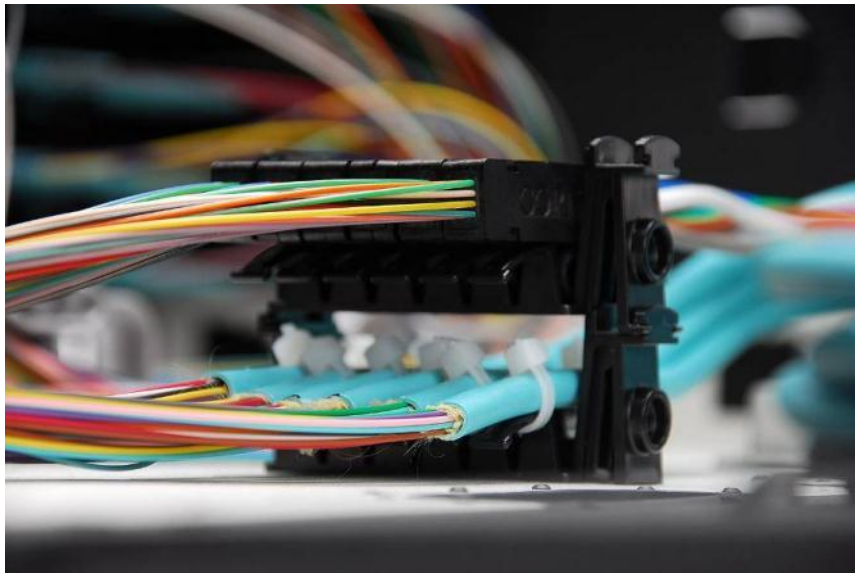
Tray etching provides routing for typical installations

Segmented fiber guides provide quick installation/removal and fibre separation

*CCH Panels*

# Internal Strain Relief Solutions

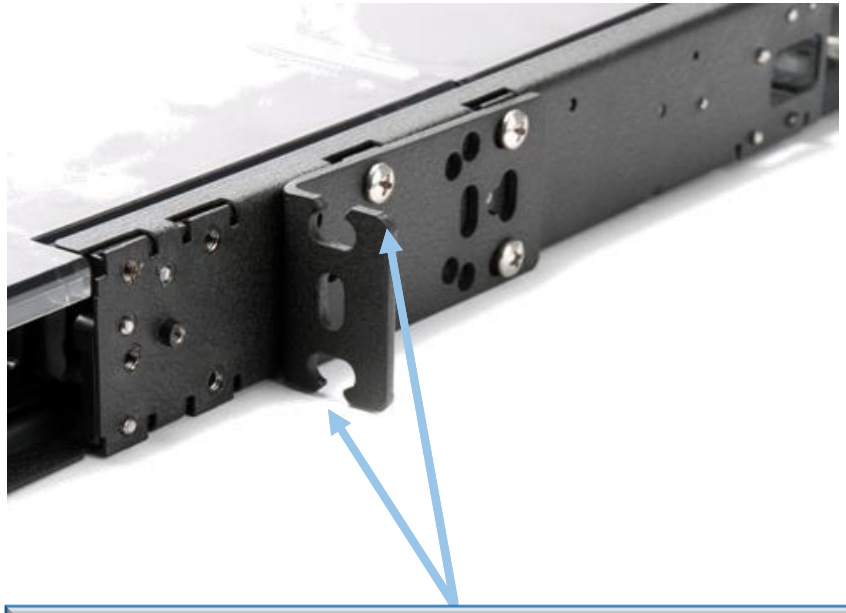
Internal Strain Relief utilizes standard tie-wraps or Velcro straps allowing enhanced cable management and is easily attached or removed from the housing



Intermediate Strain relief allows users to quickly secure cables to the sliding tray and to easily access ANY buffer-tube furcation body without disturbing additional fibers/buffer tubes

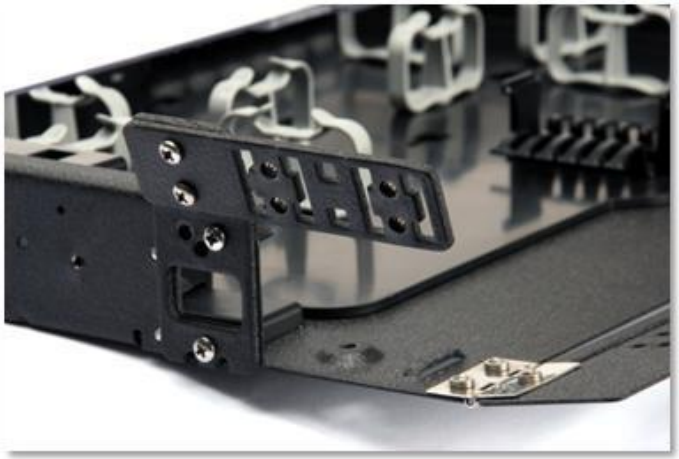
*CCH Panels*

# Additional Features Outside



Slotted holes in the mounting brackets support single-person installation by allowing the user to install mounting screws first then bring the housing to the rack/cabinet for easy install (1U-4U)

External Strain Relief bracket quickly mounts to the housing and also enables the use of tie-wraps and Velcro-straps. Bracket also accepts the current UCC Strain-Relief Clamp



*CCH Panels*

# Pull-Out Tray Including Jumper Management

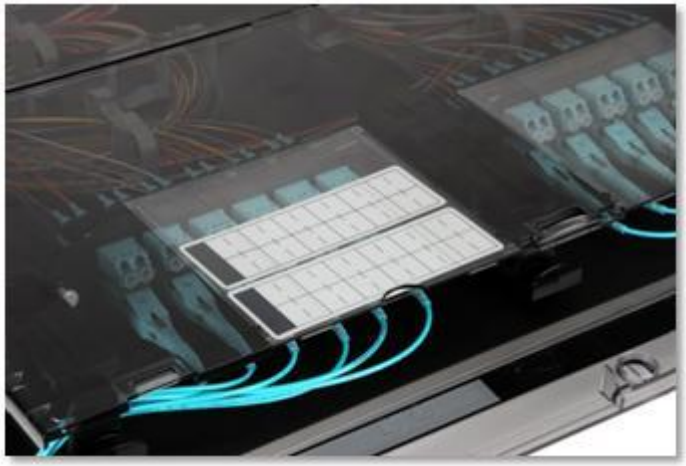
Pull-out tray has multiple “locking” positions for improved user access and can be permanently secured for flush-mounted applications

Tray enables panel viewing and management in top-of-rack applications due to open-design

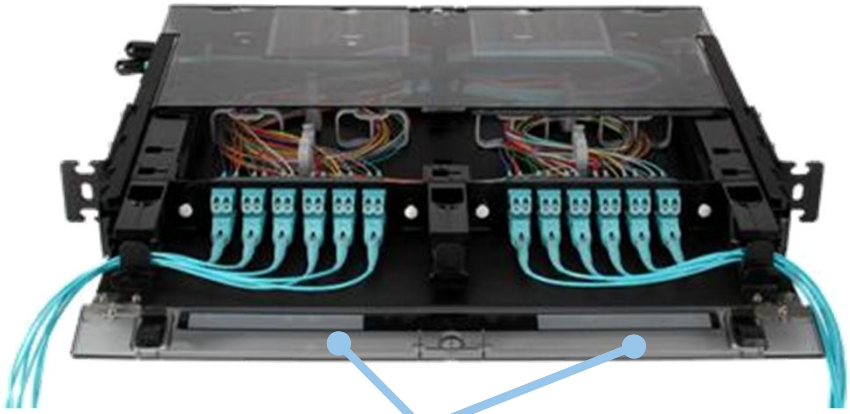
Removable jumper guides enhance management and provide dust-cap storage

*CCH Panels*

# Simple Labeling Solutions



Pull out label cards allow for easy printing on provided labels, downloadable templates from our website or readily-available Avery® printable labels



Back-of-door labeling also enabled allowing for standard 3/8” to ½” labels which are then “hidden” once the door is closed maximizing the clean appearance

*CCH Splice Cassette*

# Maximum Capability, Intuitive Design

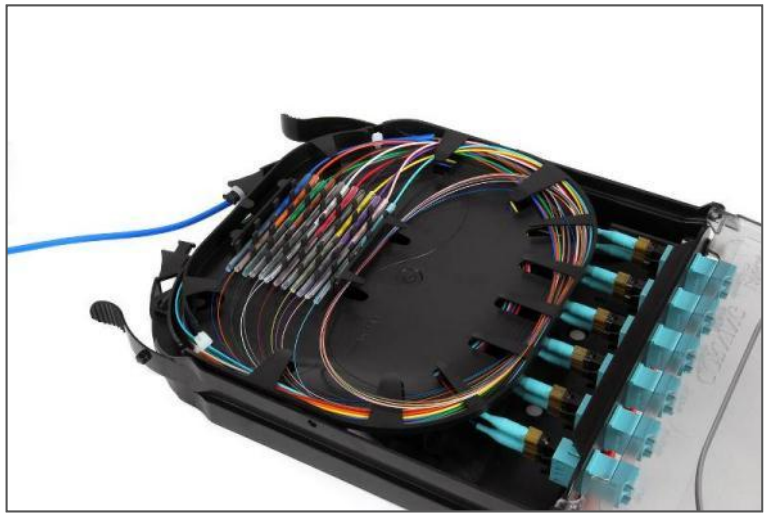
Original Package

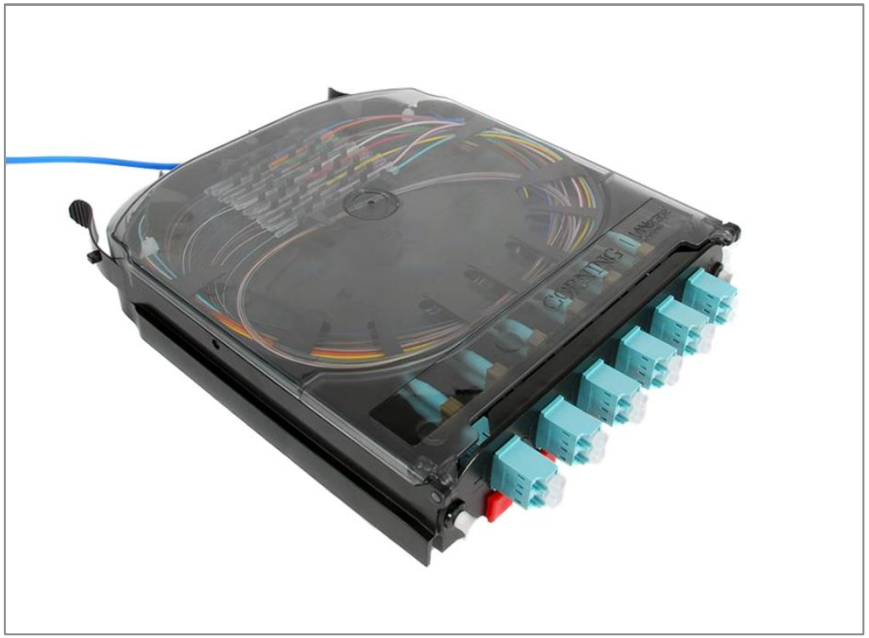
Splice Cassette is a separate component shipped in an easy-open blister pack and contains all the parts and material required to splice *(including 12 heat shrinks)* and convert the housings to receive the splice cassette

