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## **Celesta** Intelligently Bonded Ribbon Cable solutions



Just Imagine waking up one day and seeing every gadget being connected and the internet lag becoming extinct like dinosaurs. Is this for real? Such a future is nearer than you imagine as 5G transforms itself from an idea to a reality in most economically progressive countries, including India. By 2026, we can expect 4.8 billion 5G subscriptions worldwide. However, when you hear about 5G wireless, the idea of a fiber network service running through the underground may not pop into your mind right away. But 5G will significantly affect both wireless deployment and the fiber line when it comes to the global network infrastructure. In fact, 5G's uninterrupted network performance directly results from how much fiber is available to connect the cell sites.

Fiber network infrastructure provides the backhaul capacity to these small cells that power 5G and will further offer the density, flexibility, and accessibility needed to support multiple applications simultaneously in the future.

### **Aspirational Performance Goals of 5G**

Here are some perks offered by 5G which can't be overlooked, and fiber rollout is critical to delivering all the below advantages:

**5G**<sup>\*</sup>

Up to 1000x more bandwidth/ unit area

Up to 10Gbps data speed to mobile devices running in the field



Up to 100 x more connected devices without any lags



Network availability is around 99.999%.



Almost 100% network coverage



Maximum of 1ms latency

Network energy utilization is reduced by up to 90%

Providers, therefore, have no recourse but to gear up for networks that comply with the 3Rs



**Reliability** High on service quality and low losses

Resilience

Ready-for-Future

They have to achieve the 3Rs by deploying networks swiftly while at the same time optimising space. For, while the bandwidth demand is unlimited, space availability is not. Networks have to be smarter – they have to hold more optical fibre within the same available space.

Meeting these criteria of time and space are the high-density Optical Fibre Ribbon Cables. These new-age, innovative ribbon cables address the 3R requirement. They are reliable, resilient and are ready for future needs of the network because of their smart design that offer:

### CEESTA Intelligently Bonded Ribbon Cable upto 6912F





Higher Fibre Density



Reduced Installation Time



Optimised Project Cost STL Celesta ribbon cable is better and smarter than traditional loose tube cables and flat ribbon cables, Celesta ribbon cable offers an outstanding solution for demanding, high-growth, high-bandwidth

communications applications.

STL Celesta Ribbon Cables are new age cables that offer a technology leap in terms of size and space requirements. They have found wide application at data centers, equipment connections within cabinets, outside plant applications.

### STL Celesta Ribbon Cables are compliant with international performance and testing standards



# Innovative slim design optimises duct space utilisation

In Celesta, ribbons take the shape of a bundle because of their intelligently bonded design. This results in improved form factor of the cable.

432F Celesta Ribbon cable is as much as 26% slimmer than a conventional multi-loose tube cable with the same number of fibres.



High-density ribbon cable packs more fibre in the same cable diameter and helps improve duct space utilisation by as much as 4X as compared with a conventional MLT cable.



This is an ideal solution for application in space constraint locations. The 432F Celesta Ribbon Cable can be easily blown inside a 20mm duct. For a distance of up to 1 kilometre, cables can be installed inside duct as small as 15mm. This is about 30 percent lesser High-Density Polyethylene (HPDE)material under the ground and helps reduce carbon footprint.

### Installer-friendly design help operators roll out network faster



Celesta Ribbon Cable is blow ribbon cables are blow optimized, have kink-free design with innovative sheathing design and non-preferential bending. Installers can install upto 2 Km of cable within 1 hour. Up to two kilometers of cables can be installed within one hour.

The multiple peripheral strength members inside the sheath of optical fibre ribbon cables provide crush protection and are rodent resistant. Its gel-free, water-blocking and contra-helical binding cable design reduces the cable preparation time for splicing. Cable-end preparation can be done under 3 minutes and mid-span access in 13 minutes.

Once the cable has been laid inside the duct, installation of the cable is truly an installer's delight. With Celesta Ribbon Cables, the installation process takes 80% lesser time as compared to installing a conventional loose tube cable with same fibre count.

Celesta with its innovative colour-coded bonded design results in easier and faster ribbon identification. This ensures first time right splicing even with semi-skilled manpower. The ribbon fibres are compatible with existing and new fusion splicers. The collapsible ribbon design transforms quickly into a flat ribbon resulting in five times faster splicing than a MLT cable. This can result in huge savings in time and labour cost.

