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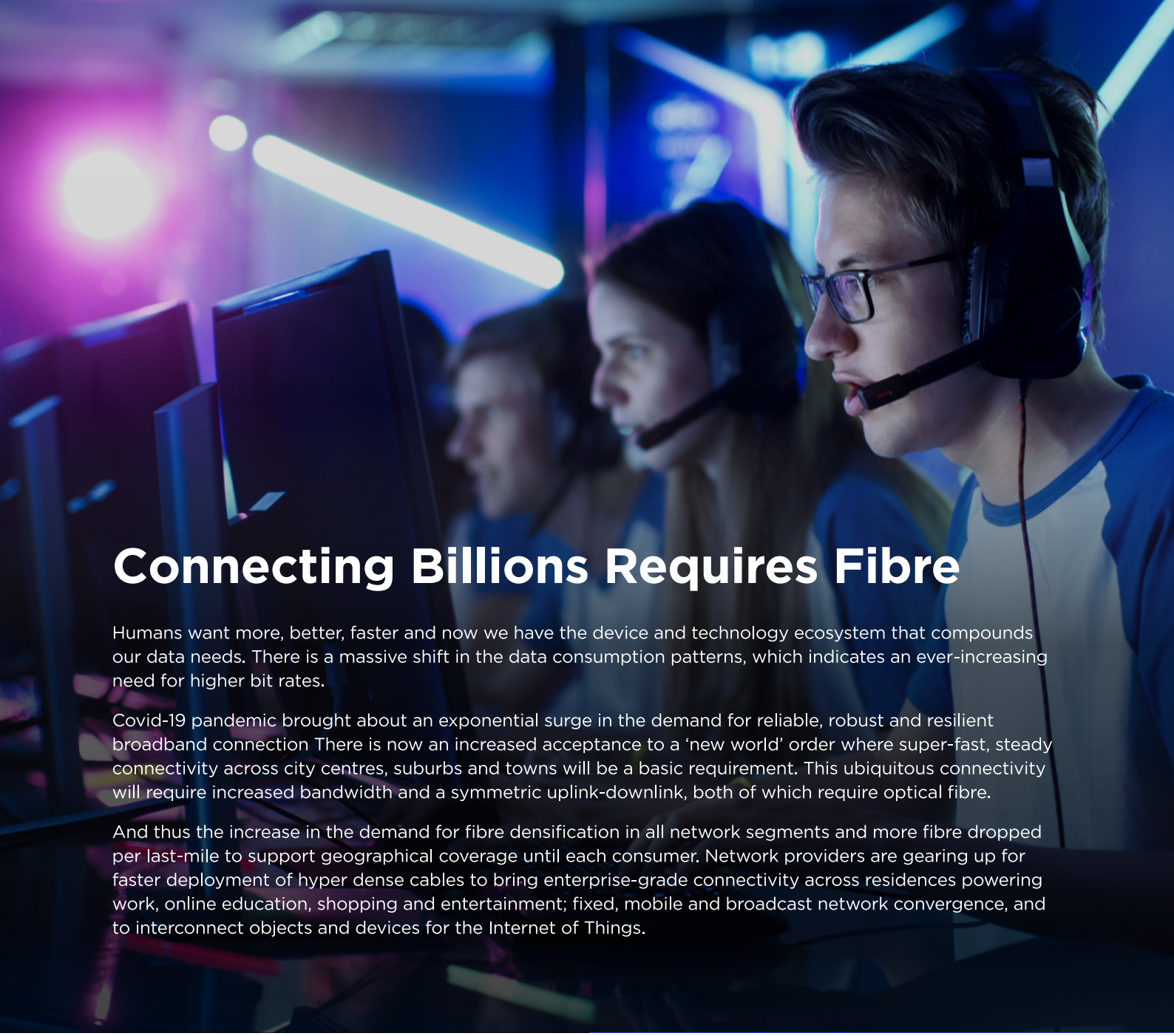
Bend Insensitive
BOW LITE SUPER
G.657.B3 Optical Fibre



Connecting Billions Requires Fibre

Humans want more, better, faster and now we have the device and technology ecosystem that compounds our data needs. There is a massive shift in the data consumption patterns, which indicates an ever-increasing need for higher bit rates.