*CCH Splice Cassette*

# Three Layers Of Fibre Routing

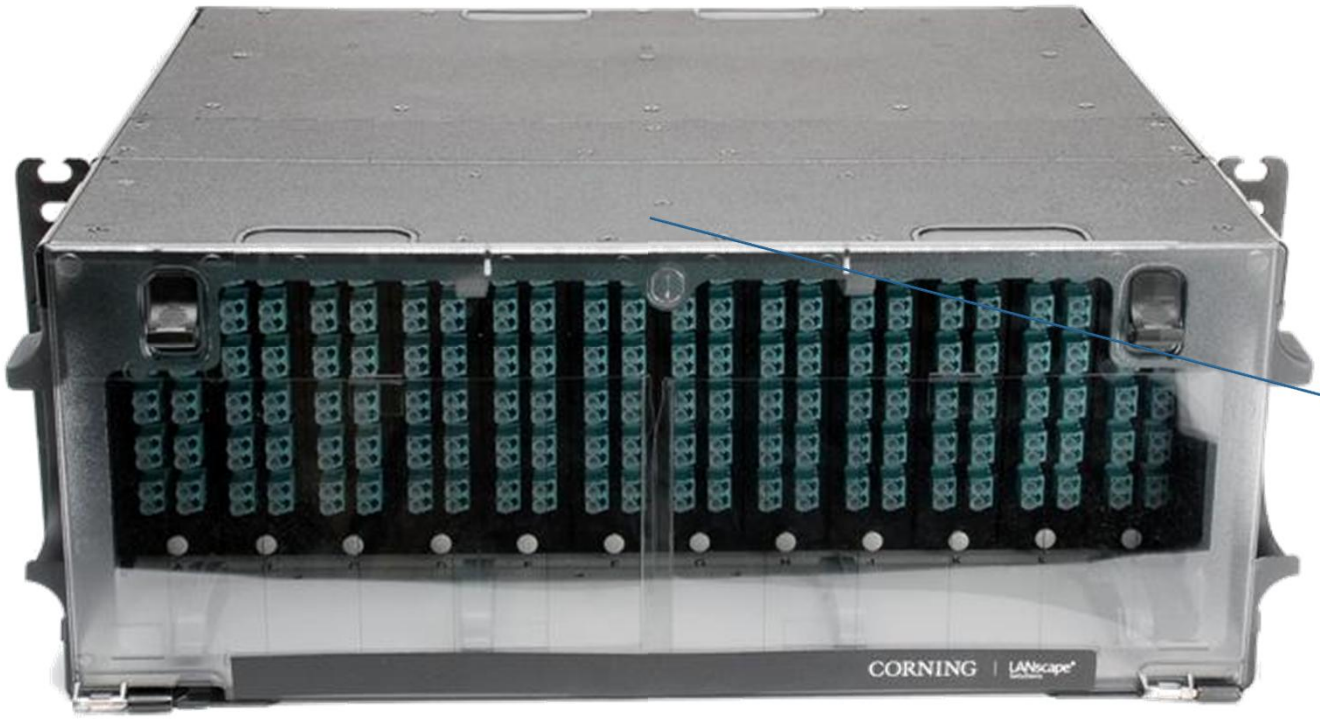
Splice Cassette support 24 splices in a single splice-stacker, provide intuitive and risk-reduced routing and flexibility to access connectors from the front  or the rear of the connector panel





*CCH Panels*

# 288 Fibres on 4U

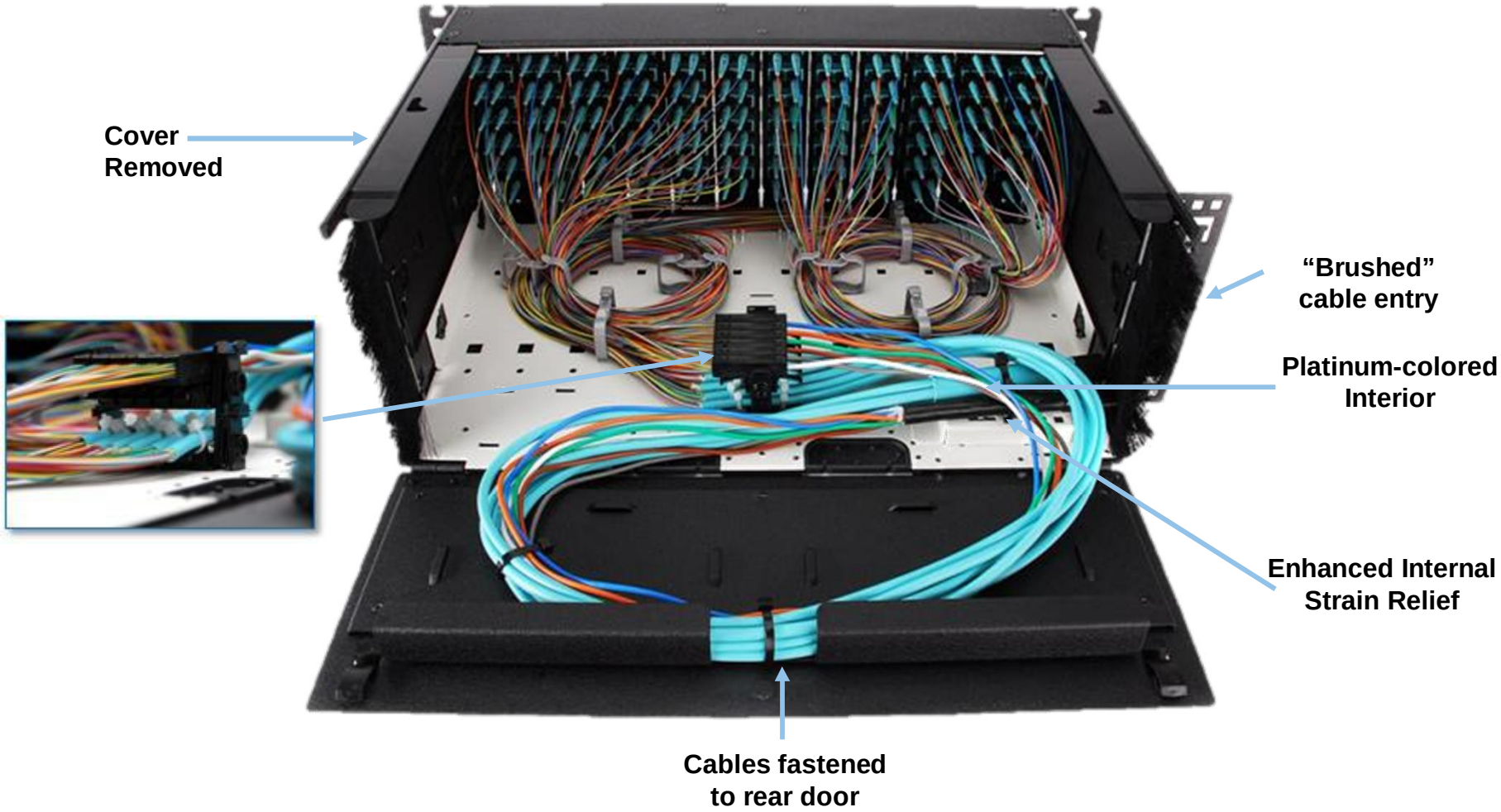



Tinted polycarbonate door similar to the 1U-3U creating enhanced visibility inside the housing

Top is solid to protect incoming/ exiting jumpers and reduces potential dust and debris