# Future-proffing network set to optimise project cost

### TYPICAL MACROBEND LOSS COMPARISON



1 turn 7.5 mm mandral radius @1550 nm wavelength

Celesta ribbon cable is made using future-ready G.657.A2 bend insensitive optical fibre and offers industry's lowest attenuation in ribbon cables.

With improved network performance and power budget, network becomes resilient to bends and cuts. After commissioning of the network, as much as 18 additional repairs can be done.

This can enhance networks like by up to 10 years, thereby improving the ROI.With superior bend performance, cable and fibres can have a much smaller bend radius. This provides ease of handling

in manholes and handholes. This also helps further improve the TCO with the reduced the size of passive infrastructure. STL Celesta's light weight design helps operator reduce the logistics cost. Smaller form factor results in smaller reel size which optimises the storage and shipping cost, result-ing in enormous capex and opex savings.

Operators can expect a cost saving of 32% in the overall investment.

### Need of the hour!

Not with standing stark digital divide across countries, most countries around the world are on their respective digital path. Already recipients of massive budget allocation, network augmentation and enhancement will witness further rise in investments. In Europe, for instance, the Connecting Europe Facility (CEF2) digital programme " aims to support and catalyse investments in digital connectivity infrastructures of common interest during the period 2021-2027 ". Policy makers have gone on record committing to providing high-quality access to Gigabit networks to all people, businesses and "socio-economic drivers" such as schools, universities, hospitals, transport hubs and public administrations . In the United States of America, counted amongst the largest online markets of the world with internet user penetration at 85.8 percent, Connecting America: The National Broadband Plan, aims to take broadband to households, institutions, government organisations to fuel their progress and ensure their safety. Even if the scale and speed of investments may differ, the narrative is similar in other countries and regions of the world.

Optical fibre ribbon cables offer the perfect solution to the present-day world riding this heightened urgency for connectivity. Optimising costs, infrastructure availability, installation time and thereby maximising investments, these high-density cables come in as game changers in the bandwidth arena. And are set to change the narrative of digital preparedness.

# **Celesta** IBR CABLE PORTFOLIO

### **NEW PRODUCT LAUNCHED**



# **Celesta IBR with Stellar 250 fiber** (12-1728F)



### Upto 40x reduced bend losses than G.652.D



1 turn 7.5 mm mandral radius @1550 nm wavelength

With superior bend performance, cable and fibres can have a much smaller bend radius. This provides ease of handling in manholes and handholes. This also helps further improve the TCO with the reduced the size of passive infrastructure.

STL Celesta's light weight design helps operator reduce the logistics cost. Smaller form factor results in smaller reel size which optimises the storage and shipping cost, resulting in enormous capex and opex savings.

Operators can expect a cost saving of 32% in the overall investment.

# Legacy Compatibility with First Time Right (FTR) installation



### Key features:

- 1. High density Ribbon Cable with up to 432 Fibres can be easily air blown inside a 16mmduct
- 2. Special bend insensitive fibre results in increased network serviceability due to network's improved power budget
- 3. Innovative Colour coded bonded design for easier and faster Ribbonidentification
- 4. Precise fibre and ribbon geometries result in excellent mass fusion splicing yields
- 5. Multiple ribbon bundles design with ripcords for easy and quick mid-span access
- 6. Dry water-blocking technology for gel free core helpsin quicker end preparation.

### **Celesta IBR with HD A2 250um** (12-1728F)





Familiar cable construction, 4x faster installation



Optical performance better than G.652 D fibre



Easy to install

### FUTURE PROOF

### Less induced bend attenuation at higher wavelengths

Best suited for WDM-PON, 10G E-PON etc.

#### IMPROVED NETWORK POWER BUDGET

### Higher splitting ratio

Enables reduced time to market (esp. for access network)

#### REDUCED REWORK

### 'First Time Right' installation

Deskilling of field installation Ensures minimum rework

#### LONGER NETWORK LIFE

### min. 10-12 years addition to network lifetime<sup>2</sup>

Reduced macro bend loss extends asset life

### TYPICAL MACROBEND LOSS COMPARISON



### Celesta IBR with HD A2 200 fiber (12-1728F)



Familiar cable construction, 4x faster installation

Optical performance better than G.652 D fibre



Easy to install

### **Bend Insensitive 200 micron fiber**

- A. Conventional cable with **72 fibre (250** micron) with ~**13.5 mm diameter**
- B. Micro cable with 288 fibre (250 micron) with ~9.4 mm diameter
- C. Micro cable with 432 fibre (200 micron) with ~8.6 mm diameter