Covid-19 pandemic brought about an exponential surge in the demand for reliable, robust and resilient broadband connection There is now an increased acceptance to a 'new world' order where super-fast, steady connectivity across city centres, suburbs and towns will be a basic requirement. This ubiquitous connectivity will require increased bandwidth and a symmetric uplink-downlink, both of which require optical fibre.

And thus the increase in the demand for fibre densification in all network segments and more fibre dropped per last-mile to support geographical coverage until each consumer. Network providers are gearing up for faster deployment of hyper dense cables to bring enterprise-grade connectivity across residences powering work, online education, shopping and entertainment; fixed, mobile and broadcast network convergence, and to interconnect objects and devices for the Internet of Things.

Fibre Today

Governments and service providers recognise the fibre imperative and are committed to rapid fiberisation. Till now, fibre has been dominant in backbone (core) and metro networks, but now fibre to the tower (FTTT) and fibre to the home (FTTH) plans are taking shape.

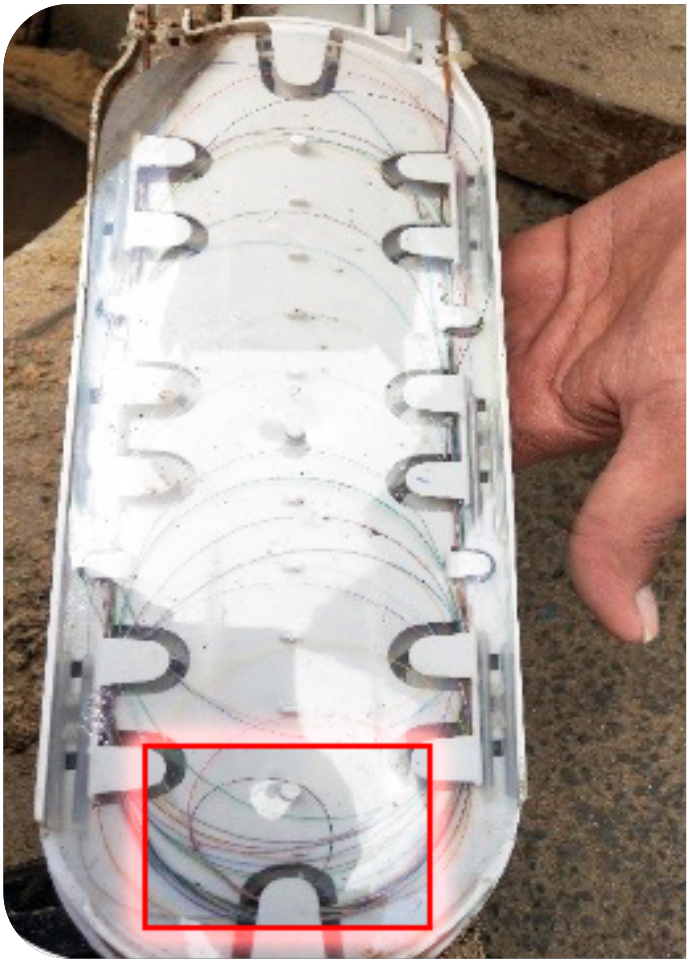
Although the scale, speed and complexity of fibre roll outs is evolving rapidly, the world is still operating with legacy fibre products.