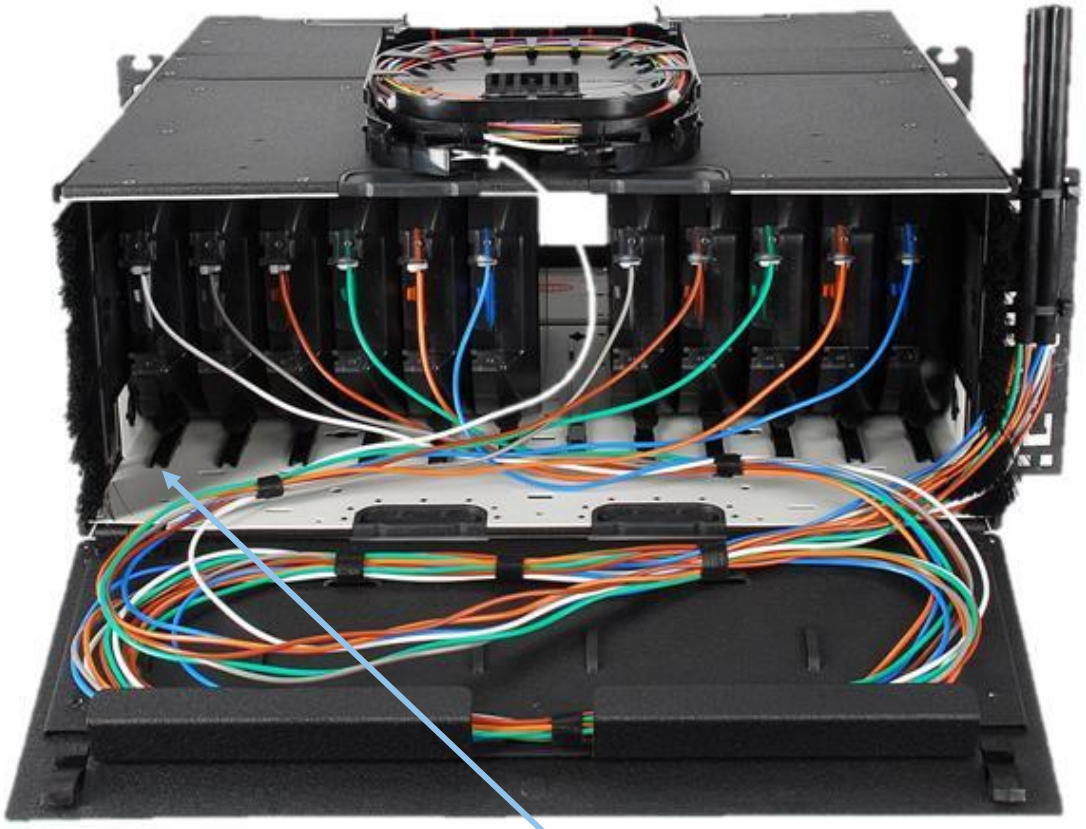
*CCH Panels*

# CCH-04U in Action…..



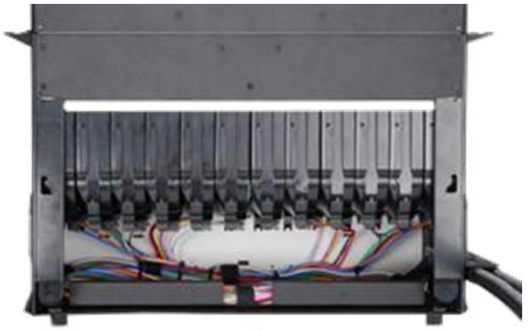
*CCH Panels*

# CCH-04U and Splice Cassettes in Action



Splice Cassettes utilize vertical orientation (i.e. blades) to maximize efficiency, density, and segregation from other fibers. Enables easy access during installation and throughout the life of the system

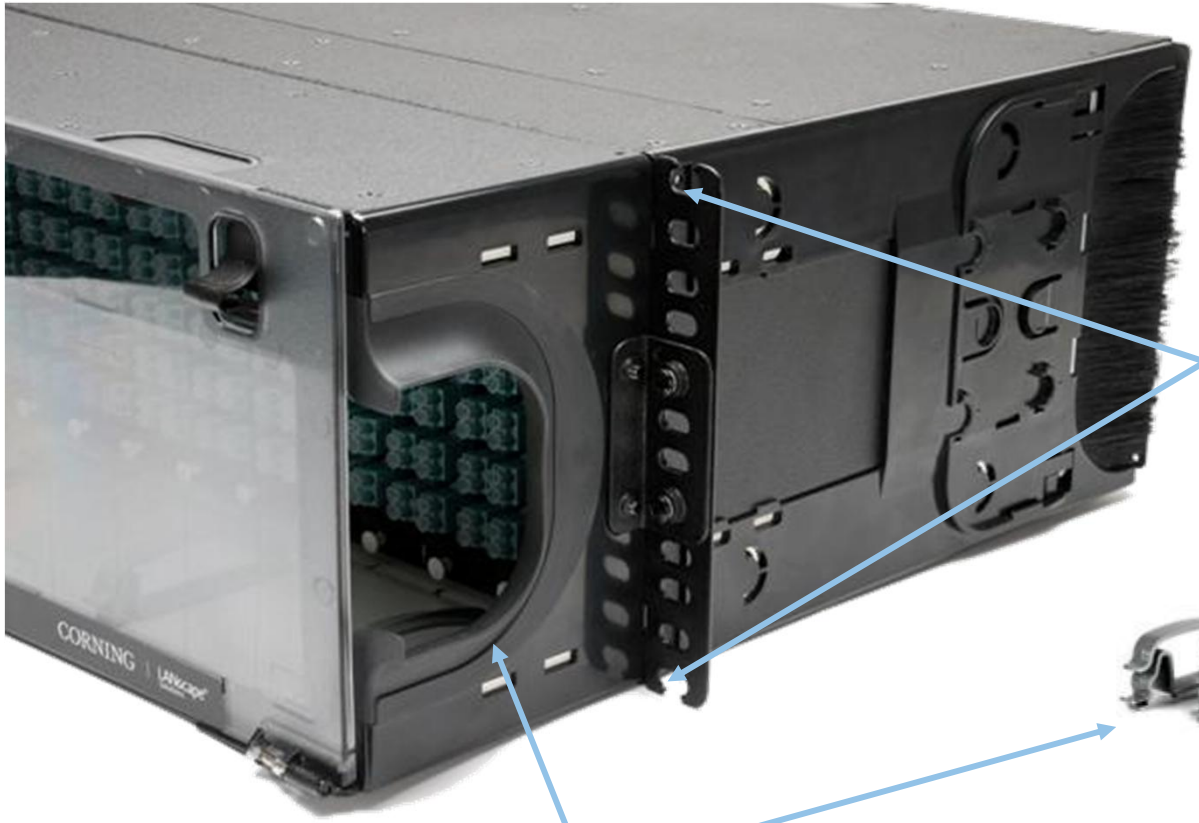
Cassettes are mounted via rails provided in original cassette packaging



**Top View**

*CCH Panels*

# CCH-04U Jumper Management and Installation

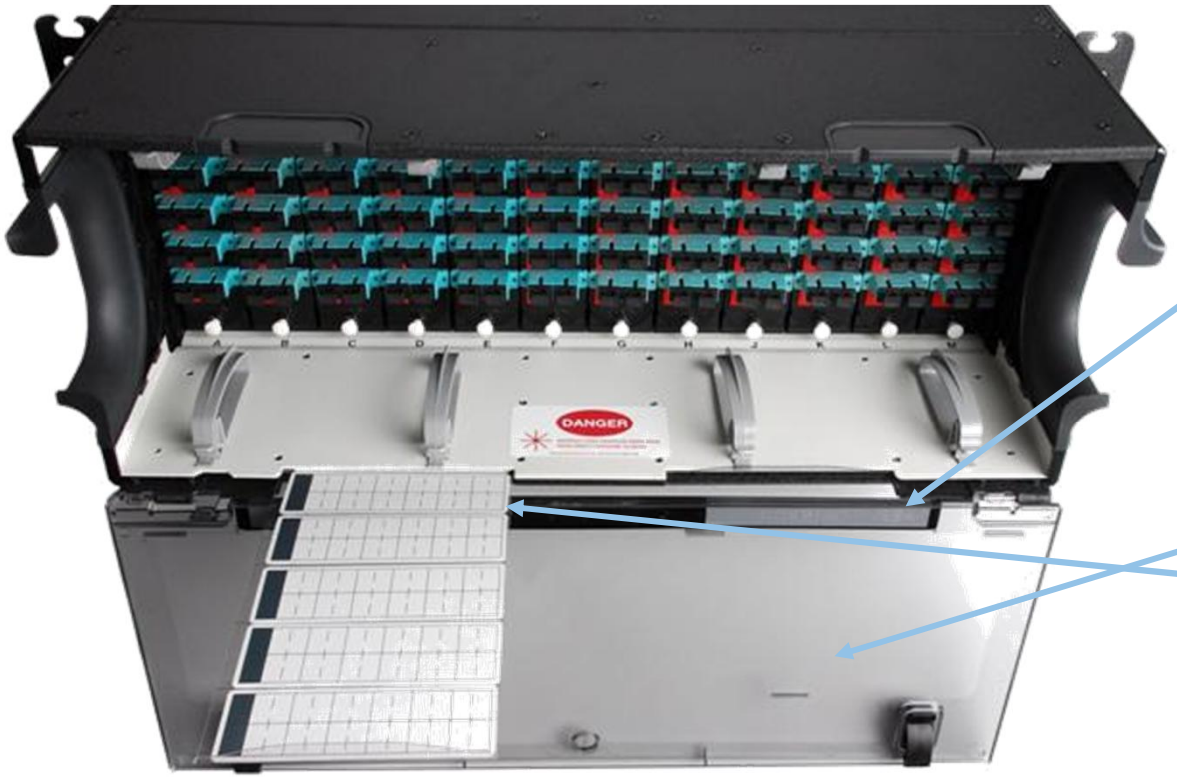



Slotted- mounting holes also employed for easy 1-person installation and removal

Improved jumper management features

*CCH Panels*

# Multiple Labeling Solutions Provided




Back-of-door labeling also enabled allowing for standard 3/8” to ½” labels

Removable label cards can be mounted “under” the shelf or on the door

## *CCH Panels*

# The Time Is Here…..

- The CCH product line is a major leap forward in intuitiveness, ease of use, and functionality, combining splicing, direct termination and PnP in one housing
- Every aspect of these housings been carefully designed to meet a specific need of our customer
- After talking to and observing thousands of customers we've solved over 2 dozen unmet needs and ultimately designed a solution **with you….and for you!**