### **Key features:**

- 1. Special bend insensitive fiber results in increased power budget and network serviceability
- 2. Unique cable design allows deployment by blowing and pulling
- 3. Innovative Color-coded bonded design for easier and faster Ribbon identification
- 4. Precise fiber and ribbon geometries result in excellent mass fusion splicing yields
- 5. Multiple ribbon bundles design with ripcords for easy and quick mid-span access
- 6. Aramid reinforced plastic strength members for mitigating preferential bending
- 7. Dry water-blocking technology for gel free core helps in quicker end preparation.

### 4 Celesta IBR with HD A1 250 fiber (96-864F)



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### STL HD A1 250 Fibre ITU-T G.657.A1 Single Mode Optical Fibre

#### **Product Description**

STL HD A1 250 fibre is a low bend loss ITU-T G.657.A1 compliant fibre with a 250-micron diameter. The induced loss of this fibre at the tightest bends is close to that of the ITU-T G.657.A2 standard providing installation and operational efficiencies in high density (HD) networks. This low bend loss extends to the longer wavelengths required for future system upgrades. Fibres with low bend loss allow operators to optimize their physical asset utilization and future proo their high-density networks.

### **Product Application**

The need to improve network installation and operational efficiencies has led to wider application of bend-insensitive fibres. STL HD A1 250 Optical Fibre is suitable for use in any high density network.

#### **Product Benefits**

- Provides installation and operational efficiencies in high density networks due to low bend loss.
- Future system ready in that low bend loss extends to longer wavelengths.
- Compatible with legacy networks due to low loss splicing to G.652.D and G.657.A1 fibres.

Macro bend loss (dB)		
1 turn 7.5 mm radius	1550nm	≤ 0.75
1 turn 10 mm radius		≤ 0.2
10 turns 15 mm radius		≤ 0.2
1 turn 7.5 mm radius	1625nm	≤ 2
1 turn 10 mm radius		≤ 0.5
10 turns 15 mm radius		≤ 0.5

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### Celesta IBR Nylon Jacket with HD A2 250 fiber (144-1728F)



### Low Fibre count cables in Unitube Designs



Twisted yarns for easy stripping

Water Swellable Yarns / Water blocking tape to prevent Water ingress in Cable Core

Fibre Reinforced Plastic (FRP) to provide tensile strength and antibuckling properties.

Black Polyethylene

UV Stabilised Green Polyamide (Pantone 375 U / RAL 6018)

### Upto 40x reduced bend losses than G.652.D



1 turn 7.5 mm mandral radius @1550 nm wavelength

With superior bend performance, cable and fibres can have a much smaller bend radius. This provides ease of handling in manholes and handholes. This also helps further improve the TCO with the reduced the size of passive infrastructure.

STL Celesta's light weight design helps operator reduce the logistics cost. Smaller form factor results in smaller reel size which optimises the storage and shipping cost, resulting in enormous capex and opex savings.

Operators can expect a cost saving of 32% in the overall investment.

### **Features:**

- 1. Special bend insensitive fiber results in increased power budget and network serviceability
- 2. Unique cable design allows deployment by blowing and pulling
- 3. Black Printing for easier and faster Ribbon identificationiv.
- 4. Precise fiber and ribbon geometries result in excellent mass fusion splicing yields
- 5. Multiple ribbon bundles design with ripcords for easy and quick mid-span access
- 6. Aramid reinforced plastic strength members for mitigating preferential bending
- 7. Dry water-blocking technology for gel free core helps in quicker end preparation

### 6 Celesta IBR FRP Armored with HD A2 250 fiber (12-1728F)



### Universally compatible A2 fiber inside

STL StellarTM Fibre is a step towards Next Gen ultra-high definition future. The leading-edge fibre guarantees best-in-class attenuation and macro bend insensitivity, and delivers a host of tangible benefits that can lead to network longevity by a minimum of 10+ years while ensuring "One choice for all network sections"



### Features:

- 1. Flat FRP dielectric armouring provides additional protection against crush and impact and protection against
- 2. rodent attacks.
- 3. Bend insensitive fibre improves installation, maintenance, and network performance
- 4. Ribbon structure allows for mass fusion splicing of 12 fibres in one step
- 5. Dry water-blocking technology to enable quicker preparation
- 6. Multiple ribbon bundles design with ripcords for easy and quick mid-span
- 7. Resistant to termite attacks.