Optical fibre cable consumed inside homes is majorly G.6572.A2 compliant, but the conventional G.657.A2 fibre lacks on multiple accounts:

- Insufficient Resilience to tighter turn & bend scenarios
- Higher bend losses at longer wavelengths needed for next generation PON technologies
- Limited scope for cable and passive ancillary miniaturisation
- Dependency on skilled manpower
- Limited network lifetime

Fibre is Indispensable, so is Fibre Evolution

When fibre needs to connect a billion un-connected lives and expand to the heart of cities and homes, it needs to achieve much more:



- Such geographical expansion into the deeper pockets of a city, requires fibre to undergo large number of turns and bends.
- To suffice the need for higher bit rates, fibre needs to function at next generation PONs working at higher wavelengths
- Sheer scale of fiberisation demands deskilling of field termination
- All this needs to be achieved with optimised optical power budgets, at lower costs and with enhanced deployment speed
- Cable abuse resistant to maintain quality of service and all time up

STL Bow Lite Super - G.657.B3 Fibre

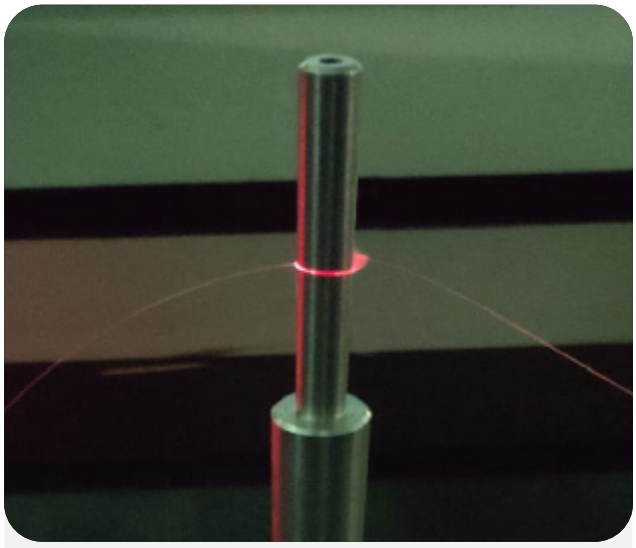
BOW LITE Super bend insensitive fibre provides the answer to all the current challenges and future requirements.

STL's BOW LITE SUPER fibre is designed to reduce bend losses by a minimum of 15 times and hence deliver better performance in tight bend scenarios and also efficient functioning at higher wavelengths to support next generation PON technologies.

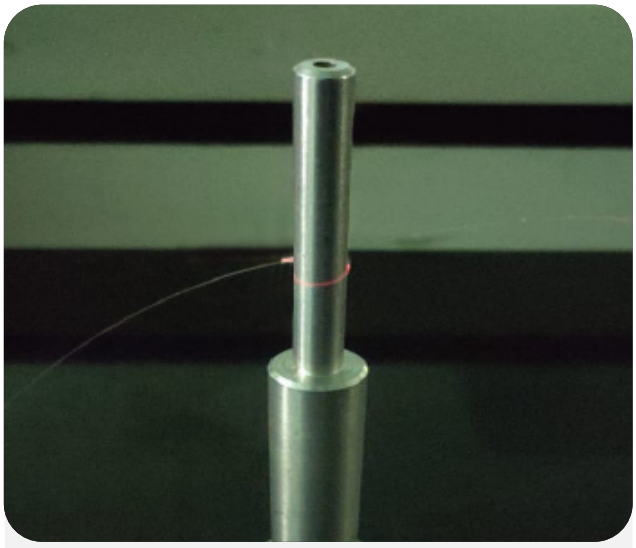
The refractive index (RI) profile which enables functional attributes like bend resilience, lower bend losses and better performance at higher wavelengths, is achieved through creating an optical trench just outside the core. Tight bend scenario is one of the major causes of signal loss and this trench of lower RI guides the light back to the core and hence ensures minimal bend loss.