For more information, visit
http://offers.corning.com/1-CCH_Innovation

CORNING

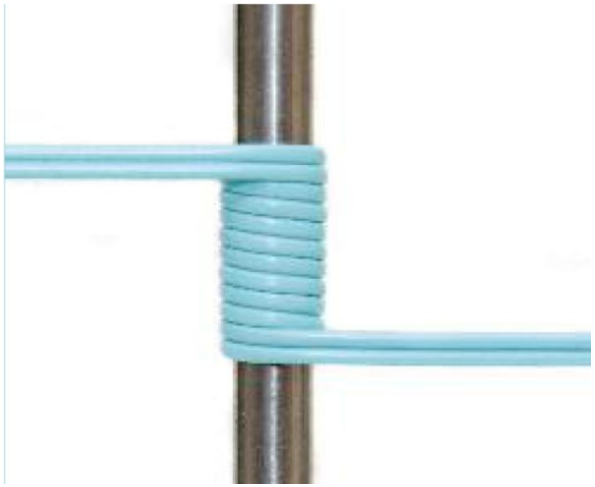
Cable Systems

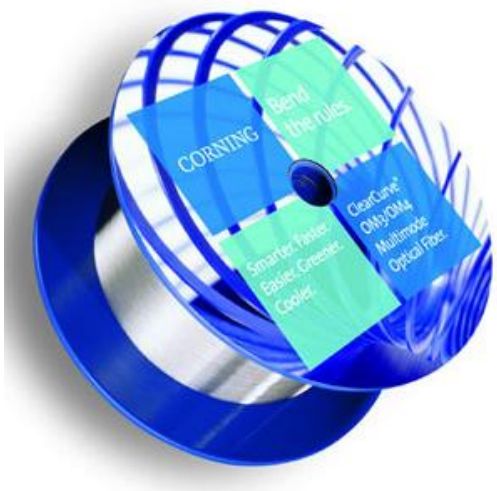
# Corning® ClearCurve® Multimode Fibre

*Romeo Lazar, Sales Manager Eastern Europe,* Enterprise Networks EMEA

# ClearCurve® Multimode Optical Fiber and Cables

*The Advantage of Corning Multimode Fibers*



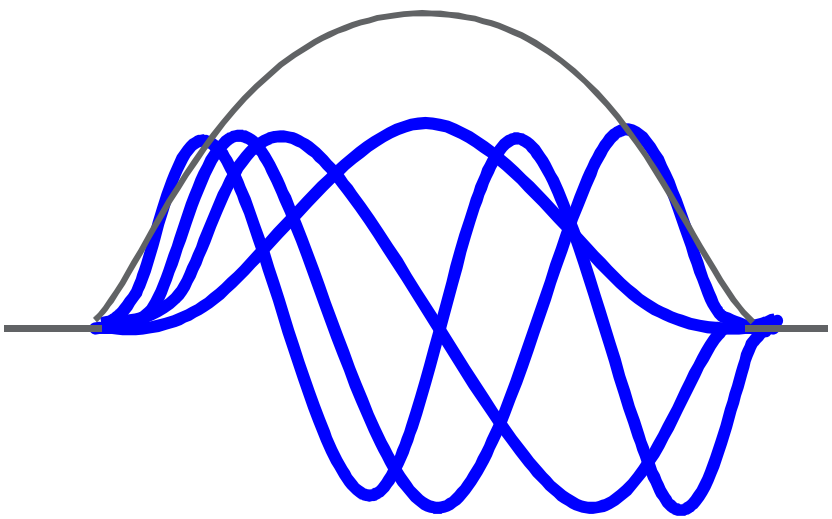


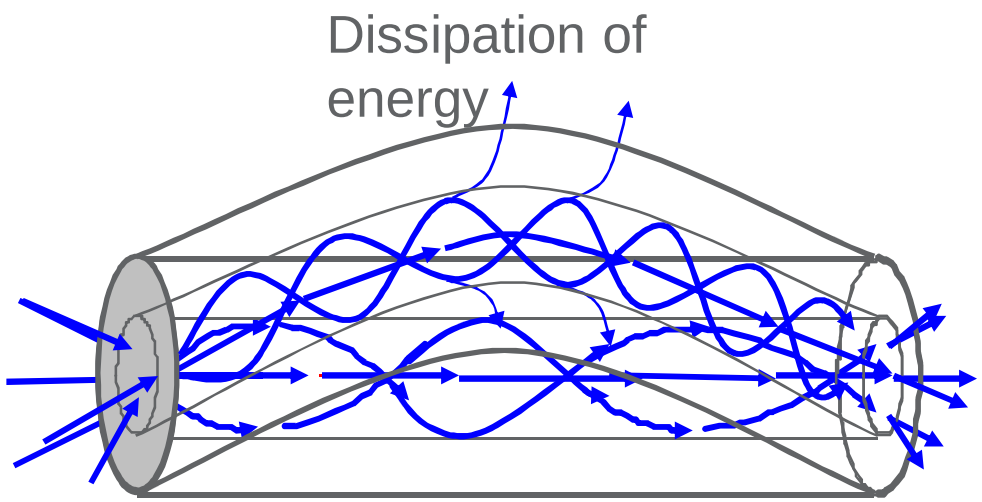

- ✓ Leadership in Research, Manufacturing, Standard Compliance and Quality
- ✓ Innovative Multimode Fiber Solutions
- ✓ Smooth Upgrade Capability
- ✓ High Performance at Low System Cost
- ✓ True System Bandwidth

- <u>Why is this important?</u>
  - Enables new possibilities for cable and patch panel design to further improve the benefits of using fibre
  - Provides additional margin against signal loss

# Macrobending in Multimode Fibers

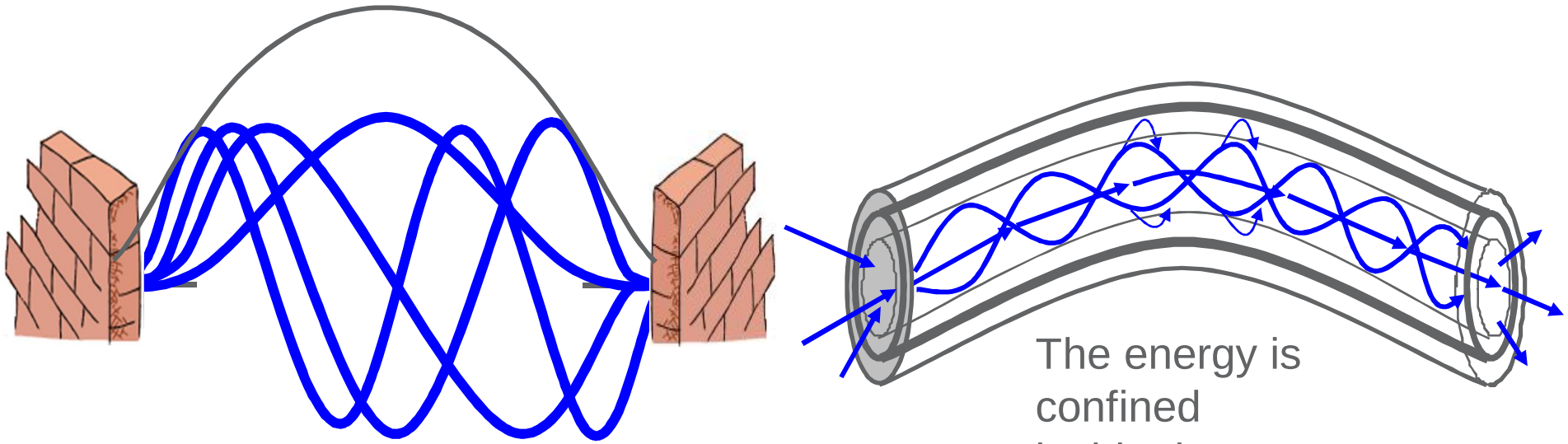
- Multimode optical fiber has many modes of light traveling through the fiber
- As each of these modes moves closer to the edge of the core it is more likely to escape, especially if the fiber is bent
- As the bend radius is decreased, the amount of light that leaks out of the core increases





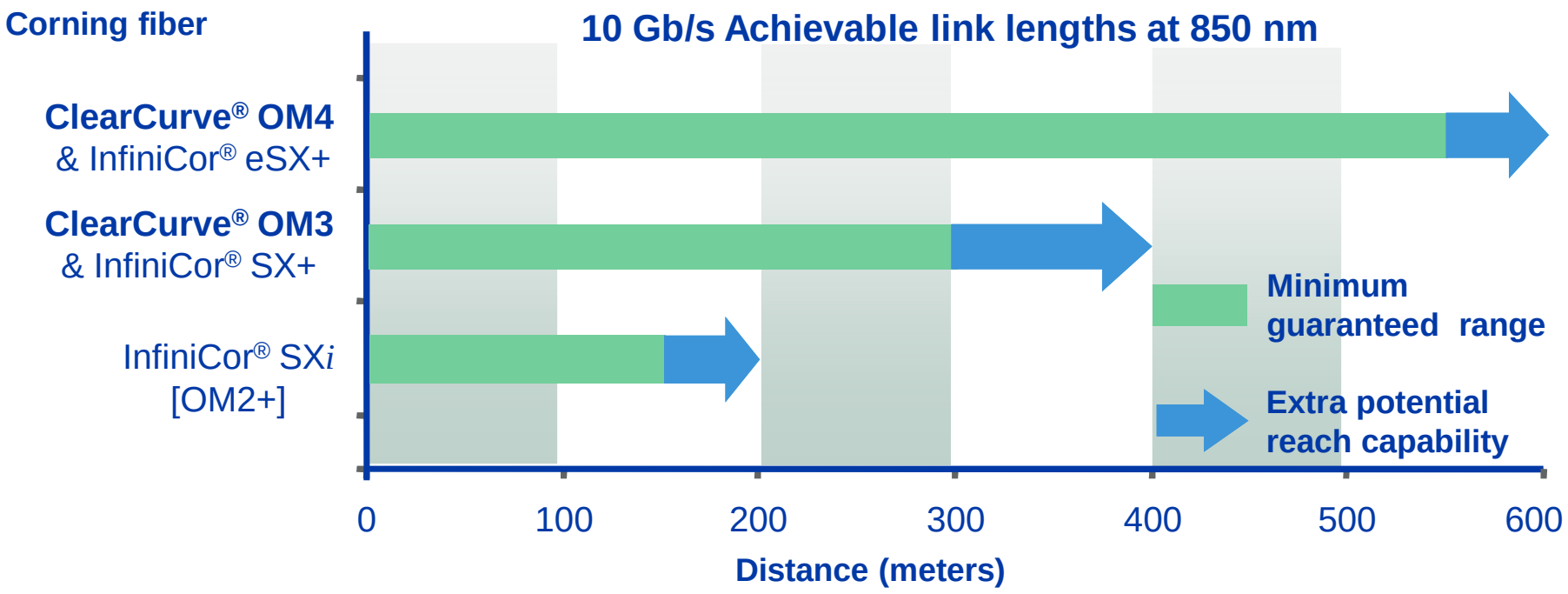
# ClearCurve® Multimode Fiber Technology