# **7** Celesta IBR Metallic Armored with stellar 250 fiber (12-1728F)



### **Features:**

- 1. IBR cable can be prepared and spliced much more rapidly
- 2. Precise Fiber and ribbon geometries result in excellent mass fusion splicing yields
- 3. IBR ribbons are individually marked for easy identification
- 4. Lower diameter cable as compared to conventional flat ribbon
- 5. Dry water-blocking technology for gel free core helps in quicker end preparation
- 6. Steel tape adds to crush resistance as well as can be used as a cable locator after installation
- 7. Easily removable rugged thermoplastic jacket
- 8. UV protected, Flexible, light weight, easy to handle & install

# Sustainable solutions for dense fullfiber networks

20/16 mm subduct



Typical 144F IBR (12.2 mm) 14/10 mm subduct



STL 144F Celesta IBR (8.2 mm)

# Save 36% 🔻 on cost of duct

STL Celesta IBR reduces duct size by nearly 33% from 20/16mm subduct to 14/10mm

Narrow trench saves times, smaller ducts easy to handle

# 144F IBR with nearly 32.7% **▼**reduced size

Only IBR with A2, 250-micron fibre 250-micron pitch, familiar cable construction

1400m single shot blow



> 36% less plastic material in the duct

-127 KgCO2e/Km less carbon footprint >48% less plastic in NextGen IBR 47.10 kgCO2e/km less carbon footprint

# **Upto 60%** reduced CO<sub>2</sub> emissions in logistics



### Longer duct and cable lengths/drum



TYPICAL 144F IBR (12.2 mm)



STL 144F IBR (8.2 mm)

### Upto 60% reduction in truckloads & loading/unloading for same lengths





TYPICAL 144F IBR (12.2 mm)

STL 144F IBR (8.2 mm)

# Longer network life, saves up to 40% emissions

Only IBR solution with A2 fibre provides more resilient networks

A UK ISP case in example

# 120 tonnes lesser CO2 emissions in maintenance truck rolls<sup>#</sup>

Leading ISP in the UK claims its field engineers typically travel 740,000 miles a year to identify and repair network faults. Equivalent to 290 tonnes CO<sub>2</sub>eq. emission.



### About STL

### **Glass to Gigabit Connectivty**

We are the only company in the world to have unique capabilities across all layers of the network. From Photonics and material science-based precision manufacturing to algorithmic design, ultra-fast deployment and AI analytics. We believe in harnessing technology to create a world with next generation connected experiences that transform everyday living. With intense focus on end-to-end network solutions development, we conduct fundamnetal research in next-generation network applications at our Centres of Excellence. At last count, we have a global patent portfolio of 686\* to our credit for optical connectivity, network services and virtual mobile edge solutions.

Patents as on H1 of FY24

### We are leading the future of networks

We have a strong global presence and have historically supplied to over a 100 countries!

Today, we are a \$863 Mn. company (FY23 revenue), with almost 34% of our revenue being export driven. On the suplly side, we have next-gen optical preform, fibre and cable manufacturing facilities in India, USA, Italy, China and Brazil. Our manufacturing facilities are world-class and we are the world's first integrated optical fibre and cable manufacturer to be Zero Waste to Landfill certified.

### About Optical Interconnect

### STL's Optical Interconnect business unit offers an exhaustive portfolio of innovative connectivity solutions that include:



With fully backward integrated optical fibre manufacturing capabilities, we are the perfect choice for all types of cable construction and applications such as 5G, FTTH etc

### 💾 Optical Fibre Cables

Our customised cable solutions including Retractable, Micro Module, Micro cables and ADSS cater to high-bandwidth requirements across customer segments globally

### **Optical Interconnect**

We offer optical fibre termination equipment through Ribbon Optimised Splice Closure (ROSC), Rack mount FMS, Wall mount FMS, Patch cords, etc. that are perfect for all kinds of OSP and ISP patching and termination requirements

### **O** Speciality Cables

STL offers a wide range of copper cables as part of its speciality cable portfolio. These include structured cabling solutions and cables for railways and other industrial applications.

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