Deployment condition	Wavelength	Induced attenuation
1 turn, 10 mm radius 1 turn, 10 mm radius	1550 nm 1625 nm	≤ 0.03 dB ≤ 0.10 dB
1 turn, 7.5 mm radius 1 turn, 7.5 mm radius	1550 nm 1625 nm	≤ 0.08 dB ≤ 0.25 dB
1 turn, 5 mm radius 1 turn, 5 mm radius	1550 nm 1625 nm	≤ 0.15 dB (Typical ≤ 0.10 dB) ≤ 0.45 dB (Typical ≤ 0.30 dB)

Visible Light Test with 1 turn at 10 mm radius



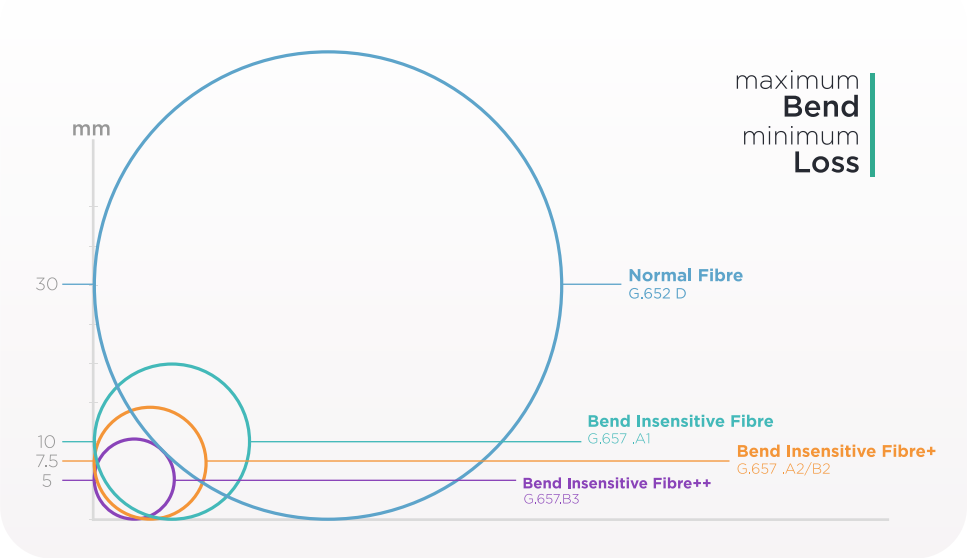
Conventional G.657. A2



STL Bow Lite Super

Super Bend Insensitivity

BOW LITE SUPER offers maximum bend resilience at minimum bend loss. Lesser bend loss ensures better packing efficiency and performance in high bend and turn scenarios.



Lower macro bend loss has a cascading effect in the form of:

Higher Network Reach
enables network extension by a minimum of 16 more kms as compared to a network built using ITU-T G.652.D

Improved power budget
With lower macro bend loss properties, this fibre can achieve so much more in the same power budget

Reduced re-work
High bend resilience directly impacts the level of skill and precision required for on field installations

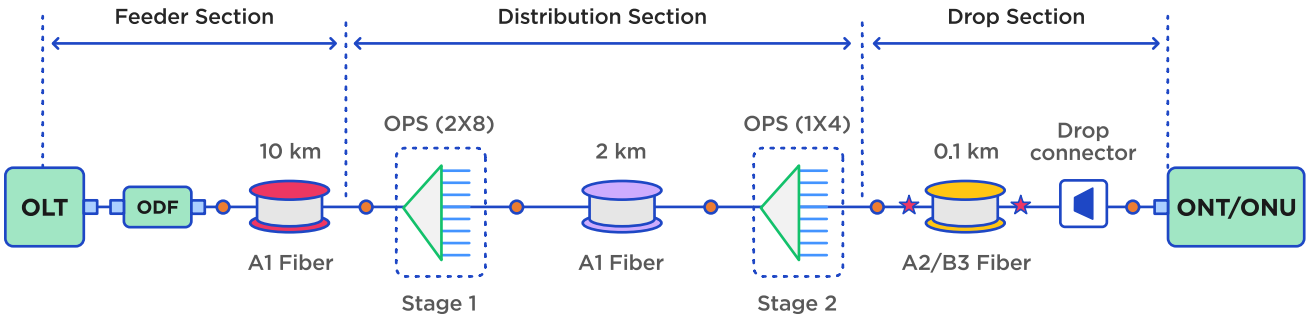
Future proof network
Due to its lower induced attenuation delivers better performance at higher wavelengths technologies like WDM-PON, 10G E PON etc

High versatility
Same fibre can be used in all parts of the networks to enhance the overall network efficiency and to optimise costs.