- ClearCurve® multimode fiber is capable of confining almost all the energy of the different modes, even in the most challenging bending scenarios
- Larger core diameter, behavior of different modes and different application space led to different solution than for single-mode fiber
- ClearCurve multimode utilizes a specially engineered optical trench to trap the many modes within the fiber core



*Smooth Upgrade Capability*

# Corning InfiniCor® and ClearCurve® Multimode Fibers offer extended reach capability



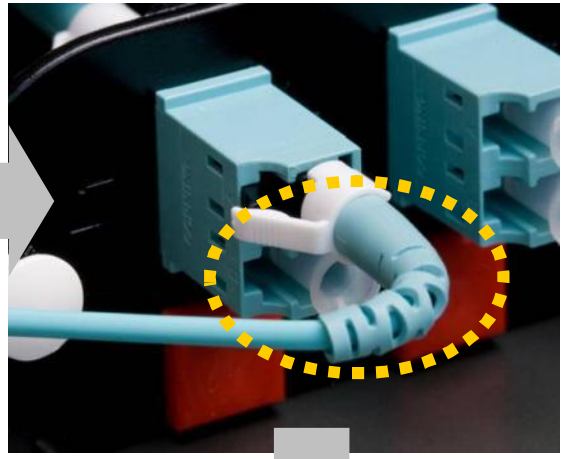

All ClearCurve & InfiniCor fibers are 10Gbs certified and 40/100Gbs ready

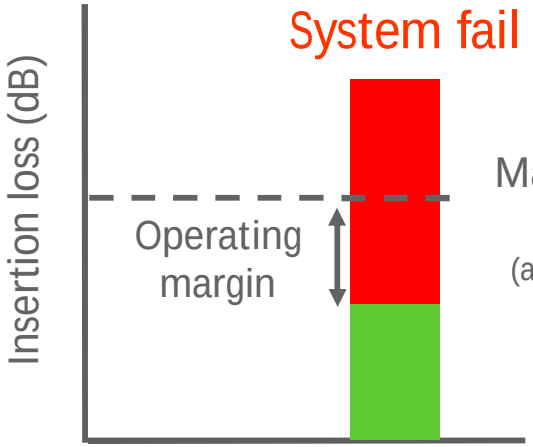
# Corning® ClearCurve® Multimode Fibre

- Corning ClearCurve Multimode fibre set a new macrobending performance benchmark for OM2, OM3 and OM4 multimode fibres when it was launched in January 2009
- Up to 10x better bend performance than standard 50 µm fiber
- From its launch ClearCurve Multimode fibre was:
  - ✓ Fully backwards compatible with all legacy multimode fibre
  - ✓ Fully compliant with all relevant multimode fibre standards
  - ✓ Fully compliant with all relevant application-based standards
- Over 750,000km of ClearCurve Multimode fibre shipped to date
- Extensive testing has been performed to confirm the backwards compatibility and standards compliance of ClearCurve Multimode fibre
  - Concentrating on core diameter, numerical aperture, bandwidth, splicing and connectorisation

# Entropy in data centres can directly impact system reliability

Standard 50 µm fibre



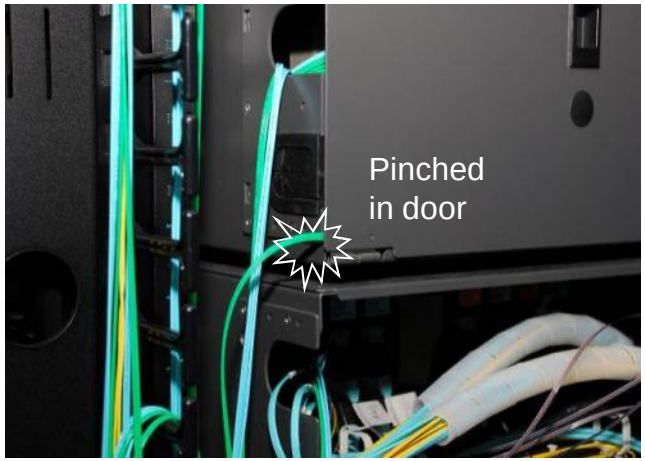


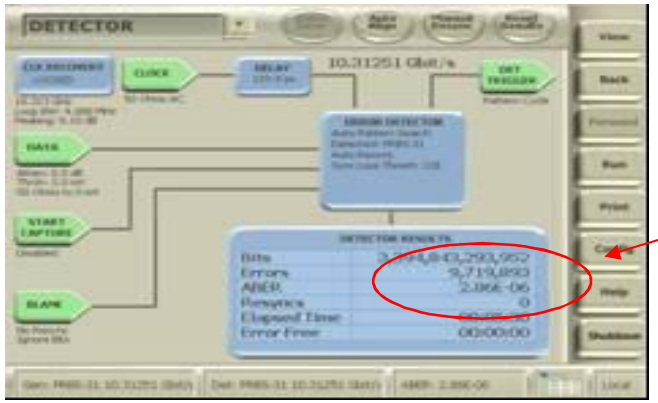

Maximum insertion loss
(according to standards OM2/OM3/OM4)

