G.657 Fibres: Bend-insensitive single-mode fibres for access networks and customer premises

Figure 2 – Relevant specified bending radii for ITU-T G.652 and ITU-T G.657

Figure 3 – Macrobending loss limits for ITU-T G.657 fibres

For more information on optical fibre and cable Recommendation activity, please check the ITU-T Study Group 15 website at: www.itu.int/ITU-T/com15

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ITU-T
The long-time leader in optical single-mode fibre and cable standardization


Background and history:

• The roll out of fibre-to-the-home (FTTH) networks has been of global importance since the early 2000s, requiring a dedicated single-mode fibre cable Recommendation.
• Operators and manufacturers jointly worked on swift introduction of this Recommendation in 2006 and its updates in 2009 and 2012.
• Since its introduction, ITU-T G.657 optical fibre cables have seen a steady increase in the total optical fibre cable market.

Benefits:

• ITU-T G.657 optical fibre cable offers flexible characteristics for easier deployment in streets, buildings and homes.
• ITU-T G.657 optical fibre cable reduces the roll-out cost for operators and the total cost of ownership (TCO) of an FTTH network.
  o Increased flexibility in optical fibre cables, allowing improved installation in tight corners of buildings.
  o Smaller cabinets, pedestals, enclosures and terminations, which are important where space is at a premium. (e.g., in apartment buildings).
  o More engineer-friendly installation leading to less re-work.

Main aspects / attributes:

• ITU-T G.657 is split into two main parts:
  o Category A fibres for Access networks.
  o Category B fibres for short distances at the end of Access networks in bending-rich environments (e.g., buildings).
• Each category (A and B) is divided into two sub-categories:
• These sub-categories have the following minimum specified bending radii:
  o G.657.A1: 10 mm
  o G.657.A2 and G.657.B2: 7.5 mm
  o G.657.B3: 5 mm
  ➔ Compliance here means adherence to the referenced Recommendation ITU-T G.652, category D meeting or exceeding the values of the specified attributes.
  ➔ Compatibility here means that these fibres will introduce negligible system impairment or deployment issues, but may not be compliant to the referenced Recommendation ITU-T G.652.D.

Additionally, another favoured application is in central offices where ITU-T G.657 fibres mitigate the risk of communication failure and/or high power damage under inadvertent bending. Care needs to be taken to not impact long-term reliability. Examples of the relationship between minimum bend radius and maximum power can be found in IEC TR62547.