Making Networks Future Ready with G.657.B3 Fibre

Power Budget at Higher Wavelengths

STL performed exhaustive experiments to derive the actual impact of fibre properties on power budget estimates at higher wavelength technologies like NG-PON. The experiment tested and compared the impact of macro bend loss at different wavelengths on G.657.A2 and STL BOW LITE SUPER fibre and the subsequent improvement in network's power budget.



OLT – Optical Line Terminal

OPS – Optical Power Splitter

ONT –Optical Network Terminal

Feeder Fibre: 10 km

Distribution Dection: 2.0 km

Drop Fiber: 100 m

Splice

Connector

Extreme Macro Bend Locations

Wavelength (nm)	Macro-bend loss (dB) @15 mm bend diameter			Macro-bend loss (dB) @ 10 mm bend diameter		
	G.657.A1	G.657.A2	G.657.B3	G.657.A1	G.657.A2	G.657.B3
1260	0.038	0.003	0.005	1.415	0.036	0.038
1310	0.084	0.006	0.001	2.051	0.052	0.038
1490	**1.234**	**0.079**	**0.045**	**9.513**	**0.359**	**0.059**
1550	2.671	0.184	0.077	11.105	0.554	0.119
1580	**3.494**	**0.252**	**0.149**	**11.55**	**0.631**	**0.164**
1625	4.443	0.416	0.23	12.581	0.9	0.258

STL Bow-Lite Super has much lower macro bend loss at higher frequencies specially at GPON and NG-PON wavelengths as compared with conventional G.657.A2 and G.657.A1 optical fibres

- **6X better performance when used in the drop section of GPON Networks:** In GPON Networks threshold optical power budget is generally 25 dB. In the drop segment of the network, G.657.B3 fibre can take 58 abuse turns @10mm diameter as compared with only 10 turns in the case of G.657.A2 fibre, while staying within the threshold optical power budget limit
- **4X better performance when used in the drop section of NG-PON Networks:** In GPON Networks threshold optical power budget is generally 29 dB. In the drop segment of the network, G.657.B3 fibre can take 44 abuse turns @10mm diameter as compared with only 11 turns in the case of G.657.A2 fibre, while staying within the threshold optical power budget limit

As data transmission and network competencies evolve, optical fibre must also evolve commensurately. STL's BOW LITE SUPER fibre changes the paradigm of optical networks by combining enhanced macro bend performance with a score of functional benefits like, optimised power budgets, hardware miniaturisation and installation agility.

STL's BOW LITE SUPER delivers on all parameters and provides a springboard to leap into the next generation of carrier grade networks.

About STL - Sterlite Technologies Ltd

STL is an industry-leading integrator of digital networks.

Our fully 5G ready digital network solutions help telcos, cloud companies, citizen networks, and large enterprises deliver enhanced experiences to their customers. STL provides integrated 5G ready end-to-end solutions ranging from wired to wireless, design to deployment, and connectivity to compute. Our core capabilities lie in Optical Interconnect, Virtualised Access Solutions, Network Software, and System Integration.

We believe in harnessing technology to create a world with next generation connected experiences that transform everyday living. With a global patent portfolio of 582 to our credit, we conduct fundamental research in next-generation network applications at our Centre of Excellence. STL has a strong global presence with next-gen optical preform, fibre, cable, and interconnect subsystem manufacturing facilities in India, Italy, China, and Brazil, along with two software-development centers across India and a data centre design facility in the UK.