# Cable 'Torture Tests'
# – Pinched in housing door

Standard 50 um Jumper

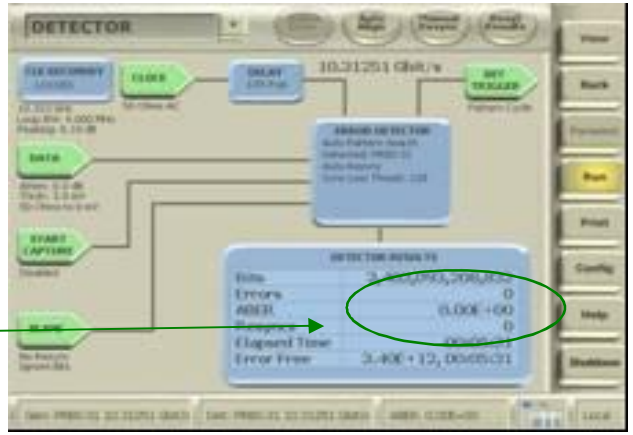
Ultra-bend 50 um Jumper





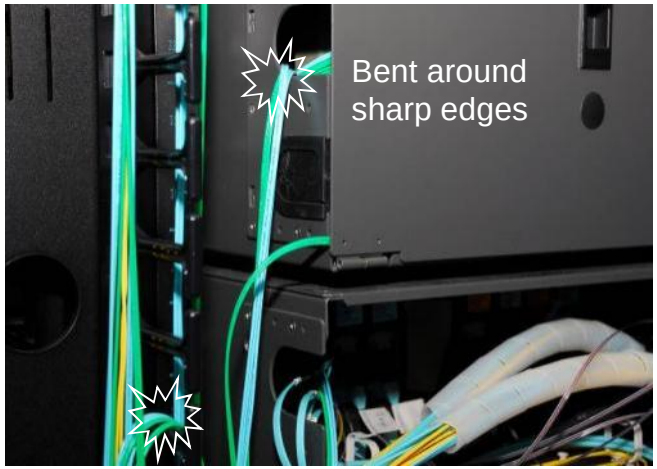

**BER**
Degrades to
$10^{-6}$

Remains better than
$10^{-12}$

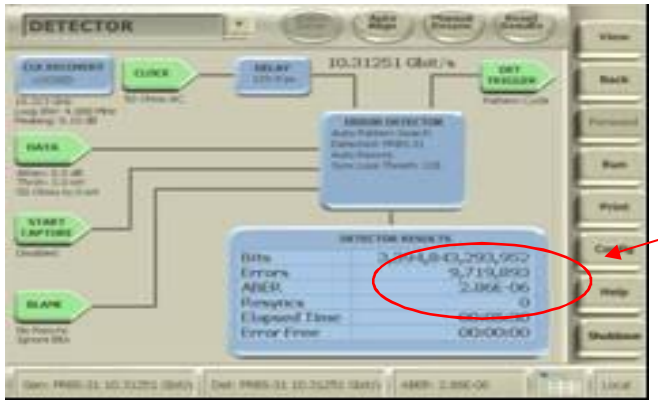


# Cable 'Torture Tests' – Sharp Bendings

Standard 50 um Jumper



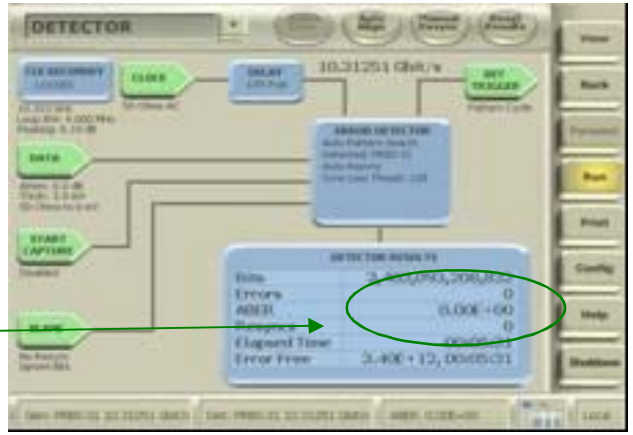

Ultra-bend 50 um Jumper




**BER**

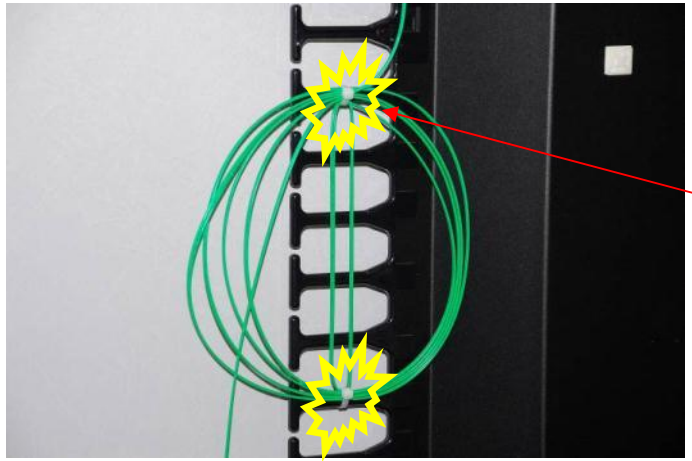
Degrades to $10^{-6}$

Remains better than $10^{-12}$

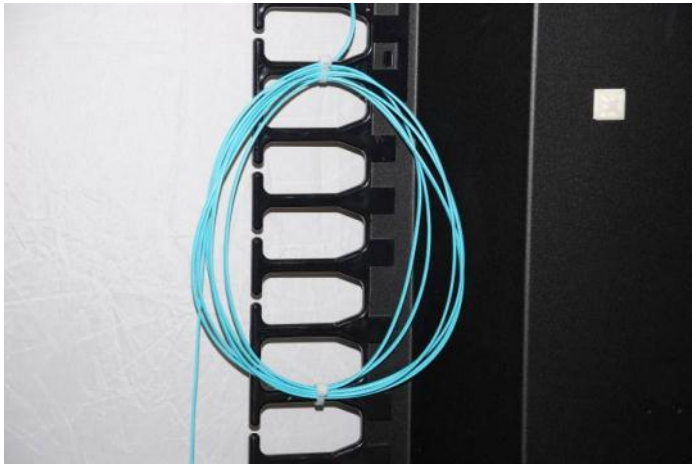


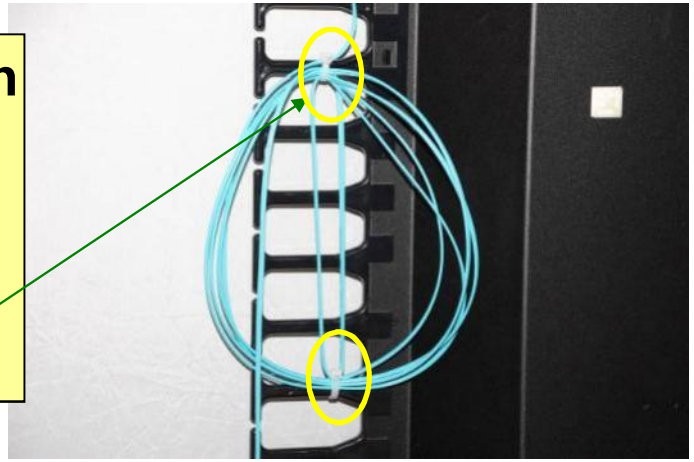
# Cable 'Torture Tests' – Tight slack loop

Standard 50 um Jumper



Ultra-bend 50 um Jumper





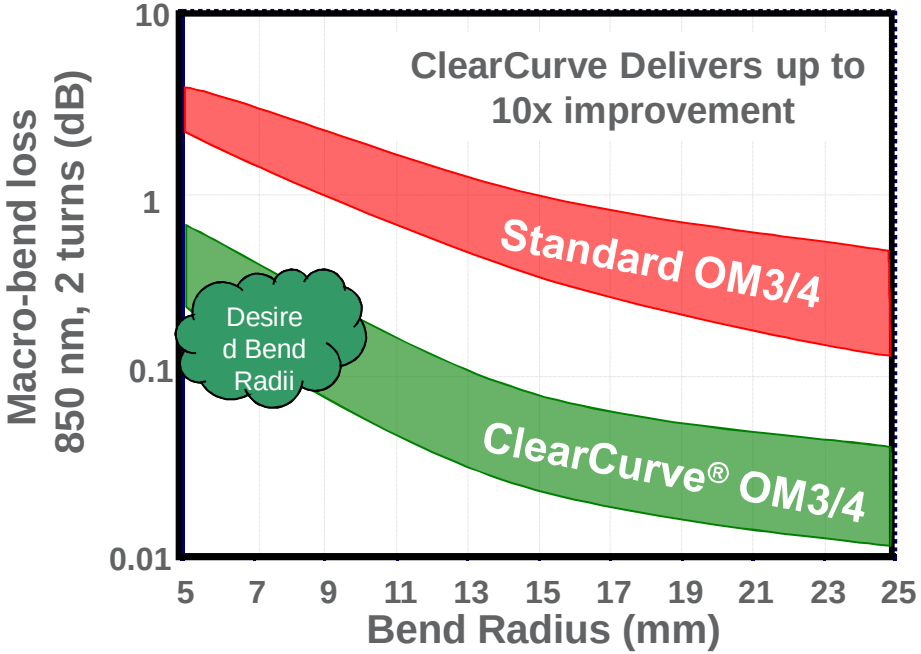
**Attenuation**

5.39 dB

0.54 dB

*Fiber Optic Performance*

# Unparalleled ClearCurve® OM3/4 fiber bend performance is a key enabler for high density and operational margin




- ClearCurve fiber provides new level of bend performance that can accommodate bend radii commonly found in data centers
- ClearCurve MMF withstands tighter bend radii and up to 10x less loss

| | Multimode Std IEC 60793-2-10 | Multimode Std ITU – G.651.1 | New Level of Bend Performance |
|---|---|---|---|
| Bend Radius | 37.5 mm | 15 mm | 7.5 mm |
| Number of Turns | 100 | 2 | 2 |
| Max Induced Attn @ 850 nm | 0.5 dB | 1 dB | |
| **ClearCurve Spec @ 850 nm** | **0.05 dB** | **0.1 dB** | **0.2 dB** |

*Pretium® EDGE Solutions - Cable*

# Trunk Cables were Developed based on Complete Integration of Fiber, Cable, Connectors and Hardware

| Component | Description |
|---|---|
| | •12 – 144 Fiber Sizes Terminated with MPO<br>•Enhanced Bend Performance – 5X OD, Clearcurve Fiber<br>•32% Reduced Cable OD |
| | •Tool-less Rapid Access Grip<br>•Enhanced Bend Performance Corrugated Tube<br>•Zippered Pulling Sleeve w Clam Shell Furcation Coupler |
| | •Small Form Factor Furcation Plug<br>•Multiple Clip Attachment Locations +Cable Stain Relief Boot<br>•Round No Preferential Bend Break-out Legs |
| | •Tool-less, snap on Integration Clip Rated up to 100lbs<br>•Sizes to house one or two Furcation Plugs |
| | •Shipped on a Pay-off Reel for Easy Deployment |

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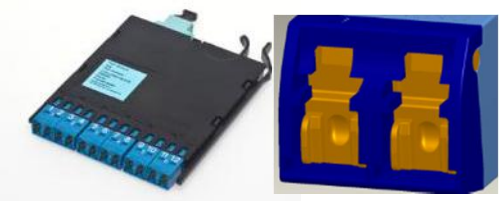
# Module & MPO Adapter Panel in new Small Form Design

| Component | Description |
|---|---|
|  | •12-F Break-out module; MPO to LC<br>•Small form factor design 3.5”W x 5”L x 0.5”D<br>•Unique geometry on the LC shutter adapter inhibits contact with the connector ferrule |
| | •Easy slide rail Installation into hardware<br>•Front and back removal trigger<br>•VFL compatible shuttered LC adapter<br>•Fiber and Port Labeling |
| | •MPO adapter panel<br>•Holds up to 4 MTP adapters<br>•Parking lot position for easy trunk scaling |
| | •Packaged in convenient blister packs |

*Pretium® EDGE Solutions – Hardware*

# Uniboot Patch Cord is Optimized for Enhanced Bending Requirements

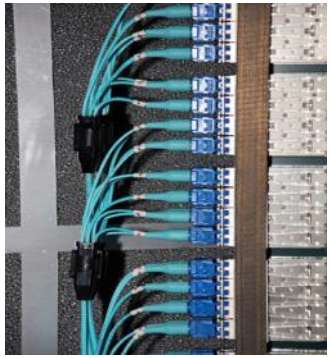
New

CORNING LANscape® Solutions

| Component | Description |
|---|---|
| | • Round 2.0 mm cable with no preferential bend<br>• Enhanced bend performance enabled by ClearCurve fiber<br>• No adjustments to field installation or maintenance procedures required |
| | • Uniboot design eliminates connector rotation in duplex clip designs<br>• Optical polarity correctable in the field<br>• Industry standard color code |

CORNING
LANscape® Solutions

# Harness Solutions Provide Quick Installation

| Component | Description |
|---|---|
| | • 12-F MTO to LC<br>• Utilizes Uniboot construction to eliminate connector rotation and reduce bulk cabling |
|  | • Small form factor furcation with integrated cable clip and velcro strap support |
| | • Staggered LC's for clean fit into system equipment – Brocade and Cisco |

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LANscape® Solutions

# 1 U Housings Provide Increased Fiber Capacity

| Component | Description |
|---|---|
| | • Scales to 96-fiber capacity<br>– Two trays per 01U housing<br>– Four modules per tray<br>–Accepts up to 8 EDGE integration clips<br>–Slide out 30 degree tilting tray |
| | • Scales to 144-fiber capacity<br>– Three trays per 01U housing<br>– Four modules per tray<br>–Accepts up to 12 EDGE integration clips<br>New |
| | |

CORNING
LANscape® Solutions

# Pretium EDGE – 4U Housing

| Component | Description |
|---|---|
| | • Scales to of 576 fibers (using MPO to LC modules)<br>–Four modules per tray<br>–Twelve trays per 4U Housing |
| | • Accepts MTP® to LC break-out modules and MTP adapter panels<br>• Trays pull out for easy module or connector access |
| | • Modules and panels install from the back or the front<br>• Tray and vertical mount cable routing guides for enhanced cable management |
| | • The trunk integration clip snaps to back of housing<br>• Brush cable entry<br>• TIA-606 compliant labeling |

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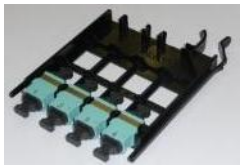
# Modular Components of Pretium EDGE Solutions

| | | | | |
|---|---|---|---|---|
| Data Center Networking Backbone | High Fiber Count to SAN Director, Storage and Zone Distribution Area / Low Count to Top of Rack | | | |
| | | | | |
| | 12 – 144 Fiber MPO Trunks | | | |
| System Equipment Interface Solutions | MDA and Server Cabinets | | SAN Director and High Port Count Electronics | |
| | | |  | |
| | Shuttered LC Module | UniBoot Patch Cord | MPO Adapter Panel | Integrated LC Harness |
| Aggregate and Protect the Interface Solution | Top of Cabinet | | MDA and SAN Director | |
| | | | | |
| | 144-Fiber 1U Housing | | 576-Fiber 4 RU Housing | |

# Plug & Play Fibre Optic Cabling Systems

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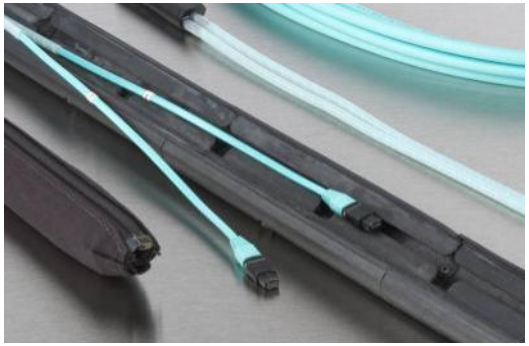
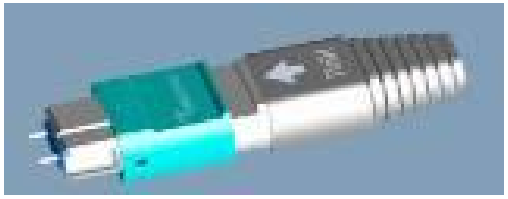
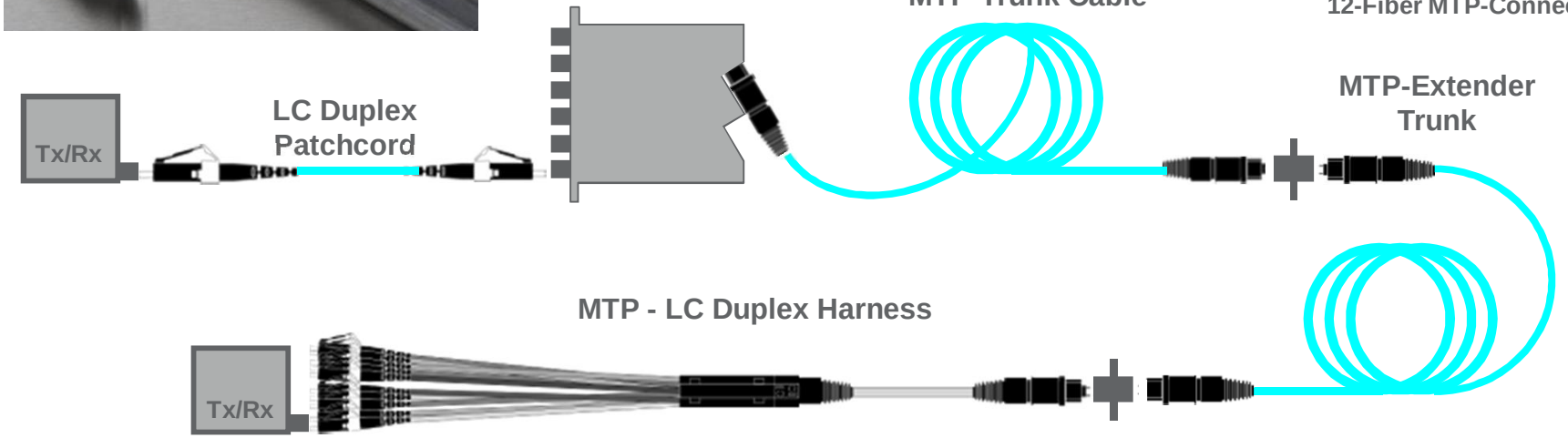
**Complete Solutions based on pre-installed Components:**





12-Fiber MTP-Connector




**… Available configurations for various port counts and density.**

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LANscape®
Solutions

# UniCam® Connectors

Romeo Lazar
Sales Manager, Eastern Europe

# The UniCam® Product Family

## *UniCam® High-Performance System*

# Proven Quality: Over 70 Million Connectors Sold

**UniCam High-Performance Connectors**

**UniCam High-Performance Toolkit**

- **Exceptional Optical Performance**
  - Think no-epoxy, no-polish connectivity means sacrificing performance?
- **Effortless Connectivity**
  - From set-up to tear-down in about a minute
- **Thoughtful Design**
  - At the top of a ladder or inside a crawlspace, our tool kit makes space a non-issue
- **100% Guarantee**
  - Every fiber type, every connector style
- **Service and Support**
  - When you need it, where you need it
- **Unparalleled Expertise**
  - Making field termination so easy…

# *UniCam® High-Performance Connectors*

## Exceptional Optical Performance

**UniCam High-Performance Connectors offer best-in-class optical performance**

UniCam High-Performance Multimode Connectors:
**0.1 dB typical insertion loss**
Available in LC, SC and ST versions

UniCam High-Performance Singlemode Connectors:
**0.2 dB typical insertion loss**
Available in LC, SC and ST versions

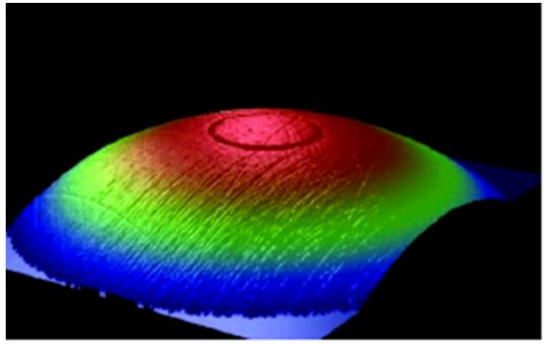
Operating Temperature: -40°to +75°C
per Telcordia Definition GR-326

## *UniCam® High-Performance Connectors*

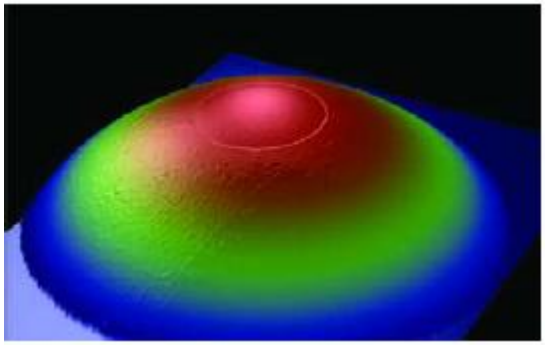
# Exceptional Optical Performance

**Factory-polished fiber stubs ensure precise end-face geometry for exceptional optical performance**

- Geometry matters
  - Connectivity depends on physical contact
  - Physical contact depends on connector end face geometry
  - Even an experienced installer introduces flaws on the end face through hand polishing (top image)
  - Factory polishes are precisely controlled, ensuring a nearly pristine end face (bottom image)



Typical epoxy-and-polish connector

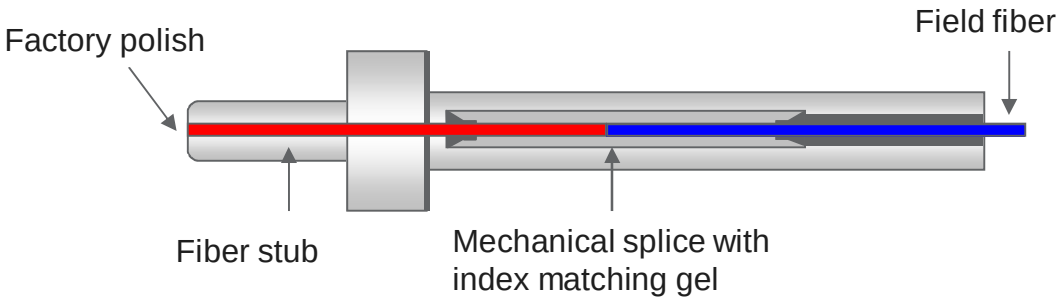


UniCam® Connector

# *UniCam® High-Performance Connectors*

## How Does This Work?

**Mechanical splicing to a factory-installed fiber stub for precision, quality and performance**




- Stub is laser cleaved in the factory for precision
- The end face is factory polished for quality
- Contains index matching gel for reliable, consistent results
  - Reduces reflectance and insertion loss
  - Has been verified through both testing and field experience for more than 30 years – no shelf life!

## *UniCam® High-Performance Toolkit*

# Effortless Connectivity In Any Situation

**The cleaver precisely controls the location and force of the cleave for a pristine field fiber end face**

- Everybody can connect fibres
  - Toolkit comes including everything you need ready to operate
  - No AC socket and no table is needed to work
  - Almost every workspace is possible:
    Ideal for working on ladders, construction areas and so on

# UniCam® High-Performance Connectors:
## *Exceptional Optical Performance*

**A wide operating temperature range – -40º to +75º C – for reliable performance in a variety of environments.**

Terminate them in here…

And put them out *there…*

# UniCam® High-Performance Tool Kit:
## *Effortless Connectivity*

**Ensure consistent, fast terminations – every time – by eliminating variability from installation.**

- Installs SC, LC and ST Compatible Connectors
- Integrated Continuity Test System (CTS) gives unmistakable Go/No-Go feedback of successful connectivity before termination is complete
  - Green light = success!
  - Red light = reseat or re-cleave the fiber and try again
    - **No scrap!**

# UniCam® High-Performance Tool Kit:
## *Effortless Connectivity*

**The cleaver precisely controls the location and force of the cleave for a pristine field fiber end face.**

- Slide the field fiber into the dual-clamp cleaver
- Press the blue button
- The **precision diamond blade** does all of the work
  - ***Effortless***
  - ***Consistent***
- Cleaves 900 micron, buffer tube fan-out and jacketed cables

# New Web Site:

## e-Catalog Website

Link to Corning's e-Catalog:
**http://www.corning.com/cablesystems/worldwide.aspx**

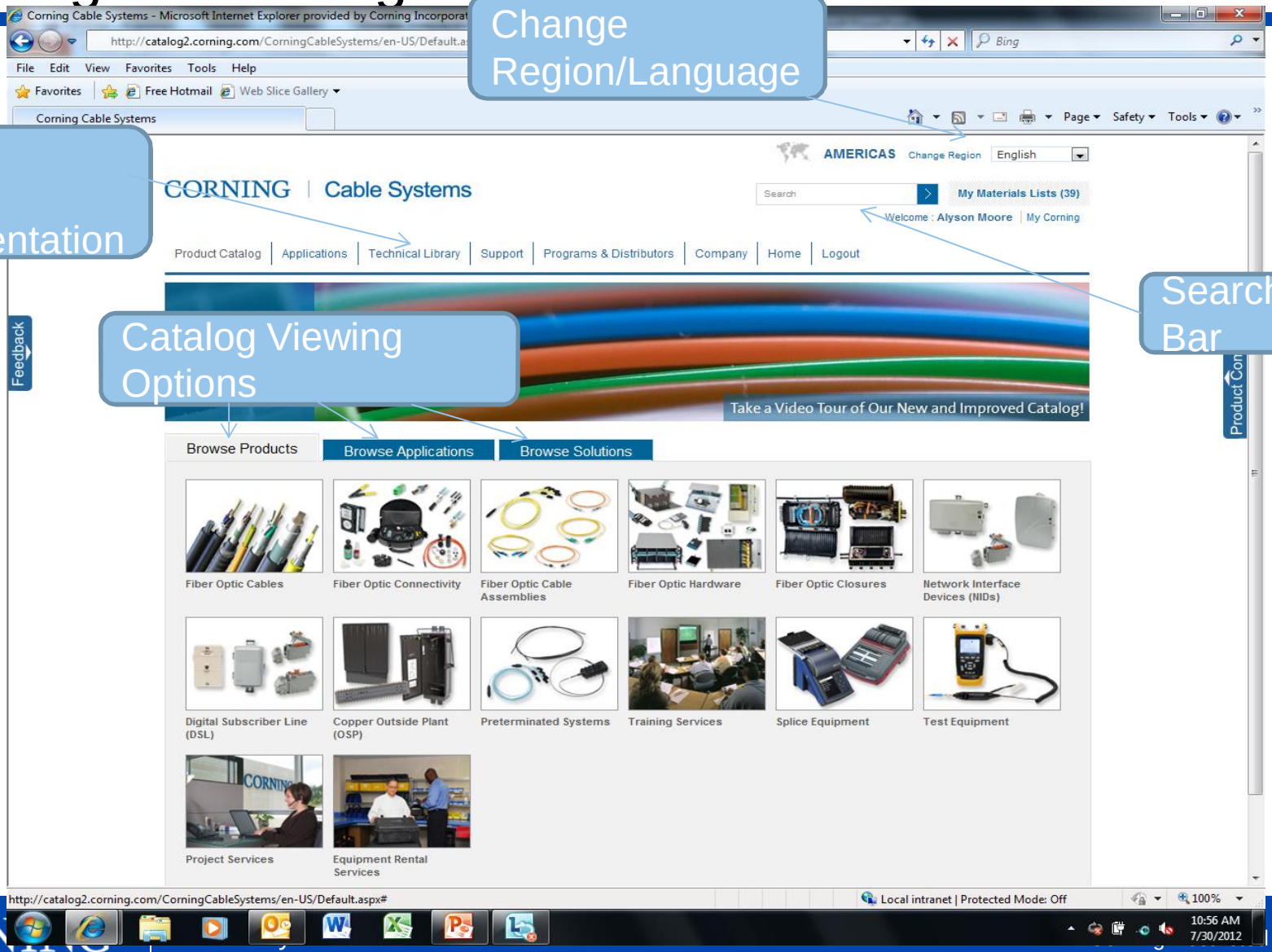
Product Catalogue | Applications | Technical Library | Support | Programmes & Distributors | Company | News & Events | Home |

Logout

Please select your region and language preference. This will be your default selection for future visits.

| | |
|---|---|
| **AMERICAS (North, Central and South America)** | |
| English | Home Page \| Product Catalog \| Technical Library |
| **EMEA (Europe, Middle East, Africa)** | |
| English | Home Page \| Product Catalogue \| Technical Library |
| Deutsch | Homepage \| Produktkatalog \| Technische Bibliothek |

# Catalog Home Page




Change Region/Language

Product Related Documentation

Search Bar

Catalog Viewing Options

# New Web Site:

- Let´s have a trial:
- http://www.corning.com/cablesystems/emea/en/index.aspx

CORNING

Cable
Systems

# Corning Cable Systems

Thank you.

Romeo Lazar
Sales Manager Eastern Europe |
PN EMEA

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mobil: +43 676 9708090
email: romeo.lazar@corning.com | http://www.corningcablesystems.com

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Solutions

# UniCam Connector Technology

## *Longevity and Use of Index Matching Gel*

- Reduces reflectance and insertion loss in optical fiber splicing
- Used as medium for optical fiber splicing since 1970s
- Has no shelf life
- Has been verified through both testing and field experience
- **Will <u>not</u> limit the life of the products, nor compromise our customer's needs in the future**

Corning Cable Systems

*Applications Engineering Note*

**The Longevity and Use of Index Matching Gel in the UniCam® Connector and the CamSplice® Mechanical Splice**

AEN 46, Revision 3

Revised: 10 December, 2002

Index matching gel is a chemically stable substance that has no shelf life. To verify it's longevity, Corning Cable Systems has performed environmental testing on the index matching gel used in our products to evaluate the long term aging of the gel in splice components. These tests include:

- Thermal cycling (-40°C to +80°C for 200 cycles)
- Thermal aging (+80°C for 21 days)
- Thermal shock (+80°C to -40°C for 10 cycles, transition time of less than one minute)

Corning Cable Systems' index matching gel conforms to the following material requirements:

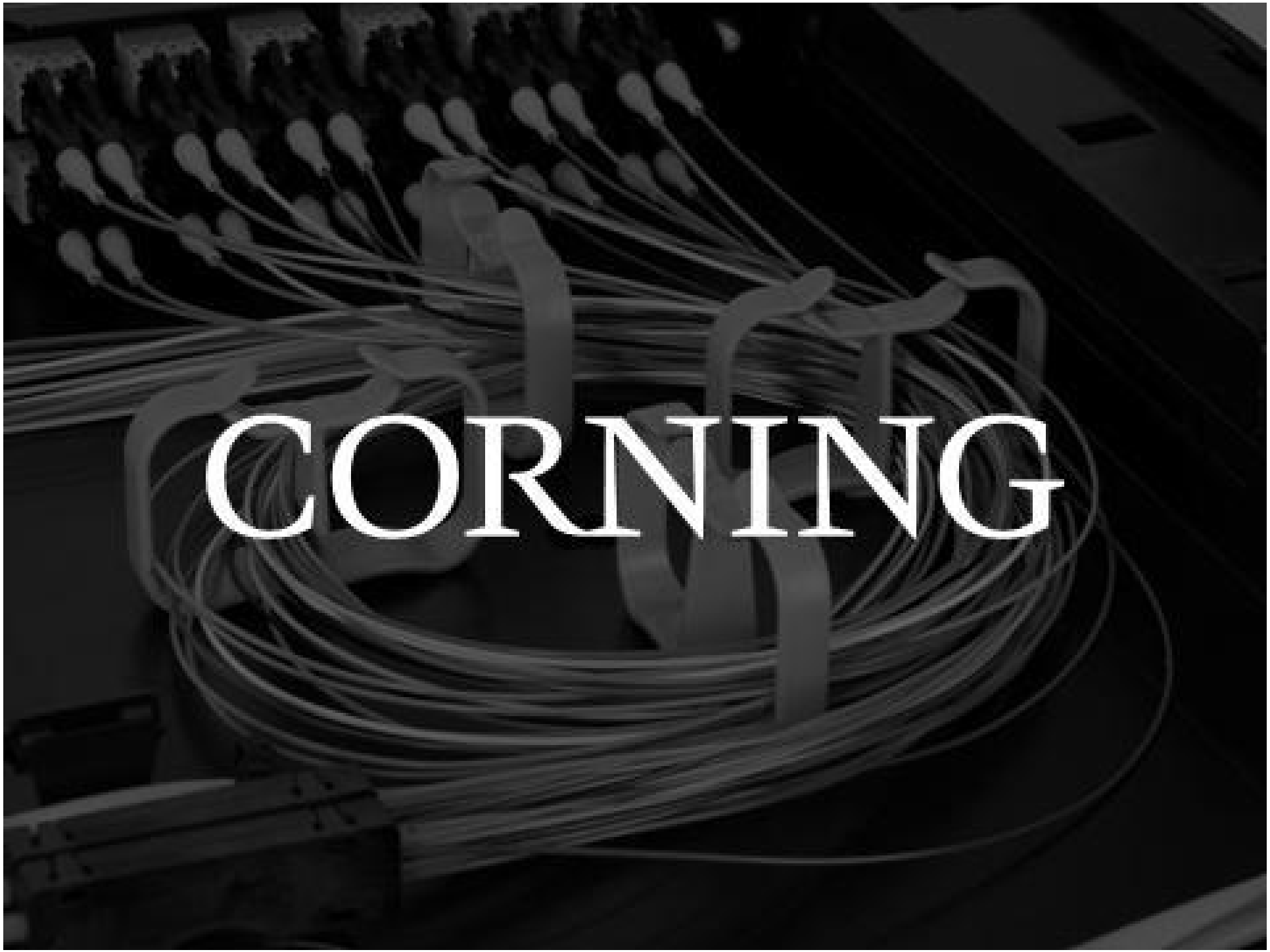
- Equilibrium water content ≤ 100 parts per million.
- No particles or inclusions which might interfere with optical transmission.
- Sufficiently high viscosity to prevent flowing.
- Optically clear over time.
- High surface tension to fill any voids during fiber movement.

Index matching gel was first used in the optical fiber industry in 1978 as an integral component of the GTE Elastomeric Splice®. The Elastomeric Splice was widely deployed and still has a large installed working base. US West presented a paper in 1990 which examined a system employing GTE Elastomeric Splices originally installed in 1985[1]. The system was upgraded to 1.12 gigabit operation in 1988. Prior to the upgrade the optical fiber links were tested for attenuation, optical return loss, and bit error rates. Results of these same tests were compared to those performed when the system was originally commissioned in 1985. No problems with the gel were observed in the study.

Many products have since been developed and widely deployed that use the same index matching properties of the gel to reduce reflectance and insertion loss in optical fiber splicing. Among them are:

www.corning.com/cablesystems

Literature Code: AEN046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